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FINAL PHASE I RFI/RI REPORT WOMAN CREEK PRIORITY DRAINAGE, OPERABLE UNIT 5

RMRS Rocky Mountain Remediation Services, LLC
...protecting the environment

VOLUME 5

APPENDICES N AND O
TEXT, FIGURES, AND TABLES

Environmental Restoration
Rocky Flats Environmental Technology Site

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Appendix N

Ecological Risk Assessment for Woman Creek and Walnut Creek Watersheds at the Rocky Flats Environmental Technology Site

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ABBREVIATIONS, ACRONYMS, AND INITIALISMS

95% UCL	95 percent upper confidence limit
AQUIRE	Aquatic Information Retrieval
AWQC	ambient water quality criteria
BCF	bioconcentration factor
BDL	below detection limit
BSF	bioconcentration sediment factor
BTAG	Biological Technical Assistance Group
bw	body weight
CDPHE	Colorado Department of Public Health and Environment
CEC	cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemical of concern
CRDL	contract-required detection limit
CWQCC	Colorado Water Quality Control Commission
DBP	di-n-butyl phthalate
DOE	U.S. Department of Energy
DQO	data quality objective
EcMP	Ecological Monitoring Program
ECOC	ecological chemical of concern
ECOCTM	ecological chemical of concern TM
EEC	environmental effects criteria
EMD	Environmental Management Department
EPA	U.S. Environmental Protection Agency
EPM	exposure pathway model
EqP	equilibrium partitioning
ERA	ecological risk assessment
ERAM	ecological risk assessment methodology
GRRASP	General Radiochemistry and Routine Analytical Services Protocol
ha	hectares
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
IA	industrial area
IAEA	International Atomic Energy Agency
IAG	Interagency Agreement
IDL	instrument detection limit
IHSS	individual hazardous substance site
IRIS	Integrated Risk Information System
ISQC	interim sediment quality criteria
ITS	interceptor trench system
LOAEL	lowest observed adverse effect level
m	meter
mg/L	milligrams per liter
MCL	maximum contaminant level
MCLG	maximum contaminant level goal

MDL	method detection limit
mrad/day	millirad per day
mph	miles per hour
NCP	National Contingency Plan
NOAEL	no observed adverse effects level
ORNL	Oak Ridge National Laboratory
OU	operable unit
PA	protected area
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCOC	potential chemical of concern
PD	percent dissimilarity
pdf	probability density function
PMJM	Preble's Meadow Jumping Mouse
PU&D	property utilization and disposal
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RfC	reference concentration
RFEDS	Rocky Flats Environmental Database System
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA facility investigation/remedial investigation
RI/FS	remedial investigation/feasibility study
SCM	sitewide conceptual model
SCMTM	sitewide conceptual model TM
SDWA	Safe Drinking Water Act
SID	south interceptor ditch
SQB	sediment quality benchmark
SUF	site use factor
SVOC	semivolatile organic compound
TA	terrestrial arthropod
TAL	target analyte list
TEF	toxicity equivalency factor
TIC	tentatively identified compound
TM	technical memoranda
TRV	toxicity reference value
TV	tolerance value
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WQS	water quality standard

EXECUTIVE SUMMARY

The Rocky Flats Environmental Technology Site (RFETS) is a former nuclear weapons fabrication facility operated by the U.S. Department of Energy (DOE), located in the Front Range of Colorado near Denver. Site activities were concentrated in an industrial area surrounded by a buffer zone of relatively undisturbed grassland that is drained by three watersheds: Walnut Creek, Woman Creek, and Rock Creek. Areas of concern associated with chemical contamination from site activities were grouped into operable units (OUs) based on the nature of the suspected contamination; each OU may have numerous individual hazardous substance sites (IHSSs). Industrial activities and IHSSs are located in the Walnut Creek and Woman Creek watersheds and may represent a potential source of contamination to downstream ecosystems. No IHSSs are located in the Rock Creek watershed.

This report presents the results of ecological risk assessments (ERAs) conducted for the Walnut Creek and Woman Creek watersheds. The ERAs represent the ecological portions of the baseline risk assessments associated with the RCRA Facility Investigation/Remedial Investigations (RFI/RIs) for OUs 1, 2, 4 (in part), 5, 6, 7, 10 (in part), and 11. The combined ERA was conducted based on recent agreements among the U.S. Environmental Protection Agency (EPA), Colorado Department of Public Health and Environment (CDPHE), and the DOE. ERAs were formerly planned for each OU, and preliminary field investigations were conducted on that basis. The agencies agreed that it is ecologically more appropriate to conduct the ERAs for each watershed, because this scale is more relevant to ecological receptors that are not constrained by administrative boundaries associated with the OUs.

The ecological risk assessment methodology (ERAM) for RFETS was developed to support risk management decisions for individual OUs. The approach used is consistent with a screening-level risk assessment appropriate for sites where ecological effects have not been observed, but contaminant levels have been measured and can be compared with concentrations considered protective of ecological receptors. The RFETS ERAM draws from DOE and EPA guidance and ERA tools developed at Oak Ridge National Laboratory (ORNL) and the Savannah River Site (DOE 1993a, 1993b; EPA 1992a, 1994; Norton *et al.* 1992; Opresko *et al.* 1994). The watershed ERAs include three phases identified in EPA guidance: (1) preliminary risk calculations and problem formulation, (2) analysis, and (3) risk characterization.

Although the EPA (1992a, 1994) identifies three main categories of environmental stressors (physical, chemical, and biological), chemical stressors are usually of greatest concern for ERAs conducted as part of the Comprehensive Environmental Remediation, Compensation, and Liability Act (CERCLA) investigations (EPA 1994). OSWER Directive 9285.2-17 states that the overall objectives of baseline ERAs for CERCLA are to: (1) identify and characterize the current and potential threats to the environment from a hazardous substance release, and (2) establish cleanup levels that will protect natural resources.

As noted above, preliminary field investigations were performed for each OU prior to the integration of ERAs into watersheds. However, Interagency Agreement schedules for individual RFI/RIs did not allow evaluation of contaminant distribution prior to ecological field investigations. Therefore, in most cases, collection of data on specific effects of individual contaminants was not possible. As a result, the watershed ERAs focused primarily on the estimation of exposure from available data on contaminant distribution in abiotic and biotic media. A large and comprehensive database was available for evaluating contaminant distribution in abiotic media. Biological tissue samples from each OU were analyzed for metals and radionuclides, and these data were used to document exposures.

The primary focus of the ERA was assessment of the potential toxicity of exposures to potential chemicals of concern (PCOCs). PCOCs are environmental contaminants identified as a result of sampling and analysis for each RFI/RI. This information was then used to identify chemicals for which exposure analysis was conducted. The analysis was conducted in two phases: (1) a preliminary risk screen was performed for more than 150 PCOCs to identify the PCOCs that were present at potentially ecotoxic concentrations (Section N3), and (2) screening-level assumptions were adopted to minimize the chance of underestimating risk from a given PCOC. The result of the preliminary risk screen was a list of chemicals, ecological chemicals of concern (ECOCs), for which potential risk was identified.

The potential risk from exposure to ECOCs was further characterized for key receptor groups. The approach and methods for risk characterization were described in a problem formulation step (Section N4) designed to be consistent with EPA guidance on conducting ERAs (EPA 1994). However, in contrast to the EPA guidance, risk characterization was performed using existing data and toxicity information.

Risk characterization was largely conducted without the benefit of sampling and analysis specifically designed to evaluate the effects of ECOCs. However, data were available on concentrations of metals, radionuclides, and certain organic chemicals (pesticides and PCBs) in aquatic and terrestrial biota in each OU. These data were reliable indicators of exposure and collected to evaluate exposure of upper level consumers to chemicals accumulated in forage or prey (Suter 1993). Risks are summarized by watershed, receptor group, ECOC, and ERA source areas in the following subsections and in Tables ES-1 and ES-2.

Executive Summary Table 1
Summary of Ecological Risks for Walnut Creek Watershed

Receptor Group	ECOCs	ERA Source Area	Media/Exposure Point	Conclusions
Wide-Ranging Wildlife	None	Not Applicable	Not Applicable	The Tier 3 ECOC screen did not identify ECOCs.
Aquatic Life	Metals and Organics in Sediments	OU6 A-Ponds OU6 B-Ponds	Sediments	Risks are primarily due to PAHs in sediments. However, no toxicity was detected in sediment toxicity tests with *Hyalella azteca*. Importance of sediment contamination is unclear but does not appear to be the to be the primary factor controlling benthic community structure.
Aquatic-Feeding Birds	Aroclor-1254	OU6 A-Ponds OU6 B-Ponds	Pond Sediments	Aroclor-1254 concentrations in sediment exceeded risk-based criteria for ponds B-1, B-2, and B-3 only if top aquatic predators were present. Ponds currently do not support this type of community but could if pond management changed.
	Mercury	OU6 A-Ponds OU6 B-Ponds	Fish Tissue	Mercury was detected in 75% of fish from B-ponds. However, the maximum concentration was detected in B-5, which has the lowest contaminant content. The maximum HQ was 2. Mercury does not appear to represent risk to herons.
	Di-N-butyl phthalate	OU6 A-Ponds OU6 B-Ponds	Sediments	All samples with detectable DBP concentrations were "J" qualified. Only one sample corresponds to an HQ of 2; all other HQs are ≤ 1. DBP does not appear to represent risk to herons or mallards.
Terrestrial-Feeding Raptors	Chromium	OU2 903 Pad OU2 East Trenches	Terrestrial Arthropods	Mean chromium concentration in soils was not greater than the background mean. No clear contaminant source exists. Chromium is not a risk to the kestrel population at RFETS.
	Chromium, Lead	OU4 Downgradient OU6 A-Ponds OU6 B-Ponds	Small Mammals	Chromium and lead were elevated in small mammals from pond areas. The source is unclear because soils and sediments contain low levels. Risks are possible to individual birds feeding in the area, but effects to RFETS population are minimal.
	Mercury, Vanadium	OU4 Downgradient OU6 A-Ponds OU6 B-Ponds	Small Mammals	Mercury and vanadium were detected at low frequency and some concentrations were "J" qualified. Risks appear to be minimal.
Small Mammals	Plutonium-239/240 Americium-241	OU2 903 Pad OU2 East Trenches	Soil	Radionuclides do not present significant risk to terrestrial receptors. Maximum tissue concentrations do not result in dose rates that exceed the TRV (0.1 rad/day).
	Barium	OU6 North Spray Field	Vegetation	The barium HQ of 1.05 indicates that exposures are very close to the NOAEL. Risks to small mammal populations are negligible. Some individual jumping mice might be exposed, but adverse effects would be minimal.
	Selenium	OU7 Downgradient	Vegetation	Selenium exposure exists in a small area but includes habitat for jumping mouse. The source of selenium is not clear. Levels in vegetation were twice that of background. Possible adverse effects to individuals exist, but population effects were negligible due to the small area.
Vegetation	Metals and Organics	Most Source Areas	Soils, Sediments	Nitrates in OU7 and OU4, and silver in B-ponds have the highest risk estimates. However, ecological risk is unclear because vegetation in these areas does not appear stressed.

Executive Summary Table 2
Summary of Ecological Risks for Woman Creek Watershed

Receptor Group	ECOCs	ERA Source Area	Media/Exposure Point	Conclusions
Wide-Ranging Wildlife	None	Not Applicable	Not Applicable	The Tier 3 ECOC screen did not identify ECOCs .
Aquatic Life	Metals and organics in sediments	OU2 903 Pad OU5 C-Ponds OU5 Old Landfill	Sediments	Risks are primarily due to PAHs in sediments. However, no toxicity was detected in sediment toxicity tests with *Hyalella azteca.* The importance of sediment contamination is unclear but does not appear to be the primary factor controlling benthic community structure.
Aquatic-Feeding Birds	Aroclor-1254	OU5 C-Ponds	Sediments of SID	Aroclor-1254 concentrations in sediment did not exceed risk-based criteria developed for sediment at RFETS.
	Mercury	OU5 Old Landfill OU5 C-Ponds	Fish Tissue	Mercury was detected in 2 of 24 fish from C-ponds. Mercury was not detected in other fish. Risks are significant only if birds obtain all food from C-1.
	Antimony	OU5 Old Landfill	Sediments	The screening estimate assumes 100% site use. Actual use is much less because the stream supports a small fish population. Risks were not significant when adjusted for realistic site use factor.
Terrestrial-Feeding Raptors	Chromium	OU2 903 Pad OU2 East Trenches	Terrestrial Arthropods	The mean chromium concentration in soils was not greater than background mean. No clear contaminant source exists. Chromium was not a risk to the kestrel population at RFETS.
Small Mammals	Plutonium-239/240 Americium-241	OU2 903 Pad OU2 East Trenches	Soils	Radionuclides do not present significant risk to terrestrial receptors. Maximum tissue concentrations do not result in dose rates that exceed TRVs (0.1 rad/day).
	Uranium-233/234 Uranium-238	OU5 Old Landfill	Soils	See text for plutonium and americium conclusions.
Vegetation	Metals	Most Source Areas	Soils, Sediments	Soils of Ash Pits contained several metals with HQs >1. The highest HQ (7.9) was for chromium. Ecological risk to vegetation communities is minimal because each of the Ash Pits involves relatively small areas.
				Sediments of C-ponds contain mercury at concentrations that exceed TRVs for wetland vegetation. However, growth of vegetation in littoral zone appears normal.

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N1. OVERVIEW OF ECOLOGICAL RISK ASSESSMENTS AT THE ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

The Rocky Flats Environmental Technology Site (RFETS) is a former nuclear weapons fabrication facility operated by the U.S. Department of Energy (DOE), located in the Front Range of Colorado near Denver (Figure N1-1). Site activities were concentrated in an industrial area surrounded by a buffer zone of relatively undisturbed grassland that is drained by three watersheds: Walnut Creek, Woman Creek, and Rock Creek (Figure N1-2). Areas of concern associated with chemical contamination from site activities were grouped into operable units (OUs) based on the nature of the suspected contamination (Figure N1-2). Each OU may have numerous individual hazardous substance sites (IHSSs). Industrial activities and IHSSs are located in the Walnut Creek and Woman Creek watersheds and may represent a potential source of contamination to downstream ecosystems (Figure N1-3). No IHSSs are located in the Rock Creek watershed.

This report presents the results of ecological risk assessments (ERAs) conducted for the Walnut Creek and Woman Creek watersheds. The ERAs represent the ecological portions of the baseline risk assessments associated with the RCRA Facility Investigation/Remedial Investigations (RFI/RIs) for OUs 1, 2, 4 (in part), 5, 6, 7, 10 (in part), and 11. The combined ERA was conducted based on recent agreements among the U.S. Environmental Protection Agency (EPA), Colorado Department of Public Health and Environment (CDPHE), and DOE. ERAs were formerly planned for each OU and preliminary field investigations were conducted on that basis.

The agencies agreed that it is ecologically more appropriate to conduct the ERAs for each watershed, because this scale is more relevant to ecological receptors that are not constrained by administrative boundaries associated with the OUs. ERAs are now required for four areas: (1) the industrial area/protected area (IA/PA); (2) the Walnut Creek watershed; (3) the Woman Creek watershed; and (4) offsite areas including Great Western Reservoir, Standley Lake, and Mower Reservoir.

N1.1 REGULATORY COMPLIANCE OBJECTIVES

An ERA is required to support the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Record of Decision or the Resource Conservation and Recovery Act (RCRA) Corrective Action Decision for any of the OUs within these areas.
Sections within CERCLA include statements that both human health and the environment must be considered when assessing risks associated with releases from hazardous waste sites. Also, the National Contingency Plan (NCP) specifically states that an environmental evaluation must be performed to assess threats to the environment (40 CFR Part 300.430 [e][2][i][G]) during the overall process of assessing the need to remediate a hazardous waste site. The Interagency Agreement (IAG) among DOE, EPA, and CDPHE states that one objective of the RFI/RI is to provide data to establish the baseline risk assessment for human health and the environment for the OU. The methodology used here evaluates the likelihood that adverse ecological effects are occurring or may occur as a result of exposure to one or more chemical stressors (EPA 1992a).

Risk managers at Superfund sites such as RFETS make decisions about the need for, and level of, remediation of contaminated sites based on the results of both human health risk assessments (HHRAs) and ERAs. This appendix presents the results of the ERAs for the Walnut Creek and Woman Creek watersheds and includes risks from exposure to contaminated environmental media, including water, sediments, soils, and biological tissues.

N1.2 ERA APPROACH

The ecological risk assessment methodology (ERAM) for RFETS was developed to support risk management decisions for individual OUs. The approach used is consistent with a screening-level risk assessment appropriate for sites where ecological effects have not been observed, but contaminant levels have been measured and can be compared with concentrations considered protective of ecological receptors. The RFETS ERAM draws from DOE and EPA guidance and ERA tools developed at Oak Ridge National Laboratory (ORNL) and the Savannah River Site (DOE 1993a, 1993b; EPA 1992a, 1994; Norton *et al.* 1992; Opresko *et al.* 1994).

Although EPA (1992a, 1994) identifies three main categories of environmental stressors (physical, chemical, and biological), chemical stressors are usually of greatest concern for ERAs conducted as part of CERCLA investigations (EPA 1994). OSWER Directive 9285.2-17 states that the overall objectives of baseline ERAs for CERCLA are (1) to identify and characterize the current and potential threats to the environment from a hazardous substance release and (2) establish cleanup levels that will protect natural resources.

As noted above, preliminary field investigations were performed for each OU prior to the integration of ERAs into watersheds. However, IAG schedules for individual RFI/RIs did not allow evaluation of contaminant distribution prior to ecological field investigations. Therefore, in most cases collection of data on specific effects of individual contaminants was not possible. As a result, the watershed ERAs focused primarily on estimation of exposure from available data on contaminant distribution in abiotic and biotic media. A large and comprehensive database was available for evaluating contaminant distribution in abiotic media. Biological tissue samples from each OU were analyzed for metals and radionuclides and these data were used to document exposures.

N1.3 SITEWIDE ERA METHODOLOGY

To complete the four RFETS ERAs, DOE is following recent EPA guidance (EPA 1992a, 1994). Each ERA was performed in three major phases: (1) problem formulation, (2) analysis, and (3) risk characterization.

Problem formulation is the process that establishes the specific goals and focus of the ERA. It consists of (1) developing a conceptual model of contaminant sources, release mechanisms, transport mechanisms, receptors, exposure points, and habitat types; (2) identifying ecological chemicals of concern (ECOCs); and (3) identifying the environmental or assessment endpoints to be protected. In the analysis phase, field studies are conducted as designed in the problem formulation, environmental exposure is assessed using these data, and measured or modeled effects are characterized. The exposure assessment describes the magnitude and spatial and temporal patterns of exposure to ecological receptors.

Risk characterization integrates the exposure assessment and the effects assessment. It includes a description of risk in terms of the assessment endpoints, a discussion of the ecological significance of the effects, a summary of the overall confidence in the ERA, and a discussion of possible risk management strategies.

N1.3.1 Documentation of the ERA

The ERAM includes two technical memoranda (TMs) that summarize the general approach and methods used in ERAs at RFETS. A summary of the TMs is presented in the following subsections.

N1.3.2 Sitewide Conceptual Model TM (SCMTM)

An important component of the ERA process is the establishment of the relationship between the key components of the RFETS ecosystem (DOE 1995a). The following information was included in the SCMTM:

- Descriptions of the key ecological features of RFETS, including vegetation, wildlife, aquatic organisms, and protected species
- Summaries of existing sitewide monitoring programs
- RFETS exposure-pathway models that describe the contaminant transport and exposure mechanisms important in evaluating exposure of ecological receptors to the chemical stressors at RFETS
- Selection criteria for the identification of key ecological receptors
- General exposure parameters for key receptor species

N1.3.3 Ecological COCs Screening Methodology TM (ECOCTM)

The objective of the ECOCTM, the ECOC screening methodology, was to describe the process by which ECOCs are identified (DOE 1995b). The selection process requires that judgments be made about the appropriate level of protectiveness for the ecological receptors at RFETS. Application of the screening process results in a list of ECOCs, which are the focus of subsequent detailed exposure and effects analysis and risk characterization.

The RFETS ecological screening methodology used a phased approach with increasingly detailed analyses conducted in three tiers. Tier 1 consisted of identifying chemicals detected within each source area that were above background concentrations. This was done using a statistical methodology developed specifically for RFETS. The aggregation of data by contaminant source area required the establishment of a sitewide database so data could be aggregated regardless of OU boundaries. Prior to this effort, all data were segregated by OU. The result of Tier 1 was a list of PCOCs that was further screened in Tier 2 and Tier 3 using ecotoxicity criteria. Tier 2 and Tier 3 screens each required estimates of exposure for the key ecological receptors at RFETS. Methods used in Tiers 1, 2, and 3 are explained in detail in Section N3.

The SCMTM (DOE 1995a) and the ECOCTM (DOE 1995b) provide the foundation of the ERA technical program. The ERA for watersheds was conducted using the information and the methods described in these two documents.

N1.4 RISK SCREEN AND CHARACTERIZATION

The screening-level risk assessment method developed for RFETS requires the comparison of site analytical data to screening-level ecotoxicological benchmarks to determine which PCOCs are present at potentially toxic levels and should be considered as ECOCs for ERAs. More than 150 potential chemicals of concern (PCOCs) including metals, organic compounds, and radionuclides were identified as a result of the RFI/RIs.

Ecotoxicological benchmarks were developed for each of the PCOCs and compared to concentrations detected in environmental media. Assistance in identifying benchmarks was solicited from other

sites in the DOE complex and associated academic institutions. Site-specific ecotoxicological benchmarks were derived using methods developed at Oak Ridge National Laboratories (ORNL) (Opresko *et al.* 1994). Toxicologists from Clemson University and radioecologists from Oregon State University and Argonne National Laboratory conducted extensive literature searches for the remaining PCOCs and developed preliminary benchmarks. Life history information on representative species found at RFETS was obtained from EPA (1993) or scientific literature and documented by DOE (1995a).

Although cumulative risks from all defined contaminant source areas within a watershed can be estimated, this assessment is not comprehensive. The ecological risk associated with potential future effects of contaminated groundwater, should it emerge to surface water, is not evaluated in this ERA, but is deferred to a separate evaluation of sitewide groundwater. The ecological risks associated with sources in the IA OUs will also be evaluated in a separate assessment. Results of this assessment, however, can be used by risk managers to make decisions on whether or current ecological risks influence cleanup of the IHSSs within the OUs listed above.

N1.5 SECTION ORGANIZATION

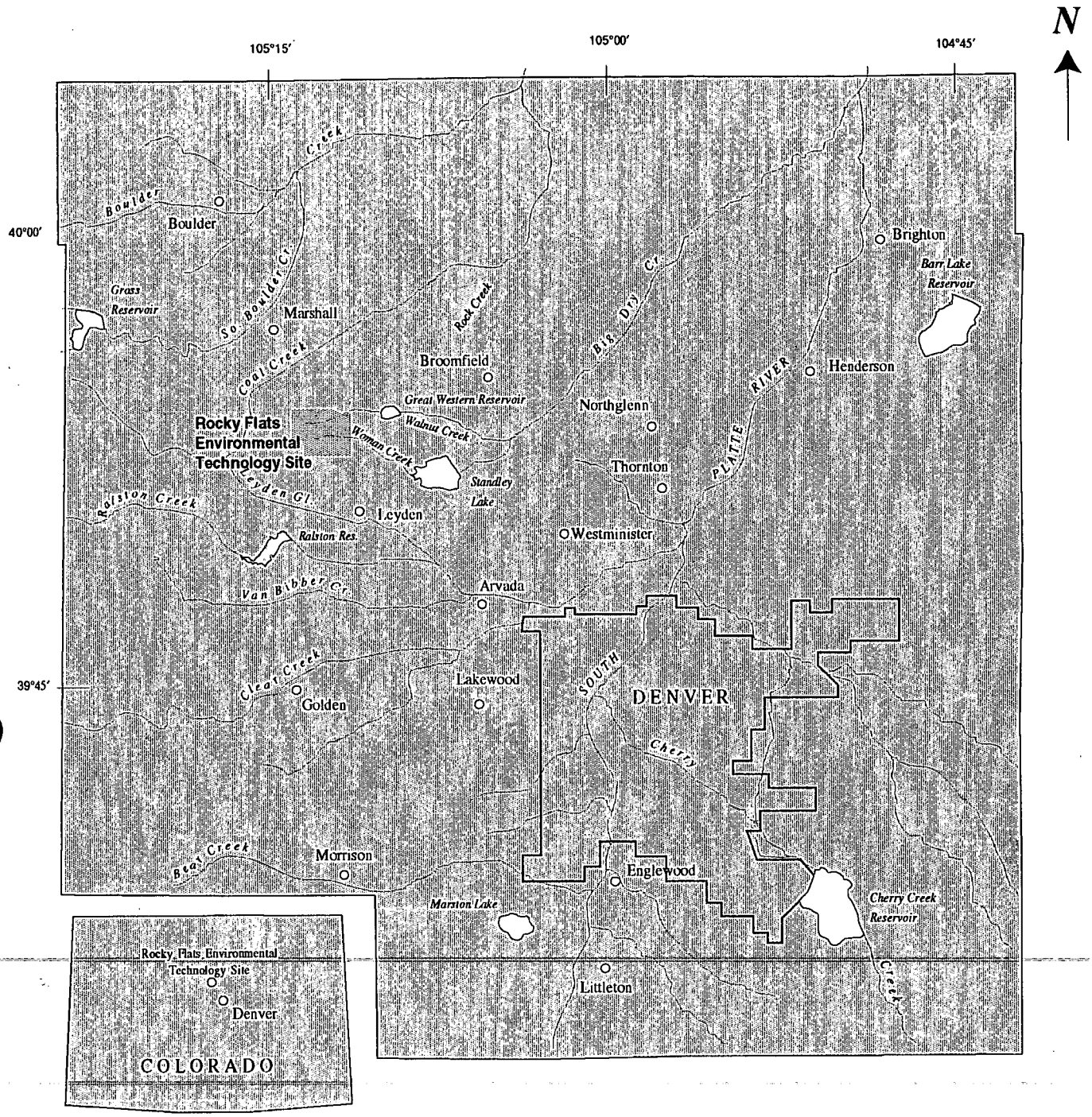
This ERA report for the two watersheds consists of a summary of the field investigation results, the analysis phase, and the risk characterization phase. To save time and limit funds, this ERA also includes documentation of the problem formulation.

- Section N2 provides a description of the site and the conceptual model used to evaluate risks of exposure to ecological receptors at RFETS. The physical and ecological setting of the site is described in Section N2.1, the distribution of contaminants at the site is summarized in Section N2.2, and areas potentially affected by site contaminants are described in Section N2.3. The conceptual model presented in Section N2.4 identifies contaminant sources, release mechanisms, transport pathways, exposure routes, abiotic and biotic exposure points, and ecological receptors present at RFETS.

- Section N3 provides the preliminary exposure and risk calculation. Approach and methods are described in N3.1, and results are summarized in Section N3.3. The preliminary risk screen resulted in a large amount of data which, for practical reasons, are presented in Attachments 5 and 6.

- Section N4 describes the problem formulation based on results of the ECOC screen presented in Section N3. Assessment endpoints and specific objectives were developed for evaluating risk to six classes of ecological receptors. In addition, a separate analysis of potential radionuclide effects is provided.

- Section N5 presents specific methods and results of the risk characterization. Conclusions are presented in Section N6.



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U.S. DEPARTMENT OF ENERGY
Rocky Flats Environmental Technology Site
Golden, Colorado

ERAs for Woman Creek and Walnut Creek Watersheds at RFETS

Location of Rocky Flats Environmental Technology Site

September 1995	Figure N1-1

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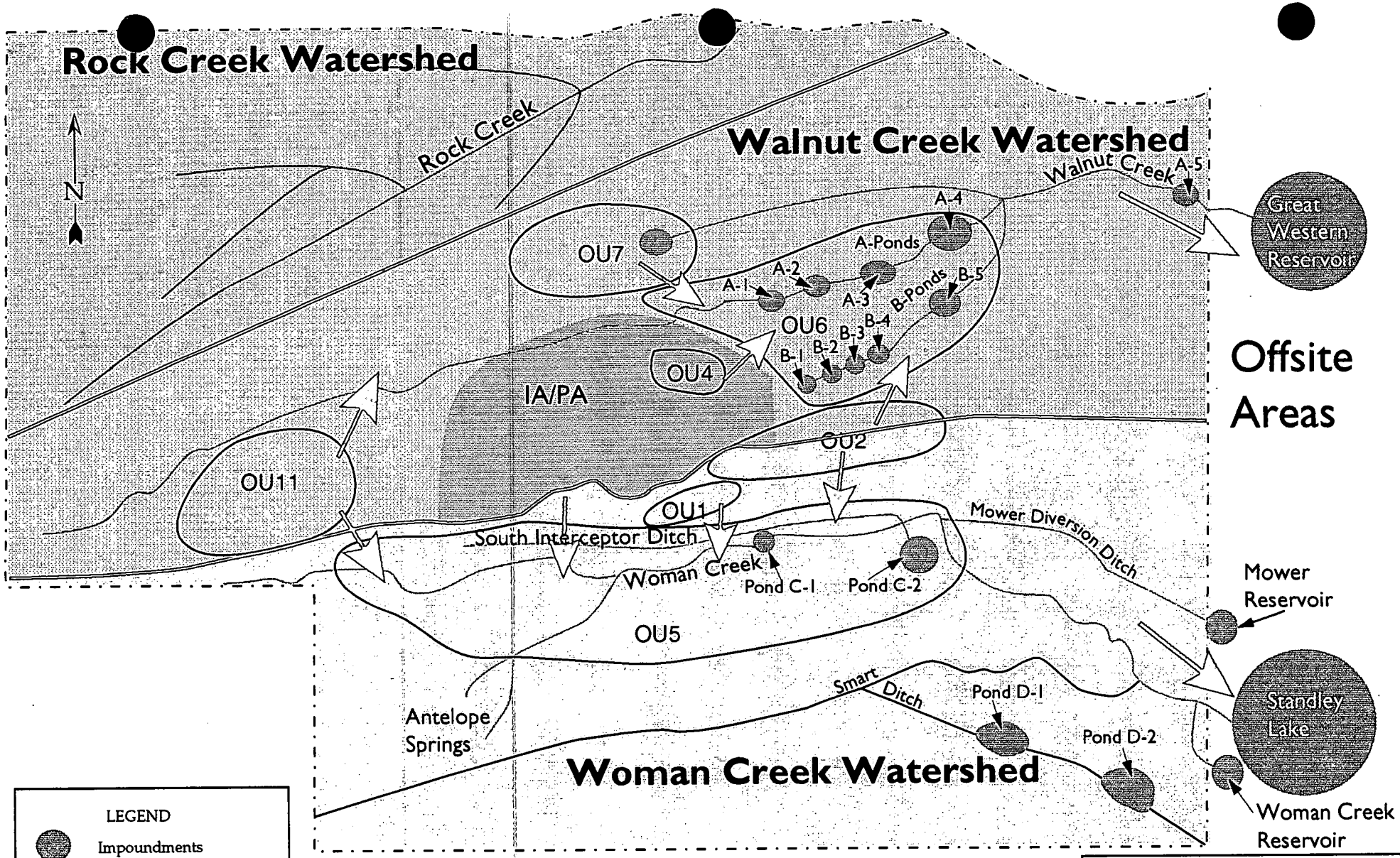

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Golden, Colorado

ERAs for Woman Creek and Walnut Creek Watersheds at RFETS

Relationship Between Watersheds, Operable Units, and Contaminant Movement

September 1995 | Figure N1-3

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N2. SITE DESCRIPTION AND CONCEPTUAL MODEL

This section provides a general site description of RFETS, summarizes the distribution of environmental contaminants, and describes the potential pathways by which ecological receptors may be exposed to site contaminants. Physical and ecological characteristics, including protected species, are presented, followed by a general description of the distribution of contaminants and the areas they potentially affect. The conceptual model summarizes abiotic and biotic exposure points, exposure pathways, and ecological receptors used in the risk assessment.

N2.1 PHYSICAL AND ECOLOGICAL SETTING

This section summarizes information on the physical and ecological characteristics at RFETS that has been presented in greater detail in other documents. An overview of site climate, geology/soils, and groundwater is provided in Sections N2.1.1 through N2.1.3. Descriptions of surface hydrology/topography and ecology are provided in Sections N2.1.4 and N2.1.5 for each of the three main watersheds at RFETS.

N2.1.1 Climate

The climate at RFETS is highly continental and semi-arid. Mean annual precipitation is approximately 18 in., based on 20-year means for Boulder and Lakewood, Colorado (NOAA 1994). Temperatures in the RFETS region exhibit large diurnal and annual ranges but are generally moderate. Average minimum and maximum temperatures, based on 20-year means for Boulder and Lakewood, Colorado, are approximately 19°F and 42°F in January and 59°F and 88°F in July (NOAA 1994).

The RFETS is noted for its strong northwesterly winds, although wind speeds under 15 miles per hour (mph) represent the average conditions. The windstorm season at RFETS extends from late November into April; the strongest winds usually occur in January. Commonly recorded wind speeds at the site exceed 75 mph; gusts exceeding 100 mph are experienced every three to four years.

N2.1.2 Geology and Soils

RFETS is located on the western margin of the Colorado Piedmont section of the Great Plains Physiographic Province (Thornbury 1965; Hunt 1967). The Colorado Piedmont is an area of dissected topography reflecting folding and faulting of bedrock along the edge of the Front Range uplift, subsequent fluvial processes, and more recent incision of drainages and removal of portions of the alluvial cap. RFETS occupies the eastern edge of the Rocky Flats pediment.

N2.1.2.1 Surficial Geology

Surficial deposits at RFETS range in thickness from 0 to more than 100 ft and include artificial fill and colluvial, landslide, and alluvial deposits. Figure N2-1 illustrates the lateral distribution of these deposits across the site. Areas where artificial fills are present include road and railroad embankments, earthen dams, landfills, and spoil piles along some of the irrigation ditches. Colluvial deposits cover the steep slopes in the incised stream drainages. Alluvial deposits occur in flood plains, stream channels, and terraces along the drainages across RFETS. Characteristics of surficial deposits are thoroughly described in USGS (1994) and EG&G (1995a).

N2.1.2.2 Bedrock Geology

The Rocky Flats Alluvium is unconformably underlain by (from youngest to oldest) the Arapahoe Formation, Laramie Formation, Fox Hills Sandstone, and Pierre Shale, all deposited during the Late Cretaceous. The Arapahoe Formation is 0 to 50-ft thick beneath RFETS and consists of fluvial claystone and silty claystone interbedded with discontinuous fluvial sandstone units. The underlying Laramie Formation, which is 600 to 800-ft thick at the site, represents a deltaic environment. The Fox Hills Sandstone comprises 90 to 140 ft of friable, fine-grained sandstone with interbedded sandy shales characteristic of near-shore marine deposits. The basal unit of the Fox Hills Sandstone interfingers with the Pierre Shale, which consists of approximately 8,000 ft of marine deposits. The Geologic Characterization Report (EG&G 1995a) contains a complete description of the bedrock geology of RFETS.

N2.1.2.3 Soils

As is typical throughout the region, soils at RFETS are strongly influenced by the deposits on which they have formed. In general, soil textures at RFETS are predominantly loamy with varying amounts of clay, sand, gravel, and cobbles. The lateral distribution of soils across the site is illustrated in Figure N2-2. The most laterally extensive soils at the site are cobbly and gravelly soils of the Flatirons mapping unit. These deep, well-drained soils occupy pediment surfaces, high terraces, and upper hillsides and are formed in stony to gravelly and loamy material of the Rocky Flats Alluvium (Price and Amen 1983). Denver-Katch-Midway clay loams are the second-most abundant soils at the site. Many of the soils are represented, especially in the eastern one-third of RFETS. Surface soil nutrient content and physical parameters such as texture and moisture holding capacity are described in the Ecological Monitoring Program (EcMP) 1995 Annual Report (DOE 1995c).

N2.1.3 Groundwater

Groundwater at RFETS occurs in Quaternary surficial materials (Rocky Flats Alluvium, colluvium, and valley-fill alluvium) and in underlying Cretaceous sedimentary bedrock (claystones, siltstones, sandstones). Groundwater present in surficial materials and the upper weathered section of bedrock units is generally under unconfined conditions. Groundwater present in bedrock aquifers beneath the upper weathered section may be under either confined or unconfined conditions. The Hydrogeologic Characterization Report (EG&G 1995b) contains a complete description of the hydrogeology of the geologic units underlying the site.

N2.1.4 Surface Hydrology

Three intermittent or ephemeral streams drain RFETS: (1) Rock Creek, (2) Walnut Creek, and (3) Woman Creek (Figures N1-2 and N1-3). Rock Creek drains the northern portion of RFETS and flows northeastward toward its confluence with Coal Creek. Rock Creek is located outside the historic influence of RFETS activities and is considered to be unaffected by the facility. Walnut Creek and Woman Creek flow eastward across the central and southern portions of the site, respectively. Because part of the Walnut Creek and Woman Creek watersheds have historically been influenced by production and waste disposal activities at RFETS, they represent potential pathways for transport of contaminants and exposure to onsite and offsite receptors. Water flow in the Walnut

Creek and Woman Creek watersheds has been historically managed for irrigation and offsite water storage and more recently for RFETS-related water and sediment management. Flow has often been diverted within and among drainages to alter natural flow patterns.

N2.1.4.1 Walnut Creek

Walnut Creek, which drains most of the industrial area, has three major branches: (1) South Walnut Creek, (2) North Walnut Creek, and (3) an unnamed tributary locally referred to as No Name Gulch (Figure N2-3). Walnut Creek currently terminates in the Broomfield Diversion Canal; the creek previously flowed into Great Western Reservoir approximately 1 mile east of the site. The stream is typically dry during much of the late summer, fall, and winter, especially in segments east of the site (EG&G 1993a, 1994a).

The topography and hydrology of Walnut Creek vary considerably throughout the watershed. The western portion of the basin has low relief, a gradient of approximately 2 percent, and high infiltration rates. The central portion of the basin has well-developed channels with sideslopes of up to 20 percent, a gradient of 4 percent, and finer soils. The eastern portion of the basin is characterized by the return to a lower gradient (2 percent), broad valley floors with shallow sideslopes of about 5 percent, and low to moderate infiltration rates.

The three branches of Walnut Creek have been greatly modified by diversion, channelization, construction of detention ponds, and placement of fill material. Four detention ponds have been constructed on North Walnut Creek (A-ponds), and five have been constructed on South Walnut Creek (B-ponds) as part of the runoff control and pollution prevention programs at RFETS. Although the ponds lie along the drainages, water does not sequentially flow from each pond to the next downstream. Flow has been diverted within the pond series to provide flood control and sediment retention for the site (DOE 1995a). Water is released from the terminal ponds (Pond A-4 and Pond B-5) as needed to manage water levels. As a result, regular flow does not occur in the northern and southern branches. The No Name Gulch drainage contains the East Landfill Pond. Flow in this ephemeral tributary is highly dependent on local runoff and groundwater recharge. No regular flow from the East Landfill Pond currently exists.

N2.1.4.2 Woman Creek

This east-flowing stream system drains the southern portion of RFETS and extends eastward to Standley Lake. The western portion of Woman Creek is characterized by shallow or indistinct channels, a low gradient, and high infiltration rates. The central portion is more incised and has both steeper gradients and steeper sideslopes. The eastern portion occupies a broad, gently sloping valley. Soils in the central and eastern reaches of the basin have low infiltration rates. As with Walnut Creek, flows are typically highest in the spring, and much of the stream channel is dry during late summer, fall, and winter.

Currently, Woman Creek is diverted via the Mower Ditch into Mower Reservoir east of Indiana Street. Water that is not collected in Mower Ditch, or that overflows the diversion, drains back into Woman Creek (Figures N1-3 and N2-4). Two detention ponds (Pond C-1 and Pond C-2) have been constructed within the historic Woman Creek watershed. Pond C-1 is fed directly by the mainstream of Woman Creek. Woman Creek is diverted around Pond C-2 and feeds both Mower Ditch and lower sections of Woman Creek. At present, the main source of water in Pond C-2 is the south interceptor ditch (SID), which intercepts runoff from the industrial complex. The SCMTM (DOE 1995a) contains a more complete description of water flow in the C-ponds.

The drainage to the south of Woman Creek, known as Smart Ditch, historically was an ephemeral tributary that joined Woman Creek just west of Indiana Street. Smart Ditch flows through Pond D-1 and Pond D-2, which are not part of the main drainage, RFETS runoff control, or pollution prevention system. Therefore, Smart Ditch is not part of Woman Creek for evaluation in the watershed ERA. Pond D-1 and Pond D-2 may be used as potential reference ponds for evaluation of the effects of contaminants versus the influence of pond management on measurement endpoints.

N2.1.5 Ecological Setting

RFETS is located just below the elevation at which plains grasslands grade abruptly into lower montane (foothills) forests. The topographic diversity, and associated differences in substrate and microclimate, found in this transition zone are reflected in a mosaic of plant and animal communities.

A complete list of vegetation, mammals, birds, reptiles, and fish occurring onsite can be found in Environmental Management Department (EMD) Operating Procedures 5-21200-OPS-EE (EG&G 1994b). A more quantitative description of many of the habitats can be found in the Ecological Monitoring Program (EcMP) 1995 Annual Report (DOE 1995c). The following sections summarize the terrestrial and aquatic communities found within the three main watersheds, which are described in greater detail in the SCMTM (DOE 1995a).

N2.1.5.1 Vegetation

The present vegetation at the site is dominated by a mixed prairie ecosystem, with riparian and wetland communities occurring along some drainages, ponds, and seeps. Some areas show lingering effects of prior grazing, and other areas clearly reflect the prolonged absence of use by domestic livestock. A relatively small percentage of the area outside the industrial complex is disturbed ground associated with various historic or ongoing activities. Most of the upland surfaces and gentle hillsides support a mixture of native grasses, forbs (broadleaf herbaceous species), and shrubs. The distribution of habitat (vegetation) types at the site is shown on Figure N2-5.

Grasslands classified as mesic compose 77 percent of the total area at RFETS. These sites often support stands of midgrasses and, in particularly moist or undisturbed sites, tallgrasses. The relatively mesic conditions of the site reflect the greater soil moisture associated with movement of water through the coarse Rocky Flats Alluvium that caps the pediment surface. Areas of tallgrass prairie are particularly limited in the region because of extensive agriculture or development; small remnant communities are present in piedmont areas in the northwestern corner of the site.

Relatively xeric (dry) sites compose 18 percent of the total area at RFETS. These sites differ from the mesic grasslands primarily in having shorter and sparser cover, occasionally dominated by species typical of shortgrass prairie, and xeric sites generally supporting fewer plant and animal species. Because drier areas are slower to recover from disturbance, some of the xeric sites contain substantial amounts of weedy annual grasses and forbs. Yucca and cacti are conspicuous in areas of historically heavy grazing and on shallow, rocky soils.

Relatively hydric (wet) sites supporting wetland and riparian communities compose 5 percent of the total area at RFETS (DOE 1994a). These wetland and riparian communities are, for the most part, linearly aligned along Walnut Creek and Woman Creek, although they also occur in areas fed by seeps. The most extensive wetlands occur in an area south of Woman Creek known as Antelope Springs, along the northern portion of Pond C-1, between the A-ponds, and on the hillsides to the southwest of the B-ponds (Figure N2-6). Wetland and riparian habitats are of particular concern for the ERAs for Walnut Creek and Woman Creek watersheds for three reasons: (1) the vegetation and seasonal availability of surface water characteristic of wetlands and riparian areas attract wildlife not associated with prairie habitat; (2) wetlands and riparian areas provide valuable resources such as water, food, shelter, and nesting areas for wildlife that inhabit surrounding areas; and (3) wetlands are dependent on the presence of surface water, an important consideration given the water management practices at RFETS.

N2.1.5.2 Wildlife

As in most of the Front Range Urban Corridor, the wildlife of RFETS has been greatly influenced by the increase in human use and disturbance over the past 100 years. Most notable have been reductions in the number and diversity of ungulates (hoofed mammals) and large predators. However, the habitat diversity of RFETS, coupled with protection from grazing and human disturbance have resulted in a relatively rich animal community. Annual monitoring reports provide detailed information on species occurrence, relative abundance, and habitat use (DOE 1993c, 1994b, 1995c), as does the SCMTM (DOE 1995a). Wildlife species typically found at RFETS are briefly described below. To enhance readability of the report, only common names are used.

Large mammals commonly observed at RFETS include mule deer and predators such as the coyote and red fox. Small mammals occurring at the site include a variety of rodent, shrew, and lagomorph species. The deer mouse and prairie vole are among the most common small mammals. The small mammal community supports several raptor species such as the American kestrel, red-tailed hawk, and great horned owl. Small birds associated with different vegetation communities at RFETS provide prey for raptors and other predators. The most extensive avian communities on the site are dominated by ground-nesting species typical of prairie ecosystems in the region. Wetland and riparian areas support mammals such as the raccoon, muskrat, and meadow vole, as well as a variety

of waterfowl and wading birds such as the mallard and great blue heron. Amphibians such as the tiger salamander, northern chorus frog, and northern leopard frog are also found onsite.

N2.1.5.3 Aquatic Habitats and Organisms

Although aquatic habitats are limited in both variety and areal extent, they tend to serve as potentially important exposure pathways to ecological receptors for three reasons: (1) surface water and shallow groundwater are important transport mechanisms at RFETS, (2) chemical exposure to aquatic organisms is often intensified by prolonged contact and direct uptake from the surrounding medium (water and sediment) as well as trophic uptake (Section N2.4.4), and (3) water is a limited resource in prairie ecosystems and thus tends to receive concentrated use.

The tendency of many of the ponds and most stream reaches to periodically become dry makes these habitats unsuitable for aquatic organisms that require permanent water. Even organisms adapted to seasonally dry sites may be precluded by the unpredictability of water quantity relative to specific life cycles. In ponds that do not become completely dry, the fluctuations in water levels inhibit the establishment of a productive littoral (shoreline) zone. Water management practices at RFETS further alter seasonal fluctuations in water levels.

N2.1.5.4 Protected Species

A variety of protected species have been documented at RFETS, and additional protected species are potentially present. Protected species include plants or animals that are federally listed as threatened or endangered, candidates for listing as threatened or endangered, or Colorado species of special concern (CDOW 1994; USFWS 1994a, 1994b, 1995; DOE 1995a). The following protected species are present or potentially occur within the RFETS vicinity:

Federally Listed Endangered Species

- Peregrine falcon (*Falco perigrinus*) (State Listed Threatened)

- Black-footed ferret (*Mustela nigripes*)

Federally Listed Threatened Species

- Bald eagle (*Haliaeetus leucocephalus*)
- Ute ladies'-tresses (*Spiranthes diluvialis*)

Category 1 Candidate for Federal Listing

- Colorado butterfly plant (*Gaura neomexicana coloradensis*)

Category 2 Candidates for Federal Listing

- White-faced ibis (*Plegadis chihi*)
- Mountain plover (*Charadrius montanus*)
- Ferruginous hawk (*Buteo regalis*)
- Northern goshawk (*Accipiter gentilis*)
- Loggerhead shrike (*Lanius ludovicianus*)
- Baird's sparrow (*Ammodramus bairdii*)
- Preble's Meadow Jumping Mouse (*Zapus hudsonius prebleii*)
- Swift fox (*Vulpes velox*)

Category 3 (no longer a candidate for federal listing)

- Long-billed curlew (*Numenius americanus*)

Colorado Species of Special Concern

- American white pelican (*Pelecanus erythrorhynchos*)
- Burrowing owl (*Athene cunicularia*)
- Forktip three-awn (*Aristida basiramea*)
- Toothcup (*Rotala ramosior*)

Details concerning the status and distribution of protected species that occur or potentially occur at RFETS are provided in the SCMTM (DOE 1995a).

One federally listed endangered bird species, the peregrine falcon, has been observed at RFETS. Peregrine falcons have nested on rock formations southwest of Boulder during recent years. This nesting area is only a few miles from the site, and it therefore is not surprising that adult and immature birds have been observed hunting at RFETS. Peregrine falcons also migrate through the area. During 1994, peregrines were seen onsite in spring, early summer, and fall more commonly than in previous years.

The bald eagle, formally federally listed as endangered, has been reclassified for the lower 48 states as threatened (USFWS 1995). Bald eagles are increasingly common in the region, occurring primarily as migrants or winter residents. To date, use of the site by bald eagles has been limited to overflights and occasional perching by birds probably associated with the reservoirs east of the site. A pair of eagles reportedly attempted unsuccessfully to nest at Standley Lake in 1992, 1993, and 1994.

Category 2 species are those species that may be appropriate for listing as threatened or endangered, pending a review of their status (USFWS 1994b). The Preble's Meadow Jumping Mouse (PMJM) is the only Category 2 species that spends significant amounts of time at RFETS. PMJM have been captured in all three watersheds, including Smart Ditch, during intensive live-trapping programs in 1992, 1993, and 1994 (EG&G 1992, 1993b; DOE 1995c). Figure N2-7 shows the capture locations

of PMJM and the distribution of apparently suitable habitat onsite. Animals were captured in riparian areas with well-developed shrub canopies and a relatively lush understory of grasses and forbs. This is typical of habitats occupied by the subspecies throughout its range.

N2.2 CONTAMINANT DISTRIBUTION

This section describes the general distribution of contaminants in the Walnut Creek and Woman Creek watersheds. The following subsections summarize information provided in the SCMTM (DOE 1995a).

Remedial investigations are currently being performed at 16 OUs designated at RFETS. Each OU contains several primary contaminant source areas, referred to IHSSs. IHSSs were designated based on historical information, areas of surface disturbance indicated in aerial photographs, and preliminary site data. However, sources of contamination may not be confined to IHSS boundaries; contaminant sources may be associated with several IHSSs or OUs, and a given IHSS or OU may contribute to contaminant transport in both Walnut Creek and Woman Creek watersheds (Figure N1-3). The Walnut Creek watershed includes IHSSs from OUs 2, 4, 6, 7, 10, and 11, and the Woman Creek watershed includes IHSSs from OUs 1, 2, 5, and 11 (Figures N2-3 and N2-4).

OUs and PCOCs are briefly described below. A more detailed explanation of PCOCs and source areas is presented in Sections N3.2.2 and N3.2.3 of this document. PCOCs are listed by media for each OU in Table N2-1.

OU 1 IHSSs include areas where contaminants were released into soils during disposal, storage, and dumping activities. Leaks and outfalls have also contributed to the contamination of soils. The SID was built to prevent contaminants in OU1 from entering Woman Creek to the south. Radionuclides, volatile organic compounds (VOCs), oils, and chromium are contaminants potentially migrating to Woman Creek from OU1.

OU 2 IHSSs include burn sites, burial trenches, drum storage areas, a metals disposal site, and spray evaporation fields. Contaminants potentially migrating from surface and subsurface soil into both Walnut Creek and Woman Creek include radionuclides, VOCs, and oils.

The only IHSS in OU 4 is the complex of solar evaporation ponds within the PA. These ponds were built to evaporate low-level radioactive wastes and neutralize acidic wastes. Plutonium, americium, uranium, and nitrate are the contaminants potentially migrating into surface and subsurface soil and groundwater northeast into Walnut Creek.

OU 5 IHSSs include the ash pits, decontamination pad, incinerator, C-ponds, and old landfill. It also contains portions of the SID, which was built to prevent industrial area runoff from reaching Woman Creek. Uranium and plutonium are the principal potential contaminants associated with these sites.

OU 6 IHSSs include the A- and B-ponds, trenches, soil dump area, sludge dispersal area, and spray fields. The A- and B-ponds held process and laundry wastewater. Plutonium, uranium, and nitrate are the principal potential contaminants associated with these sites.

OU 7 IHSSs include the present landfill, spray evaporation fields, and an inactive hazardous waste storage area. Nitrate, tritium, and VOCs are potential contaminants associated with activities at these sites.

Relevant IHSSs in OU 10 are the property utilization and disposal (PU&D) storage yard and container storage facilities. These sites have held drums of solvent and waste oils, spent batteries, and vehicles. VOCs and oils are potential contaminants associated with activities at these sites. PCOCs have not yet been identified for OU 10.

The west spray field, the only IHSS in OU 11, was used to enhance the evaporation of excess liquids from the solar evaporation ponds. Nitrate is the only contaminant potentially migrating into surface and subsurface soil and groundwater from OU 11.

N2.3 AFFECTED ENVIRONMENT

This section describes areas in the Walnut Creek and Woman Creek watersheds that could be affected by contaminants. Primary sources of contamination and general categories of receptors potentially affected are described. In addition, because wind and water can transport contaminants from one source area to another, potentially affected downgradient areas are also noted.

N2.3.1 Walnut Creek Watershed

As noted in Section N2.1.4, the Walnut Creek watershed includes three basin segments: (1) undissected uplands west of the industrial complex, (2) relatively deep valleys separated by narrow ridges in the central portion, and (3) a broad area of low relief beyond the limits of the high terrace. The Walnut Creek watershed is more significantly altered than Woman Creek and contains several water diversion systems and 11 ponds on its three branches. This basin has also been modified by the extensive use of fill for construction of the industrial complex, as well as by the Present Landfill (OU 7). Thus, the Walnut Creek watershed contains most of the production, storage, disposal, and spill sites at RFETS (DOE 1995a).

Most of the IHSSs in the Walnut Creek watershed are located in upland areas, including the Present Landfill (OU 7), 903 Pad (OU 2), East Trenches (OU 2), Solar Ponds (OU 4), West Spray Field (OU 11), and Other Outside Closures (OU 10). As noted in Section N2.2, these sites were used primarily for storage and disposal of wastes. Since the removal of the original contaminant sources, soils within these IHSSs are the primary residual contaminant source in the watershed. Species associated with the upland communities of the site may be exposed to PCOCs in soil, surface water, or groundwater.

The A-ponds and B-ponds are downgradient of the other IHSSs in the Walnut Creek watershed and thus may contain contaminants transported from primary source areas. Contaminants that have accumulated in water and sediments could affect the aquatic and wetland communities associated with these ponds. The potential for bioaccumulation and biomagnification of site contaminants is greatest for aquatic systems and upper-level aquatic feeders.

N2.3.2 Woman Creek Watershed

Unlike the Walnut Creek watershed, the main channel of the Woman Creek watershed almost completely traverses the site from west to east. Most of the IHSSs in the Woman Creek watershed are located on the south-facing slopes of this drainage, including the Ash Pits (OU 5), Old Landfill (OU 5), 881 Hillside (OU 1), 903 Pad (OU 2), and East Trenches (OU 2). Woman Creek IHSSs were used primarily for storage and disposal of hazardous materials. In some of the IHSSs, most notably the 903 Pad, hazardous wastes leaked from drums into surrounding soils; although drums have been

removed, contaminated soils and groundwater remain. Exposure to ecological receptors at these IHSSs is most likely to occur through contact with contaminated soils and surface water.

Vegetation at most of the IHSSs in the Woman Creek watershed consists of reclaimed grasslands, reflecting a history of physical disturbance. Although these reclaimed habitats do not support the same type or amount of use by wildlife as native grasslands, they are important for some small rodents. Consequently, the reclaimed grasslands are used to some extent by predators such as coyotes and raptors. In addition, some of the Woman Creek watershed contains relatively well-developed riparian woodland.

Pond C-1 and Pond C-2 are downgradient of the other IHSSs in the watershed; thus, they may contain contaminants originating from other sites. Like the A- and B-ponds in Walnut Creek, the C-ponds are of particular concern because of the possibility for bioaccumulation and biomagnification of contaminants in aquatic systems. In addition, the wetland vegetation associated with the ponds increases the variety of potentially affected species and the potential intensity of their exposure. Pond C-1 is probably the most "natural" pond on either Walnut Creek or Woman Creek in terms of associated vegetation and persistent water levels. During surveys, the pond was found to contain a rich community of large fish, including largemouth bass. Pond C-2, while far from natural in appearance, supports a large population of fathead minnows due to the absence of predatory fish. The abundance of fish in these ponds results in heavy use by piscivorous birds, particularly herons.

N2.4 SITEWIDE CONCEPTUAL MODEL

This section presents a sitewide conceptual model (SCM) that describes the contaminant sources, release mechanisms, transport pathways, exposure routes, and key receptors present at RFETS. The model presented in this document has been developed according to concepts presented in detail in the SCMTM (DOE 1995a) and provides the basis for identifying key receptor species for which exposures were estimated. As noted in Section N1, the ERAs for the Walnut Creek and Woman Creek watersheds focus on the potential effects of chemical stressors released during operation of the industrial facilities at RFETS.

N2.4.1 Sitewide Exposure Pathway Model

The contaminant transport and exposure pathways important in evaluating exposure of ecological receptors to contaminants at RFETS are presented in the exposure pathways models (EPMs) for grassland, riparian, and aquatic communities (Figures N2-8 and N2-9). The EPM identifies complete exposure pathways and describes the mechanisms by which contaminants are released, transported, and taken up by receptors. The EPM is also used to identify measurement endpoints for estimating exposures (EPA 1989a, 1989b). In addition, the EPM provides a means of identifying exposure pathways that are potentially complete and that should be evaluated in the exposure analysis (EPA 1992a, 1994). The characterization of exposure pathways includes identification of the primary source of a contaminant, the primary mechanisms by which it is released and transported from the source, the point of potential contact with an ecological receptor (exposure point), and the mechanism by which the contaminant is taken up by an ecological receptor (exposure route) (EPA 1989a, 1989b). The components of the exposure pathway can be further defined as involving primary or secondary sources and release mechanisms. As noted in the SCMTM, although they are not the ultimate source of contamination, the soils within IHSSs are considered the primary contaminant sources at RFETS. Potential sources of contamination and release mechanisms at RFETS are described in detail in the SCMTM (DOE 1995a) and summarized in the following subsections.

The types, sources, and distribution of contaminants used in the ERAs for Walnut Creek and Woman Creek were developed based on data from abiotic sampling associated with RFI/RI remedial actions at RFETS. In some cases, where potentially ecotoxic concentrations were known to occur, additional data on contaminant distribution, contaminant bioavailability, or ecological effects were collected to reduce uncertainty in exposure estimates.

N2.4.2 Abiotic Exposure Points

Abiotic exposure points are locations where biota may contact contaminants in abiotic media. Based on data from RFI/RI field investigations, the following environmental media have been identified as potential abiotic exposure points:

Soils

- Surface soils (approximately 0- to 15-cm deep) in IHSSs or other source areas
- Subsurface soils (deeper than about 15 cm) in IHSSs or other source areas
- Surface soils downgradient of IHSSs or other source areas
- Subsurface soils downgradient of IHSSs or other source areas

Sediments

- Wet pond and stream sediments (approximately 0- to 15-cm deep) in IHSSs or other source areas
- Wet pond and stream sediments (approximately 0- to 15-cm deep) downgradient of IHSSs or other source areas
- Dry sediments along pond margins and ephemeral stream channels

Surface Water

- Surface water downgradient of soil IHSSs, including seeps and springs downgradient of burial trenches
- Walnut Creek, including A-ponds and B-ponds
- Woman Creek, including Pond C-1
- South Interceptor Ditch, including Pond C-2

Groundwater

- Shallow groundwater (< 6 ft below surface) in IHSSs or other source areas

- Shallow groundwater (< 6 ft below surface) downgradient of IHSSs or other source areas with known groundwater contamination

N2.4.3 Exposure Routes

Wildlife and aquatic organisms can be exposed to contaminants directly through contact with contaminated media (air, soil, sediment, water) or indirectly through consumption of forage that has been exposed to contaminants. Exposure to vegetation may occur as a result of uptake of contaminants from soil, sediments, or water. Uptake can occur through the roots of vegetation or, through lung tissue of wildlife. The mechanisms by which a contaminant may be taken up are the exposure routes. The main exposure routes for wildlife at RFETS are ingestion of contaminants in food, soil, and water; absorption across external tissues; and inhalation (especially by burrowing animals).

N2.4.4 Food Web Interactions and Ecological Receptors

Food web interactions are an important consideration when designating ecological receptors because of the potential for bioaccumulation (DOE 1991; Fordham and Reagan 1991). Bioaccumulation can result in toxic exposures even when ambient concentrations are relatively nontoxic. Bioaccumulation occurs by absorption and accumulation of a chemical directly from abiotic media or through accumulation of contaminants ingested with food or water (Suter 1993). For most contaminants, the highest bioaccumulation potentials occur in an aquatic-based food web where contaminants from sediments or water bioconcentrate (Fordham and Reagan 1991). Bioconcentration is the process of absorption and accumulation of chemicals from water by aquatic organisms (Suter 1993).

Biomagnification is the successive accumulation of a pollutant in tissues with increasing trophic level. It is a significant mechanism of bioaccumulation for persistent organic chemicals such as

chlorinated pesticides and some organometals such as methyl-mercury. Ingestion is usually the most important intake mechanism leading to biomagnification.

In the SCMTM (DOE 1995a), food webs were used to identify the predominant pathways by which upper-level consumers not normally exposed to contaminated media may be exposed to contamination through their food sources. Aquatic and terrestrial-based food web models were incorporated into grassland and riparian community EPMs (Figures N2-8 and N2-9), which were used to identify the receptor guilds and representative receptor species outlined in the SCMTM (DOE 1995a).

N2.4.5 Other Factors Affecting Exposure Frequency and Duration

The magnitude of exposure to environmental contaminants is not only dependent on concentration but also on the frequency and duration of contact. For the most part, concentrations of contaminants in soil, sediment, and groundwater are relatively static, and resulting exposures are therefore relatively constant for resident species. Concentrations in surface water may change seasonally or in response to precipitation events, snowmelt events, or other factors affecting contaminant transport. The dominant factor controlling the exposure of ecological receptors is the behavior of individuals. Daily, weekly, and seasonal use patterns determine the amount of time an animal is in contact with contaminated media. These factors, considered on a case-by-case basis when estimating exposures to receptors, are described in Sections N3 and N4.

Table N2-1
Summary of PCOCs by Medium
for Woman Creek and Walnut Creek Watersheds

Potential Contaminants of Concern	Woman Creek Watershed			Walnut Creek Watershed			
	OU1[1]	OU5[2]	OU2[3]	OU4[4]	OU6	OU7	OU11
Metals	gw	ss,bh,sw,sd,gw	ss,bh,gw	bh,ss	ss,bh,sw,sd,gw	ss,bh,sw,sd,gw	
Pesticides/PCBs	ss,sd	ss,bh	ss,bh,gw	ss	ss,sd		
Radionuclides	ss,bh,sw,sd,gw	ss,bh,sw,sd,gw	ss,bh,gw	bh,ss	ss,bh,sw,sd,gw	ss,bh,sw,sd,gw	bh
Semivolatile Organic Compounds	ss,bh,sd	ss,bh,sw,sd,gw	ss,bh,gw	bh,ss	bh,sw,sd,gw	bh,sw,sd	
PAHs	ss,bh,sd	ss	ss,bh,gw	ss	bh,sd	sd	
Volatile Organic Compounds	ss,bh,sw,sd,gw	bh,sw,sd,gw	bh,gw	bh	bh,sw,sd,gw	bh,sw,sd,gw	
Water Quality Parameters			bh,gw	bh,ss		ss,bh	bh

[1]OU1 PCOCs were identified using different statistical tests than the other OUs.
[2]PCOCs in surface water in OU5 and OU6 were further designated by type of surface water (streams, ponds, and seeps).
[3]OU2 is in both Woman Creek and Walnut Creek drainage basins.
[4]OU4-PCOCs have been identified only for surface soil and subsurface soil.
OU10-PCOCs have not yet been identified.

bh - borehole (subsurface soil)
gw - groundwater
sd - sediment
ss - surface soil
sw - surface water

N3. PRELIMINARY EXPOSURE AND RISK CALCULATION

As noted in Section N1, the principal objective of this ERA is to evaluate risk due to chemical stressors (EPA 1994).

An initial step in conducting the watershed ERAs was to evaluate contaminant distribution data to determine which chemicals were present at potentially ecotoxic concentrations. This evaluation required screening-level exposure and risk estimations using data collected during RFI/RI activities and sitewide environmental monitoring programs. The screen corresponds to the preliminary exposure and risk calculation step of the EPA procedure for conducting ERAs at Superfund sites (EPA 1994).

The screening-level exposure and risk estimations are particularly important for ERAs at RFETS because the investigations are generally "source-driven" (Suter 1993). Potential sources have been identified in previous investigations, but there is little evidence of overt ecological stress. Exposures and more subtle toxic effects are largely uncharacterized. In addition, RFI/RI activities at the OUs resulted in an extremely large amount of data and identification of more than 150 PCOCs. Screening these data was necessary to focus more intensive risk evaluations on contaminants present at potentially ecotoxic concentrations and minimize evaluation of those that present negligible risk (Suter 1993).

A detailed description of the approach used for the preliminary exposure risk calculation is presented in Section N3.1, and the methodology is presented in Section N3.2. The results of the preliminary exposure and risk calculation are presented in Section N3.3.

N3.1 TIERED APPROACH

Preliminary exposure and risk calculations were performed according to procedures described in the ECOCTM (DOE 1995b). The screening methodology was based on a phased approach, with analyses conducted in three tiers (Figure N3-1). This approach was designed to simultaneously screen data on more than 150 PCOCs for toxicity to several ecological receptor types in multiple contaminant source areas. The approach is based on conservative assumptions that minimize the chance of excluding chemicals that may represent ecological risk. Analyses conducted in Tier 1 are intended to identify site-specific contaminants based on distribution of chemicals in abiotic media. Tier 2 and Tier 3 include

analyses of data from abiotic media and biological tissue to provide a preliminary evaluation of the potential ecotoxicity of contaminants at the site. The result of the Tier 3 screening process is a list of ECOCs for which risk is characterized in Sections N4 and N5.

The purpose of Tier 1 was to identify the site-specific contaminants (PCOCs) that are the focus of the risk assessments for each OU. Tier 1 screening combines statistical comparisons to site background conditions, data on frequency of detection, and professional judgment. The process for identifying PCOCs was developed by DOE for RFETS in cooperation with EPA and CDPHE. The result is a list of PCOCs for each environmental medium that is then used to determine COCs for the HHRA and ERA, the two components of the RFI/RI Baseline Risk Assessment. The PCOCs and the process used to identify them are detailed in COC TMs prepared for OU-specific HHRAs. EPA and CDPHE must review and approve each of the COC TMs. The ERA exposure and risk screening was conducted using a sitewide list of PCOCs generated by combining the OU-specific lists. PCOCs are listed in Section N3.2.1.

Tier 2 and Tier 3 ecotoxicity screens were conducted for a set of key receptor species that were selected to represent taxonomic and functional groups of ecological receptors. Representative species of birds, small mammals, large mammals, and fish were selected based on their abundance at RFETS, special legal status, and position in local food webs. Information on life history, body size, diet, and other parameters needed to estimate exposure was assembled and documented for review and approval by regulatory agency personnel (DOE 1995b).

The most conservative estimates of exposure were used for the Tier 2 screening evaluation. This screening step assumed that each receptor lives year-round in areas containing the maximum contaminant concentration and that 100 percent of each contaminant is absorbed from environmental media. These assumptions overestimated exposure under most conditions, minimizing the chance of eliminating a potentially ecotoxic contaminant from further risk evaluation. During the Tier 2 evaluation, maximum PCOC concentrations were compared to estimated concentrations in drinking water (C_w) and food (C_f). Because few PCOCs were removed as a result of the Tier 2 analysis, all PCOCs were carried over to the Tier 3 phase of the evaluation.

Although Tier 3 is considered a screening step, it includes a more accurate method for estimating exposure than Tier 2. The Tier 3 screen incorporates the distribution of chemicals in the environment

and the spatial and temporal aspects of receptor behavior. Factors such as diet, body size, home-range size, and seasonal migration affect the frequency, duration, and intensity of contact with contaminated media. Adjustment of exposure parameters to account for these factors is important to obtain more objective exposure and risk estimates. The more intensive level of screening included in Tier 3 is particularly appropriate in source-driven (Suter 1993) ERAs in which source areas may contain several potential contaminants, but the effects of contaminant exposure are not apparent.

The primary objective of the tiered ecotoxicity screen is to evaluate exposures to determine whether the chemical concentrations represent an ecotoxicological threat. The risk was evaluated by comparing site exposures to toxicity reference values (TRVs) that are benchmark exposures over which adverse ecological effects could occur. TRVs were derived to represent the no observed adverse effects level (NOAEL) for sublethal systemic and reproductive effects. Derivation of TRVs for the Tier 3 screen is described in Section N3.2.6.

As described in the ECOCTM (DOE 1995b), the Tier 3 screen was designed so that (1) the contributions to overall ecological risk from each exposure-point medium and each contaminant source area could be quantified and (2) the primary factors contributing to risk within specific areas could be identified. To accomplish this, the IHSSs were grouped into ERA source areas according to OU, contaminant sources, sampling locations, and habitat (Figures N3-2 and N3-3).

Source areas ranged in size from 1 to more than 45 hectares and included areas with and without surface water such as streams and ponds (Section N3.2.2). The relative contribution of each source area to total risk in the watershed or site was identified by ranking source areas according to risk. Information on the major sources of risk can be used in prioritizing remedial action decisions to gain the most cost-effective reduction of risk within the assessment area.

As noted above, the ECOC screen was conducted according to procedures described in the ECOCTM (DOE 1995b). The following subsections describe the specific approach and methods used in identifying source areas, aggregating data, and estimating exposures for key receptors.

N3.2 METHODS

Details of screening methods, exposure estimations, and development of ecotoxicological benchmarks are presented in the following sections (Figure N3-4). Radiological exposures were estimated separately because of differences in benchmark values, receptors, and ecological effects, and are discussed separately in Section N3.2.5.

N3.2.1 PCOCs

The sitewide ERA PCOCs were identified during Tier 1 evaluation by consolidating the PCOC lists generated for each OU included in this analysis. Because PCOC lists are unique for each media type, only PCOCs with complete exposure pathways were considered in developing the PCOC list for the sitewide ERA. Some analytes included in RFETS target analyte lists (TALs) are not appropriate or useful for examining toxicological risk to ecological receptors. Those inappropriate analytes have been omitted from further consideration (Table N3-1). The sitewide ERA PCOC lists are presented for each medium in Tables N3-2, N3-3, N3-4, and N3-5.

N3.2.2 Identification of ERA Source Areas

Because of the large area of RFETS and the large number of plant and animal species occurring at the site, it was impractical to evaluate exposures during Tier 3 evaluation for all possible receptors from all possible locations. Therefore, exposures were estimated for the known contaminant source areas for a representative group of species (key receptors).

The purpose of the sitewide ERA is to provide information that is useful for both evaluating ecological risk on a watershed basis and making decisions regarding remedial actions associated with the individual OUs and IHSSs within them. Sitewide ERA source areas were identified by grouping together certain IHSSs across the site, based on their associated abiotic and biotic sampling locations (Table N3-6). This aggregation of IHSSs provided manageable units (source areas) containing the majority of sampling locations with which to measure the effects of direct contamination and its short-range transport to sensitive habitats and individual receptor sites (Figures N3-2, N3-3, and N3-4).

N3.2.3 Identification of Key Receptors

Key receptor species were selected from among candidate receptor species that represent feeding guilds at RFETS (DOE 1995a) for inclusion in the Tier 2 and Tier 3 screening evaluation. Two categories of key receptors were identified: limiting species and wide-ranging species. Limiting species have small home ranges and are most sensitive to contamination, and wide-ranging species have relatively large home ranges and are potentially subjected to a much larger array of contaminants. The criteria for use in the ERA are described below. As previously stipulated in the SCMTM (DOE 1995a), key receptor species:

- Are common or keystone species in the local ecosystem
- Represent functional groups and feeding guilds
- Have significant home ranges within RFETS
- Have complete exposure pathways
- Are susceptible to toxic effects of contaminants under consideration
- Have known life-history parameters

For each receptor, exposure was estimated for all exposure routes having potentially complete exposure pathways. Complete exposure pathways were determined for each source area based on the EPMs (Figures N2-8 and N2-9). Key receptor species potentially present in each source area were determined based on habitat preference and vegetation types present (Table N3-7).

As shown in Figures N2-8 and N2-9, potential exposure routes for wildlife receptors include ingestion of contaminants in food, soil, sediments, and water; inhalation of volatile contaminants; and dermal absorption of contaminants in air, soil, sediments, and water. Exposures from dermal absorption of contaminants or inhalation of contaminated particulates were not estimated for wildlife receptors at RFETS because exposures were more conservatively estimated from ingestion pathways. Radionuclide

intakes were evaluated based on accumulated body burdens and environmental screening levels (Higley and Kuperman 1995). The principal exposure route for aquatic organisms is absorption of contaminants in surface water and sediments through integuments (skin and gills). Vegetation may be exposed to contaminants through direct contact with contaminated soil and water or through root uptake of soil contaminants.

Exposure pathways analyzed (Table N3-8) were determined with the principal dietary components (Table N3-7) and data types available. Available biotic data include small mammals, terrestrial arthropods, benthic macroinvertebrates, and fish. A complete description of data available is presented in Table N3-9.

N3.2.3.1 Limiting Species

Because limiting species may live within the confines of a single source area, potential exposure to these receptors was assessed for each source area. The following primary receptors represent limiting species at RFETS.

Preble's Meadow Jumping Mouse—PMJM was chosen to represent small mammals in the EPM. The home range of this species is such that individuals captured within most source areas are likely to have spent most of their lives there (Figure N3-7). Because of their status as a federal Category 2 species, risk to PMJM was assessed at the individual level during the problem formulation and risk characterization phases of the risk assessment.

Exposure risk to PMJM was evaluated by estimating contaminant uptake through ingestion of contaminated vegetation and terrestrial arthropods, as well as incidental ingestion of soil and dry sediments. In addition, organic contaminants in soil may volatilize and accumulate in animal burrows. Therefore, the potential for exposure to organic contaminants in burrow air was assessed for source areas with elevated organic concentrations in subsurface soil.

American Kestrel—The American kestrel represents raptorial receptors with a small home range in the EPM. Kestrels are common at RFETS and in surrounding grassland areas year-round. However, they are migratory, and the same individuals do not spend the whole year at RFETS. Because other raptor

species found at RFETS have much larger home ranges, exposure estimates for the American kestrel home range are likely to overestimate exposure to other raptors.

Exposure risk to American kestrels was evaluated by estimating contaminant uptake through ingestion of contaminated terrestrial arthropods and small mammals, as well as incidental ingestion of soil while feeding on these prey.

Great Blue Heron—Great blue herons represent large wading piscivorous birds in the EPM. Great blue herons are common during the summer, uncommon during spring and fall migration, and not present during the winter.

Exposure risk to great blue herons was evaluated by estimating contaminant uptake through ingestion of contaminated fish, surface water, and sediments. Because they may feed on carnivorous fish species, herons represent tertiary consumers and therefore are appropriate for evaluating the bioaccumulation potential of organic contaminants in aquatic systems.

Mallard—Mallards represent the various "dabbling" ducks that occur at RFETS. Mallards feed on plants, invertebrates, and seeds in pond sediments as well as terrestrial or aquatic plants. Because mallards are in frequent and prolonged contact with surface water and sediments, they are appropriate receptors for evaluating the potential for dermal exposure potential of organic contaminants in aquatic systems.

Exposure risk to mallards was evaluated by estimating contaminant uptake through ingestion of benthic macroinvertebrates, vegetation, surface water, sediments, and surface soil.

N3.2.3.2 Wide-Ranging Species

Potential exposure to wide-ranging species was assessed on a sitewide basis because the home range sizes of these animals often exceed the total area of the RFETS buffer zone (2,634 hectares [ha]). The following species represent wide-ranging species at RFETS.

Coyote—Coyotes are the most common mammalian predator at RFETS (DOE 1992). Although the primary food of this predator is small mammals, vegetation is also consumed. The coyote represents widespread and wide-ranging omnivorous species. Home range is approximately 1,130 ha (Gese *et al.* 1988), and essentially all habitats at RFETS are used (Towry 1987).

Because of their varied diets, coyotes are potentially exposed to a wide variety of contaminants. Additionally, because coyotes are secondary or tertiary consumers, they may exhibit bioaccumulation effects. Exposure risk to coyotes was evaluated by estimating contaminant uptake through ingestion of small mammals, vegetation, surface soil, and surface water.

Mule Deer—Mule deer are year-round residents and are the most abundant large herbivore at the site (DOE 1992). They represent widespread and wide-ranging herbivores in the EPM. Like the coyote, mule deer have a large home range (285 ha) and use a variety of habitats. Mule deer obtain essential salts by eating soil and possibly dry sediments; thus, their intake of soil may be substantial.

Risk to mule deer was evaluated by estimating contaminant uptake through ingestion of vegetation, sediments, surface soil, and surface water. For exposure assessment purposes, it is assumed that the amount of time a deer spends in an area is directly proportional to the fraction of its home range that the area of concern represents.

Red-tailed Hawk—The red-tailed hawk is one of the most common raptors in the United States and is a top predator at RFETS (DOE 1992). Red-tailed hawks represent wide-ranging raptorial species in the EPM. Home ranges are approximately 650 ha (Smith and Murphy 1973, Peterson 1979). Red-tailed hawks are present year-round at RFETS. However, they are migratory and are present in much greater numbers in the summer than winter (DOE 1993c). Red-tailed hawks are tertiary consumers and thus may be susceptible to effects of bioaccumulation.

Exposure risk to red-tailed hawks was evaluated by estimating contaminant uptake through small mammals and incidental ingestion of soil associated with prey items.

N3.2.3.3 Other Receptor Types

Aquatic Organisms—All source areas with the potential for aquatic life were screened to determine risk of exposure to aquatic contaminants. State surface water quality standards are based on ambient water quality criteria (AWQC), which evaluate various toxicity tests. Some of these toxicity tests have included research on amphibians while others have not.

Vegetation—No specific vegetation receptors were chosen because little information is available on toxicity to native species of vegetation. Instead, entire communities were assessed for effects of toxic exposure (Figures N3-5 and N3-6).

N3.2.4 Nonradionuclide Exposure Estimation

Nonradiological contaminant exposure to ecological receptors was estimated for individuals on a source-area, watershed, and sitewide basis. Methods used to estimate exposure to ecological receptors are described below.

N3.2.4.1 Exposure-point Concentrations

Data used in exposure estimates were collected during RFI/RI activities. Exposure-point concentrations for PCOCs in abiotic and biotic media were estimated from the 95 percent upper confidence limit of the mean (95% UCL). However, where the 95% UCL was greater than the maximum, the maximum detected concentration was used as the exposure-point concentration. Tissue data for vegetation, terrestrial arthropods, benthic macroinvertebrates, fish, and small mammals were used to estimate exposure from ingestion of forage or prey items.

In some cases where biotic data were not available, tissue contaminant concentrations were calculated from abiotic data. Where contaminant concentrations were not available for benthic macroinvertebrate and fish tissue, exposure-point concentrations were calculated from surface water data using the following equation (referred to as estimated values):

$$\textit{Exposure-point concentration} = \textit{BCF x Surface Water Concentration (dissolved)} \quad \text{(N-1)}$$

where

BCF = bioconcentration factor

BCFs are the ratio of concentrations in aquatic organisms to concentrations in water. Where no experimental data were available for BCFs, they were calculated from equilibrium partitioning data, according to the following relationship (Lyman *et al.* 1982; Veith *et al.* 1979):

$$\log BCF = 0.76 \log K_{ow} - 0.23 \quad \text{(N-2)}$$

where

Log K_{ow} = the octanol-water partition coefficient

BCFs and log K_{ow} values used for this analysis are shown in Attachment 1, Tables 1 and 2.

Contaminant concentrations in vegetation were not available for all source areas. Where necessary, concentrations were calculated using the following equation (Travis and Arms 1988):

$$U = B \times C_s \quad \text{(N-3)}$$

where

U = vegetation tissue concentration from soil uptake
B = transfer coefficient calculated from log B = 1.588 - 0.578 log K_{ow}
C_s = contaminant concentration in soil.

Transfer coefficients used to calculate contaminant concentrations in vegetation are listed in Attachment 1, Table 2. Biota data available or estimated from abiotic media are shown in Table N3-9.

N3.2.4.2 Wildlife Exposure Estimations

Ingestion—Exposure due to ingestion of contaminated food, water, soil, and sediment was estimated from exposure-point concentrations and species-specific ingestion rates. As explained in the SCMTM (DOE 1995a), ingestion rates and other species-specific exposure parameters were obtained from the scientific literature or derived from information provided in the Wildlife Exposure Factors Handbook (EPA 1993a). Bioavailability of contaminants was assumed to be 100 percent for all chemicals in all media.

For a given species, intakes were calculated using the following equation (EPA 1994, ORNL 1994, DOE 1995b):

$$\begin{aligned} \textit{Total Contaminant Intake} = {} & (C_{soil/sediment} \, x \, IR_{soil/sediment}) + (C_{water} \, x \, IR_{water} \, x \, SUF_{water}) \\ & + (C_{prey} \, x \, IR_{prey} \, x \, SUF_{prey}) + (C_{forage} \, x \, IR_{forage} \, x \, SUF_{forage}) \end{aligned} \qquad \text{(N-4)}$$

where

C_{medium}	=	exposure-point concentration of PCOC in environmental medium (i.e., prey, forage, soil, or water)
IR_{medium}	=	ingestion rate for environmental medium
SUF_{medium}	=	site use factor (SUF) for environmental medium.

Parameters used to estimate exposure were adapted for each receptor species at each source area (Tables N3-10 through N3-16; Attachment 1, Table 3). Environmental media for which intakes were calculated were determined based on the behavioral characteristics of the receptor species under consideration. Total food ingestion rates were divided among general biota types (vegetation, terrestrial arthropods, benthic macroinvertebrates, fish, and small mammals), according to the proportion of the receptor diet they represent. Where biotic contaminant concentrations could not be estimated, the total food intake rate was partitioned among prey and forage categories for which data were available. For example, for PMJM, terrestrial arthropods represent approximately 30 percent of the total food intake (DOE 1995a). Because terrestrial arthropod data were not available for OU 6 A-Ponds, vegetation was assumed to represent 100 percent of the total food intake for PMJM at this site.

Estimates of contaminant intake were also adjusted by an SUF representing the proportion of time spent in each source area relative to surrounding areas (e.g., home range). SUFs were determined primarily by

the proportion of the receptor's home range that was represented by the source area under consideration. Where the home range of the receptor was smaller than the source area, the SUF was 1.00. SUFs were also based on species-specific behavioral patterns and exposure routes. For example, because mule deer drink primarily from pond and stream edges, the mule deer SUF for surface water intake was based on pond perimeters and stream lengths within the source area as a proportion of the total length of pond and stream edge available within the home range. Seasonal use patterns could also influence SUFs; however, exposure estimates were based on the assumption that wildlife receptors are present at the source areas year-round. In most cases, this assumption overestimates the risk to migratory species such as the mallard, great blue heron, and American kestrel. SUF calculations for species with home ranges greater than individual source areas are presented in Attachment 1, Tables 4 through 9.

Inhalation —Exposure due to inhalation was estimated for small mammals, represented by PMJM, for all source areas with buried waste. The concentration of volatile contaminants in a hypothetical animal burrow was estimated using subsurface soil exposure-point concentrations and the following equation adapted from Maughan (1993):

$$C = \frac{(V_p \, x \, MW) \, x \, 1{,}000 \, mg / g)}{(R x T)} \qquad \text{(N-5)}$$

where

C	=	concentration of contaminant in burrow air
V_p	=	partial pressure of the contaminant (atm)
MW	=	molecular weight of the contaminant
R	=	ideal gas constant (m^3 atm/mole °K)
T	=	burrow temperature in °K; assumed to be 280.1°K.

Vapor pressures were calculated using the concentration of the contaminant in soils and Henry's Law constant. The method assumes equilibrium between soil and air and a closed air space. Vapor pressures were calculated according to the following equation:

$$V_p = H \times C_{soil} \tag{N-6}$$

where

H	=	Henry's Law constant
C_{soil}	=	concentration of the contaminant in soil.

N3.2.4.3 Vegetation

Potential exposure of vegetation to contaminants was estimated from subsurface soil PCOC concentrations. Subsurface soil data were used because (1) subsurface soil had the largest suite of chemicals analyzed, (2) most plants have roots that extend below the first two inches of surface soil, and (3) most toxicity data are based on concentration of contaminants in soil (Suter 1993).

N3.2.4.4 Aquatic Organisms

Exposure of aquatic organisms to contaminants was estimated for direct contact to sediments and surface water. Exposure of sediment-associated biota, such as benthic macroinvertebrates, was estimated from sediment PCOC concentrations from individual ponds and stream reaches with sediment sampling locations. In some OUs, PCOCs were assigned separately for ponds and streams. Sediment samples from the SID and the unnamed tributary to Walnut Creek were not used in exposure estimates because they were not considered relevant aquatic habitat.

Exposure of aquatic biota to surface water PCOCs was estimated from dissolved (filtered) concentrations. Dissolved concentrations are most appropriate for evaluation of toxicity to pelagic organisms because Colorado water quality standards are based on dissolved concentrations, and transdermal and gill intake are the principal exposure routes for these organisms.

N3.2.4.5 Assumptions

In an effort to treat source areas consistently while estimating exposures more realistically, several assumptions were made regarding receptor behavior and source-area characteristics. These sources of uncertainty are listed in Table N3-17.

N3.2.5 Radionuclide Exposure Estimation

Estimation of radionuclide exposure was based on the maximum detected concentration in the surface soil, surface water, and sediments at RFETS. Exposures were estimated only for the species found to be most susceptible to contamination in the environmental media in question. The limiting species defined in Higley and Kuperman (1995) are small mammals for surface soil and aquatic life for surface water and sediment. No estimated exposure values were used.

N3.2.6 Risk Estimations

Potential ecotoxicity of contaminants was assessed during the Tier 3 evaluation by comparing site-specific exposures to ecotoxicological benchmarks. The comparison is expressed as a hazard quotient (HQ), which is the ratio of a site-specific exposure estimate to an ecotoxicological benchmark (EPA 1994, DOE 1995b):

$$HQ = \frac{Estimated\ Exposure}{Benchmark\ Exposure} \qquad \text{(N-7)}$$

An HQ greater than 1 was interpreted as a level at which adverse ecological effects could potentially occur. An HQ less than 1 was evaluated based on potential ecotoxicity, bioaccumulation or biomagnification, and magnitude of the calculated quotient.

The risk to wide-ranging species for each PCOC was assessed as the mean source area HQ (HQ_{mean}).

$$HQ_{mean} = \frac{\sum HQ_{source\ areas\ at\ RFETS}}{Number\ of\ Source\ Areas\ at\ RFETS} \qquad \text{(N-8)}$$

Cumulative risk resulting from exposure to multiple contaminants was evaluated using the hazard index (HI) approach (EPA 1994). The HI approach assumes that the effect of exposure to multiple chemicals is an additive function. The HI is calculated as the sum of HQs for individual chemicals (DOE 1995b). For example:

$$HI = HQ_{aluminum} + HQ_{barium} + HQ_{etc.} \quad \text{(N-9)}$$

An HI less than 1 indicates negligible, or *de minimis* risk (Suter 1993). An HI greater than 1 indicates potentially significant risk, even if no single HQ is greater than 1. Cumulative risk for each watershed is summarized as the watershed HI ($HI_{watershed}$), which is the sum of HIs from each source area within a watershed:

$$HI_{watershed} = \sum HI_{source\ areas\ in\ watershed} \quad \text{(N-10)}$$

Cumulative risk for the entire site is summarized as the total HI (HI_{total}), which is the sum of the HIs from each source area:

$$HI_{total} = \sum HI_{source\ areas\ at\ RFETS} \quad \text{(N-11)}$$

Risk of effects to individual organisms is the basis for exposure benchmarks and HQ and HI calculations. This level of risk estimation is adequate for threatened/endangered species or other sensitive species for which protection of individual organisms is desired. However, for species that are not protected or rare, protection of populations is more appropriate (Barnthouse 1993). Therefore, extrapolation of exposure estimates to population-level effects should be considered in risk-management decisions. Qualitative discussions of population-level effects are included in the risk characterization section for each species (Sections N4 and N5).

N3.2.7 Toxicity Reference Values

- The TRVs used in risk estimations were derived from several sources of information on ecotoxicity of PCOCs and native or background concentrations estimated for RFETS. Information on NOAELs or other ecotoxicological benchmarks was obtained primarily from a database developed for DOE at ORNL (Hull and Suter 1994, Opresko *et al.* 1994; Suter and Mabrey 1994; Will and Suter 1994). Other sources of information included:

- EPA-supported databases such as the Integrated Risk Information System (IRIS) and Aquatic Information Retrieval (AQUIRE)

- U.S. Fish and Wildlife Service (USFWS) contaminant hazard reviews
- Colorado water quality standards
- EPA AWQC
- Scientific literature

For naturally occurring metals, literature-based benchmarks were compared to exposure estimates for background concentrations in soil, sediment, and surface water at RFETS. The background exposure was used as the TRV when it exceeded the literature-based benchmark. It was assumed that most organic compounds do not occur naturally; therefore, NOAELs for organic compounds were not compared to background concentrations. Surface-water TRVs for exposure to aquatic organisms also were not compared to background (Section N3.2.7.3). Development of TRVs for wildlife, vegetation, and aquatic organisms is described in the following subsections. Radionuclide benchmarks, which were developed separately, are described in Section N3.2.8.

N3.2.7.1 Terrestrial Wildlife

No state or federal standards currently exist for regulating exposure of wildlife to anthropogenic chemical contaminants. Risk evaluations and remediation decisions are predicated on criteria developed in site-specific ERAs. A process for developing ecotoxicological benchmarks and a database for some chemicals and receptor types is presented in Opresko *et al.* (1994). The benchmarks were derived to approximate NOAELs, which represent the greatest exposures at which no adverse effects are observed. NOAELs (and benchmarks) may be expressed as a dose (e.g., milligrams contaminant ingested per kilogram body weight [bw] per day [mg/kg_{bw}-day]) or as environmental effects criteria (EECs) (e.g., milligrams of contaminant per liter water [mg/L]).

ERAs are intended to assess risk to populations for species not listed as threatened or endangered. Therefore, ecotoxicological standards for birds and mammals derived from toxicological studies that measure reproductive effects were preferred because they represent effects to populations, not individuals. Studies conducted for species at critical life stages are most protective of populations.

However, these studies are not available for all chemicals and species of interest at RFETS. Endpoints from databases such as the EPA IRIS generally are not based on reproductive studies and therefore reflect risk to individuals, not populations.

Methods—Because avian and mammalian physiologies differ significantly, NOAELs can vary by a factor of 1,000 or more for the same chemical. Therefore, NOAELs for birds and mammals were developed separately following the process outlined by ORNL (Opresko *et al.* 1994) (Attachment 2, Table 1). Extrapolations among similar species were performed using a scaling factor derived from an empirical relationship between body size, body surface area, and other physiological functions (EPA 1980, 1986a, 1986b, 1988, 1989c):

$$NOAEL_w = NOAEL_t\,(bw_t/bw_w)^{1/3} \qquad \text{(N-12)}$$

where

$NOAEL_w$	=	wildlife NOAEL
$NOAEL_t$	=	test species NOAEL
bw_t	=	test species bw
bw_w	=	wildlife bw

NOAELs for mammals and birds were extrapolated to RFETS site-specific receptor species. These receptor-specific NOAELs and the TRVs derived from the NOAELs are presented in Attachment 2, Tables 2 through 8.

Burrowing animals can also be affected through inhalation of soil gases in burrows. Ecological effects criteria were developed by using the ideal gas law to calculate maximum soil concentrations that would result in acceptable exposure to burrow occupants. The ecological effects criteria were calculated by estimating partial pressure corresponding to the TRV (Maughan 1993). The corresponding soil concentrations were then calculated using Henry's Law and assuming equilibrium between soil and air within a closed burrow. Equations used in exposure calculations are provided in Section N3.2.4.

Assumptions—Extrapolating toxicity information between species requires a variety of assumptions. Endpoints that affect reproductive success were preferred. When chemical-specific information was unavailable or inappropriate, a structurally similar chemical was used as a surrogate for the chemical in

question. For example, extensive toxicity tests have not been conducted for polycyclic aromatic hydrocarbons (PAHs), therefore, toxicity equivalency factors (TEFs), as outlined in EPA (1992b, 1993b) and Nisbet and LaGoy (1992), were used to estimate NOAELs where PAH-specific information was unavailable. TEFs compare the relative toxicities of the various PAHs to benzo[a]pyrene and allow NOAELs to be extrapolated for all PAHs found at RFETS. Extrapolations among chemicals are noted in Attachment 2, Table 1.

Extrapolating NOAELs from laboratory animals to wildlife introduces uncertainty. Laboratory animals often are inbred and live in a controlled environment, whereas wild animals are genetically more variable and subject to a wide variety of environmental conditions. Consequently, laboratory and wild animals may differ in their tolerance or sensitivity to a chemical. In addition, bioavailability of chemicals may differ between experimental and natural conditions. Uncertainty factors were used to adjust a lowest observed adverse effect level (LOAEL) to a NOAEL and subchronic to chronic exposure (Attachment 2, Table 1). Short-duration exposures that occurred during reproduction were considered chronic for the following reasons: (1) the stressed condition of the adults, (2) rapid growth of the young, (3) the critical developmental stage of the young, and (4) the potential to impact the population.

Adjusting NOAELs from one species to another also introduces uncertainty. For example, larger animals often are more vulnerable to xenobiotics than are smaller animals because large animals have slower metabolic rates. There are often unpredictable uncertainties in the relative abilities of different species to absorb, metabolize, and excrete chemicals, such that NOAELS can vary greatly even among closely related species. This source of uncertainty is usually unavoidable without extensive toxicological studies of interactions between specific chemicals and biological species.

N3.2.7.2 Vegetation

Twenty-four soil-based vegetation TRVs were developed in addition to values presented in Will and Suter (1994). Although toxicity data exist for a variety of chemicals and plants, no methods have been developed for comparing or standardizing phytotoxic endpoints. The plant values presented in Attachment 2, Table 9 are based on the methodology presented in Will and Suter (1994).

Methods—Available plant toxicity information encompasses a variety of growth media. Information on plant growth in soil was used for this risk assessment. Data from plants grown in media such as vermiculite or sand were omitted because these media rarely represent natural growing conditions (Will and Suter 1994).

The Will and Suter (1994) methodology used a number of references in choosing a vegetation benchmark. A comparable number of references was not available due to a paucity of phytotoxicity data. Therefore, the level of confidence in the benchmarks is unknown. Available and relevant data for the benchmarks developed for this report are presented in Attachment 2, Table 9. Chemical benchmarks are presented in Attachment 2, Tables 10 and 11.

Assumptions—Availability of xenobiotics in soil is normally determined by the root uptake system. Metals may enter the root through a variety of mechanisms, including passive uptake within complexes and active substitution for nutrients. Metals may also sorb to the root exterior. Organic compounds can enter a plant through the root system, although molecules larger than 500 daltons are too large. Smaller organic compounds may be excluded because of polarity. Less water-soluble compounds have limited access to the plant, while more water-soluble compounds are taken up through the epidermis and translocated through the plant. Symplastic uptake and translocation is possible for very lipophilic compounds.

Bioavailability varies widely among chemicals and may vary for a specific chemical depending on environmental conditions. The bioavailability of metals is influenced primarily by soil pH, cation exchange capacity (CEC), and moisture content. Metals are often complexed with other soil constituents or sorbed to the mineral fraction of a soil. Nonionic organics tend to sorb to the organic fraction of soil. The behavior of ionic organic compounds in soil is determined by a variety of factors, including pH and the characteristics of the organic compound and soil. The influence of plant roots in the rhizosphere also alters bioavailability.

Different analytical techniques used to estimate chemical concentrations in soil can produce markedly different results that can over- or under-estimate bioavailability. Acid extractions for metals and solvent extractions for organics are used to determine the total concentration of a contaminant in a medium. These extractions often overestimate the bioavailable concentration of the compound to which the plant

is exposed. Therefore, phytotoxicity data are inappropriate or a poor measure of risk for cases in which benchmarks exceed background, benchmarks exceed site data, and the plant community is thriving and diverse.

N3.2.7.3 Aquatic Life: Surface Water Standards (TRVs)

Risks to aquatic life were assessed for exposure to pond and stream water. Ecotoxicological benchmarks for these types of surface water (Attachment 2, Table 12) were based on Colorado surface-water standards for protection of aquatic life (5 CCR 1002-8), EPA AWQC, or risk-based values derived from other sources such as the environmental restoration program at ORNL (Suter and Mabrey 1994). Because the surface-water standards are promulgated standards, no background comparison was performed.

Statewide standards have been promulgated for some metals and indicator parameters but not for most organic compounds or radionuclides (5 CCR 1002-8, September 1993). The Colorado Water Quality Control Commission (CWQCC) has classified segments of Walnut Creek and Woman Creek at RFETS as capable of supporting "Class 2 Aquatic Life." Class 2 streams are not capable of sustaining a wide variety of aquatic fauna because of a lack of physical habitat, insufficient flow, or uncorrectable water-quality conditions (5 CCR 1002-8, April 1993). Aquatic standards for Class 2 stream segments are set on a site-specific basis. The CWQCC published site-specific standards for some organics and radionuclides for segments 4 and 5 of the Big Dry Creek basin, which includes parts of RFETS (5 CCR 1002-8, April 1993).

Colorado standards are based on EPA AWQC. These criteria use available toxicological data from multiple studies and species to derive water-borne chemical concentrations that are not expected to result in toxicity to 95 percent of the species for which data are available. Criteria and water-quality standards are available for evaluating acute and chronic exposures. Chronic criteria and standards were used where available. Because they are based on the AWQC, the Colorado standards are considered risk-based criteria.

Aquatic benchmarks presented in ORNL (1994) may be used when neither state water quality standards nor AWQC are available. The endpoints used in ORNL (1994) are based on effects at population and

community levels and differ from those used in the AWQC. The resulting ORNL benchmarks tend to be less stringent than Colorado standards. Benchmarks in ORNL (1994) may also be used to supplement the Colorado standards in interpreting risks to aquatic biota.

N3.2.7.4 Aquatic Life: Sediment TRVs

Sediment quality benchmarks (SQBs) were derived from EPA guidance on estimating sediment quality criteria (EPA 1992c) and from risk-based sediment benchmarks developed from other freshwater sites in the United States and Canada (Hull and Suter 1994). Benchmarks for most non-ionic organic compounds used the equilibrium partitioning approach recommended by EPA (1992c). This approach is based on the assumption that sediment toxicity is primarily dependent upon contaminant concentration in the interstitial water. Information on the aqueous solubility of the contaminant and the total organic carbon content of the sediment is used to estimate a concentration in bulk sediment that would result in an interstitial water concentration equal to the water-quality benchmark. Benchmarks for metals in sediments were taken primarily from risk-based values developed for freshwater habitats at other sites (Hull and Suter 1994).

EPA has developed interim sediment quality criteria (ISQC) for a limited set of organic chemicals. When these criteria were available, they were used as the basis for sediment benchmarks, as shown below:

$$SQB = f_{oc} \times ISQC \qquad \text{(N-13)}$$

where

f_{oc} = fraction of organic carbon

The Hull and Suter (1994) approach, used for nonionic organics without ISQC, is

$$SQB = f_{oc} \times K_{ow} \times WQS \qquad \text{(N-14)}$$

where

K_{ow} = octanol-water partition coefficient
WQS = water quality standard.

Both methods of developing organic sediment benchmarks rely on the f_{oc} in the sediment. Therefore, sediment benchmarks for organics were developed on a pond-by-pond basis. Sediment TRVs are presented in Attachment 2, Table 13.

N3.2.7.5 Radionuclide TRVs

Benchmarks for evaluation of radionuclide exposure were developed by a consortium of scientists from RFETS, Los Alamos National Laboratory, Argonne National Laboratory, and Oregon State University (Higley and Kuperman 1995). These radiological benchmarks are based on a limiting species concept with a dose limit of 100 millirad per day (mrad/day) for terrestrial and aquatic species. Data show that population-level or reproductive effects to ecological receptors have not been observed at this dose limit (Higley and Kuperman 1995). Limiting tissue concentrations (or activities) were back-calculated from the dose limit. Radionuclide-specific benchmarks accounted for the differing biological effectiveness of the various decay types, as well as total radionuclide exposure, bioaccumulation, and bioconcentration. Benchmarks for soil, sediment, and surface water were developed, including alternative pathways of exposure to each receptor. No background comparison was included in the radionuclide benchmarks because they were developed specifically for RFETS. Radionuclide benchmarks are provided in Attachment 2, Table 14.

Small mammals were chosen as the limiting terrestrial species for the surface-soil exposure route. Soil exposures included concentration ratios and the ratio of radionuclide concentration in abiotic media to the chemical concentration in tissue. Vegetation benchmarks for radionuclides were not available. However, RFETS-specific small mammal benchmarks for radionuclides are presented in lieu of vegetation benchmarks because they are considered to be protective of all ecological receptors (Higley and Kuperman 1995).

Surface-water benchmarks were based on potential effects to aquatic species because benchmarks derived for aquatic species are more restrictive than those for terrestrial species. The surface-water methodology used a concentration ratio (Section N3.2.6). The CWQCC published site-specific standards for some radionuclides in segments 4 and 5 of the Big Dry Creek basin, which includes parts of RFETS (5 CCR 1002-8, April 1993).

Sediment benchmarks included both water column and sediment dwellers. Sediment benchmarks were developed with a distribution coefficient that was the lesser of the bioconcentration factor and the concentration ratio.

N3.2.8 Data Management

Initially, PCOCs were to be screened using the original contractor data sets. However, it was not possible to combine data sets due to substantial differences in data management procedures, final formats, and the possibility of duplicated data between data sets. Consequently, PCOC data used in the screen were extracted from the Rocky Flats Environmental Database System (RFEDS). All data collected matched location codes used by the contractor that initially identified the PCOCs.

N3.2.8.1 Data Review and Cleanup

Analytical data used in this report were extracted for the period January 1990 through March 1995 from RFEDS. In addition to the analytical data from environmental samples, RFEDS includes information such as field quality control (QC) samples and analytical results for sample dilutions.

Data were received in electronic format from RFEDS and systematically reviewed and organized to achieve a standard format for each record. These routines are based in part on guidance received from EG&G (EG&G 1994c) (Figure N3-8). Prior to data evaluation, the database was edited and made internally consistent by the following steps:

- Records reported with undefined units, laboratory qualifiers, or validation codes; blank results or unit fields; and nonradionuclide results equal to zero were researched. If a resolution was not possible, these records were labeled as unusable.

- Tentatively identified compound (TIC) records were labeled based on a result type or secondary result type of "TIC," or laboratory qualifier of "A" or "N."

- RFEDS assigned "Z" to the following sample records; records assigned a validation code of "Z" were removed from the database

- Samples analyzed at onsite laboratories

- Geophysical samples

- Sample numbers starting with NP (for National Pollutant Discharge Elimination System) or VW (for surveillance surface water)

- All laboratory quality assurance (QA) records that are typically stored in a separate RFEDS database

- Records with a blank result field and information in the laboratory disposition field

- Result values were converted to consistent units of measurement for each group of analytes for each media type.

Matrix	Analytical Group	Units
Soil	Metals and Water-Quality Parameters	milligrams per kilogram
	Radionuclides	picocuries per gram
	VOCs and SVOCs	micrograms per kilogram
Water	Radionuclides	picocuries per liter
	All other analytical groups	micrograms per liter

- A usability category was assigned based on validation codes and laboratory qualifiers (Table N3-18; Attachment 3, Tables 1 and 2).

- Results that indicated detection of an analyte and results that indicated nondetections were labeled. Metals, water-quality parameters, VOC, and semivolatile organic compound (SVOC) records with laboratory qualifiers of U, UC, UE, UJ, UN, UW, and UX were labeled "nondetections." All records for radionuclides were labeled "detections" regardless of laboratory qualifier.

- The reported detection limit was checked against the contract-required detection limit (CRDL) specified in the General Radiochemistry and Routine Analytical Services Protocol (GRRASP). If these two values were equal, the value stored in the result field was used as the instrument detection limit (IDL) for metals or the method detection limit (MDL) for SVOC and VOC records.

An internally consistent database of supportable data, with standardized units of measurement, was developed using these cleanup steps. Detection and nondetection criteria, quantity summaries, validation status, and usability status of the records were compiled from this database.

The following additional formatting steps were performed to produce the final sitewide ERA database:

- Records for duplicate samples, field blanks, trip blanks, and equipment rinses were copied to the QC database.
- TIC records were removed.
- Records assigned a "Z" validation code were removed.
- Records labeled as unusable or rejected were removed.

In the resulting database, duplicate records were identified and researched to determine which record to use based on the result type (for example, TRG [target], DIL [dilution], REP [replicate], REX [re-extraction]), laboratory qualifier, and validation code. Records not used were removed and stored. The following criteria were used interactively to identify the most accurate record:

- If none of the records was validated, the TRG record was kept and the other(s) was removed.
- If one record was validated and the other(s) was not, the validated record was kept and the other(s) was removed.

- If more than one record was validated, the record with the highest "rank" in the validation code hierarchy was kept and the other(s) was removed.

Validation Code Hierarchy	
V	Highest
A, JA	Second Highest
Y, blank	Third Highest

- If the records had the same validation code, the record with highest concentration (to be most conservative) was kept and the other(s) were removed.

Source area designations were assigned based on whether or not each location fell within the boundaries of a given source area.

The resulting final database was subdivided into the following media-specific databases: biota, sediment, surface soil, surface water, subsurface soil, and groundwater.

N3.2.8.2 Summary Statistics

Summary statistics were calculated for each medium by source area and analyte. For each of the PCOCs in each of the media-specific databases, mean concentration, 95% UCL of the mean concentration (1-tailed upper 95 percent confidence limit of the true mean), maximum detected concentration, detection frequency, and standard deviation were calculated.

Prior to performing statistical comparisons, data from the working database were systematically reviewed to identify records for nondetections. A new result value was assigned to the nondetection records for use in statistical summaries or comparison tests. In statistical summaries (e.g., and mean, standard deviation), this value is either one-half the reported detection limit when the IDL or MDL is reported or one-half the result when the CRDL is reported (EG&G 1994c). In the statistical comparison tests, this value is the reported detection limit (Gilbert 1993).

The 95% UCL was selected as a reasonable upper bound estimate of the exposure-point concentration. However, the 95% UCL is sensitive to large variances sometimes produced by small sample size or varying detection limits. Large variances can cause the 95% UCL to exceed the maximum detected concentration. The exposure-point concentration was created to address this potential problem and identified as the lesser of two values—95% UCL or the maximum detected concentration.

Background abiotic summary statistics were obtained from the Statistical Applications Group at EG&G. These data were recommended and approved by EPA. Biotic background summary statistics were calculated from data gathered in support of RFI/RI activities.

N3.3 RESULTS OF PRELIMINARY EXPOSURE SCREEN

The combined list of sitewide PCOCs was screened using methods described in Sections N3.1 and N3.2. Results from the risk screen were compiled and presented to EPA, EG&G, and DOE on May 31, 1995. Results of the preliminary risk screen were reviewed with EPA in a meeting on June 5, 1995. As a result of this meeting, ECOCs were identified and adjustments made in the screening calculations. Results of the preliminary risk screen are briefly described in the following subsections. Detailed results are presented in Attachments 4 through 6. A summary that lists the number of analytes with HQs greater than 1 for each source area having HIs greater than 1 is presented in Table N3-19.

ECOC screens were conducted for the three wide-ranging species (coyote, mule deer, and red-tailed hawk) and the four receptors with more restricted home ranges (limiting species). Risk for wide-ranging species was negligible; no HQs or HIs were greater than 1. No exposure risk estimate for any of the wide-ranging species resulted in a source area HQ or HI greater than 1. ECOCs were identified for the more limiting species and aquatic receptors that may spend most of their time in small areas and, therefore, are potentially in more frequent contact with contaminants (Table N3-20).

ECOCs were identified for each receptor and source area according to the following criteria (Figure N3-9). Analyte must:

- Have HQ greater than or equal to 1

- Be a PCOC in the relevant OU for each source area

- Not be an essential nutrient (such as magnesium or iron; potentially toxic trace metals such as zinc were not excluded)

- Have detection frequencies adequate to describe contamination. (This decision made on a consensus basis with EPA and DOE representatives. See meeting minutes for June 5, 1995)

PCOCs associated with an HQ greater than 1, but not included in the final list of ECOCs are listed in Table N3-21. The rationale for not including each analyte is also presented. The final list of ECOCs to be analyzed further in the risk characterization (Sections N4 and N5) is presented in Tables N3-20 and N3-22.

Results of exposure and risk estimates are described separately for aquatic organisms, wildlife, and vegetation. The risk estimate for each receptor group is described on sitewide (HI_{total} and HQ_{mean}), watershed ($HI_{watershed}$), and source area ($HI_{source\ area}$, $HQ_{source\ area}$) bases.

ECOCs were identified for all source areas except OU 1 881 Hillside, OU 5 Surface Disturbance, OU 6 Burial Trenches, OU 10 Outside Closures, and OU 11 West Spray Field (Figures N3-2 and N3-3). However, little data were available for estimating exposures in these source areas.

ECOCs and preliminary risk calculations are described below by receptor and source area. Data are presented for source areas in order of descending risk.

N3.3.1 Aquatic Organisms

Risk to aquatic life was primarily due to organic contaminants in sediments. Risk from surface water PCOCs was limited to a small number of inorganic chemicals and was of low magnitude.

N3.3.1.1 Sediments

Sediments	HI_{mean}
$HI_{Walnut\ Creek\ watershed}$	260
$HI_{Woman\ Creek\ watershed}$	2.3

Preliminary risk calculations were made on the basis of individual ponds and stream segments to clearly identify contaminant sources. The HI for exposure of aquatic life to sediments ranged from 1.3 in Woman Creek to 35,000 in Pond A-2, indicating extreme variability in potentially toxic conditions. PCOCs contributing the most to risk estimates are PAHs and PCBs with HQs greater than 100. Silver is the primary inorganic ECOC, with concentrations that greatly exceeded aquatic life TRVs (Attachment 1, Tables 1 through 4).

A-Ponds (Attachment 4, Table 1)

Pond A-1: HI = 160

Anthracene, chrysene, and benzo(b)fluoranthene had HQs of 89, 34, and 18, respectively. Other ECOCs in Pond A-1 had HQs between 1 and 10; these analytes included antimony, magnesium, toluene, cobalt, vanadium, Aroclor-1254, and benzo(k)fluoranthene.

Pond A-2: HI = 17

No ECOCs have HQs greater than 10. Analytes with HQs between 1 and 10 were chrysene, magnesium, aldrin, zinc, benzoic acid, cobalt, acetone, and vanadium.

Pond A-3: HI = 59

Chrysene and benzo(b)fluoranthene had HQ values of 29.1 and 18.3, respectively. Other ECOCs with HQs between 1 and 10 included antimony, magnesium, vanadium, cobalt, and zinc.

Pond A-4: HI = 13

No ECOCs had HQs greater than 10. Analytes with HQs between 1 and 10 were antimony, magnesium, vanadium, and cobalt.

Pond A-5: HI = 16

No ECOCs had HQs greater than 10. Analytes with HQs between 1 and 10 were benzoic acid, acetone, cobalt, magnesium, and vanadium.

B-Ponds (Attachment 4, Table 2)

Pond B-1: HI = 2,000

Fluorene, anthracene, chrysene, silver, benzo(b)fluoranthene, and heptachlor had HQs ranging from 13 to 1,438. ECOCs with HQs less than 10 and greater than 1 included Aroclor-1254, zinc, methylene chloride, benzo(k)fluoranthene, copper, acetone, magnesium, cobalt, dibenzo(ah)anthracene, and vanadium.

Pond B-4: HI = 250

Anthracene, chrysene, benzo(b)fluoranthene, and silver had HQs ranging from 15 to 105. Other ECOCs with HQs less than 10 and greater than 1 included antimony, gamma-BHC (Lindane), magnesium, benzo(k)fluoranthene, vanadium, Aroclor-1254, zinc, and cobalt.

Pond B-3: HI = 130

Silver, chrysene, and benzo(b)fluoranthene had HQs ranging from 18 to 63. Most other ECOCs in Pond B-3 had HQs less than 10 and greater than 1; these analytes included antimony, Aroclor-1254, copper, magnesium, zinc, cobalt, and vanadium.

Pond B-2: HI = 74

Silver has an HQ of 52. Other ECOCs had HQs less than 10 and greater than 1; these analytes were chrysene, Aroclor-1254, magnesium, acetone, cobalt, manganese, and vanadium.

Pond B-5: HI = 8.1

ECOCs in Pond B-5 that had HQs less than 10 and greater than 1 were magnesium, vanadium, and cobalt.

The Walnut Creek watershed risk characterization was focused on several aspects, including the spatial distribution, possible toxic effects, and appropriateness of calculated benchmarks for PCBs and PAHs. The aquatic community in ponds and streams within the Walnut Creek watershed was also evaluated for apparent effects of ecotoxicity.

Walnut Creek (Attachment 4, Table 3)

South Walnut Creek: HI = 230

Anthracene, chrysene, benzo(b)fluoranthene, and methylene chloride had HQs greater than 10, ranging from 17 to 138. ECOCs that had HQs less than 10 and greater than 1 were zinc, benzo(k)fluoranthene, magnesium, benzoic acid, vanadium, barium, strontium, and cobalt.

North Walnut Creek: HI = 180

Anthracene, chrysene, and benzo(b)fluoranthene had HQs ranging from 15 to 107. ECOCs that had HQs less than 10 and greater than 1 were methylene chloride, benzoic acid, magnesium, barium, cobalt, vanadium, manganese, strontium, and acetone.

Woman Creek (Attachment 4, Table 4)

Pond C-2: HI = 3.0

Benzoic acid and zinc were the only ECOCs with HQs greater than 1 (1.7 and 1.3, respectively).

Pond C-1: HI = 2.6

Benzoic acid was the only ECOC with an HQ greater than 1 (HQ = 2.6).

The focus for the risk characterization on the Woman Creek watershed is limited due to the relatively small HQs and HIs. The benzoic acid sediment benchmark and the aquatic community are evaluated in relation to watershed management practices.

N3.3.1.2 Surface Water

Surface Water	Mean
HI_{total}	30
$HI_{Walnut\ Creek}$	33
$HI_{Woman\ Creek}$	32

As described in Section N3.2.7, preliminary risk calculations were made using only the PCOCs for each relevant OU. Therefore, the HI does not include PCOCs that were not relevant to the source area analyzed. Barium was the only ECOC in each source area analyzed, ranging from 13 in OU 6 B-Ponds to 45 in OU 7 Downgradient (Attachment 4, Table 5). Barium was the only surface-water ECOC in the following source areas:

Source Area	Barium HQ	$HI_{source\ area}$
OU 7 Downgradient	45	49
OU 5 Old Landfill	37	38
OU 5 C-Ponds	24	26
OU 5 Ash Pits	17	18

There are no aquatic-life-based surface water standards available for barium. The Safe Drinking Water Act (SDWA) set the barium maximum contaminant level (MCL) and maximum contaminant level goal (MCLG) at 2,000 µg/L for human consumption. IRIS reported a human NOAEL of 10 mg/L. The Clean Water Act's AWQC chose not to set barium standards for aquatic organisms. Soluble and toxic forms of barium in freshwater or marine ecosystems were thought unlikely because of the physical and chemical properties of barium. Therefore, EPA chose not to set freshwater or marine AWQC.

The aquatic barium standard used in the previous screen (May 1995) was not a regulatory standard and was the only aquatic-life-based standard available. However, this standard was calculated as a Tier 2 secondary chronic value by Suter and Mabrey (1994) as described in the Proposed Water Quality Guidance for the Great Lakes System (EPA 1993c). This calculation was inappropriate considering barium is not believed to be toxic to aquatic life under freshwater conditions likely to occur.

N3.3.2 Wildlife

Preliminary risk calculations for wildlife species are summarized in the following sections. Exposure estimates are presented in the tables and figures in Attachment 5. Analytes that were not included in the wildlife screen and reasons for their omission (such as, no TRV available or limited abiotic data available) are listed in the tables in Attachment 5.

As noted, the HI_{total} for each wide-ranging species was less than 10: mule deer = 4.22, coyote = 1.78, and red-tailed hawk = 4.35, and no individual HI exceeded 0.05. Therefore, no ECOCs were identified for wide-ranging species.

The $HI_{source\ areas}$ for limiting species were greater than 1, suggesting that the potential for ecotoxic exposure is not negligible (Figures N3-10 and N3-11). However, conservative assumptions were used to estimate exposure, and risk may be overestimated. Conservative assumptions were reassessed in the risk characterization for ECOCs (Sections N4 and N5).

N3.3.2.1 Limiting Species

Preble's Meadow Jumping Mouse

Preble's Meadow Jumping Mouse	Mean
HI_{total}	5.40
$HI_{Walnut\ Creek}$	5.66
$HI_{Woman\ Creek}$	5.17

PMJM was selected to represent small mammals because of its omnivorous diet and special legal status. However, risk estimates may be extrapolated to other species. The potential risk to PMJM at RFETS is consistent across source areas (Figure N3-12), with HIs ranging from 8.10 in OU 4 Downgradient to 0.72 in the OU2 Mound Area.

OU 7 Downgradient and OU 6 North Spray Field were the only source areas with ECOCs with HQ greater than 1 (selenium and barium).

OU 7 Downgradient: HI = 6.47

Selenium contributes 36.46 percent of the total risk in the OU 7 Downgradient area (HQ = 2.36); most of the exposure is due to ingestion of vegetation with high selenium concentrations.

OU 6 North Spray Fields: HI = 6.38

Barium contributes 16.48 percent of the total risk in OU 6 North Spray Fields (HQ = 1.05). Most of the barium intake was due to ingestion of vegetation with high barium concentrations.

Further risk characterization focused on refining risk and toxicity estimates of barium and selenium to PMJM. Spatial distributions of potentially ecotoxic vegetation were also characterized (Sections N4 and N5).

American Kestrel

American Kestrel	Mean
HI_{total}	6.70
$HI_{Walnut\ Creek}$	8.48
$HI_{Woman\ Creek}$	7.50

OU 2 East Trenches and OU 6 B-Ponds source areas had the highest HIs of 24.71 and 17.39, respectively. OU 6 A-Ponds, OU 6 Soil Dump Area, OU 2 903 Pad, OU 1 881 Hillside, OU 5 Ash Pits, OU 5 Old Landfill, OU 7 Downgradient, OU 11 West Spray Field, OU 2 Mounds Area, OU 5 C-Ponds, and OU 6 Burial Trenches also had HIs greater than 1. Mercury, chromium, lead, and vanadium were the ECOCs for the American kestrel at RFETS (Figure N3-13).

OU 2 East Trenches: HI = 24.71

Chromium was the only ECOC in the East Trenches, contributing 17.65 percent of the total risk (HQ = 4.36). The primary source of intake was ingestion of terrestrial arthropods.

OU 6 B-Ponds: HI = 17.39

Vanadium and lead were the only ECOCs, contributing 16.46 percent and 7.17 percent, respectively to the total risk (HQ = 2.86 and 1.25). For both chemicals, the potentially ecotoxic exposure was due to ingestion of small mammals. Mercury also had an HQ of 1. However, this analyte was not identified as an ECOC because (1) the preliminary risk estimate assumes 100 percent site use, (2) seasonal migration of kestrels reduces the contact with contaminated areas, and (3) only two of nine small mammal samples had mercury concentrations above the detection limit (see meeting minutes June 5, 1995). Therefore, the probability of a kestrel ingesting ecotoxic concentrations is minimal.

OU 6 A-Ponds: HI = 12.51

Lead and chromium were the only ECOCs, contributing 14.03 percent and 10.63 percent, respectively of the total risk (HQ = 1.76 and 1.33). The risk of ecotoxic exposure to American kestrels was due to

ingestion of small mammals. Zinc was also associated with an HQ greater than 1. However, zinc was not included in ECOCs for this source area because it is an essential nutrient (EPA 1995). Vanadiam has an HQ>1, and is a PCOC in OU 6, but determined not to be an ECOC by EPA (EPA 1995a).

OU 6 Soil Dump Area: HI = 11.07

Mercury was the only ECOC, contributing 28.39 percent of the total risk (HQ = 3.14). The primary exposure pathway was ingestion of small mammals.

OU 2 903 Pad: HI = 10.78

Chromium was the only ECOC, contributing 51.54 percent of the total risk (HQ = 5.56). The primary exposure pathway was ingestion of terrestrial arthropods.

OU 4 Downgradient: HI = 4.21

Mercury was the only ECOC, contributing 32.26 percent of the total risk (HQ = 1.36). The primary exposure pathway was ingestion of small mammals.

OU 2 Mound Area: HI = 2.80

Chromium contributed 90.27 percent of the total risk (HQ = 2.53) in this source area. The primary exposure pathway was ingestion of terrestrial arthropods.

The risk characterization for American kestrels was focused on the bioavailability of ECOCs. The spatial distribution of potentially ecotoxic terrestrial arthropods and small mammals were also characterized. In addition, seasonal use and associated lower risks to the RFETS American kestrel population were assessed.

Great Blue Heron

Results of the exposure estimation indicate potentially significant risk in all source areas potentially used by great blue herons (Old Landfill, A-Ponds, B-Ponds, C-Ponds, 881 Hillside, and Ash Pits) (Figure N3-14). The HI_{mean} for all source areas was 17.92 with most risk due to mercury, antimony, and di-N-butyl phthalate (DBP).

Great Blue Heron	Mean
HI_{total}	17.92
$HI_{Walnut\ Creek}$	16.68
$HI_{Woman\ Creek}$	16.64

OU 5 Old Landfill: HI = 41.23

Mercury and antimony were the only ECOCs, contributing 69.85 and 3.78, percent respectively, of the total exposure risk. Mercury had an HQ of 28.8, primarily from estimated concentrations in fish. Antimony had an HQ of 1.56 due to ingestion of contaminated sediment.

OU 6 A-Ponds: HI = 23.50

The A-Ponds had an HI of 23.50, 70.45 percent of which was from estimated concentrations of DBP in fish tissues eaten by great blue herons (HQ = 16.36).

OU 6 B-Ponds: HI = 18.70

DBP and mercury were the only ECOCs. DBP had an HQ of 8.27 (44.21 percent of the total risk), due to estimated concentrations in fish. Mercury had an HQ of 2.40, also from estimated concentrations in fish tissue, contributing 12.83 percent of the total risk.

OU 5 C-Ponds: HI = 17.19

Mercury was the only ECOC in the C-Ponds, with an HQ of 6.40 from measured fish concentrations (37.24 percent of total risk). Copper also had an HQ greater than 1 (1.14) but was not identified as an ECOC because it does not bioaccumulate, and realistic seasonal use factors reduced the HQ to negligible risk levels.

Mercury, DBP, and antimony were included in the ECOCs because they had HQs greater than 1. PCBs appeared to be relatively nontoxic under current conditions but were included in the ECOCs because of their potential to bioaccumulate.

Preliminary risk calculations for the great blue heron were based on year-round residence at RFETS. As described in the SCMTM (DOE 1995a), great blue herons are common in summer, rare in spring and fall, and uncommon in winter. The risk characterizations focused on probabilistic estimation of risk and review of contaminant distribution.

Mallard

Mallard	Mean
HI_{total}	1.33
$HI_{Walnut\ Creek}$	2.22
$HI_{Woman\ Creek}$	0.63

Based on screening estimates, the OU 6 A-Ponds, OU 5 C-Ponds, and OU 6 B-Ponds represent the highest risk of exposure to mallards (HI = 4.55, 1.67, and 1.60, respectively) (Figure N3-15). The HI total for the A, B, and C-Ponds was 7.82. DBP in surface water in the A-Ponds was the only PCOC with an HQ greater than 1 and was identified as an ECOC. DBP risk to mallards (43.92 percent of the total) was due to ingestion of benthic macroinvertebrates.

Risk characterization focused on characterizing potential for DBP bioconcentration in the aquatic prey species in each of the A-Ponds. Although current concentrations of PCBs did not result in HQs greater than 1, these PCOCs were included in ECOCs because of their potential bioconcentration in aquatic prey.

N3.3.2.2 Wide-Ranging Species

Coyote: Sitewide HI mean = 0.14

All source areas pose negligible risks to the coyote population at RFETS (Figure N3-16). The source areas contributing the most ecotoxic exposure potential were OU 6 B-Ponds (HI = 0.44) and OU 6 A-Ponds (HI = 0.32). Every analyte evaluated had an HQ less than 1, and the mean HQ (HQ_{mean}) was less than 0.05.

Mule Deer: Sitewide HI mean = 0.34

All source areas pose negligible risk to the mule deer population at RFETS (Figure N3-17). The source area contributing the most ecotoxic exposure potential was OU 2 903 Pad (HI = 0.88). Every analyte evaluated had an HQ less than 1, and the HQ mean was less than 0.05.

Red-tailed Hawk: Sitewide HI mean = 0.32

All source areas pose negligible risk to red-tailed hawks at RFETS (Figure N3-18). The source area contributing the most ecotoxic exposure potential was the OU 6 B-Ponds (HI = 0.77). Every analyte evaluated had an HQ less than 1, and the HQ mean was less than 0.05.

Based on the preliminary exposure and risk calculations, the risk to wide-ranging species was negligible. Therefore, they were not further evaluated in the risk characterization (Section N4).

N3.3.3 Vegetation

N3.3.3.1 Subsurface Soil Phytotoxicity

The vegetation analysis portion of the preliminary risk screen estimated risk to vegetation from subsurface soil contamination (Attachment 6, Tables 2 through 6). No HQ values were greater than 10, except nitrate/nitrite with an HQ of 170 in the OU 7 Downgradient Area. ECOCs with HQs between 1 and 10 included the following metals: chromium, nickel, zinc, copper, silver, strontium, antimony, lead,

vanadium, and cadmium. Each of these analytes was included in the subsurface soil ECOCs for vegetation.

N3.3.3.2 Sediment Phytotoxicity

Potential risk to vegetation growing in wetland or riparian areas were assessed using sediment exposure-point concentrations compared with phytotoxicity TRVs (Attachment 6, Table 6). No HQ values were greater than 10 except the following: silver and zinc in Pond B-1 and silver in Ponds B-2, B-3, and B-4. ECOCs with HQs between 1 and 10 included the following metals: antimony, chromium, mercury, strontium, vanadium, and zinc.

HIs were not applicable to vegetation communities. Exposure risk to vegetation was estimated on an individual phytotoxic basis because of the inability of plants to move and the patchiness of the contaminant distribution. Thus, each plant was not likely to come into contact with all contaminants within each source area.

Further risk characterization for vegetation communities focused on ECOC distribution within the source areas. If ECOC concentrations were found to be elevated only in limited portions of the source area, those portions were assessed for toxic effects on the vegetation community.

It should be noted that benchmarks were unavailable for many PCOCs because of the lack of phytotoxicological research on these contaminants. In addition, the diversity of soils, plant species, and chemical forms require the use of site-specific vegetation benchmarks (Will and Suter 1994). The concentrations of PCOCs for which TRVs were lacking are presented in Attachment 6, Tables 7 and 8. These exposures may be re-evaluated later when more toxicity information becomes available.

N3.3.4 Burrow Air-Exposure Screen

Small Mammals	Inhalation Risk
$HI_{OU\ 2\ 903\ Pad}$	1.88×10^3
$HI_{OU\ 2\ East\ Trenches}$	19.6
$HI_{OU\ 2\ Mound\ Area}$	0.567
$HI_{OU\ 5\ Old\ Landfill}$	0.886
HI_{mean}	475

Subsurface soil concentrations were screened using inhalation TRVs to determine the potential for risk to small mammals burrowing in the soils known to have high VOC concentrations (Attachment 6, Table 9).

No HQ values were greater than 10, except toluene, with an HQ of 19.6 in the OU 2 East Trenches, and 1,880 in the OU 2 903 Pad.

It should be noted that benchmarks were unavailable for many PCOCs because of the lack of phytotoxicological research on these contaminants. The concentrations of PCOCs for which TRVs were lacking are presented in Attachment 6, Table 10. These exposures may be re-evaluated later, when more toxicity information becomes available.

Further risk characterization for small mammal inhalation risk focused on toluene distribution within the source areas as well as detection frequency and data quality.

N3.3.5 Radionuclides Ecotoxic-Exposure Screen

Sitewide surface soil, surface water, and sediment maximum PCOC concentrations were compared against the radionuclide benchmarks (Higley and Kuperman 1995) (Attachment 6, Tables 11, 12, and 13). Sediment and surface water $HI_{sitewide}$ were 0.02 and 0.46, respectively. The surface soil $HI_{sitewide}$ was 28.2, indicating that ecotoxic exposure may not be negligible. PCOCs with HQs greater than 1 were plutonium-239/240, uranium-233/234, and uranium-238.

Plutonium-239/240: Sitewide maximum HQ was 1.92 (OU 2 903 Pad surface soils).

Uranium-233/234: Sitewide maximum HQ was 1.56 (OU 5 Old Landfill surface soil).

Uranium-238: Sitewide maximum HQ was 23.8 (OU 5 Old Landfill surface soil).

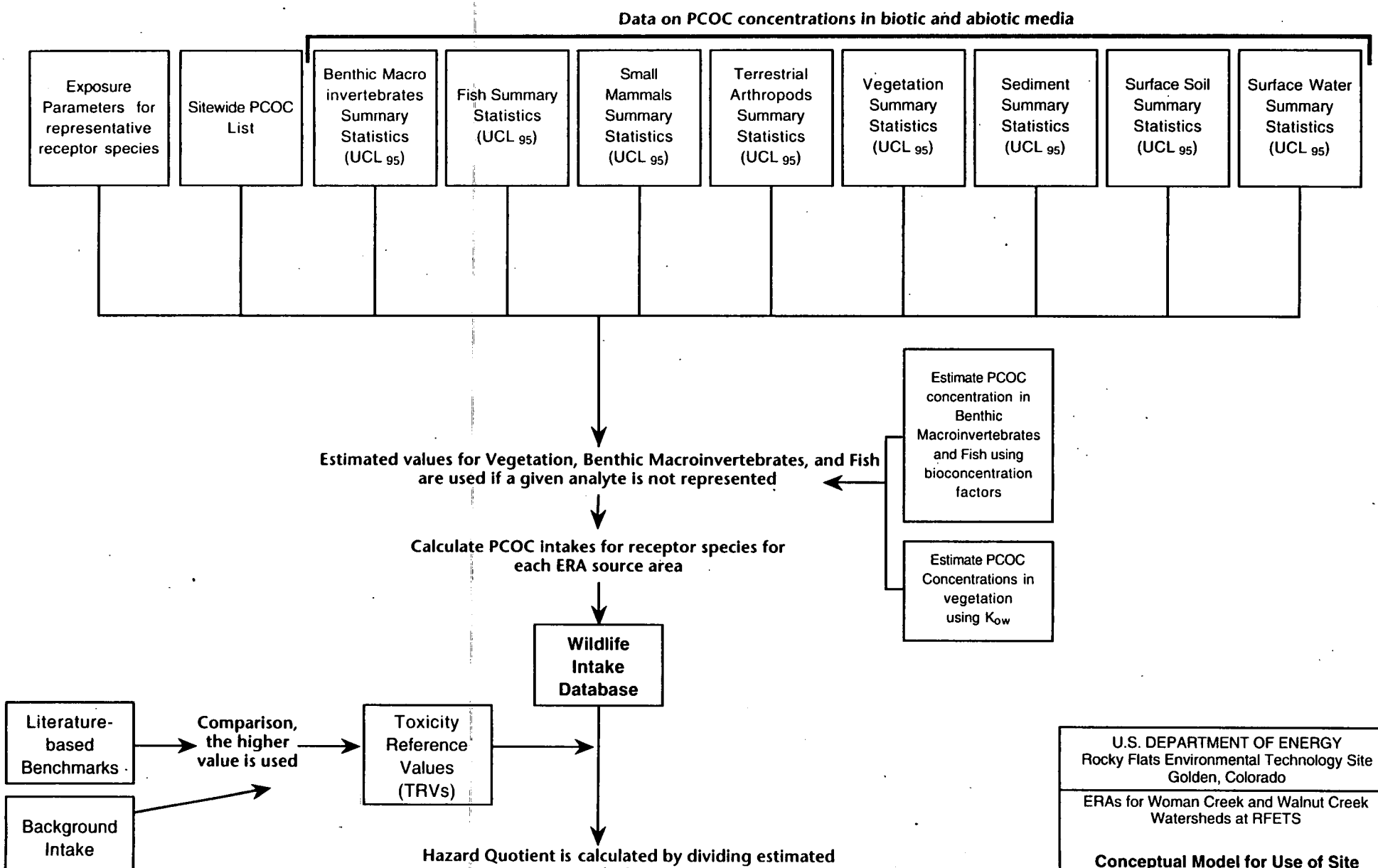
As described in Section N3.2.7, surface soil radionuclide TRVs were based on the bounding exposure of small mammals. Higley and Kuperman (1995) chose small mammals as limiting species based on their radionuclide sensitivity, small home ranges, and continuous contact with soil.

Further risk characterization focused on the radionuclide doses to small mammals and raptor species ingesting small mammals at RFETS. Body burdens required for critical doses were compared with RFETS data to evaluate the risks from radionuclides accumulating through the biological pathways.

The ECOCs chosen for further evaluation are americium-241, plutonium-239/240, radium-228, uranium-233/234, and uranium-238.

N3.4 FOCUS FOR RISK CHARACTERIZATION

The final ECOC list (Tables N3-20, N3-22, and N3-23) defines the analytes that will be further evaluated in Sections N4 and N5. Source areas, receptors at risk, exposure points, and ECOCs are defined in Tables N3-24 and N3-25.



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ERAs for Woman Creek and Walnut Creek Watersheds at RFETS

Conceptual Model for Use of Site Data and Literature Information in Exposure and Risk Estimates

September 1995 | Figure N3-4

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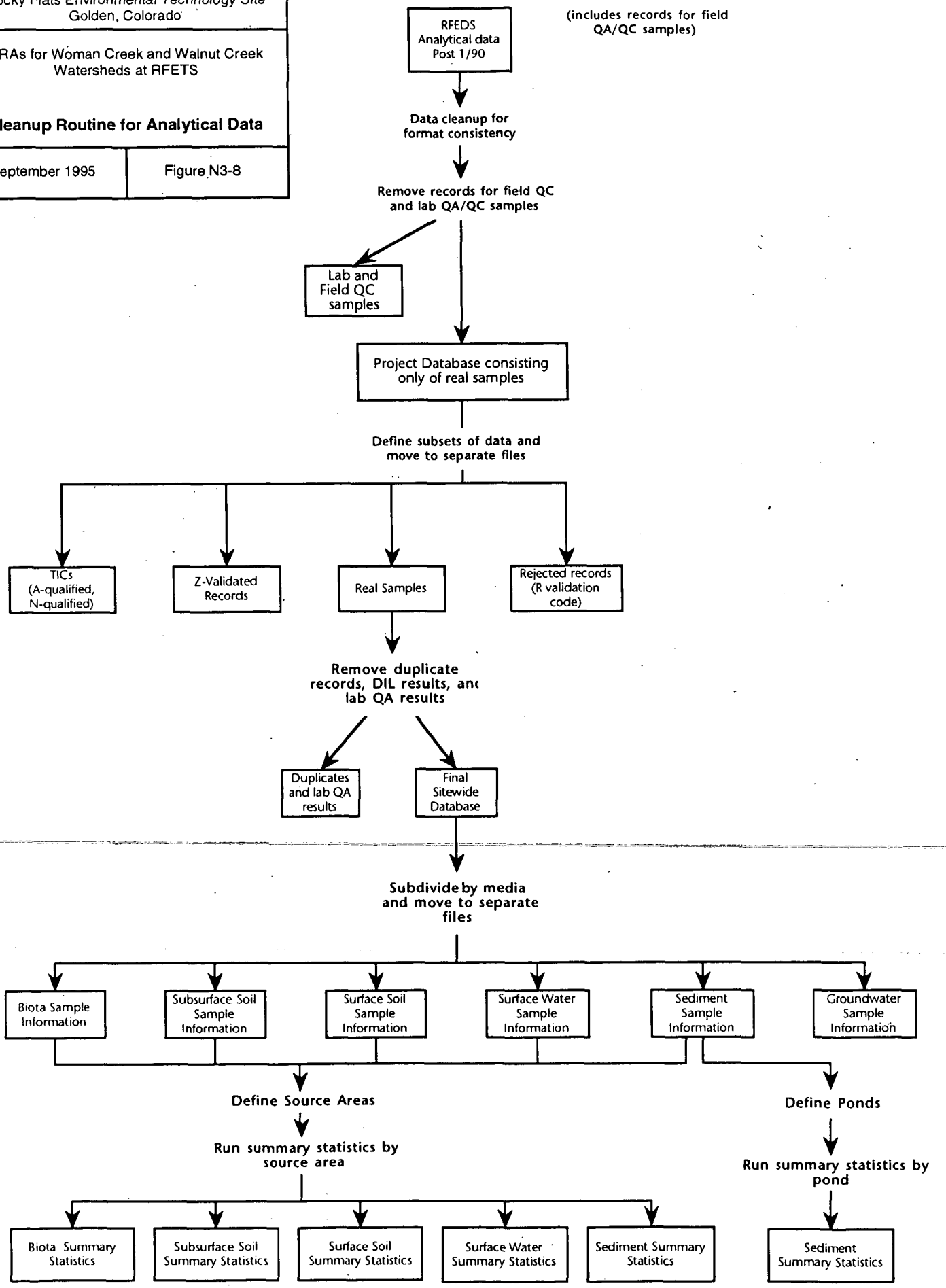
Golden, Colorado

ERAs for Woman Creek and Walnut Creek Watersheds at RFETS

Cleanup Routine for Analytical Data

September 1995 | Figure N3-8



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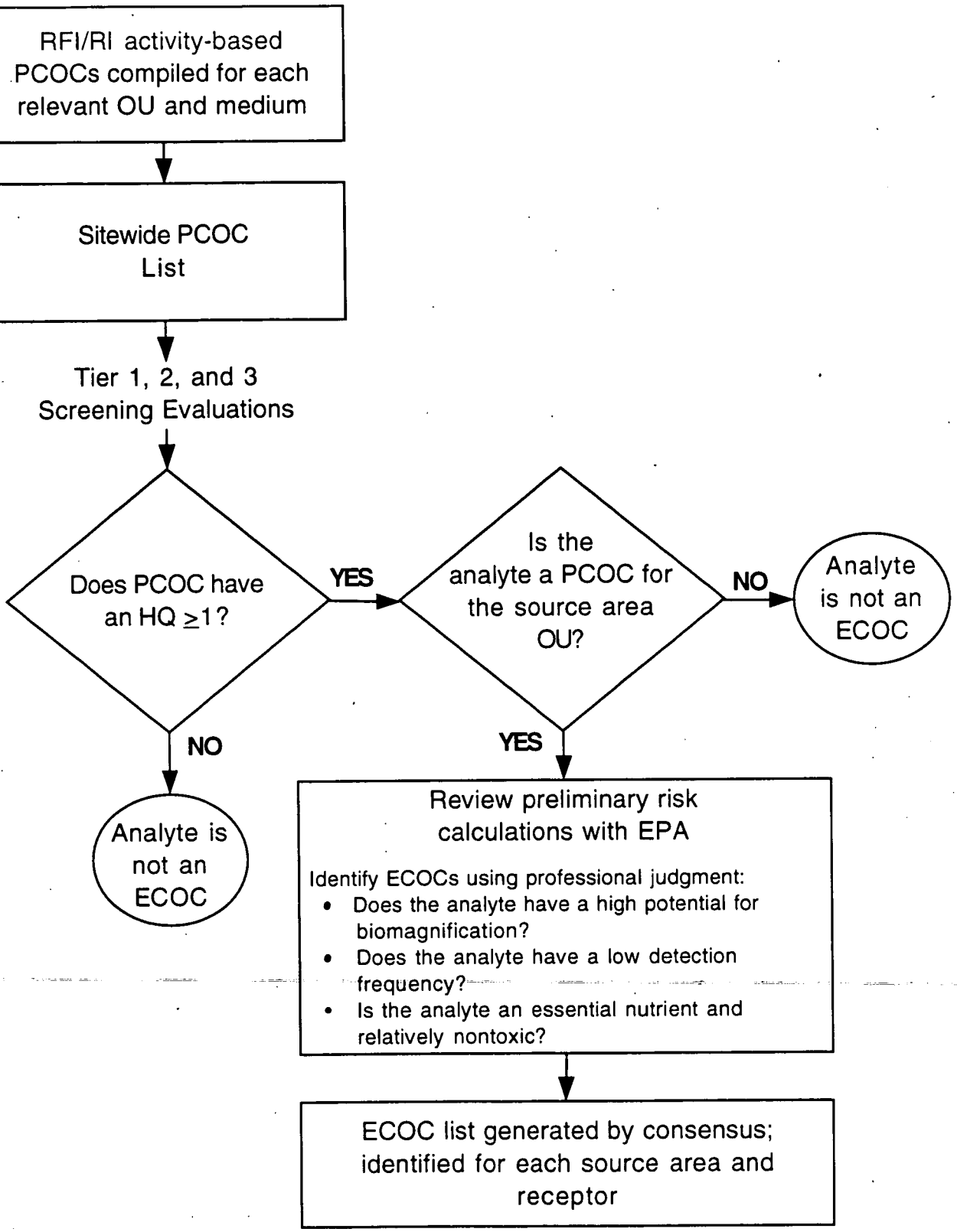

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ERAs for Woman Creek and Walnut Creek Watersheds at RFETS

Determination Process for Ecological Chemicals of Concern (ECOCs)

September 1995 | Figure N3-9

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Figure N3-12
Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mouse

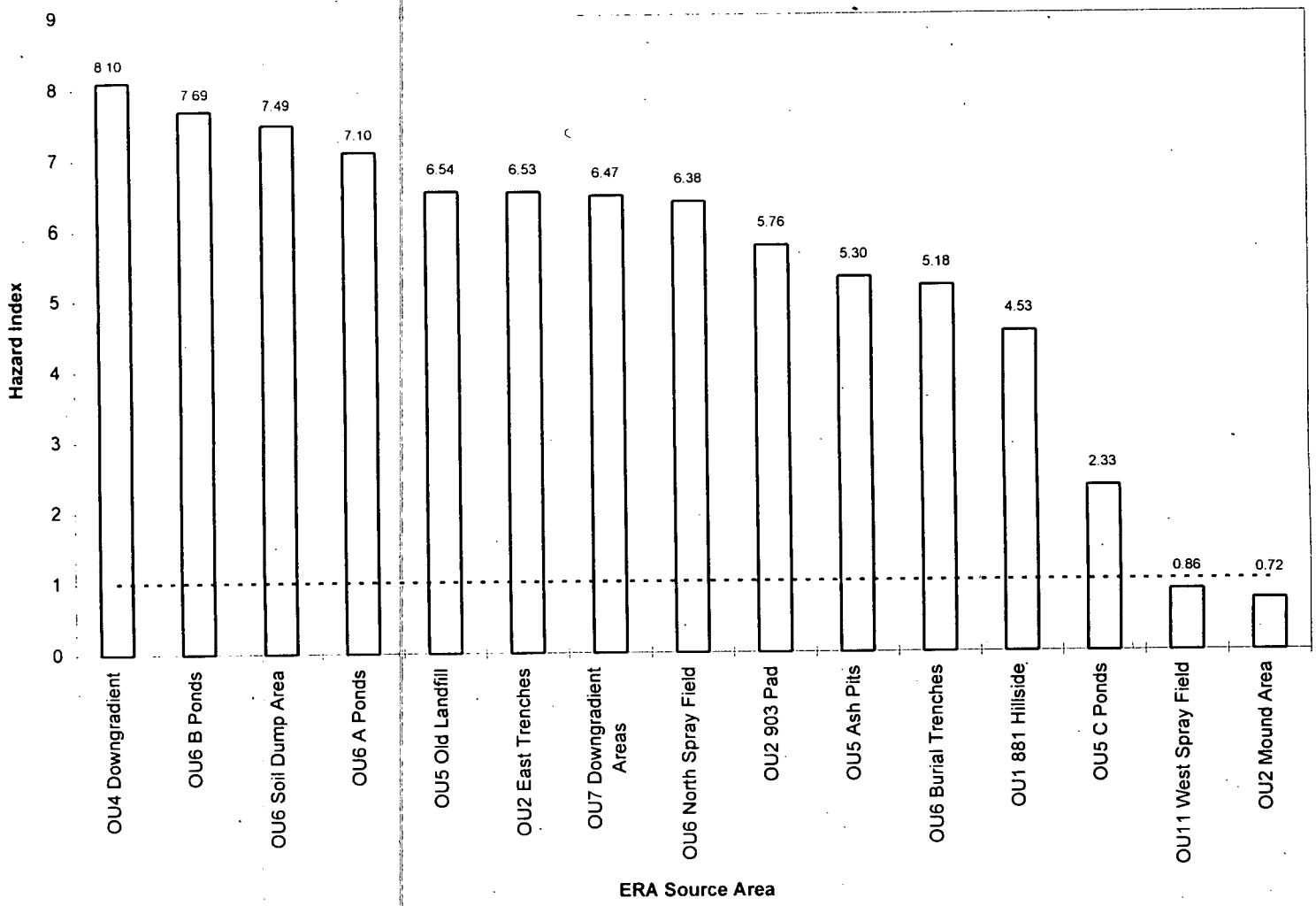

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Figure N3-13
Summary of Ecotoxicological Risk to American Kestrel

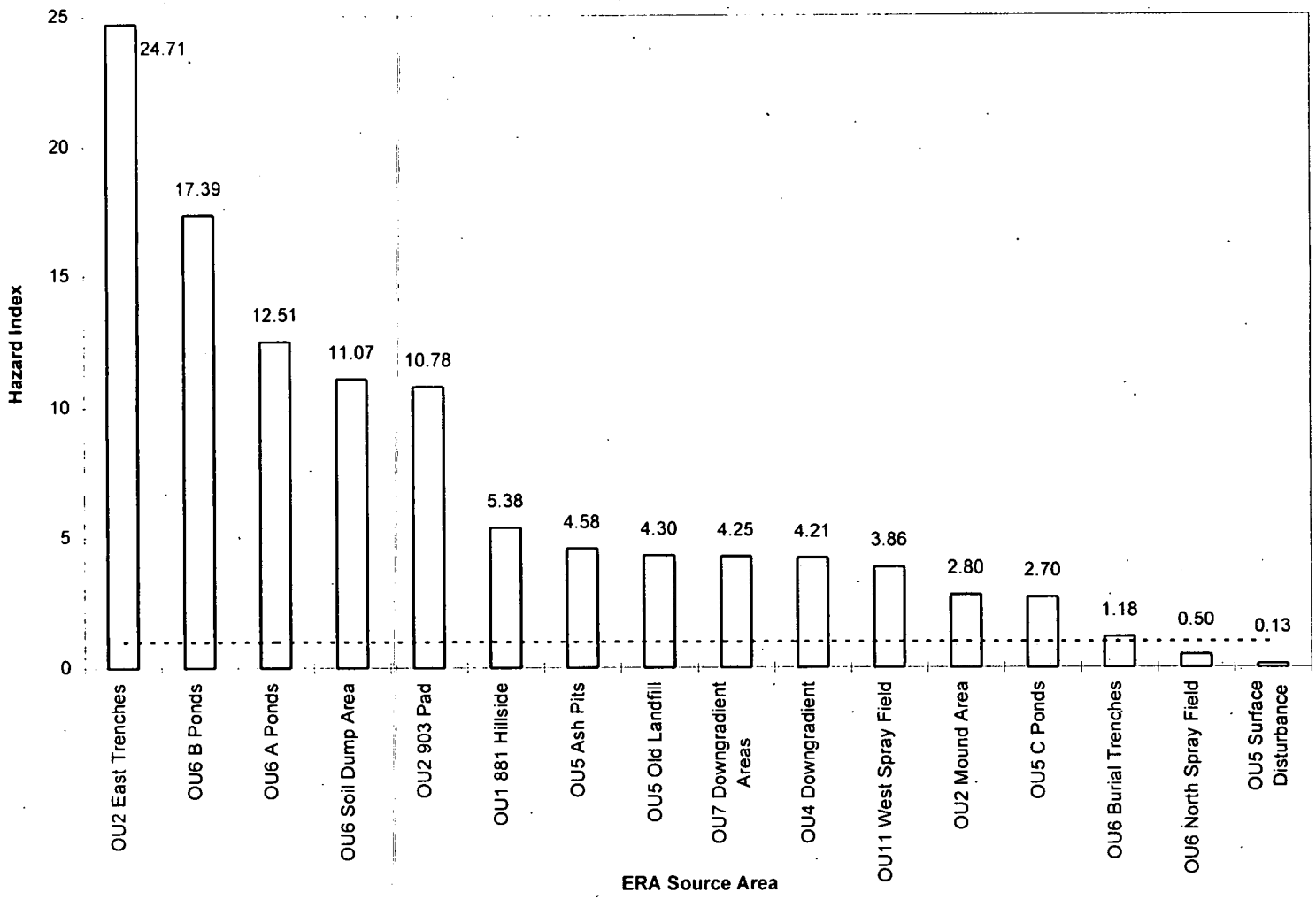

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Figure N3-14
Summary of Ecotoxicological Risk to Great Blue Heron

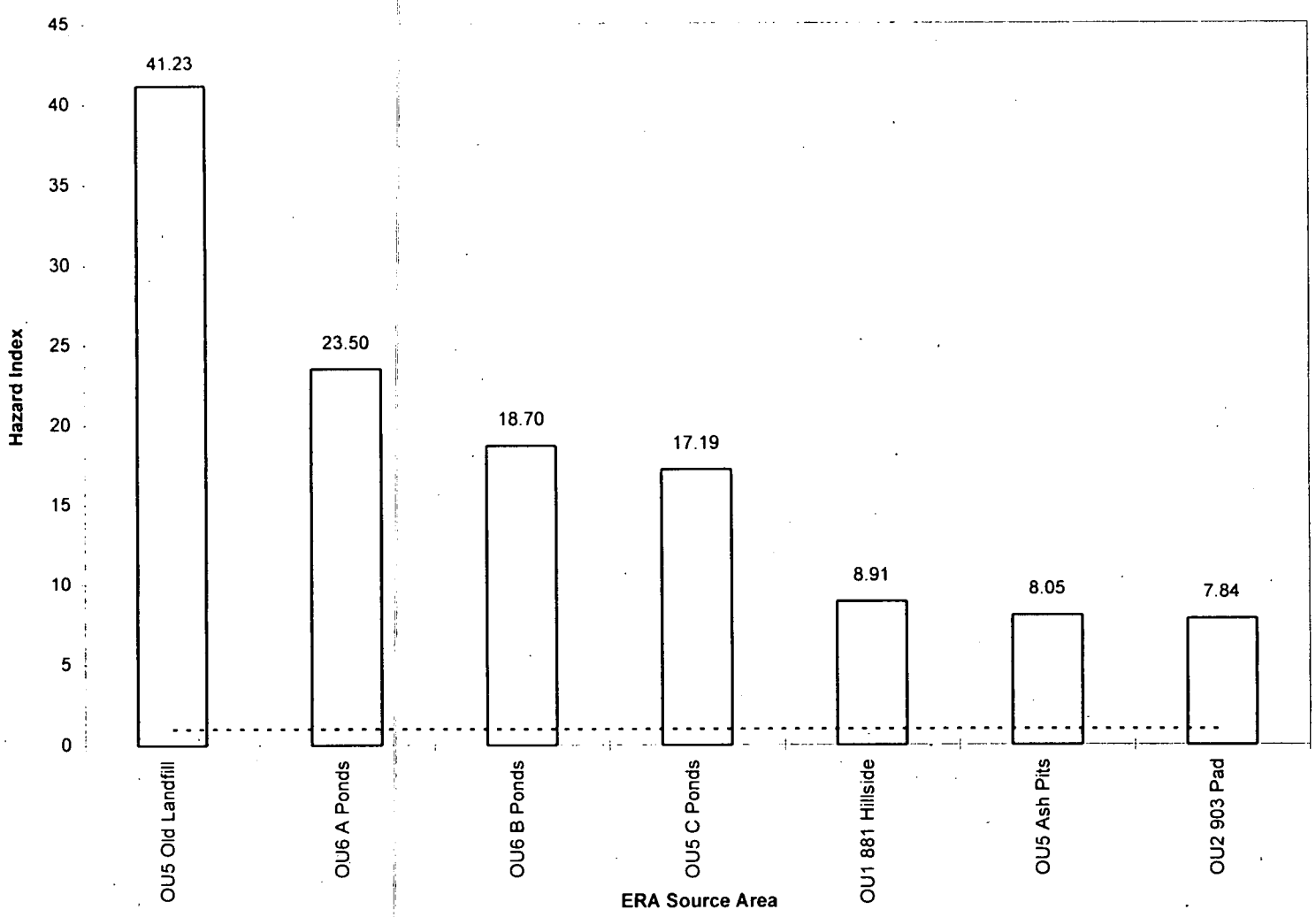

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Figure N3-15
Summary of Ecotoxicological Risk to Mallard

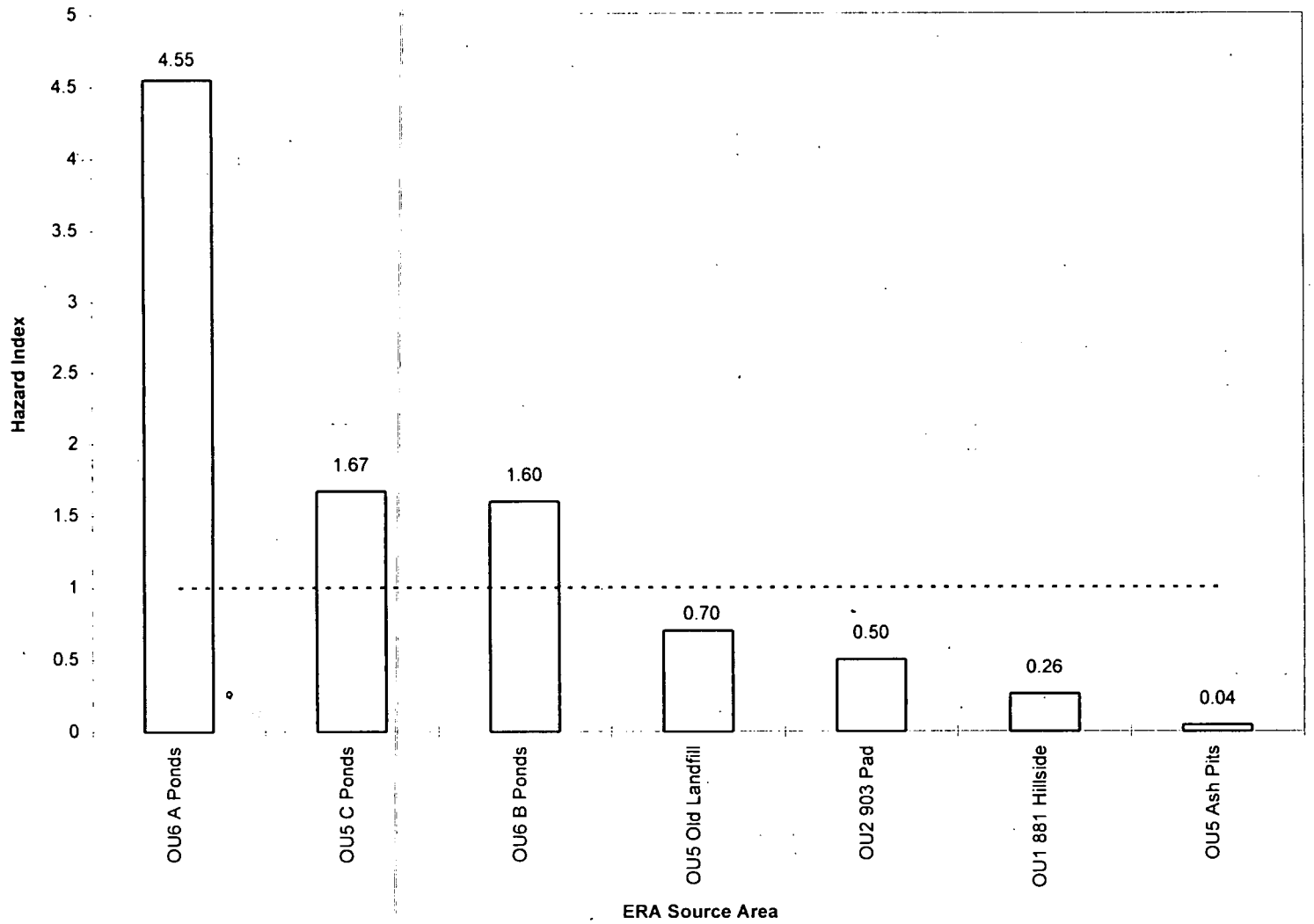

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Figure N3-16
Summary of Ecotoxicological Risk to Mule Deer

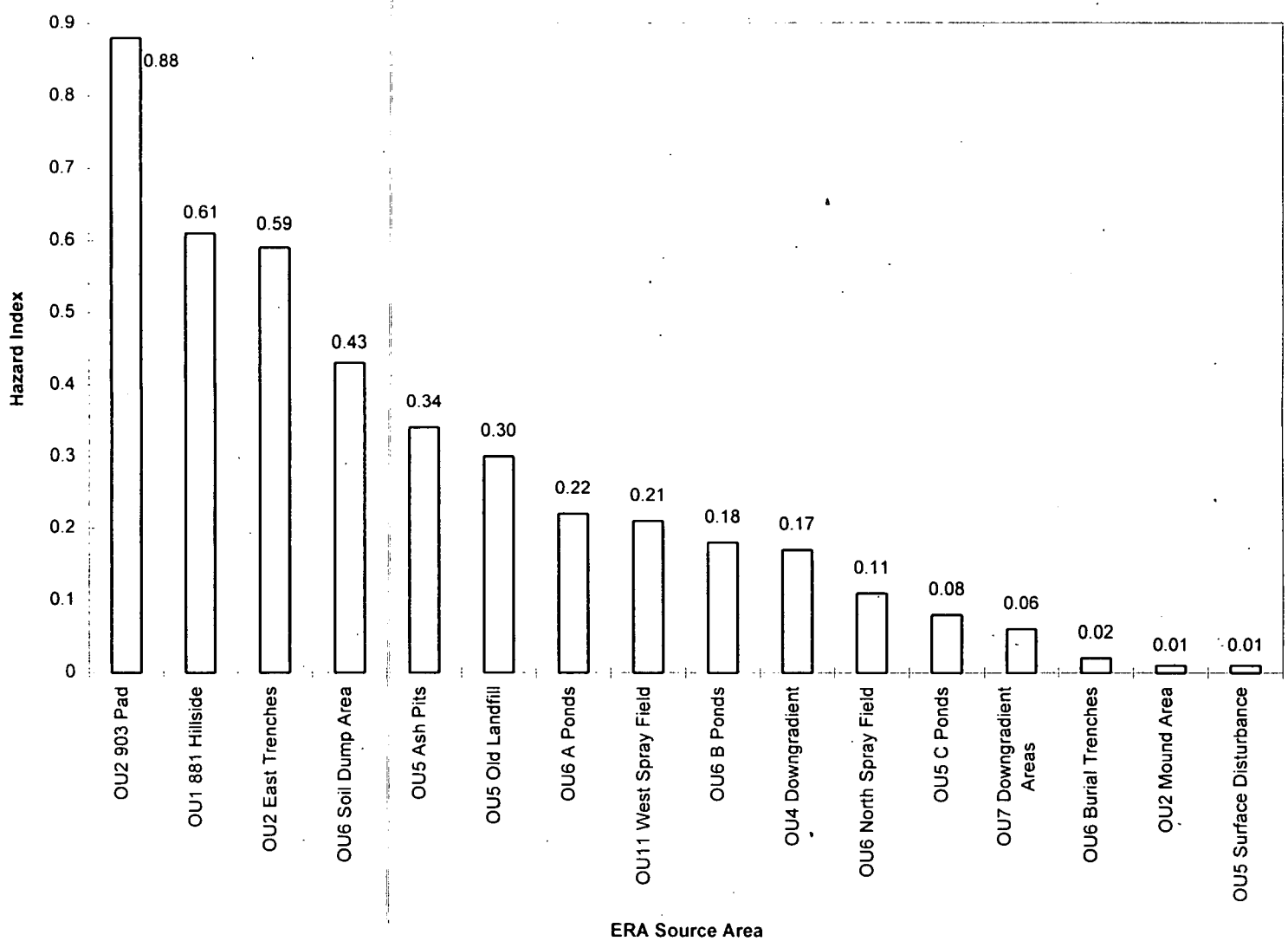

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Figure N3-17
Summary of Ecotoxicological Risk to Coyote

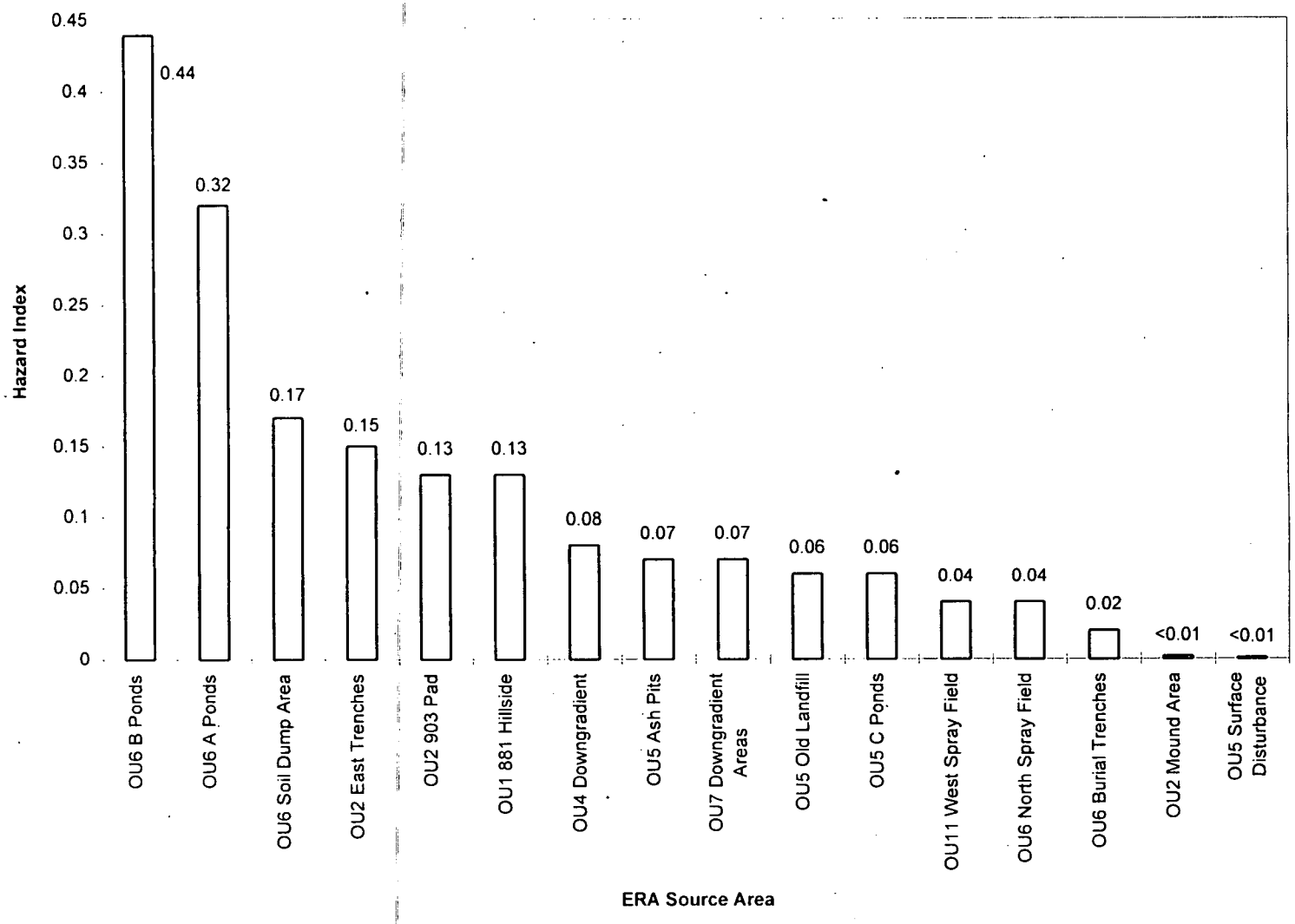

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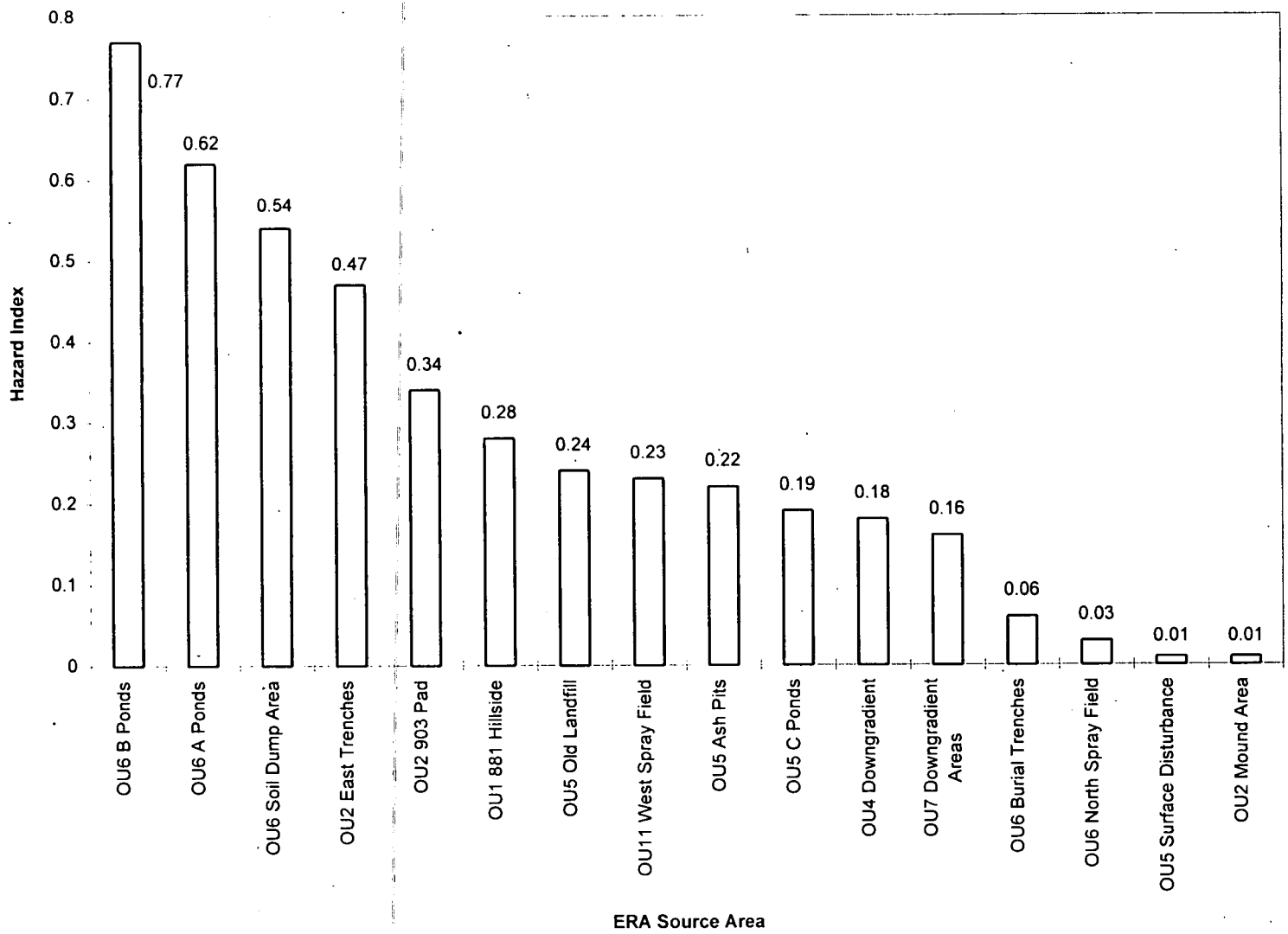
Figure N3-18
Summary of Ecotoxicological Risk to Red-tailed Hawk



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Tables N3-1 through N3-25

41 pages

Table N3-1
Analytes Omitted from the PCOC List

Analytes	Justification/Reason
Bicarbonate as $CaCO_3$	Not expected to be toxic
Calcium	Essential nutrient
Carbonate as $CaCO_3$	Not expected to be toxic
Chloride	Essential nutrient
Gross alpha	Indicator parameter; individual radionuclides were analyzed separately
Gross beta	Indicator parameter; individual radionuclides were analyzed separately
Iron	Essential nutrient
Magnesium	PCOC only for aquatic life
Orthophosphate	Not expected to be toxic
Potassium	Essential nutrient
Silicon	Not expected to be toxic
Sodium	Essential nutrient
Sulfate	Not expected to be toxic
Sulfide	Not expected to be toxic
Total dissolved solids	Not expected to be toxic

Table N3-2
Sitewide Wildlife PCOC List

Analyte	Group	OU PCOCs
Aluminum	M	7
Antimony	M	5,6,7
Arsenic	M	6,7
Barium	M	5,6,7
Beryllium	M	4,7
Cadmium	M	4
Chromium	M	2,6,7
Cobalt	M	5,6,7
Copper	M	5,6,7
Lead	M	2,5,6,7
Lithium	M	5,7
Magnesium	M	6,7
Manganese	M	6,7
Mercury	M	4,5,6
Molybdenum	M	6,7
Nickel	M	6,7
Selenium	M	7
Silver	M	4,5,6
Strontium	M	5,6,7
Thallium	M	7
Tin	M	7
Vanadium	M	6,7
Zinc	M	5,6,7
4,4'-DDT	P	2,5
Aldrin	P	5,6
Aroclor-1248	P	1
Aroclor-1254	P	1,2,4,5,6
Aroclor-1260	P	2,6
delta-BHC	P	2
Dieldrin	P	5
Endosulfan sulfate	P	5
Endrin ketone	P	5
gamma-BHC (Lindane)	P	6
Heptachlor	P	6
Heptachlor epoxide	P	5
Methoxychlor	P	5
Americium-241	R	1,2,4,5,6,7
Cesium-134	R	4
Cesium-137	R	6,7
Plutonium-239/240	R	1,2,4,5,6
Radium-226	R	2,6,7
Radium-228	R	6
Strontium-89/90	R	2,6,7
Tritium	R	4,5,6,7
Uranium-233/234	R	1,2,4,5,6
Uranium-235	R	1,2,4,5,6,7
Uranium-238	R	1,2,4,5,6,7
1,2,4-Trichlorobenzene	S	6
2-Methylnaphthalene	S	5,6
Acenaphthene	S	1,5,6,7
Acenaphthylene	S	1,5
Anthracene	S	1,5,6,7

Table N3-2
Sitewide Wildlife PCOC List

Analyte	Group	OU PCOCs
Benzo(a)anthracene	S	1,2,4,5,6,7
Benzo(a)pyrene	S	1,2,4,5,6,7
Benzo(b)fluoranthene	S	1,2,4,5,6,7
Benzo(ghi)perylene	S	1,2,4,5,6,7
Benzo(k)fluoranthene	S	1,2,4,5,6,7
Benzoic acid	S	2,5,6,7
Benzyl alcohol	S	6
Bis(2-chloroisopropyl)ether	S	7
Bis(2-ethylhexyl)phthalate	S	2,4,5,6,7
Butyl benzyl phthalate	S	5,6
Chrysene	S	1,2,4,5,6,7
Di-N-butyl phthalate	S	2,4,5,6,7
Di-N-octyl phthalate	S	5,6
Dibenzo(a,h)anthracene	S	1,5,6
Dibenzofuran	S	5,6
Fluoranthene	S	1,2,4,5,6,7
Fluorene	S	1,5,6,7
Indeno(1,2,3-cd)pyrene	S	1,2,4,5,6,7
Isophorone	S	5
Naphthalene	S	1,5,6
Pentachlorophenol	S	5
Phenanthrene	S	1,2,4,5,6,7
Phenol	S	5,6
Pyrene	S	1,2,4,5,6,7
1,1,1-Trichloroethane	V	1
1,1-Dichloroethane	V	1
1,1-Dichloroethene	V	1
1,2-Dichloroethane	V	1,6
1,2-Dichloroethene	V	1,6
2-Butanone	V	6,7
4-Methyl-2-pentanone	V	6
Acetone	V	6,7
Benzene	V	6
Chloroform	V	6
Methylene chloride	V	5,6,7
Tetrachloroethene	V	1,6
Toluene	V	1,5,6,7
Total xylenes	V	1
Trichloroethene	V	1,6
Vinyl acetate	V	7
Nitrate/Nitrite	W	4,7

M - Metal
P - Pesticide, polychlorinated biphenyl (PCB), or herbicide
R - Radionuclide
S - Semivolatile organic compound
V - Volatile organic compound
W - Water quality parameter

Table N3-3
Sitewide Vegetation PCOC List

Analyte	Group	OU PCOCs
Aluminum	M	7
Antimony	M	5
Arsenic	M	2,7
Barium	M	2,4,5,6,7
Beryllium	M	5
Cadmium	M	2,4,5
Chromium	M	2,5,6,7
Cobalt	M	2,5,7
Copper	M	2,5,7
Lead	M	2,5,6,7
Lithium	M	4
Manganese	M	2,4,7
Mercury	M	2
Molybdenum	M	5
Nickel	M	5,7
Selenium	M	7
Silver	M	2,5
Strontium	M	6,7
Vanadium	M	6
Zinc	M	2,4,5,6,7
4,4'-DDT	P	2
alpha-BHC	P	5
Aroclor-1254	P	2,5
Aroclor-1260	P	5
Heptachlor epoxide	P	5
Americium-241	R	1,2,4,5,6,7,11
Cesium-134	R	4
Cesium-137	R	2,4,7
Plutonium-239/240	R	1,2,4,5,6,11
Radium-226	R	2,4,7
Radium-228	R	2,7
Strontium-89/90	R	2,4,7
Tritium	R	2,4,7,11
Uranium-233/234	R	1,2,4,5,6
Uranium-235	R	1,2,4,5,6,7
Uranium-238	R	1,2,4,5,6,7
1,4-Dichlorobenzene	S	2,6
2-Chlorophenol	S	6
2-Methylnaphthalene	S	1,2,5
2-Methylphenol	S	2
4-Methylphenol	S	2
4-Nitroaniline	S	2
Acenaphthene	S	1,2,5,6
Acenaphthylene	S	5
Anthracene	S	1,2,5
Benzo(a)anthracene	S	1,2,5,6,7
Benzo(a)pyrene	S	1,2,5,6
Benzo(b)fluoranthene	S	1,2,5,6
Benzo(ghi)perylene	S	1,2,5
Benzo(k)fluoranthene	S	1,5,6
Benzoic acid	S	2,5,6
Bis(2-ethylhexyl)phthalate	S	2,4,5,6,7
Butyl benzyl phthalate	S	2,5,7

Table N3-3
Sitewide Vegetation PCOC List

Analyte	Group	OU PCOCs
Chrysene	S	1,2,5,6,7
Di-N-butyl phthalate	S	2,4,5
Di-N-octyl phthalate	S	2,6,7
Dibenzo(a,h)anthracene	S	1,5
Dibenzofuran	S	5
Diethyl phthalate	S	6
Fluoranthene	S	1,2,5,6,7
Fluorene	S	1,2,5
Hexachlorobutadiene	S	2
Hexachloroethane	S	2
Indeno(1,2,3-cd)pyrene	S	1,2,5,6
Isophorone	S	5
N-Nitrosodiphenylamine	S	2
Naphthalene	S	1,2,5
Pentachlorophenol	S	2,5,6
Phenanthrene	S	1,2,5,6,7
Phenol	S	5,6
Pyrene	S	1,2,5,6,7
1,1,1-Trichloroethane	V	1,2,5,7
1,1,2,2-Tetrachloroethane	V	2
1,1-Dichloroethene	V	1
1,2-Dichloroethane	V	1,2
1,2-Dichloroethene	V	2
2-Butanone	V	2,4,5,6
2-Chloroethyl vinyl ether	V	2
4-Methyl-2-pentanone	V	2,5,6,7
Acetone	V	2,4,5,6
Benzene	V	2,6
Carbon disulfide	V	2
Carbon tetrachloride	V	1,2
Chloroform	V	1,2,4,6
cis-1,3-Dichloropropene	V	2
Ethylbenzene	V	2,5
Methylene chloride	V	2,4,5,6,7
Styrene	V	2,6
Tetrachloroethene	V	1,2,5
Toluene	V	1,2,4,5,6,7
Total xylenes	V	1,2,5,6
Trichloroethene	V	1,2,5,6
Cyanide	W	4
Nitrate/Nitrite	W	2,4,7,11

M - Metal
P - Pesticide, polychlorinated biphenyl (PCB), or herbicide
R - Radionuclide
S - Semivolatile organic compound
V - Volatile organic compound
W - Water quality parameter

Table N3-4
Sitewide Sediment PCOC List

Analyte	Group	OU PCOCs
Aluminum	M	6
Antimony	M	6
Arsenic	M	6
Barium	M	6,7
Beryllium	M	7
Chromium	M	6,7
Cobalt	M	6
Copper	M	5,6,7
Lead	M	7
Magnesium	M	6,7
Mercury	M	5
Nickel	M	7
Selenium	M	7
Silver	M	6
Strontium	M	6,7
Vanadium	M	6,7
Zinc	M	5,6,7
Aldrin	P	6
Aroclor-1254	P	1,6
gamma-BHC (Lindane)	P	6
Heptachlor	P	6
Americium-241	R	1,5,6
Cesium-137	R	7
Plutonium-239/240	R	1
Radium-226	R	6
Radium-228	R	6
Strontium-89/90	R	6
Tritium	R	5,6
Uranium-233/234	R	5,6
Uranium-235	R	5,6
Uranium-238	R	5,6
1,2,4-Trichlorobenzene	S	6
2-Methylnaphthalene	S	6
4-Methyl-2-pentanone	S	6
Acenaphthene	S	6,7
Anthracene	S	6,7
Benzo(a)anthracene	S	6,7
Benzo(a)pyrene	S	6,7
Benzo(b)fuoranthene	S	1,6,7
Benzo(ghi)perylene	S	6,7
Benzo(k)fluoranthene	S	1,6,7
Benzoic acid	S	5,6,7
Benzyl alcohol	S	6
Bis(2-chloroisopropyl)ether	S	7
Bis(2-ethylhexyl)phthalate	S	6,7
Butyl benzyl phthalate	S	6
Chrysene	S	1,6,7
Di-N-butyl phthalate	S	5
Dibenzo(a,h)anthracene	S	6
Dibenzofuran	S	6
Fluoranthene	S	1,5,6,7

Table N3-4
Sitewide Sediment PCOC List

Analyte	Group	OU PCOCs
Fluorene	S	6,7
Indeno(1,2,3-cd)pyrene	S	6,7
Naphthalene	S	6
Phenanthrene	S	1,6,7
Phenol	S	5,6
Pyrene	S	1,6
1,1,1-Trichloroethane	V	1
2-Butanone	V	6,7
Acetone	V	7
Acetone	V	6,7
Benzene	V	6
Methylene chloride	V	6
Toluene	V	1,5,6,7

M - Metal
P - Pesticide, polychlorinated biphenyl (PCB), or herbicide
R - Radionuclide
S - Semivolatile organic compound
V - Volatile organic compound

Table N3-5
Sitewide Surface Water PCOC List

Analyte	Group	OU PCOCs
Antimony	M	7
Arsenic	M	7
Barium	M	5,7
Lead	M	6
Lithium	M	5,7
Magnesium	M	6,7
Manganese	M	7
Molybdenum	M	7
Nickel	M	7
Strontium	M	5,7
Thallium	M	7
Tin	M	7
Vanadium	M	7
Americium-241	R	1,5,7
Cesium-137	R	6
Plutonium-239/240	R	1
Strontium-89/90	R	6,7
Tritium	R	7
Uranium-233/234	R	5,6
Uranium-235	R	6,7
Uranium-238	R	5,6,7
Benzoic acid	S	5
Bis(2-ethylhexyl)phthalate	S	7
Di-N-butyl phthalate	S	6,7
Pentachlorophenol	S	5
1,1,1-Trichloroethane	V	1
1,1-Dichloroethane	V	1
1,1-Dichloroethene	V	1
1,2-Dichloroethane	V	1,6
1,2-Dichloroethene	V	1,6
Acetone	V	6,7
Chloroform	V	6
Methylene chloride	V	5,6,7
Tetrachloroethene	V	1,6
Toluene	V	1
Total xylenes	V	1
Trichloroethene	V	1,6
Vinyl acetate	V	7

M - Metal
P - Pesticide, polychlorinated biphenyl (PCB), or herbicide
R - Radionuclide
S - Semivolatile organic compound
V - Volatile organic compound
W - Water quality parameter

Table N3-6
Source Areas, Associated Operable Units, and IHSSs
in Walnut Creek and Woman Creek Watersheds

Operable Unit	ERA Source Area	IHSSs Included
	Woman Creek	
	Grassland	
OU5	Surface Disturbance	209
OU2	903 Pad Area	109, 112, 140, 183
	East Trenches	110, 111.1, 111.2, 111.3, 111.4, 111.5, 111.6, 111.7, 111.8, 216.2, 216.3
	Riparian/Aquatic	
OU1	881 Hillside	102, 103, 104, 106, 107, 119.1, 119.2, 130, 145, 177
OU5	Ash Pits	133.1, 133.2, 133.3, 133.4, 133.5, 133.6
	Old Landfill	115
	C-Ponds	142.1, 142.11
	Walnut Creek	
	Grassland	
OU2	East Trenches	110, 111.1, 111.2, 111.3, 111.4, 111.5, 111.6, 111.7, 111.8, 216.2, 216.3
	Mound Area	108, 113, 153, 154
	903 Pad	109, 112, 140, 183
OU6	Soil Dump Areas	141, 156.2, 165, 216.1
OU6	Burial Trenches	166.1, 166.2, 166.3
	North Spray Field	167.1. 167.2, 167.3
OU7	Downgradient Areas	NA
OU10	Other Outside Closures	170, 174
OU11	West Spray Field	168
	Riparian/Aquatic Units	
OU6	A-Ponds	142.1, 142.2, 142.3, 142.4, 142.12
OU6	B-Ponds	142.5, 142.6, 142.7, 142.8, 142.9

Table N3-7
Habitat Preferences and Primary Dietary Components for Key Receptor Species

Key Receptor Species	Habitat Preferences																Primary Dietary Components[1]
	Open Water	Wet Meadow	Short Marsh	Tall Marsh	Riparian Woodland	Ponderosa Pine Woodland	Tree Plantings	Riparian Shrubland	Short Upland Shrubland	Tall Upland Shrubland	Short Grassland	Mesic Mixed Grassland	Xeric Mixed Grassland	Reclaimed Grassland	Disturbed Annual Grass/Forb	Disturbed/Barren Land	
Preble's Meadow Jumping Mouse		X			X			X									grass seeds, insects, fruit
American Kestrel		X			X		X		X	X	X	X	X	X	X		invertebrates, small mammals, birds, reptiles
Great Blue Heron	X	X	X	X	X			X									fish, amphibians, crustaceans
Mallard	X	X	X	X	X			X									invertebrates, plants
Coyote		X	X	X	X	X	X	X	X	X	X	X	X	X	X		animals, plants
Mule Deer		X	X	X	X	X	X	X	X	X	X	X	X	X	X		shrubs and forbs; grasses during the spring
Red-tailed Hawk		X			X	X	X		X	X	X	X	X	X	X		lagomorphs, small mammals, birds, reptiles

[1]Based on literature reviews summarized in TM2 (DOE 1995b), listed from largest to smallest component.

Table N3-8
Exposure Routes and Exposure Points for Key Receptors

Key Receptors	Exposure Routes	Exposure Points
Limiting Species		
Preble's Meadow Jumping Mouse	Ingestion	Surface soil Sediments Surface water Vegetation Terrestrial arthropods
	Inhalation	Air in burrows
American Kestrel	Ingestion	Surface soil Small mammals Terrestrial arthropods
Great Blue Heron	Ingestion	Surface water Sediment Fish
Mallard	Ingestion	Surface water Soil Sediments Fish Benthic macroinvertebrates Vegetation
Wide-Ranging Species		
Coyote	Ingestion	Surface soil Surface water Small mammals Vegetation
Mule Deer	Ingestion	Surface soil Surface water Vegetation
Red-tailed Hawk	Ingestion	Surface soil Small mammals
Other Receptors		
Vegetation	Direct contact	Subsurface soil
Aquatic Organisms	Direct contact	Surface water Sediment

Table N3-9
Biota Data Available

OU	Source Area / Analyte Group	Small Mammals			Vegetation[1]			Terrestrial Arthropods			Fish[2]			Benthic Macroinvertebrates[2]		
		M	R	O	M	R	O	M	R	O	M	R	O	M	R	O
OU1	881 Hillside	X	X	—	X	X	C	X	X	—	B	X	C	C	—	C
OU2	903 Pad Area	X	X	—	X	X	C	X	X	—	C	—	C	C	—	C
OU2	East Trenches	X	X	—	X	X	C	X	—	—	INC	INC	INC	INC	INC	INC
OU2	Mound Area	X	—	—	—	—	C	X	—	—	INC	INC	INC	INC	INC	INC
OU4	Downgradient	X	X	—	X	X	C	—	—	—	INC	INC	INC	INC	INC	INC
OU5	Ash Pits	X	X	—	X	X	—	—	—	—	C	—	C	C	—	C
OU5	C-Ponds	X	X	—	X	X	C	X	X	—	B	X	B	B	X	C
OU5	Old Landfill	X	X	—	X	X	C	—	—	—	C	—	C	B	X	C
OU5	Surface Disturbance	—	—	—	—	—	—	—	—	—	INC	INC	INC	INC	INC	INC
OU6	A-Ponds	X	X	—	X	X	C	—	—	—	B	X	B	C	—	B
OU6	Burial Trenches	X	X	—	X	X	C	—	—	—	INC	INC	INC	INC	INC	INC
OU6	B-Ponds	X	X	—	X	X	B	—	—	—	B	X	B	C	—	B
OU6	Soil Dump Areas	X	X	—	X	X	C	—	—	—	INC	INC	INC	INC	INC	INC
OU6	North Spray Field	—	—	—	X	X	C	—	—	—	INC	INC	INC	INC	INC	INC
OU7	Downgradient Areas	X	X	—	X	X	C	—	—	—	INC	INC	INC	INC	INC	INC
OU10	Other Outside Closures	—	—	—	—	—	—	—	—	—	INC	INC	INC	INC	INC	INC
OU11	West Spray Field	—	—	—	—	—	C	—	—	—	INC	INC	INC	INC	INC	INC

[1]Concentration of organic compounds in vegetation estimated from subsurface soil concentrations, using methods in Travis and
[2]Concentration of metals and organics in fish and benthic macroinvertebrate tissue estimated from surface water concentrations, using bioconcentration factors (Lyman *et al.* 1982).

M - metals
R - radionuclide
O - organics
X - measured values

C - calculated value
B - both measured and calculated values
INC - incomplete pathway
— - unable to estimate concentrations

Table N3-10
Exposure Parameters for Preble's Meadow Jumping Mouse

Source Area	Source Area Size (hectares)	Intake Rate (kg/kg/day)					Site Use Factor				
		Terrestrial Arthropods	Vegetation	Sediment	Soil[1]	Surface Water[2]	Terrestrial Arthropods	Vegetation	Sediment	Soil	Surface Water
OU1 881 Hillside	22.303	0.051	0.119	0.002	0.002	0.150	1.000	1.000	1.000	1.000	1.000
OU2 903 Pad	27.605	0.051	0.119	0.002	0.002	0.150	1.000	1.000	1.000	1.000	1.000
OU2 East Trenches	39.861	0.051	0.119	INC	0.004	INC	1.000	1.000	INC	1.000	INC
OU2 Mound Area	2.256	NR	0.170	INC	0.004	INC	1.000	1.000	INC	1.000	INC
OU4 Downgradient	6.370	NR	0.170	INC	0.004	INC	1.000	1.000	INC	1.000	INC
OU5 Ash Pits	19.080	NR	0.170	0.002	0.002	0.150	1.000	1.000	1.000	1.000	1.000
OU5 C-Ponds	12.759	0.051	0.119	0.002	0.002	0.150	1.000	1.000	1.000	1.000	1.000
OU5 Old Landfill	13.532	NR	0.170	0.002	0.002	0.150	1.000	1.000	1.000	1.000	1.000
OU6 A-Ponds	12.828	NR	0.170	0.002	0.002	0.150	1.000	1.000	1.000	1.000	1.000
OU6 B-Ponds	8.473	NR	0.170	0.002	0.002	0.150	1.000	1.000	1.000	1.000	1.000
OU6 Burial Trenches	1.040	NR	0.170	INC	NR	INC	1.000	1.000	INC	1.000	INC
OU6 North Spray Field	4.397	NR	0.170	INC	0.004	INC	1.000	1.000	INC	1.000	INC
OU6 Soil Dump Areas	18.038	NR	0.170	INC	0.004	INC	1.000	1.000	INC	1.000	INC
OU7 Downgradient Areas	2.764	NR	0.170	INC	0.004	INC	1.000	1.000	INC	1.000	INC
OU10 Outside Closures	2.690	NR	0.170	INC	NR	INC	1.000	1.000	INC	1.000	INC
OU11 West Spray Field	45.953	NR	0.170	INC	0.004	INC	1.000	1.000	INC	1.000	INC

[1] Soil ingestion rates from Attachment 1, Table 3
[2] Surface water ingestion rates from DOE 1995b
INC - incomplete pathway
NR - no data are available for this media

Preble's Meadow Jumping Mouse Information
Environmental media for which intakes were calculated: terrestrial arthropods, vegetation, sediment, soil, and surface water
Percent of diet represented: vegetation - 70%; terrestrial arthropods - 30% (DOE 1995b)
Total food ingestion rate: 0.17 kg/kg/day (DOE 1995b)
Home range: 0.365 ha (DOE 1995b)
Because home range < source area, all Site Use Factors = 1.000

Table N3-11
Exposure Parameters for American Kestrel

Source Area	Source Area Size (hectares)	Intake Rate (kg/kg-day)			Site Use Factor		
		Small Mammals	Terrestrial Arthropods	Soil[1]	Small Mammals	Terrestrial Arthropods	Soil
OU1 881 Hillside	22.300	0.140	0.150	0.008	0.592	0.592	0.592
OU2 903 Pad	27.600	0.140	0.150	0.008	0.733	0.733	0.733
OU2 East Trenches	39.860	0.140	0.150	0.008	1.000	1.000	1.000
OU2 Mound Area	2.260	NR	NR	0.008	0.060	0.060	0.060
OU4 Downgradient	6.370	0.290	NR	0.008	0.172	0.172	0.172
OU5 Ash Pits	19.080	0.290	NR	0.008	0.502	0.502	0.502
OU5 C-Ponds	12.760	0.140	0.150	0.008	0.301	0.301	0.301
OU5 Old Landfill	13.530	0.290	NR	0.008	0.356	0.356	0.356
OU5 Surface Disturbance	1.660	NR	NR	0.008	0.044	0.044	0.044
OU6 A-Ponds	12.830	0.290	NR	0.008	0.287	0.287	0.287
OU6 B-Ponds	8.470	0.290	NR	0.008	0.208	0.208	0.208
OU6 Burial Trenches	1.040	0.290	NR	NR	0.028	0.028	0.028
OU6 North Spray Field	4.400	NR	NR	0.008	0.119	0.119	0.119
OU6 Soil Dump Areas	18.040	0.290	NR	0.008	0.496	0.496	0.496
OU7 Downgradient Areas	2.760	0.290	NR	0.008	0.075	0.075	0.075
OU10 Outside Closures	2.690	NR	NR	NR	0.071	0.071	0.071
OU11 West Spray Field	45.950	NR	NR	0.008	1.000	1.000	1.000

[1] soil ingestion rates from Attachment 1, Table 3
NR - no data are available for this media

American Kestrel Information
Environmental media for which intakes were calculated: small mammals, terrestrial arthropods, birds, and soil
Percent of diet represented: terrestrial arthropods - 51%; small mammals - 49% (DOE 1995b)
Assumes raptors do not drink surface water; all water needs are met through metabolism of prey
Total food ingestion rate: 0.29 kg/kg/day (DOE 1995b)
Home range: 38 ha (DOE 1995b)
Refer to Attachment 1, Table 6 for Site Use Factor calculation methods for American Kestrel

Table N3-12
Exposure Parameters for Great Blue Heron

Source Area	Source Area Size (hectares)	Intake Rate (kg/kg/day)			Site Use Factor		
		Fish	Sediment	SurfaceWater[1]	Fish	Sediment	Surface Water
OU1 881 Hillside	22.300	0.180	0.004	0.045	1.000	1.000	1.000
OU2 903 Pad	27.600	0.180	0.004	0.045	1.000	1.000	1.000
OU5 Ash Pits	19.080	0.180	0.004	0.045	1.000	1.000	1.000
OU5 C-Ponds	12.760	0.180	0.004	0.045	1.000	1.000	1.000
OU5 Old Landfill	13.530	0.180	0.004	0.045	1.000	1.000	1.000
OU6 A-Ponds	12.830	0.180	0.004	0.045	1.000	1.000	1.000
OU6 B-Ponds	8.470	0.180	0.004	0.045	1.000	1.000	1.000

[1] Surface water ingestion rates from DOE 1995b

Great Blue Heron Information
Environmental media for which intakes were calculated: fish, sediment, and surface water
Percent of diet represented: fish - 100% (DOE 1995b)
Total food ingestion rate: 0.18 kg/kg/day (DOE 1995b)
Home range: 4.5 ha (DOE 1995b)
Because home range < source area, all Site Use Factors = 1.000

Table N3-13
Exposure Parameters for Mallard

Source Area	Source Area Size (hectares)	Intake Rate (kg\kg\day)					Site Use Factor				
		Benthic Macroinvertebrates	Vegetation	Sediment	Soil[1]	Surface Water[2]	Benthic Macroinvertebrates	Vegetation	Sediment	Soil	Surface Water
OU1 881 Hillside	22.300	0.039	0.013	0.001	0.001	0.056	0.032	0.032	0.032	0.039	0.032
OU2 903 Pad	27.600	0.039	0.013	0.001	0.001	0.056	0.014	0.014	0.014	0.048	0.014
OU5 Ash Pits	19.080	0.039	0.013	0.001	0.001	0.056	0.007	0.007	0.007	0.034	0.007
OU5 C-Ponds	12.760	0.039	0.013	0.001	0.001	0.056	0.165	0.165	0.165	0.019	0.165
OU5 Old Landfill	13.530	0.039	0.013	0.001	0.001	0.056	0.081	0.081	0.081	0.023	0.087
OU6 A-Ponds	12.830	0.039	0.013	0.001	0.001	0.056	0.428	0.428	0.428	0.017	0.428
OU6 B-Ponds	8.470	0.039	0.013	0.001	0.001	0.056	0.204	0.204	0.204	0.012	0.204

[1] Soil ingestion rates from Attachment 1, Table 3
[2] Surface water ingestion rates from DOE 1995b

Mallard Information
Environmental media for which intakes were calculated: benthic macroinvertebrates, vegetation, sediment, soil, and surface water
Percent of diet represented: benthic macroinvertebrates - 75%; vegetation - 25% (DOE 1995b)
Total food ingestion rate: 0.052 kg/kg/day (DOE 1995b)
Home range: 580 ha (DOE 1995b)
Refer to Attachment 1, Table 7 for Site Use Factor calculation methods for mallards

Table N3-14
Exposure Parameters for Coyote

Source Area	Source Area Size (hectares)	Intake Rate (kg/kg/day)				Site Use Factor			
		Small Mammals	Vegetation	Soil[1]	Surface Water[2]	Small Mammals	Vegetation	Soil	Surface Water
OU1 881 Hillside	22.300	0.042	0.005	0.001	0.077	0.020	0.020	0.020	0.126
OU2 903 Pad	27.600	0.042	0.005	0.001	0.077	0.025	0.025	0.025	0.064
OU2 East Trenches	39.860	0.042	0.005	0.001	INC	0.036	0.036	0.036	INC
OU2 Mound Area	2.260	NR	0.047	0.001	INC	0.002	0.002	0.002	INC
OU4 Downgradient	6.370	0.042	0.005	0.001	INC	0.006	0.006	0.006	INC
OU5 Ash Pits	19.080	0.042	0.005	0.001	0.077	0.017	0.017	0.017	0.061
OU5 C-Ponds	12.760	0.042	0.005	0.001	0.077	0.010	0.010	0.010	0.192
OU5 Old Landfill	13.530	0.042	0.005	0.001	0.077	0.012	0.012	0.012	0.093
OU5 Surface Disturbance	1.660	NR	NR	0.001	INC	0.001	0.001	0.001	INC
OU6 A-Ponds	12.830	0.042	0.005	0.001	0.077	0.008	0.008	0.008	0.269
OU6 B-Ponds	8.470	0.042	0.005	0.001	0.077	0.006	0.006	0.006	0.164
OU6 Burial Trenches	1.040	0.042	0.005	NR	INC	0.001	0.001	0.001	INC
OU6 North Spray Field	4.400	NR	0.047	0.001	INC	0.004	0.004	0.004	INC
OU6 Soil Dump Areas	18.040	0.042	0.005	0.001	INC	0.016	0.016	0.016	INC
OU7 Downgradient Areas	2.760	0.042	0.005	0.001	INC	0.002	0.002	0.002	INC
OU10 Outside Closures	2.690	NR	0.047	NR	INC	0.002	0.002	0.002	INC
OU11 West Spray Field	45.950	NR	0.047	0.001	INC	0.041	0.041	0.041	INC

[1] Soil ingestion rates from Attachment 1, Table 3
[2] Surface water ingestion rates from DOE 1995b
INC - incomplete pathway
NR - no data are available for this media

Coyote Information
Environmental media for which intakes were calculated: small mammals, vegetation, sediment, soil, and surface water
Percent of diet represented: small mammals - 90%; vegetation - 10% (DOE 1995b)
Total food ingestion rate: 0.047 kg/kg/day (DOE 1995b)
Home range: 1130 ha (DOE 1995b)
Refer to Attachment 1, Table 9 for Site Use Factor calculation methods for coyotes

Table N3-15
Exposure Parameters for Mule Deer

Source Area	Source Area Size (hectares)	Intake Rate (kg/kg/day)			Site Use Factor		
		Vegetation	Soil[1]	Surface Water[2]	Vegetation	Soil	Surface Water
OU1 881 Hillside	22.300	0.022	0.001	0.044	0.079	0.079	0.130
OU2 903 Pad	27.600	0.022	0.001	0.044	0.099	0.099	0.066
OU2 East Trenches	39.860	0.022	0.001	INC	0.143	0.143	INC
OU2 Mound Area	2.260	0.022	0.001	INC	0.008	0.008	INC
OU4 Downgradient	6.370	0.022	0.001	INC	0.023	0.023	INC
OU5 Ash Pits	19.080	0.022	0.001	0.044	0.067	0.067	0.063
OU5 C-Ponds	12.760	0.022	0.001	0.044	0.039	0.039	0.198
OU5 Old Landfill	13.530	0.022	0.001	0.044	0.048	0.048	0.096
OU5 Surface Disturbance	1.660	NR	0.001	INC	0.006	0.006	INC
OU6 A-Ponds	12.830	0.022	0.001	0.044	0.034	0.034	0.277
OU6 B-Ponds	8.470	0.022	0.001	0.044	0.025	0.025	0.169
OU6 Burial Trenches	1.040	0.022	NR	INC	0.004	0.004	INC
OU6 North Spray Field	4.400	0.022	0.001	INC	0.016	0.016	INC
OU6 Soil Dump Areas	18.040	0.022	0.001	INC	0.065	0.065	INC
OU7 Downgradient Areas	2.760	0.022	0.001	INC	0.010	0.010	INC
OU10 Outside Closures	2.690	0.022	NR	INC	0.010	0.010	INC
OU11 West Spray Field	45.950	0.022	0.001	INC	0.161	0.161	INC

[1] Soil ingestion rates from Attachment 1, Table 3
[2] Surface water ingestion rates from DOE 1995b
INC - incomplete pathway
NR - no data are available for this media

Mule Deer Information
Environmental media for which intakes were calculated: vegetation, soil, and surface water
Percent of diet represented: vegetation - 100% (DOE 1995b)
Total food ingestion rate: 0.022 kg/kg/day (DOE 1995b)
Home range: 285 ha (DOE 1995b)
Refer to Attachment 1, Table 8 for Site Use Factor calculation methods for mule deer

Table N3-16
Exposure Parameters for Red-tailed Hawk

Source Area	Source Area Size (hectares)	Intake Rate (kg/kg/day)		Site Use Factor	
		Small Mammals	Soil[1]	Small Mammals	Soil
OU1 881 Hillside	22.300	0.098	0.003	0.034	0.034
OU2 903 Pad	27.600	0.098	0.003	0.042	0.042
OU2 East Trenches	39.860	0.098	0.003	0.061	0.061
OU2 Mound Area	2.260	NR	0.003	0.003	0.003
OU4 Downgradient	6.370	0.098	0.003	0.010	0.010
OU5 Ash Pits	19.080	0.098	0.003	0.029	0.029
OU5 C-Ponds	12.760	0.098	0.003	0.029	0.029
OU5 Old Landfill	13.530	0.098	0.003	0.021	0.021
OU5 Surface Disturbance	1.660	NR	0.003	0.003	0.003
OU6 A-Ponds	12.830	0.098	0.003	0.020	0.020
OU6 B-Ponds	8.470	0.098	0.003	0.013	0.013
OU6 Burial Trenches	1.040	0.098	NR	0.002	0.002
OU6 North Spray Field	4.400	NR	0.003	0.007	0.007
OU6 Soil Dump Areas	18.040	0.098	0.003	0.028	0.028
OU7 Downgradient Areas	2.760	0.098	0.003	0.004	0.004
OU10 Outside Closures	2.690	NR	NR	0.004	0.004
OU11 West Spray Field	45.950	NR	0.003	0.071	0.071

[1] Soil ingestion rates from Attachment 1, Table 3
NR - no data are available for this media

Red-tailed Hawk Information
Environmental media for which intakes were calculated: small mammals and soil
Percent of diet represented: small mammals - 100% (DOE 1995b)
Assumes raptors do not drink surface water; all water needs are met through metabolism of prey
Total food ingestion rate: 0.098 kg/kg/day (DOE 1995b)
Home range: 650 ha (DOE 1995b)
Site Use Factors for food and soil intakes were calculated as: (area of source area) / (area of home range)

Table N3-17
Sources of Uncertainty and their Potential Effects on Exposure Estimations and Derivation of Toxicity Reference Values

Source	Effect	Remark
Exposure Assessment		
1. Abiotic sampling not designed specifically for ecological risk assessment	Data on chemical concentrations in abiotic media may not represent true exposure point concentrations	The exposure assessment adopted a screening level approach that is based on conservative assumptions and is designed to minimize chance of underestimating exposures.
2. Assume 100% bioavailability of chemicals in abiotic and biotic samples	May overestimate exposure to radionuclides and metals	Not all contaminants taken up are assimilated. This is especially true for metals that form significant portions of natural rock matrices.
3. Assume constant rate of ingestion and site use in estimation of exposures	May overestimate exposures	Site use probably is not constant, especially for larger, wide-ranging species and migratory species. Extensive physiological elimination of chemicals can occur when receptor is not using the site.
4. Assume assimilation efficiency for uptake is 100% (a=1)	May overestimate exposures	Efficiency of uptake varies with chemical, form, and receptor species.
5. Use of mean ingestion rates, body weights, and home range sizes in estimating exposure	May over- or underestimate probability of exceeding critical value	Means were used because data from literature were not amenable to statistical analysis.
6. Assume equilibrium between VOCs in soil and burrow air	May overestimate concentration of VOCs in burrow air	Burrows are usually not closed systems. Therefore, diluting effect of exchange with ambient air not included in exposure estimate.
7. Assume literature values for BCFs for transfer of PCOCs from soils to invertebrates and vertebrates	May over- or underestimate ingestion rates and probability of exceeding critical value	BCFs are conservatively based. Transfer coefficient often is less than one.
8. Assume literature values for B-factors for transfer of PCOCs from soils to vegetation	May over- or underestimate ingestion rates and probability of exceeding critical value	B-factors are conservatively based. Transfer coefficient often is less than one.
9. Assume surface water and sediment exposure pathways are incomplete for ERA source areas without surface water samples	May over- or underestimate ingestion rates and probability of exceeding critical value	Unsampled streams are ephemeral and in most cases do not possess significant aquatic attributes.
10. Assume surface water exposure pathway is incomplete at the OU7 downgradient source area	May over- or underestimate ingestion rates and probability of exceeding critical value	Surface water samples in the OU7 downgradient source area were taken from ephemeral seeps that are not a significant source of drinking water for wildlife receptors.

Table N3-17
Sources of Uncertainty and their Potential Effects on Exposure Estimations and Derivation of Toxicity Reference Values

Source	Effect	Remark
11. Assume mallard and great blue heron occur only in source areas with surface water samples	May over- or underestimate sitewide exposure to contaminants for mallard and great blue heron	Unsampled streams are ephemeral and in most cases do not possess significant aquatic attributes necessary to support great blue herons and/or mallards. Although mallards use other habitats, in summer they are found primarily near open water.
12. Assume summer diet for mallard	May over- or underestimate ingestion rates and probability of exceeding critical value	Mallards were chosen to represent aquatic feeding avian species; therefore, their summer diet is most appropriate for the exposure analysis. Also, mallards are most frequently observed at RFETS during the summer.
13. Assume terrestrial -feeding receptors ingest surface water from pond margins and streamsides, whereas aquatic-feeding receptors ingest water from total surface area of ponds/streams	May over- or underestimate ingestion rates and probability of exceeding critical value	Terrestrial species usually have access to water from pond and stream edges, whereas aquatic feeders such as herons and ducks have a larger surface area of water available to them.
14. Assume Preble's meadow jumping mouse, mallard, and great blue heron are only key receptors that ingest sediments	May over- or underestimate ingestion rates and probability of exceeding critical value	Most terrestrial receptors have minimal contact with sediments; however, mallards and great blue herons forage among sediments. Preble's meadow jumping mice may also be in more frequent contact with sediments.
15. Assume Preble's meadow jumping mouse and mallard ingest equal amounts of soil and sediments	May over- or underestimate ingestion rates and probability of exceeding critical value	Preble's meadow jumping mice and mallards spend significant amounts of time in contact with both soil and sediments.
16. Assume great blue heron does not ingest soil	May overestimate exposure to great blue herons from contaminants in sediments or underestimate exposure to great blue herons from contaminants in soil	Great blue herons spend minimal time on dry land and, therefore, have little direct contact with surface soils.
17. Assume that raptors do not ingest water	May underestimate ingestion of contaminants in surface water	Raptors obtain most of their water from moisture in prey through oxidative metabolism. Most raptors can survive without drinking, although they may occasionally drink negligible amounts.[1,2]
18. Assume small mammals represent 100% of American Kestrel diet except where data for contaminant concentrations in terrestrial arthropods exist	May over- or underestimate ingestion rates and probability of exceeding critical value	Minimal data for contaminant concentrations in terrestrial arthropod exist. Data for contaminant concentrations in bird tissues were too sparse to be of use.

Table N3-17
Sources of Uncertainty and their Potential Effects on Exposure Estimations and Derivation of Toxicity Reference Values

Source	Effect	Remark
19. Assume vegetation represents 100% of diet for Preble's meadow jumping mouse, coyote, mallard where data for other dietary components are not available	May over- or underestimate ingestion rates and probability of exceeding critical value	Contaminant concentrations in vegetation are conservatively estimated from subsurface soil contaminant concentrations.
Toxicity Assessment		
20. Contaminant identification process a. All detected organics are considered PCOCs b. "Gilbert Toolbox" used to determine metals PCOCs	May overestimate number of site PCOCs	Both a and b are very conservative approaches.
21. Tissue analytes identified before contaminants known	Data on chemicals concentration in biological tissue not available for some PCOCs	BCFs and transfer coefficients from the literature were used in modeling uptake of some PCOCs.
22. Lack of specific toxicity information for exposure of Rocky Flats species to PCOCs	May over- or underestimate critical effects concentrations	Scaling factors were used to extrapolate literature-based toxicity information to Rocky Flats species. Also, see item 2.
23. Use most sensitive species in literature to set NOAEL	May over- or underestimate critical effects concentrations	Data for most sensitive species used to protect greater number of species.
24. Estimation of TRV from NOAEL and background data	May over- or underestimate critical effects concentrations	Results in protective values when combined with item 2.

[1]Bartholomew and Cade, 1957, 1963
[2]Duke *et al*. 1973
BCF - bioconcentration factor
B-factor - transfer coefficient

Table N3-18
Data Usability Categories

Category	Definition	Validation Codes[1]	Laboratory Qualifiers[2]
Valid	Fully usable	A, V	blank, U
Estimate	Usable as estimated result	A, J, V, JA[3]	+, *, B, C, D, E (inorganics), F, G, H, I, J, N, S, UJ, UN, UW, UX, W, X, Y, Z
Reject	Not valid	B, C, N, P, R, S,	E (organics), L, R, UE (radionuclides)
Blnk/Y Val	Acceptable or estimated result, no validation code	Y, blank	blank, +, *, B, C, D, E (inorganics), F, G, H, I, J, N, S, U, UJ, UN, UW, UX, W, X, Y, Z

[1] Data validation codes are defined in Attachment 3, Table 1.

[2] Laboratory qualifiers are defined in Attachment 3, Table 2.

[3] If the validation code is J or JA, then U and blank laboratory qualifiers are considered to be estimates.

Table N3-19
Results of Ecological Contaminants of Concern Tier 3 Evaluation
Number of Analytes with HQ>1 for Source Areas with HI>1

Receptor	ERA Source Areas																
	OU6 A-Ponds	OU6 B-Ponds	OU7 Downgradient	OU6 Soil Dump	OU6 Burial Trenches	OU5 Old Landfill	OU6 North Spray Fields	OU5 Ash Pits	OU2 903 Pad	OU2 East Trenches	OU1 881 Hillside	OU2 Mound Area	OU5 C-Ponds	OU4 Downgradient	OU11 West Spray Field	OU5 Surface Disturbance	OU10 Other Outside Closures
	Number of Analytes with HQ≥1																
Wildlife Receptors																	
Preble's Meadow Jumping Mouse	3	3	2	2	2	2	3	2	1	2	1	HI<1	1	3	HI<1		
American Kestrel	5	6	0	3	0	0	HI<1	0	1	4	0	1	0	1	0	HI<1	
Great Blue Heron	3	4				5		1	1	HI<1	2		5				
Mallard	1	0							HI<1		HI<1		0				
Aquatic Species																	
Aquatic Organisms - Surface Water	2	2	3			1		1	3		2		2				
Vegetation Communities																	
Vegetation - Subsurface Soil	2		4	4	3	3	4	9	1	0	4	3	3	6	3		
Vegetation - Sediments	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Radiological Contaminants																	
Small Mammals - Surface Soils	HI<1	HI<1	HI<1	HI<1	HI<1	2	HI<1	HI<1	1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1
Aquatic Organisms - Sediments	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1
Aquatic Organisms - Surface Water	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1	HI<1
Aquatic Organisms - Sediments	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Receptor	ERA Source Areas														
	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	North Walnut Creek	South Walnut Creek	Pond C-1	Pond C-2	Woman Creek
	Number of Analytes with HQ≥1														
Wildlife Receptors															
Preble's Meadow Jumping Mouse	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
American Kestrel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Great Blue Heron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mallard	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aquatic Species															
Aquatic Organisms - Surface Water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vegetation Communities															
Vegetation - Subsurface Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vegetation - Sediments	4	3	4	4	3	4	4	5	5	3	3	HI<1	2	2	1
Radiological Contaminants															
Small Mammals - Surface Soils	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aquatic Organisms - Sediments	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aquatic Organisms - Surface Water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aquatic Organisms - Sediments	10	8	7	4	5	17	18	11	12	3	11	12	1	2	0

Shading indicates that risk was not assessed for that receptor/source area combination.
NA - Not applicable

Table N3-20
Results of Ecological Contaminants of Concern Tier 3 Evaluation

Receptor/Analyte	ERA Source Areas													
	OU1 881 Hillside	OU5 Ash Pits	OU5 C-Ponds	OU5 Old Landfill	OU2 903 Pad	OU2 East Trenches	OU4 Downgradient	OU6 A-Ponds	OU6 B-Ponds	OU2 Mound Area	OU6 North Spray Field	OU6 Burial Trenches	OU7 Downgradient	OU6 Soil Dump Areas
Wildlife Receptors														
Preble's Meadow Jumping Mouse														
Barium											X			
Selenium													X	
American Kestrel														
Chromium					X	X		X		X				
Lead								X	X					
Mercury							X							X
Vanadium									X					
Great Blue Heron														
Antimony				X										
Aroclor-1254					X									
Di-N-butyl phthalate								X	X					
Mercury			X	X					X					
PCBs[1]								#	#					
Mallard														
Di-N-butyl phthalate								X						
PCBs[1]								#	#					
Aquatic Species														
Surface Water														
Barium		X	X	X										
Vegetation-Subsurface Soil														
Antimony		X												
Cadmium		X												
Chromium		X	X								X			
Copper		X		X										
Lead		X					X							
Nickel		X												
Nitrate/Nitrite							X						X	
Silver		X												
Strontium												X	X	X
Zinc		X	X	X	X		X	X		X	X		X	X
Small Mammals														
Surficial Soils														
Plutonium-239/240	Sitewide Maximum													
Uranium-233/234	Sitewide Maximum													
Uranium-238	Sitewide Maximum													

[1]PCBs - polychlorinated biphenyls included in the risk characterization due to its potential to bioaccumulate; # in X indicates that analyte is an ECOC in the specified source area

Table N3-21
List of PCOCs with HQs≥1 Not Evaluated as ECOCs in the Risk Characterization

Receptor	Source Area	PCOC	HQ	Reason
Preble's Meadow Jumping Mouse	OU1 881 Hillside	Acetone	1.24	Not a PCOC in OU1
	OU5 Ash Pits	Aluminum	1.10	Not a PCOC in OU5
		Magnesium	1.02	Not a PCOC in OU5
	OU5 C-Ponds	Cadmium	1.06	Not a PCOC in OU5
	OU5 Old Landfill	Magnesium	1.69	Not a PCOC in OU5
		Aluminum	1.10	Not a PCOC in OU5
	OU2 903 Pad	Aluminum	1.10	Not a PCOC in OU2
	OU2 East Trenches	Copper	3.18	Not a PCOC in OU2
		Cadmium	1.75	Not a PCOC in OU2
	OU4 Downgradient	Selenium	1.95	Not a PCOC in OU4
		Magnesium	1.39	Not a PCOC in OU4
		Aluminum	1.20	Not a PCOC in OU4
	OU6 A-Ponds	Magnesium	1.55	Essential nutrient
		Selenium	1.35	Not a PCOC in OU6
		Aluminum	1.06	Not a PCOC in OU6
	OU6 B-Ponds	Selenium	1.52	Not a PCOC in OU6
		Magnesium	1.17	Essential nutrient
		Aluminum	1.12	Not a PCOC in OU6
	OU6 North Spray Field	Magnesium	2.86	Essential nutrient
		Aluminum	1.33	Not a PCOC in OU6
	OU6 Burial Trenches	Selenium	1.38	Not a PCOC in OU6
		Magnesium	1.05	Essential nutrient
	OU7 Downgradient	Magnesium	1.69	Essential nutrient
	OU6 Soil Dump	Selenium	3.55	Not a PCOC in OU6
		Magnesium	1.06	Essential nutrient
American Kestrel	OU2 East Trenches	Copper	12.00	Not a PCOC in OU2
		Zinc	2.81	Not a PCOC in OU2
		Lithium	1.07	Not a PCOC in OU2
	OU6 A-Ponds	Magnesium	3.32	Essential Nutrient
		Zinc	1.41	Essential Nutrient
		Vanadium	1.15	Only 1/3 hits had conc. above det. limit
	OU6 B-Ponds	Selenium	3.97	Not a PCOC in OU6
		Magnesium	2.86	Essential nutrient
		Aluminum	1.17	Not a PCOC in OU6
		Mercury	1.00	Only 2/9 hits had conc. above det. limit
	OU6 Soil Dump	Beryllium	3.07	Not a PCOC in OU6
		Magnesium	1.53	Essential nutrient
Great Blue Heron	OU1 881 Hillside	Magnesium	1.95	Not a PCOC in OU1
		Aluminum	1.43	Not a PCOC in OU1
	OU5 Old Landfill	Cadmium	3.26	Not a PCOC in OU5
		Magnesium	1.63	Not a PCOC in OU5
		Aluminum	1.44	Not a PCOC in OU5
	OU5 Ash Pits	Cadmium	2.98	Not a PCOC in OU5
	OU5 C-Ponds	Selenium	2.64	Not a PCOC in OU5
		Aluminum	1.19	Not a PCOC in OU5
		Copper	1.14	Does not bioaccumulate, and more realistic assumptions about seasonal exposure factors would result in negligible risk.
		Magnesium	1.10	
	OU6 A-Ponds	Magnesium	1.39	Essential nutrient
		Aluminum	1.26	Not a PCOC in OU6
	OU6 B-Ponds	Magnesium	1.28	Essential nutrient
		Aluminum	1.04	Not a PCOC in OU6

Table N3-21
List of PCOCs with HQs≥1 Not Evaluated as ECOCs in the Risk Characterization

Receptor	Source Area	PCOC	HQ	Reason
Vegetation Community	OU4 Downgradient	Lithium	3.7	Not a PCOC in OU4
		Strontium	1.1	Not a PCOC in OU4
		Vanadium	1.1	Not a PCOC in OU4
	OU6 A-Ponds	Lithium	6.6	Not a PCOC in OU6
	OU2 Mound Area	Antimony	1.6	Not a PCOC in OU2
		Strontium	1.5	Not a PCOC in OU2
	OU6 North Spray Field	Lithium	2.2	Not a PCOC in OU6
		Antimony	1.3	Not a PCOC in OU6
	OU11 West Spray Field	Lithium	2.7	Not a PCOC in OU11
		Chromium	2.1	Not a PCOC in OU11
		Mercury	1.6	Not a PCOC in OU11
	OU6 Burial Trenches	Lithium	2.4	Not a PCOC in OU6
		Antimony	1.0	Not a PCOC in OU6
	OU7 Downgradient Area	Lithium	4.0	Not a PCOC in OU7
	OU6 Soil Dump Areas	Lithium	3.9	Not a PCOC in OU6
		Antimony	1.2	Not a PCOC in OU6
	OU1 881 Hillside	Lithium	5.2	Not a PCOC in OU1
		Antimony	1.5	Not a PCOC in OU1
		Strontium	1.4	Not a PCOC in OU1
		Zinc	1.2	Not a PCOC in OU1
	OU5 Ash Pits	Lithium	4.9	Not a PCOC in OU5
	OU5 C-Ponds	Lithium	3.4	Not a PCOC in OU5
	OU5 Old Landfill	Lithium	3.6	Not a PCOC in OU5
Wetland Vegetation Community	Pond A-1	Aluminum	1.90	Not a PCOC in OU6
		Strontium	1.70	Not a PCOC in OU6
		Mercury	1.40	Not a PCOC in OU6
	Pond A-2	Strontium	1.80	Not a PCOC in OU6
		Aluminum	1.40	Not a PCOC in OU6
	Pond A-3	Aluminum	3.80	Not a PCOC in OU6
		Lithium	1.80	Not a PCOC in OU6
		Strontium	1.50	Not a PCOC in OU6
	Pond A-4	Aluminum	2.90	Not a PCOC in OU6
		Strontium	1.90	Not a PCOC in OU6
		Selenium	1.40	Not a PCOC in OU6
		Lithium	1.10	Not a PCOC in OU6
	Pond A-5	Aluminum	1.60	Not a PCOC in OU6
		Strontium	1.30	Not a PCOC in OU6
	Pond B-1	Mercury	3.30	Not a PCOC in OU6
		Lead	2.40	Not a PCOC in OU6
		Strontium	2.20	Not a PCOC in OU6
		Cadmium	2.20	Not a PCOC in OU6
		Aluminum	1.40	Not a PCOC in OU6
		Nickel	1.00	Not a PCOC in OU6
		Beryllium	1.00	Not a PCOC in OU6
	Pond B-2	Strontium	6.20	Not a PCOC in OU6
		Mercury	1.60	Not a PCOC in OU6
		Selenium	1.60	Not a PCOC in OU6
		Cadmium	1.50	Not a PCOC in OU6
		Aluminum	1.10	Not a PCOC in OU6
	Pond B-3	NA	N/A	Not a PCOC in OU6
	Pond B-4	Aluminum	1.90	Not a PCOC in OU6
		Strontium	1.80	Not a PCOC in OU6
	Pond B-5	Aluminum	2.80	Not a PCOC in OU6
		Strontium	1.40	Not a PCOC in OU6
		Lithium	1.30	Not a PCOC in OU6

Table N3-21
List of PCOCs with HQs≥1 Not Evaluated as ECOCs in the Risk Characterization

Receptor	Source Area	PCOC	HQ	Reason
Wetland Vegetation Community	North Walnut Creek	Antimony	2.90	Not a PCOC in OU6
		Aluminum	1.20	Not a PCOC in OU6
	South Walnut Creek	NA	N/A	
	Woman Creek	Antimony	1.50	Not a PCOC in OU5
		Aluminum	1.40	Not a PCOC in OU5
		Selenium	1.20	Not a PCOC in OU5
		Vanadium	1.20	Not a PCOC in OU5
		Chromium	1.00	Not a PCOC in OU5
	Pond C-1	Aluminum	2.20	Not a PCOC in OU5
		Chromium	2.00	Not a PCOC in OU5
		Lithium	1.80	Not a PCOC in OU5
		Vanadium	1.70	Not a PCOC in OU5
		Selenium	1.50	Not a PCOC in OU5
		Strontium	1.50	Not a PCOC in OU5
	Pond C-2	Strontium	3.30	Not a PCOC in OU5
		Vanadium	1.90	Not a PCOC in OU5
		Chromium	1.80	Not a PCOC in OU5
		Aluminum	1.80	Not a PCOC in OU5
		Lithium	1.10	Not a PCOC in OU5

Table N3-22
Sediment PCOCs with Exposure Point HQs ≥1 by Pond

Analyte	Group	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	North Walnut Creek	South Walnut Creek	Pond C-1	Pond C-2	Woman Creek
Aquatic Life																
Antimony	M	X		X	X				X	X						
Arsenic	M															
Barium	M											X	X			
Chromium	M															
Cobalt	M	X	X	X	X	X	X	X	X	X	X	X				
Copper	M						X		X							
Magnesium	M	X	X	X	X	X	X	X	X	X	X	X	X			
Manganese	M							X				X				
Silver	M						X	X	X	X						
Strontium	M											X	X			
Vanadium	M	X	X	X	X	X	X	X	X	X	X	X	X			
Zinc	M		X	X			X		X	X			X		X	
Aldrin	P		X													
Aroclor-1254[1]	P	X					X	X	X	X						
Aroclor-1260[1]	P								X							
gamma-BHC (Lindane)	P									X						
Heptachlor	P						X									
Anthracene[2]	S	X					X			X		X	X			
Benzo(b)fluoranthene[2]	S	X		X			X		X	X		X	X			
Benzo(ghi)perylene[2]	S															
Benzo(k)fluoranthene[2]	S	X					X			X			X			
Chrysene[2]	S	X	X	X			X	X	X	X		X	X			
Dibenzo(ah)anthracene[2]	S						X									
Fluorene[2]	S						X									
Naphthalene[2]	S						X						X			
Benzoic acid	S		X			X						X	X	X	X	
Acetone	V		X			X	X	X								
Methylene chloride	V						X					X	X			
Toluene	V	X														
Wetland Vegetation Communities																
Antimony	M	X		X	X				X	X						
Chromium	M	X	X	X	X	X	X	X	X	X	X					
Mercury	M													X	X	
Silver	M						X	X	X	X						
Strontium	M											X				
Vanadium	M	X	X	X	X	X	X	X	X	X	X	X				
Zinc	M	X	X	X	X	X	X	X	X	X	X	X		X	X	X

[1]Polychlorinated biphenyls (PCBs)
[2]Polycyclic aromatic hydrocarbons (PAHs)

Table N3-23
Vegetation ECOCs: Subsurface Soil and Sediments

Source Area	Subsurface Soil ECOCs	Subsurface Soil Hazard Quotient	Sediment ECOCs	Sediment Hazard Quotient
Walnut Creek Watershed				
OU2 903 Pad	Zinc	1.2		
OU2 Mound Area	Zinc	1.4		
OU4 Downgradient	Nitrate/Nitrite	4.8		
	Zinc	1.4		
	Lead	1.3		
OU6 A-Ponds	Zinc	1.0		
Pond A-1			Antimony	3.8
			Chromium	1.9
			Vanadium	1.7
			Zinc	1.5
Pond A-2			Zinc	3.9
			Vanadium	1.4
			Chromium	1.0
Pond A-3			Antimony	3.0
			Chromium	2.8
			Vanadium	2.8
			Zinc	2.1
Pond A-4			Antimony	5.2
			Vanadium	2.4
			Zinc	1.9
			Chromium	1.6
Pond A-5			Vanadium	1.6
			Chromium	1.3
			Zinc	1.0
OU6 B-Ponds				
Pond B-1			Silver	88
			Zinc	10
			Chromium	6.6
			Vanadium	1.4
Pond B-2			Silver	51
			Chromium	2.0
			Zinc	1.7
			Vanadium	1.1
Pond B-3			Silver	63
			Antimony	8.9
			Zinc	3.3
			Chromium	2.9
			Vanadium	1.4
Pond B-4			Silver	15
			Zinc	3.5
			Antimony	3.3
			Vanadium	1.8
			Chromium	1.8

Table N3-23
Vegetation ECOCs: Subsurface Soil and Sediments

Source Area	Subsurface Soil ECOCs	Subsurface Soil Hazard Quotient	Sediment ECOCs	Sediment Hazard Quotient
Pond B-5			Vanadium	2.2
			Zinc	2.0
			Chromium	2.0
North Walnut Creek			Zinc	1.3
			Vanadium	1.3
			Strontium	1.1
South Walnut Creek			NA	NA
OU6 Burial Trenches	Strontium	1.5		
OU6 Soil Dump Areas	Strontium	1.6		
	Zinc	1.0		
OU6 North Spray Field	Chromium	1.2		
	Zinc	1.0		
OU7 Downgradient Areas	Nitrate/Nitrite	170		
	Strontium	1.6		
	Zinc	1.5		
Woman Creek Watershed				
OU5 Ash Pits	Chromium	7.9		
	Nickel	3.7		
	Zinc	3.0		
	Silver	2.0		
	Antimony	1.3		
	Lead	1.1		
	Copper	1.1		
	Cadmium	1.0		
OU5 Old Landfill	Copper	2.6		
	Zinc	2.0		
OU5 C-Ponds	Chromium	2.7		
	Zinc	1.1		
Pond C-1			Mercury	6.0
			Zinc	1.5
Pond C-2			Zinc	2.8
			Mercury	2.3
Woman Creek			Zinc	1.6
OU2 903 Pad	Zinc	1.2		

OU - operable unit
ECOC - ecological chemical of concern
In the following source areas, all PCOCs had HQs less than one:
OU1 881 Hillside
OU2 East Trenches
OU11 West Spray Field

Table N3-24
Summary of Risk Estimates by Receptor

Receptors at Risk	Source Areas	Exposure Points Contributing the Most Risk	ECOC	HQ
Aquatic Species	North Walnut Creek	Sediments	Anthracene	110
			Barium	1.4
			Benzo(b)fluoranthene	15
			Benzoic acid	8.2
			Chrysene	32
			Cobalt	1.4
			Magnesium	1.6
			Manganese	1.2
			Methylene chloride	9.5
			Strontium	1.1
			Vanadium	1.2
	South Walnut Creek	Sediments	Anthracene	140
			Barium	1.3
			Benzo(b)fluoranthene	19
			Benzo(k)fluoranthene	1.5
			Benzoic acid	1.3
			Chrysene	38
			Cobalt	1.0
			Magnesium	1.3
			Methylene chloride	17
			Naphthalene	1,100
			Strontium	1.3
			Vanadium	1.3
			Zinc	1.8
	OU2 903 Pad	Surface Water	Barium	39
	Pond A-1	Sediments	Anthracene	88
			Antimony	3.7
			Aroclor-1254	1.3
			Benzo(b)fluoranthene	18
			Benzo(k)fluoranthene	1.2
			Chrysene	34
			Cobalt	1.8
			Magnesium	2.4
			Toluene	2.2
			Vanadium	1.7
	Pond A-2	Sediments	Acetone	1.5
			Aldrin	35,000
			Benzoic acid	1.7
			Chrysene	3.9
			Cobalt	1.5
			Magnesium	2.3
			Vanadium	1.4
			Zinc	1.9
	Pond A-3	Sediments	Antimony	3.0
			Benzo(b)fluoranthene	18
			Chrysene	29
			Cobalt	2.1
			Magnesium	3.0
			Vanadium	2.8
			Zinc	1.0

Table N3-24
Summary of Risk Estimates by Receptor

Receptors at Risk	Source Areas	Exposure Points Contributing the Most Risk	ECOC	HQ
Aquatic Species (continued)	Pond A-4	Sediments	Antimony	5.2
			Cobalt	2.0
			Magnesium	2.6
			Vanadium	2.3
	Pond A-5	Sediments	Acetone	2.9
			Benzoic acid	7.7
			Cobalt	1.8
			Magnesium	1.7
			Vanadium	1.6
	Pond B-1	Sediments	Acetone	2.2
			Anthracene	270
			Aroclor-1254	8.9
			Benzo(b)fluoranthene	61
			Benzo(k)fluoranthene	2.8
			Chrysene	94
			Cobalt	1.6
			Copper	2.6
			Dibenzo(ah)anthracene	1.4
			Fluorene	1,400
			Heptachlor	230
			Magnesium	2.0
			Methylene chloride	4.3
			Naphthalene	3,500
			Silver	90
			Vanadium	1.4
			Zinc	4.8
	Pond B-2	Sediments	Acetone	3.1
			Aroclor-1254	4.3
			Chrysene	7.7
			Cobalt	1.7
			Magnesium	3.1
			Manganese	1.2
			Silver	52
			Vanadium	1.1
	Pond B-3	Sediments	Antimony	8.9
			Aroclor-1254	4.0
			Aroclor-1260	48
			Benzo(b)fluoranthene	18
			Chrysene	32
			Cobalt	1.7
			Copper	1.9
			Magnesium	1.8
			Silver	64
			Vanadium	1.4
			Zinc	1.6

Table N3-24
Summary of Risk Estimates by Receptor

Receptors at Risk	Source Areas	Exposure Points Contributing the Most Risk	ECOC	HQ
Aquatic Species (continued)	Pond B-4	Sediments	Anthracene	110
			Antimony	3.3
			Aroclor-1254	1.7
			Benzo(b)fluoranthene	51
			Benzo(k)fluoranthene	2.1
			Chrysene	62
			Cobalt	1.5
			gamma-BHC (Lindane)	12
			Magnesium	2.3
			Silver	15
			Vanadium	1.8
			Zinc	1.7
	Pond B-5	Sediments	Cobalt	1.6
			Magnesium	2.5
			Vanadium	2.1
	OU7 Downgradient	Surface Water	Barium	45
			Barium	45
			Manganese	2.4
			Strontium	1.5
	OU5 Ash Pits	Surface Water	Barium	17.00
	OU5 C-Ponds	Surface Water	Barium	24
	Pond C-1	Sediments	Benzoic acid	2.6
	Pond C-2	Sediments	Benzoic acid	1.7
			Zinc	1.3
	OU5 Old Landfill	Surface Water	Barium	37
Preble's Meadow Jumping Mouse[1]	OU6 North Spray Fields	Vegetation	Barium	1.05
	OU7 Downgradient	Vegetation	Selenium	2.36
Small Mammals	OU2 903 Pad	Sediments	Toluene	1,900
			Plutonium-239/240	1.92
	OU2 East Trenches	Subsurface Soil	Toluene	20
	OU5 Old Landfill	Surface Soils	Uranium-233/234	1.56
			Uranium-238	23.8
American Kestrel	OU2 903 Pad	Terrestrial Arthropods	Chromium	5.56
	OU2 East Trenches	Terrestrial Arthropods	Chromium	4.36
	OU4 Downgradient	Small Mammals	Mercury	1.36
	OU6 A-Ponds	Small Mammals	Lead	1.76
			Chromium	1.33
	OU6 B-Ponds	Small Mammals	Lead	1.25
			Vanadium	2.86
	OU2 Mound Area	Terrestrial Arthropods	Chromium	2.53
	OU6 Soil Dump Area	Small Mammals	Mercury	3.14
Great Blue Heron	OU2 903 Pad	Fish	Aroclor-1254	5.78
	OU6 A-Ponds	Fish	Di-N-butyl phthalate	16.56
	A-Ponds	Sediments	PCBs	NA
	OU6 B-Ponds	Fish	Mercury	2.40
			Di-N-butyl phthalate	8.27
	B-Ponds	Sediments	PAHs	NA
			PCBs	NA
	OU5 C-Ponds	Fish	Mercury	6.40
	OU5 Old Landfill	Fish	Mercury	28.8
	OU5 Old Landfill	Sediments	Antimony	1.56

Table N3-24
Summary of Risk Estimates by Receptor

Receptors at Risk	Source Areas	Exposure Points Contributing the Most Risk	ECOC	HQ
Mallard	OU6 A-Ponds	Benthic Macroinvertebrates	Di-N-butyl phthalate	2.00
	A-Ponds	Sediments	PCBs	NA
	B-Ponds	Sediments	PCBs	NA
Vegetation Communities	OU2 903 Pad	Subsurface Soil	Zinc	1.2
	OU4 Downgradient	Subsurface Soil	Nitrate/Nitrite	4.8
			Zinc	1.4
			Lead	1.3
	OU6 A-Ponds	Subsurface Soil	Zinc	1.0
	OU2 Mound Area	Subsurface Soil	Zinc	1.4
	OU6 North Spray Fields	Subsurface Soil	Chromium	1.2
			Zinc	1.0
	OU6 Burial Trenches	Subsurface Soil	Strontium	1.5
	OU7 Downgradient	Subsurface Soil	Nitrate/Nitrite	170
			Strontium	1.6
			Zinc	1.5
	OU6 Soil Dump Area	Subsurface Soil	Strontium	1.6
			Zinc	1.0
	OU5 Ash Pits	Subsurface Soil	Chromium	7.9
			Nickel	3.7
			Zinc	3.0
			Silver	2.0
			Antimony	1.3
			Copper	1.1
			Lead	1.1
			Cadmium	1.0
	OU5 C-Ponds	Subsurface Soil	Chromium	2.7
			Zinc	1.1
	OU5 Old Landfill	Subsurface Soil	Copper	2.6
			Zinc	2.0
Wetland Vegetation Communities	North Walnut Creek	Sediments	Zinc	1.3
			Vanadium	1.3
			Strontium	1.1
	Pond A-1	Sediments	Antimony	3.8
			Chromium	1.9
			Vanadium	1.7
			Zinc	1.5
	Pond A-2	Sediments	Zinc	3.9
			Vanadium	1.4
			Chromium	1.0
	Pond A-3	Sediments	Antimony	3.0
			Chromium	2.8
			Vanadium	2.8
			Zinc	2.1
	Pond A-4	Sediments	Antimony	5.2
			Vanadium	2.4
			Zinc	1.9
			Chromium	1.6
	Pond A-5	Sediments	Vanadium	1.6
			Chromium	1.3
			Zinc	1.0

Table N3-24
Summary of Risk Estimates by Receptor

Receptors at Risk	Source Areas	Exposure Points Contributing the Most Risk	ECOC	HQ
	Pond B-1	Sediments	Silver	88.0
			Zinc	10.0
			Chromium	6.6
			Vanadium	1.4
	Pond B-2	Sediments	Silver	51.0
			Chromium	2.0
			Zinc	1.7
			Vanadium	1.1
	Pond B-3	Sediments	Silver	63.0
			Antimony	8.9
			Zinc	3.3
			Chromium	2.9
			Vanadium	1.4
	Pond B-4	Sediments	Silver	15.0
			Zinc	3.5
			Antimony	3.3
			Vanadium	1.8
			Chromium	1.8
	Pond B-5	Sediments	Vanadium	2.2
			Zinc	2.0
			Chromium	2.0
	Woman Creek	Sediments	Zinc	1.6
	Pond C-1	Sediments	Mercury	6.0
			Zinc	1.5
	Pond C-2	Sediments	Zinc	2.8
	Pond C-2	Subsurface Soil	Mercury	2.3

NOTE: Two significant figures were presented for all receptors except wildlife receptors.
[1]Radionuclide benchmarks use small mammals as the limiting species, but Preble's meadow jumping mouse can be substituted, because it represents our small mammal receptor.

Table N3-25
Summary of Risk Estimates for ECOCs by Source Area

Source Areas	Receptors at Risk	Exposure Points Contributing the Most Risk	ECOC	HQ
Walnut Creek Watershed				
North Walnut Creek	Aquatic Species	Sediments	Anthracene	110
			Chrysene	32
			Benzo(b)fluoranthene	15
			Methylene chloride	9.5
			Benzoic acid	8.2
			Magnesium	1.6
			Barium	1.4
			Cobalt	1.4
			Vanadium	1.2
			Manganese	1.2
			Strontium	1.1
	Wetland Vegetation Communities	Sediments	Zinc	1.3
			Vanadium	1.3
			Strontium	1.1
South Walnut Creek	Aquatic Species	Sediments	Naphthalene	1,100
			Anthracene	140
			Chrysene	38
			Benzo(b)fluoranthene	19
			Methylene chloride	17
			Zinc	1.8
			Benzo(k)fluoranthene	1.5
			Magnesium	1.3
			Benzoic acid	1.3
			Vanadium	1.3
			Barium	1.3
			Strontium	1.3
			Cobalt	1.0
OU2 903 Pad	American Kestrel	Terrestrial Arthropods	Chromium	5.56
	Aquatic Species	Surface Water	Barium	39
	Great Blue Heron	Fish	Aroclor-1254	5.78
	Small Mammals	Sediments	Toluene	1,900
	Small Mammals[1]	Surface Soils	Plutonium-239/240	1.92
	Vegetation Communities	Subsurface Soil	Zinc	1.2
OU2 East Trenches	American Kestrel	Terrestrial Arthropods	Chromium	4.36
	Small Mammals	Subsurface Soil	Toluene	20.0
OU2 Mound Area	American Kestrel	Terrestrial Arthropods	Chromium	2.53
	Vegetation Communities	Subsurface Soil	Zinc	1.4
OU4 Downgradient	American Kestrel	Small Mammals	Mercury	1.36
	Vegetation Communities	Subsurface Soil	Nitrate/Nitrite	4.8
			Zinc	1.4
			Lead	1.3
OU6 A-Ponds	American Kestrel	Small Mammals	Lead	1.76
			Chromium	1.33
	Great Blue Heron	Fish	Di-N-butyl phthalate	16.56
	Mallard	Benthic Macroinvertebrates	Di-N-butyl phthalate	2.00
	Vegetation Communities	Subsurface Soil	Zinc	1.0
	Great Blue Heron	Sediments	PCBs	NA
	Mallard	Sediments	PCBs	NA

Table N3-25
Summary of Risk Estimates for ECOCs by Source Area

Source Areas	Receptors at Risk	Exposure Points Contributing the Most Risk	ECOC	HQ
Pond A-1	Aquatic Species	Sediments	Anthracene	88
			Chrysene	34
			Benzo(b)fluoranthene	18
			Antimony	3.7
			Magnesium	2.4
			Toluene	2.2
			Cobalt	1.8
			Vanadium	1.7
			Aroclor-1254	1.3
			Benzo(k)fluoranthene	1.2
	Wetland Vegetation Communities	Sediments	Antimony	3.8
			Chromium	1.9
			Vanadium	1.7
			Zinc	1.5
Pond A-2	Aquatic Species	Sediments	Aldrin	35,000
			Chrysene	3.9
			Magnesium	2.3
			Zinc	1.9
			Benzoic acid	1.7
			Acetone	1.5
			Cobalt	1.5
			Vanadium	1.4
	Wetland Vegetation Communities	Sediments	Zinc	3.9
			Vanadium	1.4
			Chromium	1.0
Pond A-3	Aquatic Species	Sediments	Chrysene	29
			Benzo(b)fluoranthene	18
			Antimony	3.0
			Magnesium	3.0
			Vanadium	2.8
			Cobalt	2.1
			Zinc	1.0
	Wetland Vegetation Communities	Sediments	Antimony	3.0
			Chromium	2.8
			Vanadium	2.8
			Zinc	2.1
Pond A-4	Aquatic Species	Sediments	Antimony	5.2
			Magnesium	2.6
			Vanadium	2.3
			Cobalt	2.0
	Wetland Vegetation Communities	Sediments	Antimony	5.2
			Vanadium	2.4
			Zinc	1.9
			Chromium	1.6

Table N3-25
Summary of Risk Estimates for ECOCs by Source Area

Source Areas	Receptors at Risk	Exposure Points Contributing the Most Risk	ECOC	HQ
Pond A-5	Aquatic Species	Sediments	Benzoic acid	7.7
			Acetone	2.9
			Cobalt	1.8
			Magnesium	1.7
			Vanadium	1.6
	Wetland Vegetation Communities	Sediments	Vanadium	1.6
			Chromium	1.3
			Zinc	1.0
OU6 B-Ponds	American Kestrel	Small Mammals	Lead	1.25
			Vanadium	2.86
	Great Blue Heron	Fish	Mercury	2.40
			Di-N-butyl phthalate	8.27
	Great Blue Heron	Sediments	PCBs	NA
	Mallard	Sediments	PCBs	NA
Pond B-1	Aquatic Species	Sediments	Naphthalene	3,500
			Fluorene	1,400
			Anthracene	270
			Heptachlor	230
			Chrysene	94
			Silver	90
			Benzo(b)fluoranthene	61
			Aroclor-1254	8.9
			Zinc	4.8
			Methylene chloride	4.3
			Benzo(k)fluoranthene	2.8
			Copper	2.6
			Acetone	2.2
			Magnesium	2.0
			Cobalt	1.6
			Vanadium	1.4
			Dibenzo(ah)anthracene	1.4
	Wetland Vegetation Communities	Sediments	Silver	88.0
			Zinc	10.0
			Chromium	6.6
			Vanadium	1.4
Pond B-2	Aquatic Species	Sediments	Silver	52
			Chrysene	7.7
			Aroclor-1254	4.3
			Magnesium	3.1
			Acetone	3.1
			Cobalt	1.7
			Manganese	1.2
			Vanadium	1.1
	Wetland Vegetation Communities	Sediments	Silver	51.0
			Chromium	2.0
			Zinc	1.7
			Vanadium	1.1

Table N3-25
Summary of Risk Estimates for ECOCs by Source Area

Source Areas	Receptors at Risk	Exposure Points Contributing the Most Risk	ECOC	HQ
Pond B-3	Aquatic Species	Sediments	Silver	64
			Aroclor-1260	48
			Chrysene	32
			Benzo(b)fluoranthene	18
			Antimony	8.9
			Aroclor-1254	4.0
			Copper	1.9
			Magnesium	1.8
			Cobalt	1.7
			Zinc	1.6
			Vanadium	1.4
Pond B-3	Wetland Vegetation Communities	Sediments	Silver	63.0
			Antimony	8.9
			Zinc	3.3
			Chromium	2.9
			Vanadium	1.4
Pond B-4	Aquatic Species	Sediments	Anthracene	110
			Chrysene	62
			Benzo(b)fluoranthene	51
			Silver	15
			gamma-BHC (Lindane)	12
			Antimony	3.3
			Magnesium	2.3
			Benzo(k)fluoranthene	2.1
			Vanadium	1.8
			Zinc	1.7
			Aroclor-1254	1.7
			Cobalt	1.5
	Wetland Vegetation Communities	Sediments	Silver	15.0
			Zinc	3.5
			Antimony	3.3
			Vanadium	1.8
			Chromium	1.8
Pond B-5	Aquatic Species	Sediments	Magnesium	2.5
			Vanadium	2.1
			Cobalt	1.6
	Wetland Vegetation Communities	Sediments	Vanadium	2.2
			Zinc	2.0
			Chromium	2.0
OU6 North Spray Fields	Preble's Meadow Jumping Mouse	Vegetation	Barium	1.05
	Vegetation Communities	Subsurface Soil	Chromium	1.2
			Zinc	1.0
OU6 Burial Trenches	Vegetation Communities	Subsurface Soil	Strontium	1.5
OU6 Soil Dump Area	American Kestrel	Small Mammals	Mercury	3.14
	Vegetation Communities	Subsurface Soil	Strontium	1.6
			Zinc	1.0

Table N3-25
Summary of Risk Estimates for ECOCs by Source Area

Source Areas	Receptors at Risk	Exposure Points Contributing the Most Risk	ECOC	HQ
OU7 Downgradient	Aquatic Species	Surface Water	Barium	45
			Manganese	2.4
			Strontium	1.5
			Barium	45
	Preble's Meadow Jumping Mouse	Vegetation	Selenium	2.36
	Vegetation Communities	Subsurface Soil	Nitrate/Nitrite	170
			Strontium	1.6
			Zinc	1.5
Woman Creek Watershed				
Woman Creek	Wetland Vegetation Communities	Sediments	Zinc	1.6
OU5 Ash Pits	Aquatic Species	Surface Water	Barium	17.00
	Vegetation Communities	Subsurface Soil	Chromium	7.9
			Nickel	3.7
			Zinc	3.0
			Silver	2.0
			Antimony	1.3
			Copper	1.1
			Lead	1.1
			Cadmium	1.0
OU5 C-Ponds	Aquatic Species	Surface Water	Barium	24
	Great Blue Heron	Fish	Mercury	6.40
	Vegetation Communities	Subsurface Soil	Chromium	2.7
			Zinc	1.1
Pond C-1	Aquatic Species	Sediments	Benzoic acid	2.6
	Wetland Vegetation Communities	Sediments	Mercury	6.0
			Zinc	1.5
Pond C-2	Aquatic Species	Sediments	Benzoic acid	1.7
			Zinc	1.3
	Wetland Vegetation Communities	Sediments	Zinc	2.8
		Subsurface Soil	Mercury	2.3
OU5 Old Landfill	Aquatic Species	Surface Water	Barium	37
	Great Blue Heron	Fish	Mercury	28.8
		Sediments	Antimony	1.56
	Small Mammals[1]	Surface Soils	Uranium-233/234	1.56
			Uranium-238	23.8
	Vegetation Communities	Subsurface Soil	Copper	2.6
			Zinc	2.0
OU2 903 Pad	American Kestrel	Terrestrial Arthropods	Chromium	5.56
	Aquatic Species	Surface Water	Barium	39
	Great Blue Heron	Fish	Aroclor-1254	5.78
	Small Mammals	Sediments	Toluene	1,900
	Small Mammals[1]	Surface Soils	Plutonium-239/240	1.92
	Vegetation Communities	Subsurface Soil	Zinc	1.2
OU2 East Trenches	American Kestrel	Terrestrial Arthropods	Chromium	4.36
	Small Mammals	Subsurface Soil	Toluene	20

[1]Radionuclide benchmarks use small mammals as the limiting species, but Preble's meadow jumping mouse can be substituted, because it represents our small mammal receptor.

Two significant figures were presented for all receptors except wildlife receptors.

NA - HQ<1, chemical included as ECOC by professional judgement.

N4. PROBLEM FORMULATION

The Tier 3 screen identified ECOCs based on chemical concentrations in abiotic and biotic media and conservative assumptions concerning exposure and toxicity. The remainder of the ERA focuses on further characterization of ecological risk from exposure to the ECOCs. The purpose of problem formulation is to establish the specific objectives and approach for risk characterization (EPA 1994). The problem formulation phase of this ERA describes methods by which existing data were used in risk characterization. Results of analyses and risk characterization are presented in Section N5.

The risk characterization has two main goals: (1) refine risk estimates through use of less conservative and more realistic assumptions and characterize remaining uncertainty, and (2) identify areas, chemicals, and media contributing most to risk. Where feasible, guidance for developing cleanup criteria protective of assessment endpoints is also provided. Where appropriate, exposures and risk are summarized by watershed, OU, and IHSS to aid in risk management and remediation decisions.

Conservative assumptions were used in the Tier 3 screen to improve efficiency of the screen or to account for uncertainty in exposure or toxicity estimates. Conservative assumptions were selected to minimize the probability of underestimating risk so that uncertainty would be biased in only one direction (EPA 1994). Refinement of risk estimates involved use of less conservative assumptions and/or site data on direct measurement of toxic effects to reduce uncertainty. In most cases, a combination of data types was used in a weight-of-evidence approach to risk characterization.

The risk characterization for each of the ECOCs included the following activities: (1) refine exposure estimates to more accurately reflect site conditions, including bioavailability, contaminant distribution, and frequency and duration of exposures; (2) refine toxicity estimates based on more specific evaluation of contaminant forms and potential toxicity; (3) review site data to determine if predicted effects were manifested; (4) if appropriate, extrapolate effects on individuals to estimate effects to RFETS populations or communities; and (5) identify, characterize, and rank sources of uncertainty and identify data needed to further refine estimates.

The risk characterization focused on potential toxic effects of ECOCs to five ecological receptor groups:

1. Aquatic life

2. Aquatic-feeding birds

3. Terrestrial-feeding raptors

4. Small mammals

5. Vegetation communities

These receptor groups were selected based on results of the ECOC screen presented in Section N3, either because potential toxicity from ECOCs was identified or because available data were inadequate to conclude that risk was negligible. Each group represents a category of ecological receptors for which potential risk was identified in Section N3 and further risk characterization is needed. Potential effects of radionuclides on plants and wildlife were evaluated separately.

Assessment endpoints and specific objectives of the risk characterization were identified for each resource category (Table N4-1). Assessment endpoints are explicit expressions of the environmental values to be protected (Suter 1989, EPA 1992a). The purpose of assessment endpoints in this phase of the ERA is to focus the risk characterization on chemical contaminants that are present at potentially toxic concentrations and specific effects that may result from exposure. The potential for exposure and toxicity was established in the Tier 3 screen. In most cases, the specific effect is defined by the toxicological endpoints on which the TRVs were based. Most of these endpoints were based on chronic sublethal or reproductive effects that were not measured at RFETS. Results of toxicity testing or other measurements of effects were available for some groups and were used where appropriate.

For each receptor group, assessment endpoints, exposure pathways, and specific goals and objectives are identified. Where appropriate, a working null hypothesis (H_0) was defined to help guide analysis and evaluation of uncertainty.

N4.1 AQUATIC LIFE

As described in Section N2, aquatic habitats at RFETS have been highly modified by diversion and impoundment of water, which occurred historically for agricultural use and, more recently, for control of potential offsite transport of contaminants in water and sediments. Prior to agricultural development, Walnut Creek and Woman Creek were seasonally intermittent streams fed primarily by snowmelt and runoff. Aquatic communities were limited by both the periodic lack of flows and the generally low flows. Reliable surface flows occur only near seeps and springs.

Construction of detention ponds in both watersheds severely altered the natural hydrologic conditions. Creation of the ponds resulted in permanent lentic (standing water) habitats in areas where water previously was present only seasonally. In Walnut Creek, batch-release of water from the terminal ponds (Pond A-4 and Pond B-5) has caused stream segments immediately downstream to be dry most of the time. Establishment of aquatic life in these stream segments is limited because batch-releases are of short duration and occur at irregular intervals. Much of the water in Woman Creek has historically been diverted to Mower Ditch, leaving the segment below Pond C-2 dry much of the year. Flow in portions of Woman Creek upstream of Pond C-2 is relatively natural, although some groundwater sources may have been interrupted by installation of the SID and French drain in OU 1 and OU 5.

Stream communities at RFETS are composed of species that are typical of limited-flow or seasonal-flow environments. Under these conditions, assessment of impacts due to contaminant input is difficult because of natural variability. Several years of monitoring data and suitable upstream reference sites are necessary to identify community impacts; such data do not currently exist for RFETS.

Physical conditions in the ponds also hinder assessment of toxic impacts. Water levels in Ponds A-3, A-4, B-2, B-3, and B-5 are manipulated for site water management (DOE 1995a). Ponds A-1, A-2,

B-1, and B-2 are relatively shallow (less than 1 meter [m]), have no regular input besides local runoff, and have no regular output besides evaporation. As a result, the ponds have abundant aquatic plant life. However, faunal communities are limited, probably because of high daytime temperatures (in summer) and low dissolved oxygen at night. Pond B-3 receives output from the site wastewater treatment plant, and un-ionized ammonia has been cited as a potential toxicant in the past (Wolaver 1993).

Because the physical conditions in stream and pond communities hindered definitive identification of toxic effects in the ERA, a weight-of-evidence approach was used to evaluate potential toxicity. The approach included evaluation of chemical concentrations in sediments, review of screening-level TRVs for applicability to the sites, results of laboratory toxicity tests, and data on benthic and pelagic community composition.

N4.1.1 ECOCs

ECOCs for aquatic life were primarily associated with sediments and included metals and SVOCs (Tables N3-20 and N3-22). Screening-level risk estimates indicated that PAHs and silver were the ECOCs contributing most to potential toxicity in sediments (Table N3-22).

N4.1.2 Assessment Endpoints and Specific Objectives

Assessment endpoint:

⇒ *Determine whether sediment ECOCs could result in toxicity to benthic fauna, fish, or amphibians sufficient to limit the aquatic communities in the ponds.*

The toxicity evaluation was conducted assuming that physical conditions are not limiting.

The risk characterization focused on addressing two main questions:

1. Are concentrations of ECOCs in sediments above levels toxic to aquatic life? (H_0: sediment ECOC concentrations less than TRVs)

2. Do results of community surveys and toxicity testing indicate the toxicity predicted by the preliminary exposure and risk characterization? (H_0: community composition degraded with respect to areas not impacted by sediment contamination; H_0: toxicity of site sediment samples less than controls)

The potential for introduction of groundwater contaminants into surface water onsite was also evaluated using information on groundwater movements and contamination. This evaluation did not include quantitative modeling of groundwater transport. Rather, the evaluation was conducted by comparing maximum concentrations of groundwater PCOCs to water-quality standards and identifying the stream segments or ponds toward which contaminant plumes are moving.

The following specific objectives were addressed in the analysis:

- *Evaluate results of sediment and water toxicity tests.* Toxicity tests were conducted using sediments from each of the A-, B-, and C-series ponds and from stream locations in Woman Creek that were downgradient of OU 5 IHSSs. Tests were conducted using *Hyalella azteca* and *Chironomus tentans*. In addition, acute toxicity screens and whole-effluent toxicity tests were conducted for water using fathead minnows and *Ceriodaphnia* sp. These data were used to help determine whether the levels of toxicity predicted by the HQs in the preliminary risk calculations correspond to results of toxicity tests.

- *Evaluate aquatic community composition.* Community data on benthic macroinvertebrates, fish, and plankton were collected from each of the impoundments at RFETS using quantitative methods. These data were used to evaluate potential toxic impacts in two ways: (1) standard measures of community composition and presence/absence of sensitive/tolerant taxa were used to assess the potential toxic effects and (2) although data from strictly comparable reference areas were not available, community data were evaluated using data on communities in nearby stock ponds (D-series ponds) as indicators of potential community structure.

- *Compare ECOC concentration in sediments to TRVs.* Data on chemical concentrations were used to estimate exposures and characterize distribution of ECOCs in sediments. The

relationship between community measures and toxicity predicted from preliminary risk screens was evaluated to determine whether a "dose-response" relationship between ECOC concentration and adverse effects on pond communities was apparent.

- *Determine ECOC concentration in biological tissues.* In some cases, concentrations of ECOCs in invertebrate or fish tissues were compared to information concerning concentrations known to cause adverse effects. Tissue data were also used to characterize site-specific uptake ratios between ECOC concentrations in biota and sediments. Estimated uptake ratios were then used to approximate the levels to which contaminants might accumulate in ponds that currently lack well-developed aquatic communities.

- *Characterize contaminant concentrations in groundwater.* PCOC concentrations in groundwater were summarized for IHSS in OUs 1, 2, 4, and 5. Maximum concentrations were compared to surface-water quality standards because of the potential for groundwater to enter surface-water systems. Information on groundwater flow patterns at RFETS was used to identify stream segments and ponds that may receive contaminant input from groundwater.

N4.2 AQUATIC-FEEDING BIRDS

Aquatic habitats created by the construction of detention ponds at RFETS attract a variety of wildlife. Although many of the ponds lack a well-developed aquatic community (DOE 1995d), species such as raccoons, mule deer, black-crowned night-herons, great blue herons, and waterfowl have been observed feeding and drinking from the ponds and thus may be exposed to contaminants in surface water and sediments. Stream and ditch habitats at RFETS are also occasionally used by these species.

Birds and mammals that feed in aquatic habitats may experience higher contaminant exposures than their terrestrial-feeding counterparts. This is primarily due to three factors:

1. Erosion and groundwater transport may cause contaminants to accumulate and focus in watersheds.

2. Patches of aquatic habitats are usually small relative to terrestrial areas, and aquatic-feeding wildlife tend to concentrate around suitable habitat. Thus, use of aquatic habitats can be disproportionately high compared to areal extent.

3. Bioconcentration and bioaccumulation of chemicals in aquatic organisms can lead to toxic exposures even when concentrations in abiotic media are relatively nontoxic or when contact with the contaminated media is limited (e.g., sediments).

Aquatic-feeding birds and mammals are attracted to pond habitats at RFETS and, therefore, could also be exposed to sediment or surface-water contaminants. Preliminary risk estimates indicate that current concentrations of ECOCs in sediment and biota are probably nontoxic (Section N3 and Stiger 1994). However, ponds with the highest PCB concentrations apparently do not support significant fish or amphibian populations. More extensive colonization of the ponds could result in more complex food webs, increased biological transport of sediment contaminants, and exposure of birds or mammals to higher concentrations in biota. The risk characterization includes evaluation of potential exposures as well as those based on existing conditions.

The mallard and great blue heron were selected to represent aquatic-feeding wildlife because they are common species in the area and are known to occur at RFETS. In addition, birds are more sensitive than mammals to organic contaminants because they lack the same capacity for detoxification and therefore represent a more limiting exposure and risk scenario.

Herons feed primarily on fish. Amphibians and invertebrates are usually minor components of their diets but can be important in localized areas. Herons have relatively little direct contact with sediments during feeding. Mallards have more contact with the sediment because they may feed by filtering plant material and invertebrates. However, the amount of sediment ingested by mallards does not greatly exceed that of other more selective feeders (EPA 1993a). Thus, the primary pathway for exposure of both birds to PCBs in sediments is through ingestion of aquatic organisms that have become contaminated. Estimating exposure of herons and mallards requires measurement of concentrations in biota or estimating transfer of PCBs from sediments to prey species.

N4.2.1 ECOCs

ECOCs identified in Section N3 include Aroclor-1254 and PAHs in sediments and DBP in surface water. As noted above, screening-level exposure and risk calculations indicated minimal risk from PCB concentrations in sediments and biota under current conditions. However, biological samples were not available from the ponds with highest concentrations in sediments, and further evaluation of potential exposure and risk was needed because of the high potential for bioaccumulation of these contaminants. DBP was identified as an ECOC due to its potential for bioconcentration in the aquatic prey of mallards and herons (Table N3-20). DBP concentrations in aquatic biota were estimated from BCF and surface-water data. This approach was necessary because biological samples were not analyzed for this compound and, therefore, tissue data were not available for exposure analyses.

For all three ECOCs, the primary exposure pathway of concern was ingestion of contaminants in food.

N4.2.2 Assessment Endpoints and Specific Objectives

Assessment endpoint:

⇒ *Determine if ECOC concentrations in surface water and sediments of the detention ponds could result in exposures that reduce the survivorship or reproductive capacity of aquatic feeding birds. (H_0: exposure less than TRV)*

The risk characterization was based on exposure and risk to individual birds because great blue heron and mallard are protected under the Migratory Bird Treaty Act.

The exposure and risk evaluation were conducted for mallards and great blue herons under two exposure scenarios: (1) current and aquatic community structure and contaminant distribution, and (2) more complex aquatic communities that could result in increased biological transport of sediment contaminants and increased PCB concentrations in prey. Several of the ponds that have PCBs in sediments currently lack fish or productive littoral zones. Introduction of fish or an increase in primary production could result in completion of exposure pathways that are currently incomplete.

The basis for use of site-specific data in predicting potential concentrations in aquatic prey is described in the following paragraphs.

Because of their high hydrophobicity, many organic contaminants in aquatic environments tend to adsorb to sediment particulates and are distributed primarily by bulk transport of sediment. Aquatic organisms can take up PCBs from sediments through direct contact with sediments and interstitial waters or through ingestion of contaminated food. The former pathways are most important for benthic invertebrates and fish that have more direct contact with sediments. Food chain transfer is more important for more pelagic organisms, such as fathead minnows and largemouth bass (Thomann 1981, Rasmussen *et al.* 1990, Macdonald *et al.* 1993).

Distribution of PCBs in sediments and aquatic biota is determined by their hydrophobicity. In animals, persistent hydrophobic organics such as PCBs are found primarily in fat or other high-lipid tissues. In sediments, PCBs partition into the organic carbon component, which includes detritus and micro-organisms. Transfer from sediments to the benthic infauna is controlled by the rate of desorption from sediment particles into interstitial water (Landrum and Robbins 1990). As a result, the concentration of PCBs in the lipids of benthic fauna is generally equal to that in the organic carbon component of the surrounding sediment (Di Toro *et al.* 1991). PCB concentrations in higher organisms are more difficult to predict because the primary intake mechanisms are more complex and may vary among sites (Macdonald *et al.* 1993). The magnitude of bioaccumulation in aquatic communities is usually proportional to the length of the food chains (Rasmussen *et al.* 1990). Therefore, concentrations of organic contaminants in aquatic predators such as bass tend to vary with the complexity of local food webs.

Exposure of herons and mallards to Aroclor-1254 was estimated from site-specific data on PCB concentrations in sediment and biota. Current exposures were estimated using PCB concentrations measured in biota samples from individual ponds. Field surveys indicate that fish or other important prey may be lacking in some ponds. For these sites, potential exposures were estimated using biota-sediment PCB concentration ratios that were based on data from ponds for which biota and sediment data were available. Tissue PCB content was estimated from the ratio of concentrations in biota lipid to that in the organic carbon of sediment (bioconcentration sediment factor [BSF]) (Macdonald *et al.* 1993). These data were also used to estimate sediment cleanup criteria by estimating the

concentration of PCBs in sediments that would result in exposures equal to the TRVs for mallards and herons.

The following specific objectives were addressed in the analyses:

- *Estimate current exposure using ECOC concentrations in sediment and biota.* Exposures were estimated for each pond in which contaminants were detected.

- *Estimate site-specific biota:sediment PCB concentration ratios.* Data from ponds where both sediment and biota samples were collected were used to calculate ratios of Aroclor-1254 concentrations in biota to those in sediment. Ratios were calculated for whole-body:bulk sediment and lipid:sediment organic carbon. The latter ratio was used to estimate uptake and tissue concentrations in ponds that currently lack fish.

- *Develop remediation criteria for sediments.* Concentrations of Aroclor-1254 in sediment that would be protective of aquatic birds were estimated from the site-specific concentration ratios. Criteria were calculated for a range of site-use scenarios to aid in decisions on remedial actions.

- *Evaluate exposure of receptors to DBP in aquatic prey.* Concentrations of DBP in abiotic media were used in each pond where they were detected. Bioconcentration of DBP was estimated for each pond using surface-water data.

N4.3 TERRESTRIAL-FEEDING RAPTORS

Raptors that feed on terrestrial organisms may be exposed to contaminants that bioaccumulate in prey or through ingestion of contaminated soil or water. The Tier 3 screen included evaluation of two raptors: the red-tailed hawk and American kestrel. Risks to red-tailed hawks were negligible. However, the screen identified potential risks to kestrels from metals in small mammal and invertebrate prey species in source areas in upper Walnut Creek from OU 2, OU 4, and OU 6.

American kestrels feed on a wide variety of small mammal and invertebrate prey, and their foraging ranges are small relative to other falcons and hawks. Kestrels are common along the Front Range and have been observed foraging in nearly every vegetation community type at RFETS, including areas of upper Walnut Creek. The species has also been observed nesting in abandoned buildings in the buffer zone (DOE 1995d). Kestrels represent a limiting exposure scenario for raptors at RFETS because individuals may spend most or all of the breeding season onsite and forage in potentially contaminated areas.

N4.3.1 ECOCs

ECOCs identified for kestrels were chromium, lead, mercury, and vanadium. Risks in OU 2 were primarily due to chromium concentrations in invertebrates. Risks in OU 6 were due to chromium, lead, mercury, and vanadium in small mammals.

The initial phase of the risk characterization evaluated the data used in screening-level exposure estimates. Mercury and vanadium were detected at low frequencies in small mammals from the Walnut Creek area. The frequency of chromium detection in terrestrial invertebrates from OU 2 was also low. The uncertainty associated with using the maximum detected metal concentrations for the preliminary exposure estimates was evaluated and summarized qualitatively. Chromium was included in the OU 6 PCOC list based on a single soil sample that exceeded the $UTL_{99/99}$ (DOE 1994e). However, chromium and lead concentrations were elevated in small mammals captured in the Walnut Creek watershed. Exposure of kestrels to chromium and lead in small mammals from the Walnut Creek watershed and RFETS background areas was evaluated using probabilistic methods.

N4.3.2 Assessment Endpoints and Specific Objectives

Assessment endpoint:

⇒ *Determine the likelihood that individual kestrels will experience toxic exposures that will significantly reduce their survivorship or reproductive capacity. (H_0 exposure less than TRV)*

The risk characterization focused on refining exposure estimates through evaluation of data used in preliminary risk screens; exposure estimates were based on individual birds. Results of the risk characterization were calculated for individual birds and qualitatively extrapolated to the RFETS population.

The following specific objectives were addressed in the analyses:

- *Assess representativeness of data on metal content of potential prey.* Analytical data were reviewed to determine the reliability of the screening-level risk estimate. Detection frequency, spatial distribution, and range of concentrations were considered in the assessment.

- *Estimate probability of exceeding TRV in Walnut Creek source areas.* The probability that a kestrel feeding in the A- and B-pond areas would exceed TRVs for lead and chromium was estimated using Latin hypercube simulation procedures (Bartell *et al.* 1992) and data on metal concentrations in small mammals from the OU 6 A-Ponds, OU 6 B-Ponds, and OU 4 Downgradient source areas. Only the distribution of metal concentrations was modeled; all other intake parameters were fixed at levels consistent with EPA guidance (EPA 1993a). Exposure analyses were based on total metal concentrations in prey.

N4.4 SMALL MAMMALS

Small mammals represent a limiting exposure scenario for omnivorous vertebrates because they (1) are in relatively constant contact with soils, the primary contaminated media at RFETS, and (2) have home ranges sufficiently small that they may spend all of their time within a single source area.

Evaluation of risk to small mammals was based on exposure of individuals to ECOCs through ingestion or inhalation. The risk evaluation was based on individual animals because of the presence of PMJM at RFETS. As noted in Section N2, PMJM is of special concern at RFETS because it is listed as a Category 2 species by the USFWS. Although this subspecies is primarily associated with riparian corridors, it has been captured in upland areas of RFETS and may be exposed to chemical stressors in grassland habitats such as in the IHSSs in OU 2 and OU 6.

N4.4.1 ECOCs

The preliminary risk calculation indicated relatively low risk to PMJM from ingestion of PCOCs. Selenium and barium were identified as ECOCs in single source areas (Table N3-20). Exposure to volatilized organic contaminants in soils was also evaluated. However, little information was available for evaluating the potential toxicity of respiratory exposures (Attachment 6, Table 9 and Table 10).

N4.4.2 Assessment Endpoints and Specific Objectives

Assessment endpoint:

⇒ *Determine the likelihood that individual animals will experience toxic exposures that will significantly reduce their survivorship or reproductive capacity. (H_0: exposure less than TRV)*

The following specific endpoints were addressed in the analysis:

- *Estimate contaminant intake from soil.* Intake of selenium and barium from soils was estimated as in the Tier 3 screen. The distribution of selenium and barium was evaluated to determine whether or not more accurate assumptions about bioavailability and frequency and duration of exposures can be applied. Relative risks were re-evaluated based on new estimates.

- *Evaluate TRVs for selenium and barium.* Toxicity information for selenium and barium was reviewed to determine whether or not TRVs were overly conservative due to overestimates of bioavailability, underestimates of elimination rates, or sensitivity of test species versus RFETS receptors.

- *Estimate concentrations of volatilized organic compounds that could accumulate in burrow air.* Concentrations were estimated for areas of buried waste and known subsurface contamination. Exposure estimates were compared to toxicity information when available. However, little information was available on toxicity to mammals through respiratory

pathways. Therefore, exposures were estimated and presented for evaluation until better toxicity information is developed.

N4.5 VEGETATION COMMUNITIES

Vegetation communities are the most important biological component that characterizes an ecosystem. Vegetation community structure is critical in determining the quality and suitability of wildlife habitats because plants provide important food sources, refuges, and structural components. The vegetation communities in the RFETS buffer zone are important locally because they have been relatively undisturbed for more than 50 years and contain a large number of native species that are not common in more disturbed areas.

Areas of obvious phytotoxic stress were not observed during extensive field investigations. Many areas showed signs of physical disturbance associated with construction, remediation, or RFETS industrial activities. Therefore, the evaluation of potential ecotoxicity was based primarily on review of literature on phytotoxicity of PCOCs.

N4.5.1 ECOCs

Little suitable data on toxicity of chemical contaminants, particularly organic chemicals, to plants were available for assessing potential toxicity of PCOCs. In addition, the toxicity of a given chemical is usually highly dependent on soil chemistry and physical conditions. Therefore, toxicity thresholds are often not comparable between sites. Plant species also vary greatly in their sensitivity and potential for contaminant uptake.

As described in Section N3, preliminary risk estimates for vegetation were conducted based on comparison of PCOC concentrations in surface soils and sediments to available toxicity information. Numerous PCOCs were associated with HQs greater than 1 (Attachment 6, Tables 1 through 6). Soil and sediment PCOCs for which no toxicity data were available are listed with their concentrations (Attachment 6, Tables 7 and 8).

N4.5.2 Assessment Endpoints and Specific Objectives

Assessment endpoint:

⇒ *Determine if ECOC concentrations and the areal extent of contaminated subsurface soils (or sediments) could adversely affect more than 5 percent of any given vegetation community type at RFETS. (H_0: concentration in subsurface soil less than TRV in 95 percent of samples from a given vegetation type)*

The following specific objectives were addressed in the analysis:

- *Identify sampling locations with ECOC concentrations that correspond to an HQ greater than 10.* This level of toxicity was arbitrarily selected to identify sites with the greatest potential for phytotoxicity. ECOCs associated with an HQ greater than 1 are listed in Table N3-23. This approach seemed adequate because although the HQ for many PCOCs exceeded 1, the lack of obvious phytotoxicity in plants throughout the site seemed to indicate that TRVs were conservative.

- *Estimate area of contamination associated with HQ greater than 10 for any given ECOC.* Areas were visually identified based on sampling locations and chemical data. ECOC concentrations in sediment samples from pond and stream sampling sites were used to estimate exposure to wetland plants. The amount of each habitat type within the watershed represented by these affected areas was then estimated.

N4.6 RADIOLOGICAL DOSE RATES

Transuranic radionuclides are important environmental contaminants at RFETS. The potential ecotoxicity of radionuclides in abiotic media was evaluated in the Tier 3 screen using TRVs developed specifically for RFETS by radioecologists from Oregon State University (Higley and Kuperman 1995). The Tier 3 screen indicated negligible risk from most areas of the site. However, because of the importance of radionuclide contamination at RFETS, the potential risk was also evaluated by a second method. Data on the radionuclide content of vegetation, small mammal, and aquatic biota samples were used to estimate internal radiological dose rates. These values were then

compared to the 0.1 rad/day dose rates cited as safe by the International Atomic Energy Agency (IAEA) (1992) and used in deriving benchmarks for abiotic media (Higley and Kuperman 1995).

N4.6.1 Assessment Endpoints and Specific Objectives

Assessment endpoint:

⇒ *Determine whether or not uptake of radionuclides by biota at RFETS could result in concentrations that exceed TRVs for radiological dose rates.*

The following specific objectives were addressed in the analysis:

- *Estimate radiological dose rates from data on ECOC concentrations in biological samples.* Dose rates were estimated for each of the major transuranic radionuclides using the following equation (Whicker 1993):

$$Dose(rad/day) = \frac{C_{tissue,x} x\, DR_x x\, E_x x\, 1.6x10^{-6}\ ergs/MeV x\ 1{,}440\, min/day}{100\, ergs/g - rad} \quad \text{(N-15)}$$

where

$C_{tissue,x}$ = concentration of radionuclide x in tissue samples (pCi/g)

DR_x = disintegration rate for radionuclide x (dis/min)

E_x = effective absorbed dose for radionuclide x (MeV/dis)

- *Estimate potential accumulation of radionuclides by predators.* Potential uptake and accumulation of radionuclides by predators feeding at RFETS was also estimated using biological tissue data and the following equation:

$$Tissue\ Concentration = \frac{C_f\ x\ FIR\ x\ a}{bw\ x\ k_e}\ x\ (1 - e^{k_e t}) \qquad \text{(N-16)}$$

where

C_f	=	concentration in food (pCi/g)
FIR	=	food ingestion rate (kg/day)
a	=	assimilation rate (unitless)
bw	=	body weight (kg)
k_e	=	coefficient of elimination (per day)
t	=	time (days).

The radiological dose rate associated with the predicted tissue concentrations was calculated using the equation on the previous page. Dose rates were compared to the TRV (0.1 rad/day) recommended by the IAEA. Calculations were first conducted using site maximum concentrations (or activities). If maximum dose rates exceeded the TRV, all samples and locations with tissue concentrations exceeding critical levels were identified and mapped to determine probable abiotic sources.

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Table N4-1
Summary of Assessment Endpoints and Measurement Endpoints for Risk Characterization

Type Receptor	Pathways	ECOCs	Assessment Endpoint	Measurement Endpoint	Null Working Hypothesis
Aquatic Life	Direct exposure to sediments	PAHs, PCBs, metals	Impacts to community composition	(1) toxicity to test organisms (2) community composition (3) correlation of concentration with endpoint (4) estimate bioaccumulation in fish tissue (PCBs)	(1) toxicity in site samples not greater than controls (2) communities different than D-Ponds (3) contaminant concentrations not correlated with biological effect (toxicity, community measures) (4) concentration in tissue not greater than TRV
Aquatic-Feeding Wildlife	Ingestion of contaminated food	Aroclor-1254 di-N-butyl phthalate	Potential toxicity to individuals, extrapolate to populations	(1) contaminant intake rate as estimated from: (a)measured concentration in prey species or (b) concentration in prey estimated from sediment data (2) develop site-specific remediation criteria	(1) intake rate not greater than TRV (2) N/A
Small Mammals	Ingestion of contaminants in prey and soils Inhalation of organic compounds in burrows	selenium, barium VOCs, SVOCs	Toxicity to individual *Z.h. preblei* Toxicity to individual *Z.h. preblei*	(1) contaminant intake as estimated from ECOC concentrations in soil, invertebrates; spatial distribution of ECOCs in soils (2) estimated concentration of organics in burrow air	(1) intake rate not greater than TRV (2) concentration in air not greater than TRV
Vegetation Communities	Direct exposure to contaminants in soils	metals, SVOCs	Impacts to community	(1) concentration of PCOCs in soils (2) area with potentially toxic levels of ECOCs	(1) concentration in soils not greater than TRV (2) area of potential toxicity is not greater than 5% of habitat in water-shed
Terrestrial-feeding Raptors	Ingestion of contaminants in prey	metals, PCBs	Potential toxicity to individuals, extrapolate to populations	(1) concentration of PCOCs in prey	(1) intake rate not greater than TRV
Radionuclide Effects to Vegetation and Wildlife	Internal radiation dose rate	plutonium, uranium, americium	Toxic effects to individual small mammals and raptors; community effects to vegetation	(1) dose rates estimated from radionuclide concentration in tissues (2) estimated uptake and retention by predators	(1) calculated dose rates do not exceed TRV (2) estimated dose rates do not exceed TRV

ECOC - ecological chemical of concern
PAH - polyaromatic hydrocarbon
PCB - polychlorinated biphenyl
PCOC - potential chemical of concern
SVOC - semivolatile organic compound
TRV - toxicity reference value
VOC - volatile organic compound

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N5. RISK CHARACTERIZATION

This section presents results of analyses described in Section N4. Evaluations are presented for each of the ecological receptor groups identified in Section N4.1. In some cases, evaluation of ECOCs required different approaches and levels of quantification and necessitated separate presentation of results. The approach to risk characterization varied by receptor and chemical. Some analyses focused on evaluating RFI/RI data for accuracy and representativeness in estimating exposures. Other analyses provide more accurate exposure estimates through use of more sophisticated methodology than was used in the preliminary risk screen. Where appropriate and feasible, guidelines for establishing remediation criteria are presented.

N5.1 AQUATIC LIFE

Detention ponds within the North Walnut Creek, South Walnut Creek, and Woman Creek watersheds have been constructed to minimize the offsite transport of sediment and waterborne contaminants at RFETS. The locations of the A-series ponds on North Walnut Creek, B-series ponds on South Walnut Creek, C-series ponds on Woman Creek, and reference-area Ponds D-1 and D-2 are illustrated in Figure N2-4. General physicochemical characteristics of these ponds are presented in Table N5-1. Although these ponds are variable in size and depth, they all are relatively shallow and thus are characterized by relatively warm water. Shallow conditions also result in thorough mixing as a result of wind effects; consequently, most of the ponds are also relatively well oxygenated.

Risks to aquatic life from chemical concentrations in sediments were evaluated by a weight-of-evidence approach. HQ and HI values from the Tier 3 screen indicate a relatively high potential for toxic effects in sediments. Characteristics of benthic community structure and results of sediment bioassay tests were used to check predictions of toxic stress as indicated by the screening results. Community characteristics, such as lower richness and diversity coupled with higher density of pollution-tolerant organisms, would be expected from locations having sediments with a potential toxic screen of PCOCs (high HQ and HI values). Similarly, sediment bioassay results should be consistent with estimations of sediment risk. Results of the sediment risk estimates, benthic community characterization, and sediment bioassay tests and relationships among these parameters are described below.

N5.1.1 Sediment ECOCs

Based on the ECOC screen, sediments in the detention ponds contain several metal and organic contaminants. HQs of individual PCOCs and pond HI values resulting from the sediment ECOC screen are presented in Attachment 4, Tables 1 through 4. In both the A- and B-series ponds in the Walnut Creek watershed, the highest HI values were calculated for the most upstream ponds. HI values for Ponds C-1 and C-2 in the Woman Creek watershed were approximately equal to each other and lower than for the Walnut Creek ponds (Figure N5-1).

HI values for the North Walnut Creek ponds ranged from 13 for Pond A-4 to 160 for Pond A-1. The North Walnut Creek stream location had an HI value of 180. For ponds in the South Walnut Creek watershed, the greatest risk to aquatic life was in Pond B-1, which had an HI of 2,000. The stream sediments in South Walnut Creek exhibited a higher HI value (230) than all ponds except Pond B-1. The lowest HI value of 8.0 was determined for Pond B-5. The C-series ponds had HI values of 2.6 for Pond C-1 and 3.0 for Pond C-2 compared to an HI value of 1.0 for the corresponding stream site in the Woman Creek watershed.

Analytes that contribute to the HI for each pond (Attachment 4, Tables 1 through 4) include metals, pesticides, PAHs, non-PAH semivolatiles, and volatile compounds. HQ values were calculated by pond for each of these chemical classes (Figures N5-2 through N5-4). With the exception of Pond C-2 and Woman Creek sediments, risks estimates are attributed primarily to PAHs, especially in ponds with moderate to high HIs (Figure N5-5, Table N5-2). Metals, which were detected in all pond sediments, were found to be the predominant toxicant in Pond A-4 and Woman Creek and represent about 40 percent of the total risk in Pond C-2. Although non-PAH semivolatiles accounted for half of the HI for Pond B-5, overall, pesticides, non-PAH semivolatiles, and volatiles were minor contributors to toxic risk.

N5.1.1.1 Benthic Macroinvertebrate Communities

Benthos samples were collected from all of the A-, B-, C-, and D-series ponds during May through July 1994. Five replicate multi-core composite samples were obtained from different water depths and submerged habitat types to ensure complete representation of the pond biota. Samples were

analyzed for taxonomic composition and abundance; taxa were recorded at the lowest practical taxonomic level for the sample period.

A total of 81 different taxa representing all the major orders of aquatic organisms were identified in the pond benthos samples. A composite listing of identified taxa and mean abundance for each pond is presented in Attachment 8, Table 1. Oligochaete worms and dipterans dominated the benthos samples from all locations. The B-series ponds contained the highest abundance of all taxa except Pelecypoda (snails), which were most abundant in the A-series ponds. The C-series ponds did not support a wide variety of organisms other than oligochaetes and dipterans.

Descriptive data for community parameters such as richness, density, Simpson and Shannon-Wiener diversity measures, number of dominant taxa (Hill's N1), and abundance-based relationships for oligochaetes and dipterans are presented in Table N5-3 for each pond. These data represent pond-level characteristics for a composite of data from the five different habitat samples.

Total richness ranged from 6 taxa in Pond C-1 to 48 taxa in Pond A-1. Mean density (for all organisms) ranged from a low of 66 organisms/m^3 in Pond C-1 to 55,000 organisms/m^3 in Pond B-3. Density of oligochaetes ranged from 39 organisms/m^3 in Pond D-2 to 26,000 organisms/m^3 in Pond A-3. Density of dipterans ranged from 25 organisms/m^3 in Pond C-1 to 12,000 organisms/m^3 in Pond B-4. Pond B-3 had the lowest diversity as indicated by the Simpson and Shannon-Weiner diversity indices (Table N5-3). The highest diversity was measured in Pond D-2 (Table N5-3). The Shannon-Weiner diversity coefficient varies with community richness and can be an unreliable measure of organism distribution for communities with low richness values (Washington 1984). Therefore, the maximum Shannon-Weiner diversity value (all organisms with equal abundance) for a given sample richness is also reported in Table N5-3 to more accurately describe differences in diversity among the samples.

The number of dominant taxa in each pond was determined using Hill's N1 coefficient (Ludwig and Reynolds 1988). Evaluation of the most common taxa facilitates ecological comparisons and interpretation because less emphasis is given to relatively rare species. Pollution tolerance values (TVs) are also commonly used to evaluate benthic communities for community health and biological responses to pollution stress (Hilsenhoff 1988, EPA 1989d, Clark and Maret 1993). A TV of 0

represents no tolerance to pollution, and a value of 10 is assigned to organisms most tolerant to pollution.

Dominant taxa, density-weighted TV, mean TV for dominant taxa in the pond, and rank of the weighted TV array are presented in Table N5-4. The density-weighted TV for each pond was calculated by dividing the dominant taxa density into the sum of the products of TV and percent density. TVs have traditionally been used for assessment of effects of pollution by organic compounds on macroinvertebrates. Density-weighted TVs presented here provide a relative measure for comparing community pollution tolerances among the ponds. Density-weighted tolerance values ranged from 5.2 for Pond A-1 to 8.9 for Pond A-2 (Table N5-4). Ponds A-1 and A-3 had the least pollution-tolerant communities of all ponds, including the D-series reference ponds. Ponds A-2 and B-2 had the most pollution-tolerant communities.

Conventional interpretation of benthic community structure suggests that communities with low densities of organisms or reduced richness and diversity are subject to physical or chemical stress. Under sustained chemical stress, the benthic community may also contain high densities of pollution-tolerant species, which in turn may result in low richness and low diversity. Benthic communities from Ponds D-1 and D-2 were sampled to represent locations with no known contaminant input from RFETS. Ponds D-1 and D-2 exhibit a wide range of community characteristics (Table N5-3), including the second lowest (Pond D-1) and highest (Pond D-2) diversity values.

Benthic community characteristics that would best reflect exposure to high-risk conditions include depressed richness or diversity and elevated density or abundance of tolerant species. A cursory review of the benthic community data indicates that Ponds A-4, B-3, and C-1 may be under the most persistent chemical or physical stress. In each of these ponds, oligochaetes and dipterans are the dominant taxa (Table N5-3, Attachment 8, Table 1). These organisms are considered good colonizers and frequently are the dominant taxa from habitats with high physical variability (Baxter 1977, Ward 1992). The highly variable environmental (physicochemical) conditions at RFETS may account for the dominance of colonizers.

Trends in benthic community data were compared to HQs to assess the extent to which communities are affected by chemical stress. Results of these comparisons are presented in Section N5.1.1.3.

N5.1.1.2 Sediment Bioassays

Sediment toxicity tests were conducted on composite sediment samples collected from each pond during October and November 1992. Whole sediment tests following protocols outlined in Nelson *et al.* (1990) were used for 28-day exposure of the amphipod *Hyalella azteca* and 10-day exposure of the dipteran *Chironomus tentans*. Fine sands were used as controls. Sediments from the A-, B-, and C-series ponds were tested with *Hyalella azteca*. Toxicity tests using *Chironomus tentans* were limited to Ponds A-3, A-4, B-3, B-4, and B-5 due to reduced availability of acceptable test organisms. Toxicity test results reported here are based on information provided to the RFETS Surface Water Division in documents submitted by The Seacrest Group of Broomfield, Colorado. Further review of the toxicity test results may be necessary to evaluate test validity and statistical results.

Bioassay results for Pond B-2 sediments indicated that survival of *Hyalella azteca* after 28 days of exposure (64 percent) was significantly lower than in controls (85 percent)($t=3.72$, $t_{0.05}=2.18$). No toxic effects were observed for *Hyalella azteca* or *Chironomus tentans* in any other sediment exposures. Table N5-5 presents a summary of the available bioassay test results.

N5.1.1.3 Sediment Effects on Aquatic Life

Risk to aquatic life from contaminants contained in sediments from the A-, B-, and C-series ponds was assessed by comparing toxicological sediment bioassay data and in situ benthic community data to results of the sediment ECOC screen. This approach is similar to the Sediment Quality Triad procedure (Chapman 1986, EPA 1992c), which uses toxicity, chemistry, and benthic community data to investigate biological impact of sediment pollution and identify mechanisms of effects-based sediment studies (Chapman *et al.* 1992, Power and Chapman 1992, Canfield *et al.* 1994).

Evaluation of risk estimates was based on the following principles.

1. The sediment ECOC screening process resulted in a range in HI values of sufficient magnitude that differences in community-level effects to benthos and sediment bioassay test results can be expected among the sample sites.

2. Differences in community structure that typically reflect stress to the benthic assemblage will correspond to differences in HI values.

3. Statistically significant differences between treatments and controls in the sediment bioassay tests will correspond to differences in HI values among the sample sites.

Initial analysis of the data allowed identification of sites with benthic communities that are similar in composition and structure to sites with no known exposure to contaminants (Pond D-1 and Pond D-2). Cluster analysis (Ludwig and Reynolds 1988) was used to combine sites in hierarchical order of similarity based on density data for each taxon within the community. A conservative approach was taken by excluding data from Pond D-1 in this analysis.

Although the sediments from Pond D-1 are considered to be uncontaminated, the low richness and diversity and the high abundance of a single taxon at this site appear to reflect some type of environmental stress. The Bray-Curtis Percent Dissimilarity (PD) index was used to establish a level of resemblance for each pair-wise comparison among the sample sites. This measure of similarity is preferable because it utilizes a comparison of abundance data for shared taxa between two sampling sites. The matrix of pair-wise comparisons for all combinations of samples was transformed to a matrix of mathematical distance measures and grouped by flexible clustering strategies to minimize distortion from original distance values. A complete discussion of the applications and calculations of the PD index and cluster analysis techniques can be found in Ludwig and Reynolds (1988).

A dendrogram depicting relationships among the sites based on PD comparisons of density is presented in Figure N5-6. The matrix of PD values is presented in Attachment 8, Table 2. The dendrogram depicts three distinct groups: Ponds A-2, A-4, and B-2; Ponds A-1, A-3, B-1, and B-5; and Ponds B-3, B-4, C-1, C-2, and D-2. The benthic communities that show greatest resemblance to the community characteristic for Pond D-1 include Ponds B-3, B-4, C-1, and C-2.

The ponds grouped with Pond D-2 on the dendrogram were used to evaluate the correlation of HI values with benthic communities structure. HI values ranged from 3 for Pond C-2 to 251 for Pond B-4 (Attachment 4, Tables 1 through 4). The HI for Pond B-4 (251) was the second highest among all

ponds. Groups identified by this clustering do not correlate to clusters derived using HIs (Figure N5-7). This result suggests a lack of correlation between diversity and HI estimates.

Differential sensitivity of community structure to effects from exposure to contaminated sediments is obscured in the comparisons above. Cluster analysis techniques were used to determine the relationship between the HI estimate and community structure for each pond. Cluster dendrograms were also generated for benthos richness, diversity (Shannon-Weiner), density, and abundance-weighted TVs for dominant taxa; these are presented in Figures N5-8 and N5-9. Matrices for each of the cluster diagrams are included in Attachment 8, Tables 3 through 7. It is clear from the site groupings that none of the community structure parameters mirror the HI site grouping pattern. This result suggests a lack of correlation between the magnitude of the HIs and pond benthic community structure.

Agreement between measures of community structure and predicted toxicity was also assessed by evaluating correlations between community parameters and HIs and between the ranks for each parameter. The strength of the correlation between measured values and HIs or ranks was used to indicate the predictive power of HIs in assessing toxicity in the ponds.

Correlation between ranks indicates that 50 percent of the difference in richness and 46 percent of difference in density of the benthic community may be accounted for by differences in HI (Table N5-6). Use of ranks in evaluating correlations is intended only to identify trends in the relationships between community parameters and HI. However, use of ranks does not account for magnitude of differences. When correlations between measurements are evaluated, data indicate that changes in HI estimates for the study ponds may account for up to 15 percent of the variability in richness (Table N5-6).

Sediment bioassay tests indicated toxicity only in sediments from Pond B-2 (Table N5-5). These results are also not consistent with toxicity predicted by HIs. The HI for Pond B-2 was the second lowest of the B-series. In addition, B-2 sediments contained lower concentrations of all sediment ECOCs and fewer PCOCs that exceeded sediment quality criteria than in Ponds B-1, B-3, or B-4.

Results of the analyses illustrate the conservative nature of the TRVs used in calculating HQs and HIs. In most cases, toxicity is overestimated. Results of toxicity tests and benthic community analysis do not reflect the high levels of toxicity indicated by HQs and HIs, especially in Ponds A-1 and B-1. Correlation of HI and community parameters ranks may be indicative of toxicity. However, the effects of robust differences in physical habitat may mask changes due to toxicity. Potential toxicity of sediment contaminants, particularly PAHs and silver, may be important factors in limiting aquatic communities if physical stress was reduced through a change in management of the ponds.

N5.1.2 Potential Impacts of Groundwater on Surface Water Quality

This section describes the potential impact that existing groundwater contamination may have on surface-water quality at RFETS. Based on data available from RFI/RIs and sitewide groundwater and surface-water sampling, a conceptual model was developed to qualitatively assess the potential for groundwater contamination to affect surface water quality at RFETS. Groundwater monitoring and investigations indicate that groundwater quality has been impacted in OU1, OU2, OU4, and OU5 (DOE 1993d, 1994f, 1995e, 1995f, EG&G 1994d) and the assessment focuses on sources in these areas (Figure N5-10). However, groundwater contamination in the industrial area/protected area (IA/PA) portion of RFETS is not yet characterized and, therefore, the potential effects of contaminants in this area cannot be assessed. A comprehensive evaluation of sitewide groundwater and movement contamination (including the IA) is planned. Results of this evaluation are needed to perform a quantitative evaluation of effects of groundwater on surface-water quality at RFETS.

The level of risk associated with groundwater contamination is dependent on a complete pathway to a surface-water body, the contaminant level in groundwater, and dilution of contaminated groundwater as it mixes with surface water. The assessment focuses on risks to aquatic life by comparing groundwater PCOC concentrations to Colorado state water quality standards. The evaluation was qualitative and intended only to identify surface water bodies potentially at risk from contamination by groundwater. Various aspects of the hydrologic system were examined, including groundwater flowpaths to surface water bodies, surface-water-groundwater interaction, and contaminant levels in groundwater.

Groundwater flowpaths were examined to determine if contaminated groundwater could reach a surface-water body. The interaction between surface water and groundwater in stream drainages has only been studied along Woman Creek (DOE 1995f). Therefore, the results of this study are used to provide a general framework for groundwater-surface-water interaction throughout the site.

N5.1.2.1 Risks from OU1 Groundwater

Groundwater in OU1 flows from the hilltop down the hillside toward Woman Creek. However, a complete groundwater to surface water pathway does not exist at OU1 because a French drain has been installed to intercept groundwater flowing down the OU1 hillside in the unconsolidated deposits (EG&G 1995b).

Groundwater also flows beneath the French drain in the underlying claystones and siltstones of the Laramie Formation. However, a downward hydraulic gradient exists between the unconsolidated materials and bedrock in almost all areas of the site (EG&G 1995b). Therefore, any contaminants in the weathered bedrock will probably not flow upward into the unconsolidated materials where they may contact surface water.

The existing French drain and hydraulic conditions at OU1 prevent contaminated groundwater from reaching Woman Creek. Thus, groundwater in OU1 does not appear to pose a risk to surface water quality.

N5.1.2.2 Risks from OU2 Groundwater

Most of OU2 is situated on an east-west-trending ridge bounded to the south by the Woman Creek drainage and to the north by South Walnut Creek. Groundwater flows along the length of the ridge in both unconsolidated deposits and bedrock sandstones. Seeps form along the hillsides in areas where bedrock sandstones subcrop or at the alluvium-bedrock contact. Groundwater from these seeps evaporates, is transpired by vegetation, or flows down the hillsides to South Walnut Creek or Woman Creek. Groundwater also flows within the unconsolidated materials down the hillsides toward South Walnut Creek and Woman Creek (DOE 1993d).

Groundwater in the valley-fill alluvium contributes water to the stream flow of Woman Creek only during the wettest months (December through April) (DOE 1995f). Although no studies have been performed to determine groundwater-surface-water interaction along South Walnut Creek, it is assumed that the hydrology is analogous to that of Woman Creek. Thus, it is likely that South Walnut Creek is gaining only during the wettest months.

Groundwater in the bedrock beneath the streams will not flow upward into the valley-fill alluvium and then into the stream because a downward hydraulic gradient exists between the weathered bedrock and overlying alluvium in almost all areas of the site (EG&G 1995b).

As part of remedial investigations at OU2, water samples were collected from seeps. Contaminants in seep water that exceed the surface water standards for aquatic life include carbon tetrachloride and trichloroethene in seeps above the Walnut Creek drainage and only carbon tetrachloride in seeps facing the Woman Creek drainage. In addition, trichloroethene, manganese, antimony, and strontium exist at levels above the surface-water standard in samples from groundwater flowing toward South Walnut Creek. In samples from groundwater flowing toward Woman Creek, chloroform, tetrachloroethene; 1,-1-dichloroethene, manganese, antimony, and strontium are found at levels above the surface water standard (DOE 1993d).

N5.1.2.3 Risks from OU4 Groundwater

Groundwater in OU4 flows from the solar ponds northward to North Walnut Creek and southeastward to South Walnut Creek. Groundwater in the unconsolidated deposits north of the ponds is largely intercepted by the interceptor trench system (ITS). However, construction records indicate that the ITS is not keyed into bedrock at all locations. Groundwater, therefore, is able to flow beneath the ITS in the unconsolidated deposits toward North Walnut Creek.

Seeps are present on the hillside north of the solar ponds facing North Walnut Creek. Surface runoff from these seeps is intercepted by the southern extension of the ITS, which effectively collects all surface water flowing down the hillside. This water is then pumped to temporary storage tanks prior to treatment (DOE 1994f).

Groundwater also flows beneath the ITS in the underlying claystones and siltstones of the Laramie formation. As described above, a downward hydraulic gradient exists between the unconsolidated materials and bedrock in almost all areas of the site (EG&G 1995b). Thus, any contaminants in the weathered bedrock will not flow upward into the unconsolidated materials.

No site-specific studies have been performed to analyze the interaction between groundwater and surface water along either North Walnut Creek or South Walnut Creek. However, it is assumed that the hydrology is analogous to that of Woman Creek. Thus, it is likely that both South Walnut Creek and North Walnut Creek gain only during the wettest months (December through April).

The most serious threat to surface-water quality from OU 4 groundwater appears to be from nitrate/nitrite. Elevated levels of nitrate/nitrite have been detected along North Walnut Creek and in the immediate vicinity of the ponds. Additionally, americium-241 and 1,1-dichloroethane are sporadically detected above the surface-water standard at single locations near the solar ponds. The maximum concentrations/activities of nitrate/nitrite, americium-241, and 1,1-dichloroethane in unconsolidated deposits during 1993 are 850,000 µg/L, 5,764 pCi/L, and 52 µg/L (EG&G 1994d).

The americium-241 and 1,1-dichloroethane were each detected at levels exceeding the surface-water standard only once in 1993. The elevated levels of americium-241 are anomalous. Activities in samples from the same location are two or three orders of magnitude lower during the rest of the year. Therefore, americium-241 is not considered to pose a risk to aquatic life in the OU4 area. The single detection of 1,1-dichloroethane (52 µg/L) is only slightly above the surface-water standard (47 µg/L). The concentration of 1,1- dichloroethane will certainly decrease below the standard upon mixing with surface water. Therefore, 1,1- dichloroethane poses no significant risk to surface water in OU4 (EG&G 1994d).

Because a groundwater investigation has not been competed for OU4, the only available source of data is the Annual RCRA Groundwater Monitoring Reports. These reports contain primarily information on radionuclides, VOCs, and water quality parameters for OU4. No detailed information about dissolved metals was presented. Thus, the risk to aquatic life from dissolved metals in OU4 groundwater has not been assessed.

N5.1.2.4 Risks from OU5 Groundwater

Groundwater in OU5 flows from the hilltop through unconsolidated materials and landfill materials southward to the valley-fill alluvium along Woman Creek. Groundwater flows to the east in the valley-fill alluvium paralleling Woman Creek. Woman Creek is gaining only during the wettest months (December through April). Thus, groundwater flows into the stream only during this period. Groundwater discharges to the surface in areas of shallow bedrock as seeps and springs along the hillside. Water from these seeps and springs is transpired by vegetation, evaporates, or flows downhill where it is intercepted by the SID (DOE 1995f).

Groundwater in the bedrock also flows from the hilltop southward to Woman Creek. As stated above, groundwater in the bedrock does not recharge surface water bodies at RFETS and, therefore, cannot contribute to degradation in surface water quality (EG&G 1995b).

Only two groundwater COCs in OU5 (aluminum and manganese) exceed the surface-water standard for aquatic life. Both aluminum and manganese are present at levels above the surface water standard. Maximum concentrations of aluminum and manganese in OU5 groundwater are 4,900 µg/L and 10,500 µg/L, respectively (DOE 1995f).

N5.1.2.5 Risks from OU7 Groundwater

The groundwater system in OU7 is somewhat complex. The key components of the hydrologic system in OU7 are the landfill, landfill pond, groundwater-intercept system upgradient of the landfill, and the landfill pond dam. Most of the groundwater in the unconsolidated deposits is diverted around the landfill to the landfill pond by the groundwater-intercept system. Groundwater that flows through the landfill materials is discharged to the landfill pond (DOE 1995e).

Water from the pond infiltrates into the weathered bedrock and flows under the dam. However, the pond dam prevents most groundwater in the unconsolidated deposits from flowing downgradient toward No Name Gulch. As a result, the unconsolidated deposits downgradient of the dam are often unsaturated and many of the contaminants are trapped in the landfill pond.

No site-specific studies of groundwater-surface-water interaction have been performed along the unnamed tributary to Walnut Creek (No Name Gulch). It is assumed that the hydrology is analogous to that of Woman Creek. Therefore, it is likely that No Name Gulch gains only during the wettest months (December through April).

Only groundwater quality downgradient of the dam is of concern because the pond and dam serve to limit the movement of contamination in groundwater. Furthermore, only contaminants in the unconsolidated deposits may pose a risk to surface water quality because a downward hydraulic gradient exists between the unconsolidated materials and underlying bedrock (DOE 1995e).

Comparisons of water-quality data to the surface-water standards indicate that only sulfate and fluoride are present in unconsolidated deposits at levels exceeding surface-water standards. (No surface-water standard for aquatic life for fluoride was available; therefore, the domestic use standard, 2,000 µg/L, was used for comparative purposes.) Fluoride concentrations in groundwater samples downgradient of the dam range from 400 to 79,221 µg/L. Sulfate concentrations in samples from unconsolidated materials groundwater downgradient of the dam range from 33,000 to 770,000 µg/L (surface-water standard for aquatic-life standard is 250,000 µg/L) (DOE 1995e).

N5.1.2.6 Summary

Groundwater in several areas of RFETS has the potential to adversely affect surface-water quality and may pose a risk to aquatic life. However, the risk associated with existing groundwater contamination is limited by several factors (Figure N5-10).

Groundwater flows into streams at RFETS only during the wettest months. Therefore, contaminant loading to the streams is limited to only part of the year.

Mixing of groundwater and surface water in the stream drainages dilutes contaminated groundwater, and the resulting concentrations in surface water will be lower. Furthermore, groundwater flow into streams occurs only during the wettest months when stream flow is highest and dilution is greatest. The resulting contaminant concentrations in surface water may then be below the surface-water standards for aquatic life.

VOCs in groundwater will volatilize when exposed to the atmosphere. Thus, VOC concentrations will decrease as seep water flows toward surface-water bodies or as groundwater mixes with surface water in the streams. The amount of volatilization is dependent on the properties of the analyte and length of the flow path.

N5.2 AQUATIC-FEEDING BIRDS

Chemicals identified as ECOCs for aquatic-feeding birds included DBP, mercury, antimony, and PCBs. Mallards and great blue herons were identified as representative species because they are relatively common at RFETS and because birds are generally more sensitive to organic contaminants than are mammals. Analyses used in the risk characterization were described in Section N4.3. The following subsections provide more detail on methods and present results. Because the analysis approach differed by chemical, results are presented separately for each ECOC.

N5.2.1 Risk from Aroclor-1254

As noted in Section N4.2, available data on concentrations of PCBs indicate negligible risk to aquatic-feeding birds. However, further analyses were needed because (1) data on biological tissues were not available for all ponds in which PCBs were detected in sediments and (2) development of the aquatic community in ponds could result in increased biological transport of sediment contaminants and increased exposure to aquatic-feeding birds.

Site-specific information was used to estimate the uptake of PCBs by fish and other aquatic life in ponds for which biological tissue data were not available. This approach was used because site-specific data were available and because use of EqP theory and BCFs to predict food web transfer overestimated tissue concentrations by at least one order of magnitude. For example, use of EqP and BCF to predict tissue concentrations in fathead minnows in Pond B-4 resulted in a concentration of 5.4 mg PCB/kg tissue, while the maximum concentration measured in fish taken from the pond was 0.48 mg/kg.

During RFI/RI field sampling at OU6, sediments were collected from multiple locations within each of the A- and B-series ponds and analyzed for several PCB congeners. Only Aroclor-1254 and

Aroclor-1260 were detected in these samples, and concentrations varied considerably between ponds (Figure N5-11). The highest concentrations were in the most upstream ponds in each watershed, with progressively lower concentrations downgradient. In general, concentrations in sediments from the B-series ponds averaged ten times those in the A-series ponds, reflecting the fact that the South Walnut Creek watershed includes most of the industrialized area of RFETS and receives discharge from the wastewater treatment plant. PCBs were detected in 100 percent of the samples from Ponds A-1, B-1, B-2, B-3, and B-4; in three of four samples from Pond A-2; and in none of the samples from Ponds A-3, A-4, or B-5 (DOE 1994c).

Aquatic organisms typically are not exposed to sediments below the upper 15 cm. Data generated during the RFI/RI field program, which included collection of sediment samples below this depth, did not permit evaluation of biological exposures. Consequently, sediments and biota in the ponds were re-sampled and re-analyzed to obtain data more appropriate for assessing ecological risk. Samples were taken from the upper 15 cm at the same sites sampled during the earlier investigation. Where available, tissue samples were also collected for fish, salamanders, crayfish, and benthic macroinvertebrates. Sampling was conducted in June and July 1994. A preliminary report on the results of this follow-up sampling and analysis program was submitted to DOE by EG&G (Stiger 1994). The exposure analysis and risk characterization presented here was based on results of the 1994 sampling.

The following subsections present results of analyses described in Section N4.3. This information provides a basis for developing site-specific remediation criteria for protection of aquatic-feeding birds from toxic exposures to PCBs in pond sediments.

N5.2.1.1 Distribution of PCBs in Pond Sediments and Biota

Results of sediment sampling are presented in Table N5-7. As with the earlier sampling, PCB concentrations were higher in the B-ponds than in the A-ponds, with the highest concentrations in Pond B-2. However, the maximum concentrations were generally lower than in the earlier (RFI/RI) samples. As noted above, the earlier sampling program included collection of sediment from variable depths greater than the upper 15 cm to which aquatic organisms are typically exposed. The

fact that sediments within the upper 15 cm had generally lower PCB concentrations than the deeper sediments suggests a lower risk to aquatic life than indicated by the earlier data.

Biota was sampled in all ponds. However, some of the ponds did not produce samples sufficient for analysis. Adequate samples were obtained only for Ponds A-2, A-3, A-4, B-1, B-2, B-4, and B-5 (Table N5-8). Limited availability of biota also resulted in samples of variable taxa among ponds. Taxa collected for analysis included largemouth bass from Pond A-2; fathead minnows from Ponds A-4, B-4, and B-5; tiger salamander larvae from Ponds B-1 and B-2; and crayfish from Ponds A-2, A-3, A-4, and B-5. A single sample of benthic macroinvertebrates was collected from Pond A-2.

Aroclor-1254 was the only PCB consistently detected in biota and sediments. Aroclor-1260 was detected in only one biota sample from Pond B-3, and was not detected in sediment samples. The remaining risk characterization is limited to Aroclor-1254.

Concentrations of Aroclor-1254 in aquatic biota ranged from below detection limit (BDL) to 500 mg/kg in a fathead minnow sample from Pond B-4 (Table N5-7). The highest concentrations in tissues were not detected in samples from the ponds with the highest sediment concentrations. Aroclor-1254 was not detected in any of the crayfish samples. However, with the exception of Pond A-2, crayfish were captured in ponds with one (Pond A-3) or no sediment samples with detectable PCBs in sediments.

The ratio of Aroclor-1254 content in biota to that in sediments was calculated for ponds in which Aroclor-1254 was detected in both sediments and biological samples (Table N5-9). The variability of biota types available, and the lack of PCB detections in some ponds with biota, limited comparison of BSF values among ponds. BSF ratios varied among biota types, ranging from 0.1 in salamander neonates from Pond B-1 to 3.3 in fathead minnows from Pond B-4. Largemouth bass, which were found in only in Pond A-2, had a BSF of 0.6. These values are comparable to BSFs estimated for aquatic biota in other studies (Rassmussen *et al.* 1990, Macdonald *et al.* 1993).

The relationship of food chain length and BSF was also difficult to evaluate because of the inconsistent presence of aquatic species in the ponds. However, bioaccumulation effects may explain results for Pond A-2, where the BSF for bass was approximately twice that for benthic

macroinvertebrates. The latter were probably the main prey of bass in this pond, because fathead minnows and salamander larvae and other potential vertebrate-prey were apparently absent.

N5.2.1.2 Evaluation of Potential Risk and Development of Remediation Criteria

Risk of PCB toxicity to herons and mallards from ingestion of toxic levels of PCBs was evaluated first using available data on PCB concentrations in fish and macroinvertebrate tissue (Section N3). The screen indicated negligible risk. However, available biological tissue data may not represent all possible exposure scenarios and do not provide location-specific evaluations.

Potential risk was further evaluated using site-specific data on biological uptake of PCBs to estimate protective concentrations in sediments, called EECs, that would result in exposures equal to or less than the TRVs. Available data for pond sediments were then compared to the EECs. EECs were developed for use as guides in developing remediation criteria. The EECs vary with the intensity of site use and complexity of food chains (Table N5-10). The most restrictive EECs are associated with the highest level of site use and longest food chain.

When EECs were compared to current concentrations of Aroclor-1254 in sediments at RFETS, risk was identified only for the most restrictive scenario, great blue herons feeding in ponds with piscivorous fish present (Table N5-10, Figure N5-12). For all ponds, the maximum concentrations of Aroclor-1254 in sediments were below criteria derived for 100-percent site use by mallards (Table N5-10) and great blue herons feeding in ponds without piscivorous fish (Figure N5-13A).

For longer food chains, the evaluation indicated potential risk for herons feeding in Ponds B-1, B-2, and B-3 (Figure N5-13B). For example, maximum Aroclor-1254 concentration exceeded EECs for site use greater than 20 percent in Pond B-2 and 30 percent in Ponds B-1 and B-3 (Figure N5-13B). Mean Aroclor-1254 concentrations exceeded the EECs for 40 percent site use in Pond B-2, 70 percent in Pond B-1, and 90 percent in Pond B-3 (Figure N5-13B).

Using maximum Aroclor-1254 sediment concentrations for comparison, it appears that mallards and herons would not experience a toxic exposure from sediment PCB contamination by feeding on invertebrates or forage fish in any of the ponds. The data also suggest that a heron feeding in the

most contaminated pond (B-2) would not experience a toxic exposure from PCBs unless more than 20 percent of its diet was composed of piscivorous fish from there. When mean sediment concentrations were used for comparison, the results indicate that the exposure in Pond B-2 would probably not exceed the TRV for herons unless site use was greater than about 45 percent and they fed exclusively on upper-level aquatic predators.

Aroclor-1254 was also identified as an ECOC in the 903 Pad ERA source area, primarily due to concentrations detected in sediments in the SID. The initial risk calculations were based on estimates of PCB uptake by aquatic biota, because no tissue data were available for the site. The uptakes were based on potential bioconcentration of PCBs from interstitial water. Data on total organic carbon in sediment from the SID were not available. However, the maximum Aroclor-1254 concentration detected in bulk sediments (0.26 mg/kg) was below the average concentrations in Pond A-3, which appeared to represent negligible risk to aquatic-feeding birds.

Results of this analysis suggest that piscivorous birds would be most at risk from PCB toxicity if they fed exclusively in Ponds B-1, B-2, and B-3. This scenario seems unlikely, because none of these ponds currently supports extensive fish populations. In addition, the uptake calculations may overestimate PCB concentrations in fish because the maximum BSF (3.3) found in site data was used. The next highest BSF, less than one-third of this value, was calculated for largemouth bass, which is the highest-level aquatic predator found at the site.

In addition to assessing risks of PCB toxicity, the results of this analysis can be used as a guide for developing remediation criteria for protection of aquatic-feeding birds or in evaluating the protectiveness of remedial criteria developed for other purposes.

N5.2.2 Risk from Mercury

Mercury was identified as an ECOC in the B-Ponds, C-Ponds, and Old Landfill source areas. In each source area, mercury was included as an ECOC because of measured or calculated concentrations in fish tissues.

The C-Ponds and Old Landfill are located in the Woman Creek watershed and included in OU5. Mercury was identified as a PCOC in soil, groundwater, stream sediments, and pond sediments in OU5 (Table N5-11A). The Old Landfill is immediately upstream of the C-Ponds source area and could be a source of contaminants to downstream areas, including the C-ponds.

Mercury was detected in 2 of 13 (15 percent) fish collected from Pond C-1 (Table N5-11A). The maximum detected concentration (0.47 mg/kg) was greater than the average dietary concentration (0.027 mg/kg) considered safe for great blue herons (Opresko *et al.* 1994) and corresponds to an HQ of 17. Mercury was identified as an ECOC for the Old Landfill source area based on the estimated bioconcentration in fish tissue calculated from the maximum detected concentration in surface water.

Mercury was detected in less than 50 percent of samples from all media in OU5 except pond sediments (Table N5-11A). Therefore, pond sediments are probably the primary source for uptake of mercury by fish in Pond C-1. However only 15 percent of fish collected from Pond C-1 contain detectable quantities of mercury. Moreover, it is possible that the two samples with detectable quantities may have had sediment in the gastrointestinal tract when analyzed.

Actual risks to great blue herons from mercury ingestion are probably less than indicated by the HQ of 17, because this value was calculated using the maximum detected mercury concentration in fish and assuming that the herons obtain all of their food from Pond C-1. Great blue herons return frequently to feeding areas, but they could not use a pond the size of C-1 exclusively. Thus, the risk estimate probably overestimates both the exposure-point concentration and the frequency of exposure.

Two-thirds of fish from the B-series ponds contained detectable levels of mercury (Table N5-11B). However, mercury was not identified as a PCOC for pond sediments or surface water in OU6. It was identified as a PCOC for soils, groundwater, and stream sediments in OU6 (Table N5-11B). The highest concentrations in fish were detected for Pond B-5, the terminal pond in the series and the one that generally had the lowest concentrations of OU6 PCOCs. Thus, the source of mercury in fish is unclear. The maximum concentration in fish from the B-Ponds was much less than that found in fish from Pond C-1 and corresponds to an HQ of 2 when compared to the dietary levels noted above.

N5.2.3 Risk from Di-n-butyl-phthalate

Di-n-butyl-phthalate (DBP) was identified as an ECOC for aquatic-feeding birds based on estimated bioconcentration from surface water. DBP was detected in six surface water samples from Ponds A-2, A-3, and B-4. However, the following evidence suggests that DBP may not be a persistent contaminant or represent unacceptable risk in the ponds:

- The maximum concentration detected in surface water was 2 µg/L, and all six of the detectable quantities were estimated below the CRDL of 10 µg/L (i.e., result was "J"-qualified).

- DBP is a hydrophobic compound (log K_{ow} = 4.57) and would probably accumulate in the organic fraction of sediments if persistently present. However, DBP was not detected in sediments from any of these ponds.

- DBP is a common laboratory contaminant.

- The magnitude of the estimated exposures may be overly conservative. The risk estimate was based on an HQ of 2, which was calculated from the maximum DBP concentration in surface water (2 µg/L). This concentration was detected only in Pond A-3. All other detectable concentrations were 1 µg/L, which corresponds to an HQ of 1, suggesting minimal risk. The exposure estimate also assumes that aquatic-feeding birds spend all of their time feeding in areas of maximum contamination. Thus, the HQ for DBP exceeds 1 in only one of the nine ponds in the upper Walnut Creek watershed.

N5.2.4 Risks from Antimony

Antimony was identified as an ECOC based on incidental ingestion of sediments from Woman Creek. The HQ of 1.6 was based on 100-percent site use by herons in the section of Woman Creek in the Old Landfill source area. This segment of Woman Creek is seasonally intermittent and supports a minimal fish population. Herons have not been observed in this area, although they have been

sighted at Pond C-1. It is unlikely that a heron would use this segment of Woman Creek to the extent necessary to exceed an HQ of 1.

N5.3 TERRESTRIAL-FEEDING RAPTORS

As noted in Section N4.3, chromium, lead, mercury, and vanadium were detected in terrestrial arthropods from OU2 and small mammals from OU4 and OU6 source areas (OU4/6 area) at concentrations that could be toxic to raptors feeding extensively in the areas. American kestrels were selected to represent ecological receptors because they have relatively small home ranges and are known to breed at RFETS.

The objective of the risk characterization was to refine the exposure estimates to assess whether or not individual birds feeding in the area would experience exposures that exceed the TRVs and, if so, identify contaminated areas that contribute most to the risk. This was accomplished by (1) reviewing information on contaminant distribution to determine the spatial extent of contamination and representativeness of data and/or (2) estimating the probability that an individual bird feeding in the area would experience a toxic exposure.

N5.3.1 Risk from Chromium in Terrestrial Arthropods from OU2

Ecotoxicological risks (HQs) for chromium exposure to American kestrels in the OU2 source areas were primarily due to concentrations of chromium in terrestrial arthropods (TAs) in OU2 source areas. The risk estimate is based on exposure to chromium III because this is the most common form at RFETS (Lewis 1995). Evaluation of the TA data indicates that chromium was detected in three of five TA samples collected from OU2 source areas (Table N5-12A and Figure N5-14). Only one of these samples exceeded the CRDL (74.9 mg/kg at MG07A2) (Table N5-12A). The exposure-point concentration for the OU2 East Trenches source area is the UCL_{95} of chromium in TAs from the OU2 East Trenches source area. Thus, this exposure-point concentration is heavily influenced by a maximum concentration that was more than 30 times greater than the next highest concentration (2.3 mg/kg). As a result, the risk estimate for chromium in the OU2 East Trenches source area is based primarily on one sample that appears to have an anomalously high concentration.

Because adequate TA samples were not available, chromium exposure-point concentrations for the OU2 903 Pad source area and the OU2 Mound source area were estimated from the ratio of chromium in TAs to chromium in surficial soil for the OU2 East Trenches source area. Thus, risk in the OU2 903 Pad and OU2 Mound Area source areas may also be based on an anomalous measurement. If the maximum TA chromium concentration were treated as an outlier and excluded from the calculations of the exposure-point concentrations, the HQ for chromium exposure to American kestrels would be well below 1.

Although chromium was included in the list of PCOCs for OU2, samples from only 2 of 24 surficial soil sampling locations within OU2 had concentrations above the $UTL_{99/99}$ for surficial soil in RFETS background (16.6 mg/kg) (Table N5-12B) (DOE 1994d). Both of these sampling locations are in the OU2 903 Pad source area. No surficial soil samples in the OU2 East Trenches source area or the OU2 Mound source area exceeded the RFETS background $UTL_{99/99}$. In addition, samples from only 3 of the 24 sampling locations within OU2 exceeded the RFETS background mean of 15.3 mg/kg. Moreover, because the OU2 903 Pad source area includes portions of OU1, the OU2 903 Pad source area exposure-point concentration was calculated using samples from 9 locations within OU1, including a sample from a site in OU1 IHSS 119.2 that had a value of 80.5 mg/kg (Table N5-12A). Therefore, the risk estimate for exposure to kestrels to chromium in the OU2 903 Pad source area is based in part on sample concentrations from OU1 that are not due to OU2 sources.

The total area of the OU2 source areas (69.2 ha) represents less than twice the home range of an American kestrel (38 ha) (DOE 1995a). Because the OU2 source areas represent 2.6 percent of the total area at RFETS, only a small proportion of the American kestrel population at RFETS is likely to be exposed to the chromium in terrestrial arthropods in OU2.

N5.3.2 Risks from Chromium, Lead, Mercury, and Vanadium in Small Mammals

N5.3.2.1 Distribution of ECOCs in Soils, Sediments, and Small Mammals

Soils and Sediments—Chromium, lead, mercury, and vanadium were identified as ECOCs in soil in OU6. Mercury was also identified as an ECOC in OU4. Contamination of surface and subsurface soils in OU6 and OU4 was of relatively low magnitude. Mean concentrations of chromium, lead, and vanadium in surface and subsurface soils were not greater than concentrations in background soils,

and 2 percent or less of the samples exceeded the $UTL_{99/99}$ of the background mean (Table N5-13)(DOE 1994e). The mean mercury concentration in surface soils exceeded the background mean, but the detection frequency was only 41 percent, and none of the samples from OU6 exceeded the background $UTL_{99/99}$ (Table N5-13).

Sediments of the A- and B-series ponds contained all four metals. However, mean concentrations in dry (not inundated) sediments were not greater than in OU6 or background surface soils, and none of the samples contained metals above the background $UTL_{99/99}$.

Small Mammals—Chromium and lead concentrations in small mammals were higher in the OU4/6 area than in the background areas (Table N5-14, Figure N5-15). The elevated metals concentrations were due primarily to samples taken from the A-Ponds and B-Ponds source areas. Small mammal samples from the OU4 Downgradient and OU6 Soil Dump source areas did not contain elevated concentrations of these metals.

Mercury and vanadium were also higher in animals from OU4 and OU6 than those from background areas. Neither metal was detected in background samples. However, detection frequencies were also low for samples from OU4/6 area.

N5.3.2.2 Probabilistic Exposure Estimates

In order to better estimate risk to kestrels from ECOCs in the OU4/6 area, ingestion of chromium and lead in small mammals was simulated using Latin hypercube procedures to estimate the distribution of exposures expected in the field (Iman and Conover 1980, Bartell *et al.* 1992, Suter 1993). Data on chromium and lead concentrations in small mammals were used to estimate the (statistical) distribution of the exposure-point concentrations. Frequency histograms indicated a lognormal distributions for both metals (Figure N5-16). The empirical distributions from site data were not used because data sets were relatively small and therefore probably do not represent the true distribution (Bartell *et al.* 1992, Kirchner 1993).

Concentrations were then [pseudo-]randomly sampled from the data distributions using stratified random, or Latin hypercube, procedures; these concentrations were then used in the exposure

calculation (Bartell *et al.* 1992). This process was repeated 500 times, resulting in 500 exposure estimations from which a mean and standard deviation could be calculated. The results were also used to construct a probability density function (pdf) that was used to estimate the probability of exceeding certain critical values (i.e., TRVs). This approach allowed propagation of the uncertainty associated with the input parameters and estimation of the probability that kestrels will experience a potentially harmful exposure.

Results of simulations are presented in Table N5-15 and Figure N5-17. Estimated ingestion of both chromium and lead was greater for the OU4/6 area than background (Figure N5-17). Based on simulated ingestion rates, kestrels feeding on small mammals in the OU4/6 area have about a 63 percent chance of exceeding the TRV for chromium and a 50 percent chance of exceeding the TRV for lead (Table N5-15). Kestrels feeding in background areas of RFETS have about a 23 percent chance of exceeding the chromium TRV but are not likely to exceed the lead TRV (Table N5-15).

These results suggest that kestrels feeding exclusively in the OU4/6 area of Walnut Creek may experience toxic exposures to chromium and lead. The total area of the source areas included in the analysis is about 28 ha, or about 75 percent of the normal foraging range of kestrels in Front Range (38 ha) (DOE 1995a). Thus, this estimate may be relatively representative of kestrels in the wild since they were assumed to spend all of their time in the OU4/6 area.

The exposure estimate assumes that all of the chromium and lead in the small mammals was bioavailable and absorbed by the kestrels. This conservative assumption was made because it is difficult to assess the actual bioavailability. However, it is likely that at least some of the metal content in tissue was due to soil or sediment particles adsorbed to external body surfaces or contained within the gastrointestinal tract. Chromium and lead in soil particles is probably less bioavailable than solubilized or organically transformed metals contained in tissues.

Review of the small-mammal tissue data indicates that animals captured near the ponds contribute most to the kestrel exposure estimate (Table N5-14, Figure N5-15). However, the source of chromium and lead in the small mammals is unclear. Data for dry sediments do not indicate elevated concentrations in surface materials around the ponds. Chromium and lead may be more available to small mammals in these areas because of the fine texture of the sediment compared to surface soils in

more upland areas. Finer materials would result in more adsorption to surfaces and higher bioavailability of metals in ingested soils. In any case, it appears that if the source of chromium and lead to small mammals around the ponds were attenuated, uptake of these metals by kestrels would be near background levels.

N5.4 SMALL MAMMALS

Small mammals were identified as a key ecological resource because of their importance as a prey base for many vertebrate predators and because of the presence of PMJM, a rare subspecies listed as Category 2 by the USFWS. Small mammals also represent a limiting exposure scenario because of their small home ranges and relatively constant and intimate contact with surface and subsurface soils.

Barium, selenium, and toluene were identified as ECOCs for small mammals. Barium and selenium were present at potentially toxic concentrations in vegetation in the North Spray Field and OU7 Downgradient source areas. Toluene was identified as potentially toxic in air of burrows in the 903 Pad and East Trenches source areas in OU2. As noted in Section N3, subsurface soils in these areas also contained organic PCOCs for which no inhalation TRVs were available. Risk from the ECOCs and less well characterized PCOCs is discussed below.

N5.4.1 Risk from Barium

Barium was detected in vegetation samples from the North Spray Field at concentrations that could be toxic to herbivorous small mammals. Barium was identified as a PCOC in subsurface soil and groundwater in OU6 (DOE 1994e). The North Spray Field source area includes areas identified as probable habitat for the PMJM (Figure N3-7). Therefore, risk to individual animals should be considered in risk management decisions.

The TRV for barium was based on concentrations that produced hypertension in laboratory rats (Perry *et al.* 1983 as cited in Opresko *et al.* 1994). The concentration on which the NOAEL was based was the maximum dose in the study and did not affect growth or food or water consumption experimental animals. Therefore, the level of risk associated with exceeding the TRV is unclear. The HQ for barium in the North Spray Field was 1.05 indicating exposures approximately equal to

the NOAEL. Thus, the barium concentration in vegetation in this source area may produce some adverse effects in individual animals, but the potential for long-term effects on growth or reproduction is unclear.

N5.4.2 Risk from Selenium

Selenium was also detected in vegetation at concentrations that could exceed the TRV for ingestion by small mammals. Selenium was identified as an ECOC in the OU7 Downgradient areas (Figure N3-20). Selenium was detected in surface soils of OU7 at concentrations that exceed background levels (DOE 1995e). The HQ for selenium was 2.4.

The TRV was based on intakes calculated for background areas of RFETS (0.317 mg/kg/day) because it exceeded the literature-based ecotoxicological benchmark (0.075 mg/kg/day). The estimated background intake was about three times the minimum intake needed for maintenance in pregnant rats (NRC 1995). The intakes estimated for background areas and the OU7 Downgradient area were based on total selenium in food and incidentally ingested soils. Inorganic forms of selenium may be less bioavailable and therefore, site intakes may overestimate the amounts absorbed through intestinal walls. Small mammals inhabiting RFETS may be adapted to high ambient concentrations of selenium that are common in semi-arid areas of the Rocky Mountain west. However, intakes from the OU7 area are more than twice those estimated for background areas and may represent a risk to individuals that spend all of their time there.

The source of selenium in vegetation from the OU7 downgradient area is not clear. This area was not subject to spray evaporation of pond water (DOE 1995e). However, an area of groundwater with elevated selenium was identified during the OU7 RFI/RI (DOE 1995e). The highest concentration (7,200 μg/L) were found near the western end of the landfill pond, but the area of elevated concentrations extends eastward into the OU7 Downgradient source area. In addition, the vegetation samples from the area may have included selenium accumulators (such as *Astragalus* sp.) that are common at RFETS.

The area represents an insignificant proportion of the total mesic grassland habitat RFETS. The source area is located within areas identified as probable habitat for PMJM. Further sampling of

vegetation and soils may be required to more fully characterize the risk of selenium to small mammals in this area.

N5.4.3 Risks from Toluene and Other Burrow-Air Constituents

Toluene exceeded the EEC for exposure of small mammals to burrow air in areas of OU2 that are known to contain buried waste or contaminated soil (Table N5-16, Figure N5-18). Inhalation TRVs were available for only six other organic PCOCs (Attachment 6, Table 9); soil concentrations for these compounds did not exceed TRVs. At the time this report was prepared, adequate information on respiratory toxicity was not available for most of the organic PCOCs found in soils, and inhalation TRVs could not be set. Review of existing information in IRIS (EPA 1995b) indicates that EPA is currently developing reference concentrations (RfCs) for some of the compounds. Respiratory exposures were estimated for all organic PCOCs; these are presented in Attachment 6, Table 9.

Toluene irritates mucosal membranes of the eyes and respiratory tract at very low concentrations (EPA 1995b). Therefore, animals may avoid areas of contaminated soil when constructing burrows, fortuitously reducing their exposure. However, for purposes of this study, no avoidance behavior is assumed and all areas exceeding the EEC are included in Figure N5-18.

Areas in which toluene exceeded the EEC were identified using Thiessen polygons. These areas covered approximately 0.31 ha in the 903 Pad areas and 0.27 ha in the East Trenches area. All of the affected polygons lie within or adjacent to IHSSs (Figure N5-18). This result suggests that risks to burrowing animals from toluene exposure in OU2 may be restricted to the primary contaminant source areas. However, risk from organic PCOCs without TRVs remains unclear.

Areas impacted by toluene are found in the mesic and xeric mixed grassland habitat types on the ridge between South Walnut Creek and Woman Creek (Figure N5-18). None of the areas overlaps with probable PMJM habitat (Figure N5-18). The Thiessen polygons represent about 0.011 percent of the mesic and 0.088 percent of the xeric grassland habitat types at RFETS. These percentages may be used as a rough estimate of the proportion of burrowing habitat affected for more common species such as deer mice and prairie voles that use the drier, more upland areas of the site.

N5.5 VEGETATION COMMUNITIES

Results of the Tier 3 screen indicated several PCOCs exceed subsurface soil or sediment TRVs in several source areas (Table N3-23). This group of chemicals included mostly metals. Concentrations of organic PCOCs did not exceed TRVs (Attachment 6, Table 1). However, TRVs were not available for several organic compounds that were PCOCs for subsurface soil and sediments (Attachment 6, Tables 2 and 7). Subsurface soil data were not available for the OU5 Surface Disturbance, OU6 B-Ponds, or the OU10 Outside Closures. No HQs exceeded 1 for PCOCs in OU1 881 Hillside, OU2 East Trenches, and OU11 West Spray Field.

The highest HQ for exposure to subsurface soils was for nitrates (HQ = 170) in the OU7 Downgradient source area (Table N3-23). The source of nitrates in subsurface soils may be related to local groundwater contamination identified in the OU7 RFI/RI (DOE 1995e). Nitrate concentrations as high as 200 mg/L were detected in the area. However, detection frequency for nitrate in the OU7 Downgradient source area was low indicating heterogenous distribution (Table N5-17). However, vegetation in the area does not show obvious signs of ecotoxic stress. Nitrate concentrations also exceeded the TRV (HQ = 4.8) in the OU4 Downgradient areas (Table N3-23). Nitrate concentrations in this source area are probably associated with a plume of contaminated groundwater originating in the OU4 Solar Pond area.

Chromium (7.9) nickel (3.7), and zinc (3.0) all had HQs of 3 or greater in the Ash Pits source area (Table N3-23). All other HQs for metals in subsurface soil were 2 or below.

Many of the TRVs for metals were equal to RFETS background soil concentrations, because literature-based toxicity values were below the UCL95 for background. Thus, HQs greater than 1 indicate concentrations that exceed background. Soil toxicity tests were not conducted using site soils. However, the risk associated with HQ values near 1 is unclear because background concentrations can vary by orders of magnitude. As noted previously, areas of obvious vegetation stress were not observed during preliminary field surveys. Thus, the importance of these risk estimates is not clear.

The potential phytotoxicity of sediments was also assessed as an indicator of potential effects on wetlands or the establishment of them. As with soils, TRVs were not available for many organic PCOCs. Sediment metal concentrations exceeded TRVs in at least one location for antimony, chromium, mercury, silver, vanadium and zinc. All HQs were below 10 except for silver in the B-Ponds. The highest silver HQ was 88 in Pond B-1 and progressively decreased in ponds downstream (Table N3-23). This pattern suggests a source of silver upstream of Pond B-1. The source could be related to the waste water treatment plant which formerly emptied into Pond B-1. The HQ of 88 suggests a high level of toxicity to aquatic plants. However, this HQ may overestimate risk, because Pond B-1 supports a vigorous plant community.

N5.6 EFFECTS OF RADIONUCLIDES ON PLANTS AND WILDLIFE

Transuranic radionuclides were elevated in surface soils and identified as PCOCs in most source areas. Concentrations (activities) at four locations exceeded the TRVs for radionuclides in soils (Higley and Kuperman 1995). Two of the locations were in the Old Landfill source area; samples from one exceeded the TRV for uranium-233/244 and uranium-238, while samples from the other exceeded only the TRV for uranium-238 (Attachment 6, Table 10 and Figure N5-20). The TRV for plutonium-239/240 was exceeded at two locations in the 903 Pad source area (Attachment 6 tables). These locations apparently represent very localized areas of contamination and risk, because adjacent sampling locations did not contain radionuclides at concentrations that exceeded the TRVs.

Biological samples collected during field investigations also were analyzed for radionuclides. Concentrations of americium-241, plutonium-239/240, uranium 233/244, and uranium-238 in small mammals (Figure N5-21) and vegetation (Figure N5-22) were slightly to significantly elevated over samples collected from background areas.

The relationship between radionuclide content of soils and biota was variable. Maximum concentrations of americium-241 and plutonium-239/240 in vegetation and small mammals were found in samples from the source areas with the highest concentrations in soils. This was not the case for the uranium isotopes in either small mammals or vegetation. The relationship between radionuclide concentrations in small mammals and soils was evaluated for 11 source areas for which both data types were available (Table N5-18, Figure N5-23). Concentrations of plutonium and

americium in small-mammal tissue samples were well correlated with concentrations in soils, but concentrations of uranium isotopes were not. This result may reflect the higher aqueous solubility of uranium compounds. Plutonium and americium are tightly bound to clay and other particles in surface soils and tend to remain in surface materials. Uranium deposited on surface soils may be transported into deeper soils that are less accessible to small mammals at the surface.

The radiation dose resulting from the maximum concentrations of radionuclides in tissues from small mammals was assessed (Table N5-19). Results suggest that radionuclide concentrations are not a hazard to small mammals. Dose rates from individual radionuclides and the total radiological dose rate were at least 10,000 times less than the critical dose rate of 0.1 rad/day.

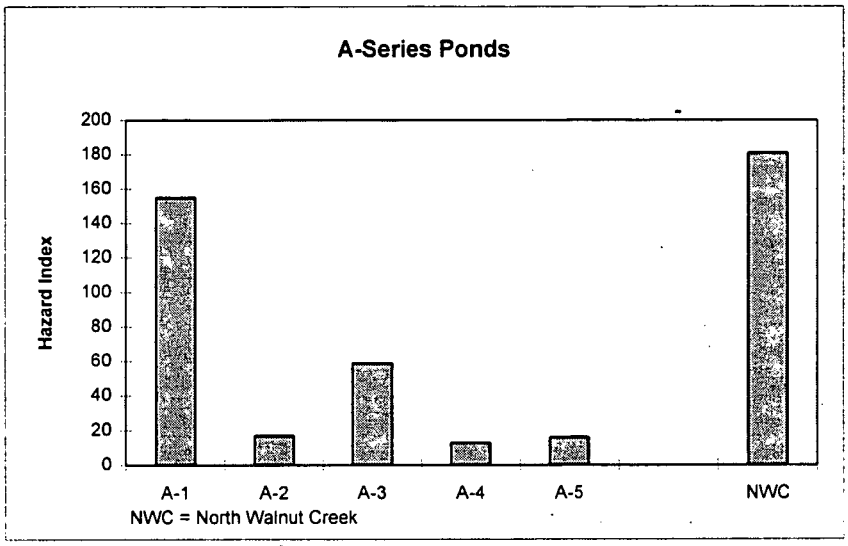
Tissue data were not available for species in higher trophic levels. Therefore, the total body burden for aquatic and terrestrial predators was estimated based on an assumed 3-year exposure to radionuclide concentrations measured in small mammals and fish from RFETS. Body burdens were calculated using biological half-life values obtained from the literature (Table N5-19) (Killough and McKay 1976). The predicted body burdens for aquatic (Table N5-20) and terrestrial (Table N5-21) predators were at least 1,000 times less than the tissue concentrations required for the critical dose.

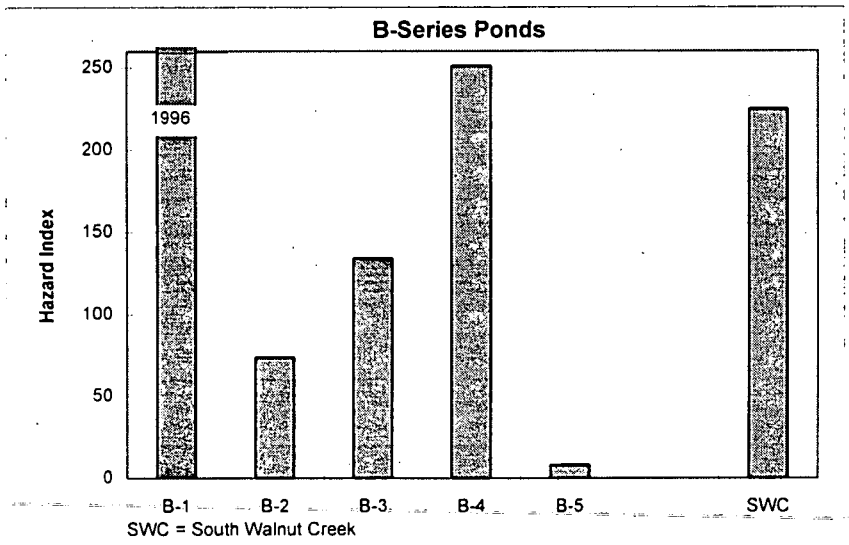
Although some radionuclide contamination was apparent at RFETS, the levels in soils and biological tissues do not appear to threaten ecological receptors. The levels of external and internal exposures presented in this study agree with the previous study conducted at RFETS by Little *et al.* (1980) and other studies in the western United States (e.g., Hakonson 1975, Bly and Whicker 1978). The doses shown above are probably overestimates of the amount of radionuclides actually internalized and from which effective dose is received. Other studies indicate that greater than 90 percent of the plutonium associated with small mammals either adheres to the pelt or is contained in the gastrointestinal tract (Hakonson 1975). Because of the radiation stopping power of intestinal contents, less than 1 percent of the available alpha particle dose is actually applied to the intestine wall (Killough and McKay 1976). Less than one-half of gamma and beta emissions actually reach the intestinal wall.

Section N5.

Figures

Figure N5-1
Pond Hazard Index Distribution





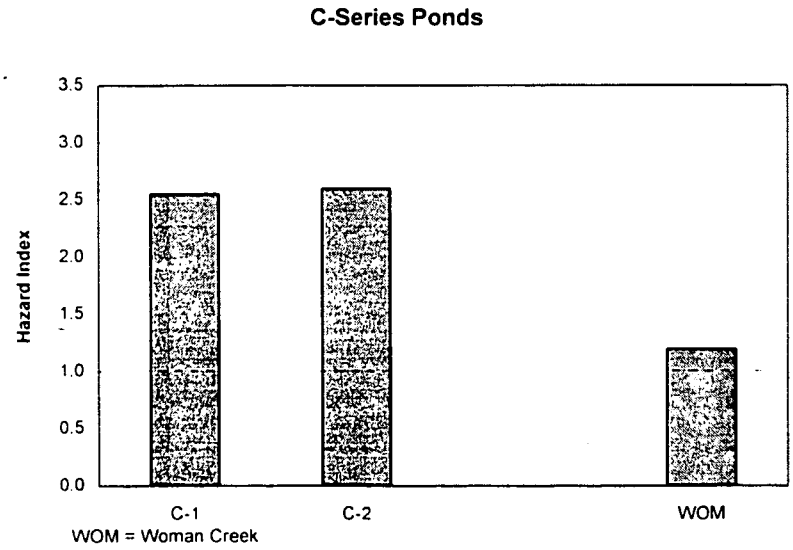
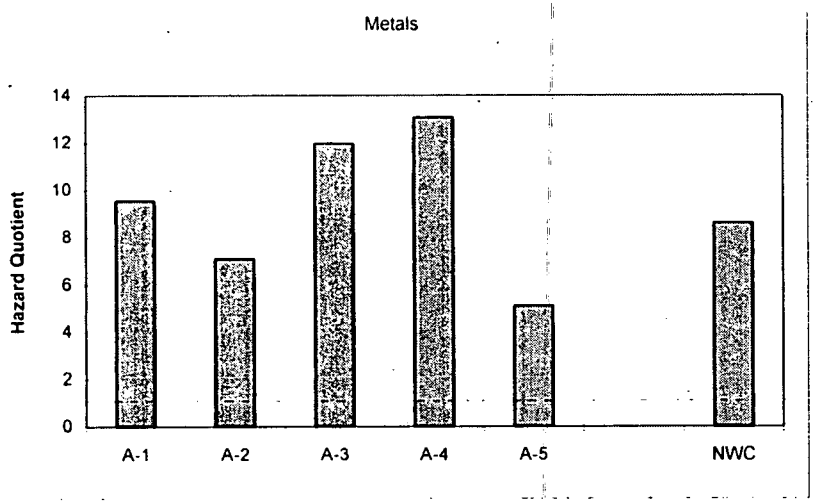
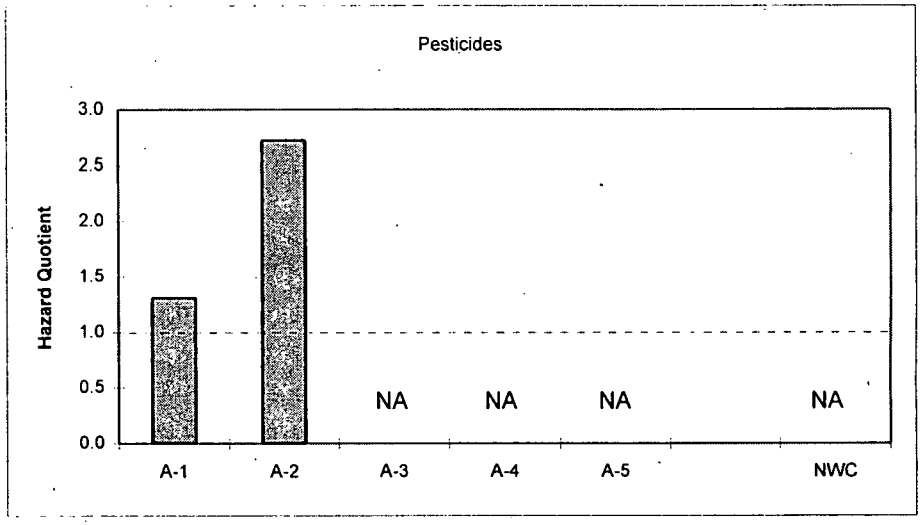
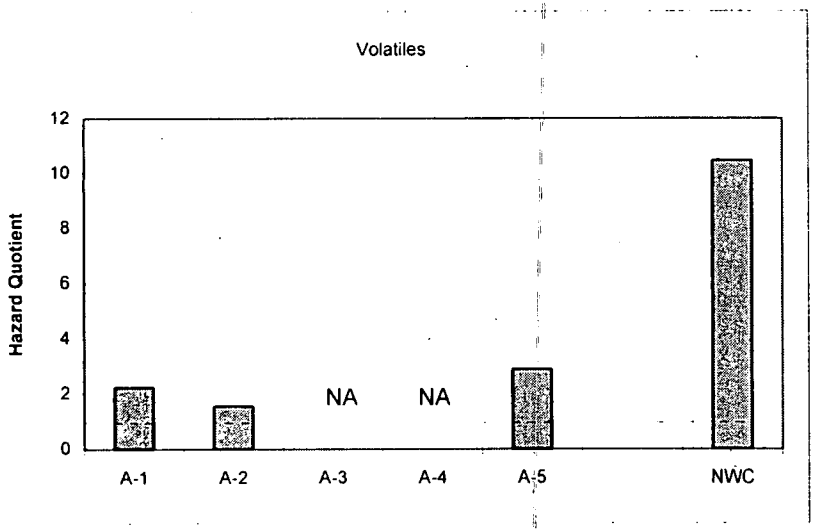
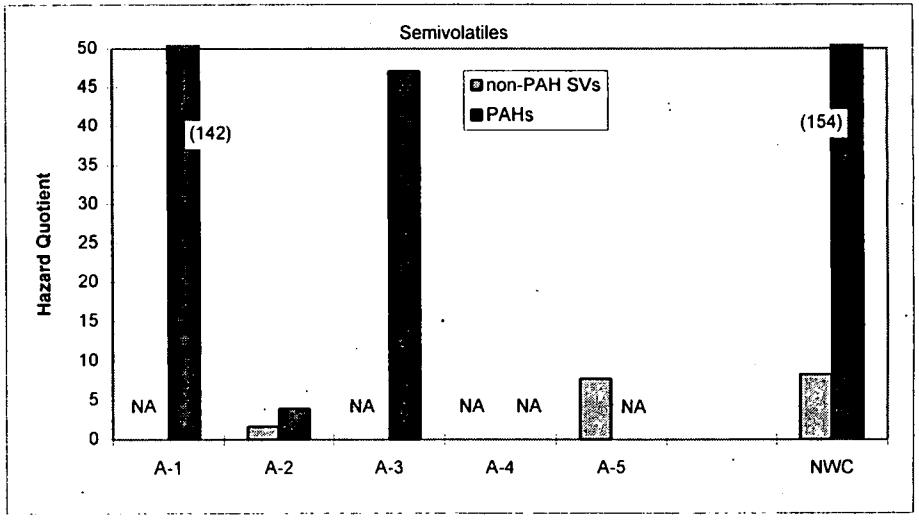


Figure N5-2
Hazard Quotients by Analyte Category for A-Series Ponds









NWC = North Walnut Creek

NA = No results in this class of compounds exceeded the TRV

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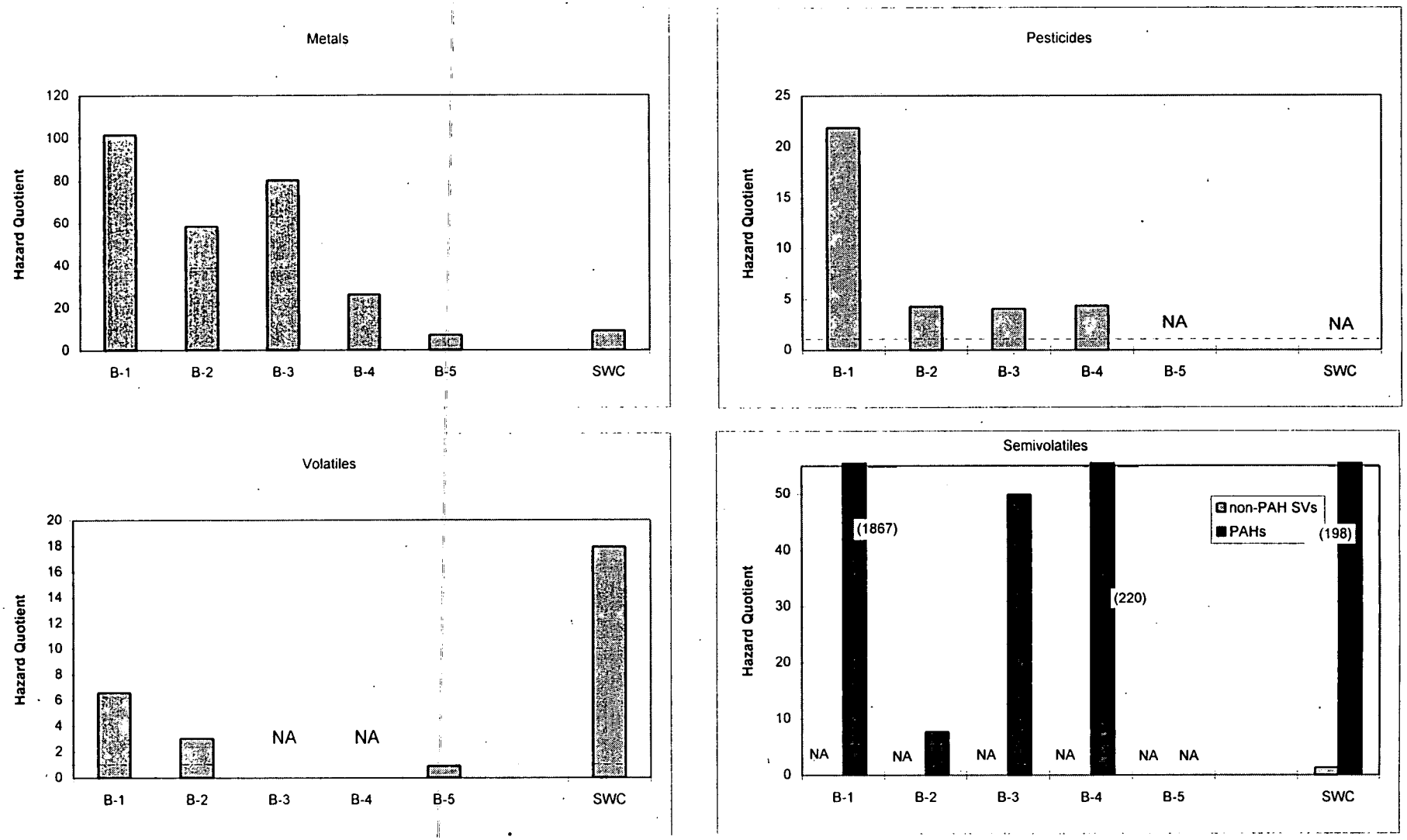
Figure N5-3
Hazard Quotients by Analyte Category for B-Series Ponds



SWC = South Walnut Creek

NA = No results in this class of compounds exceeded the TRV

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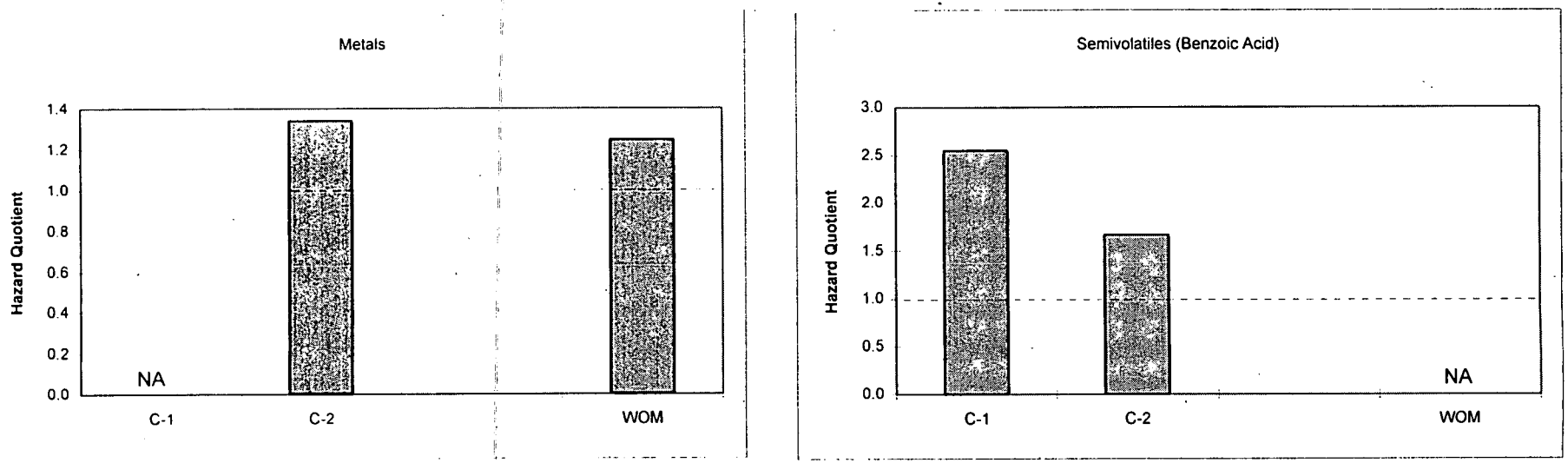
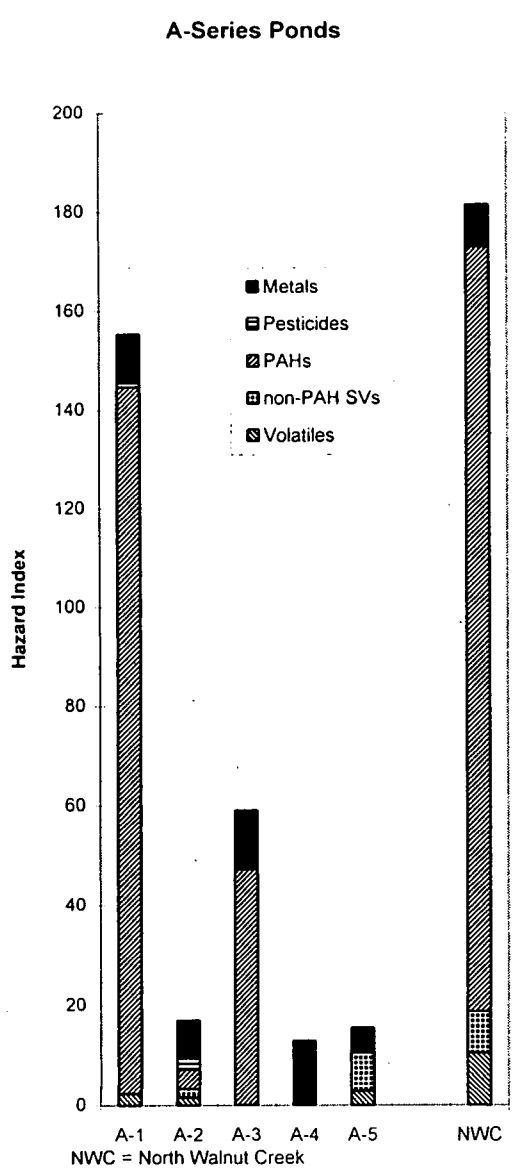
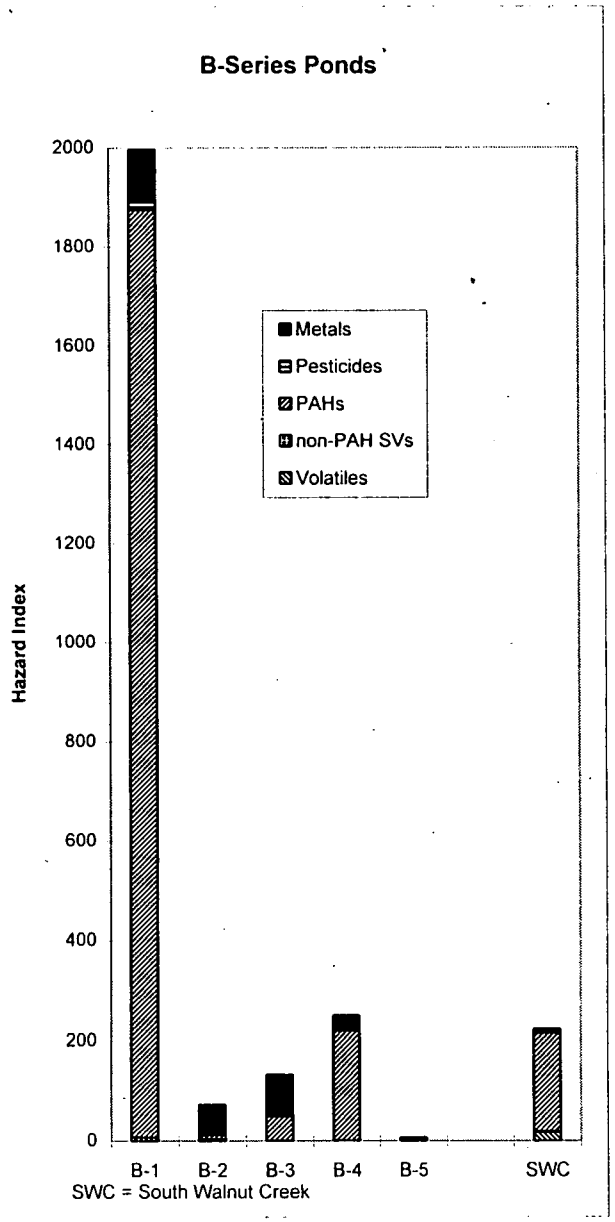
Figure N5-4
Hazard Quotients by Analyte Category for C-Series Ponds

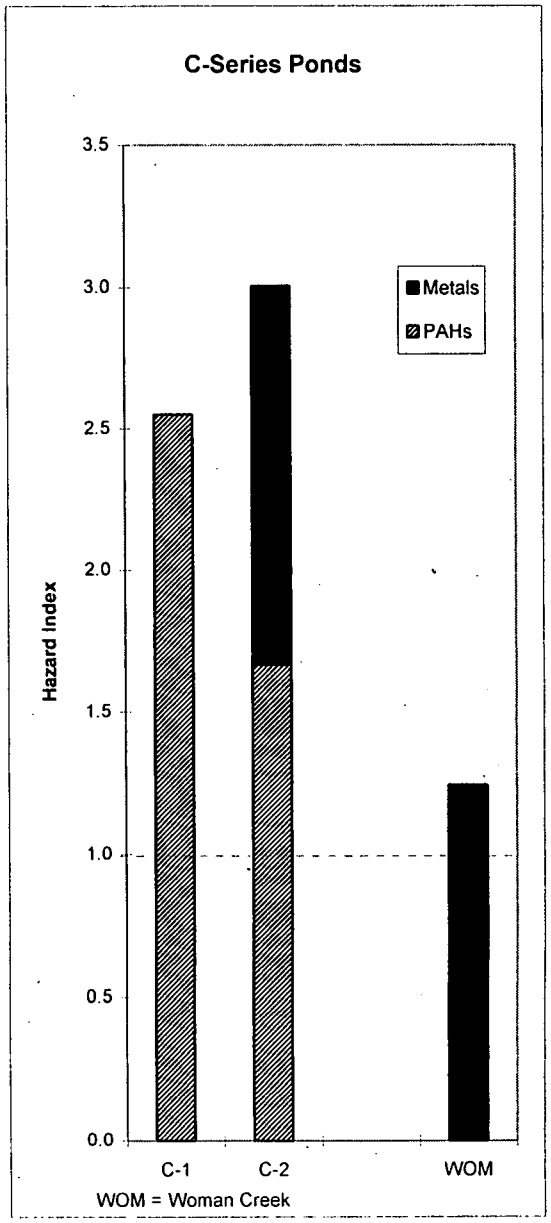


WOM = Woman Creek
NA = No results in this class of compounds exceeded the TRV.

Figure N5-5
Hazard Index by Analyte Category







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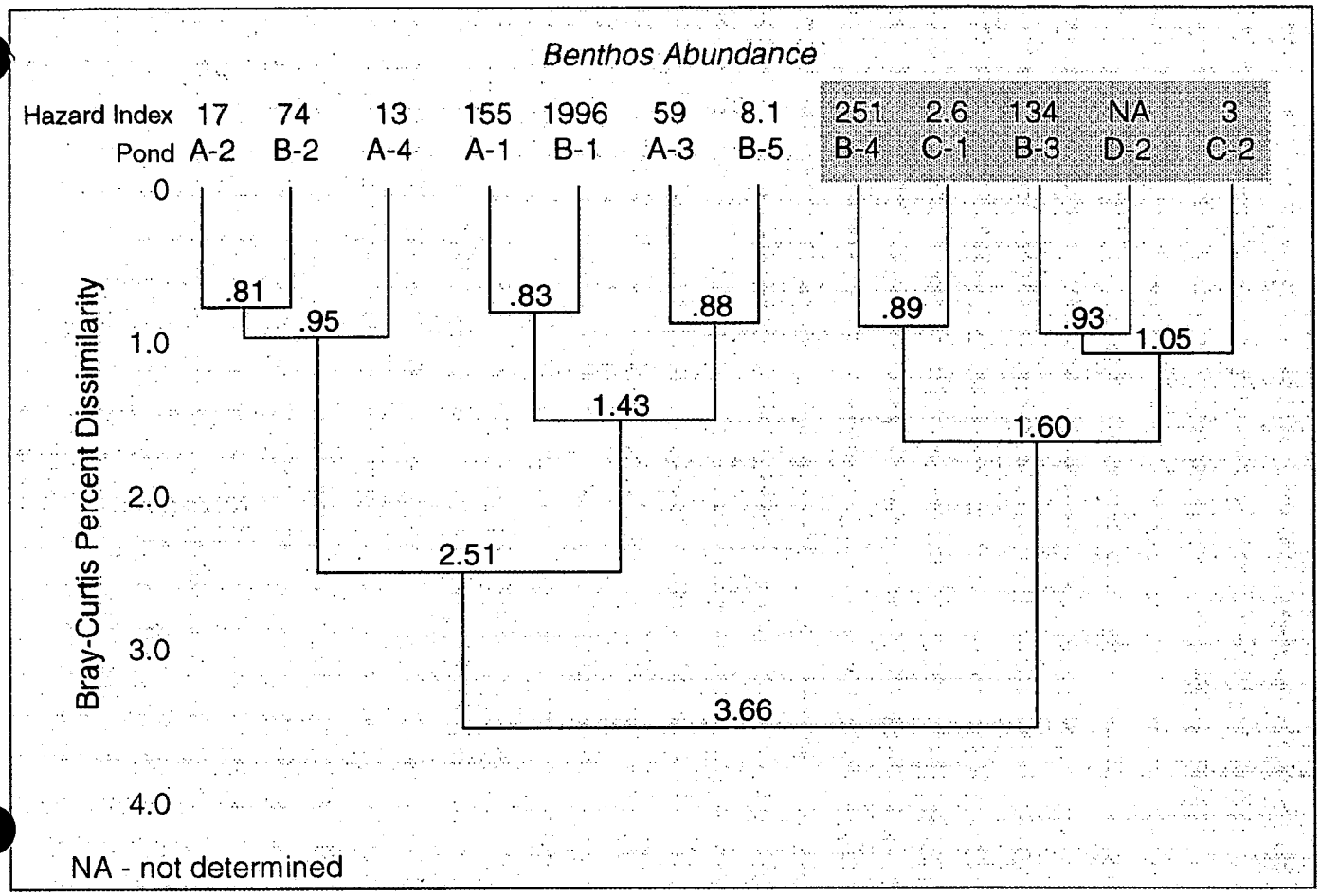

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Golden, Colorado

ERAs for Woman Creek and Walnut Creek Watersheds at RFETS

Cluster Analysis Dendrogram
Bray-Curtis Percent Dissimilarity
Benthos Species Abundance

September 1995 | Figure N5-6

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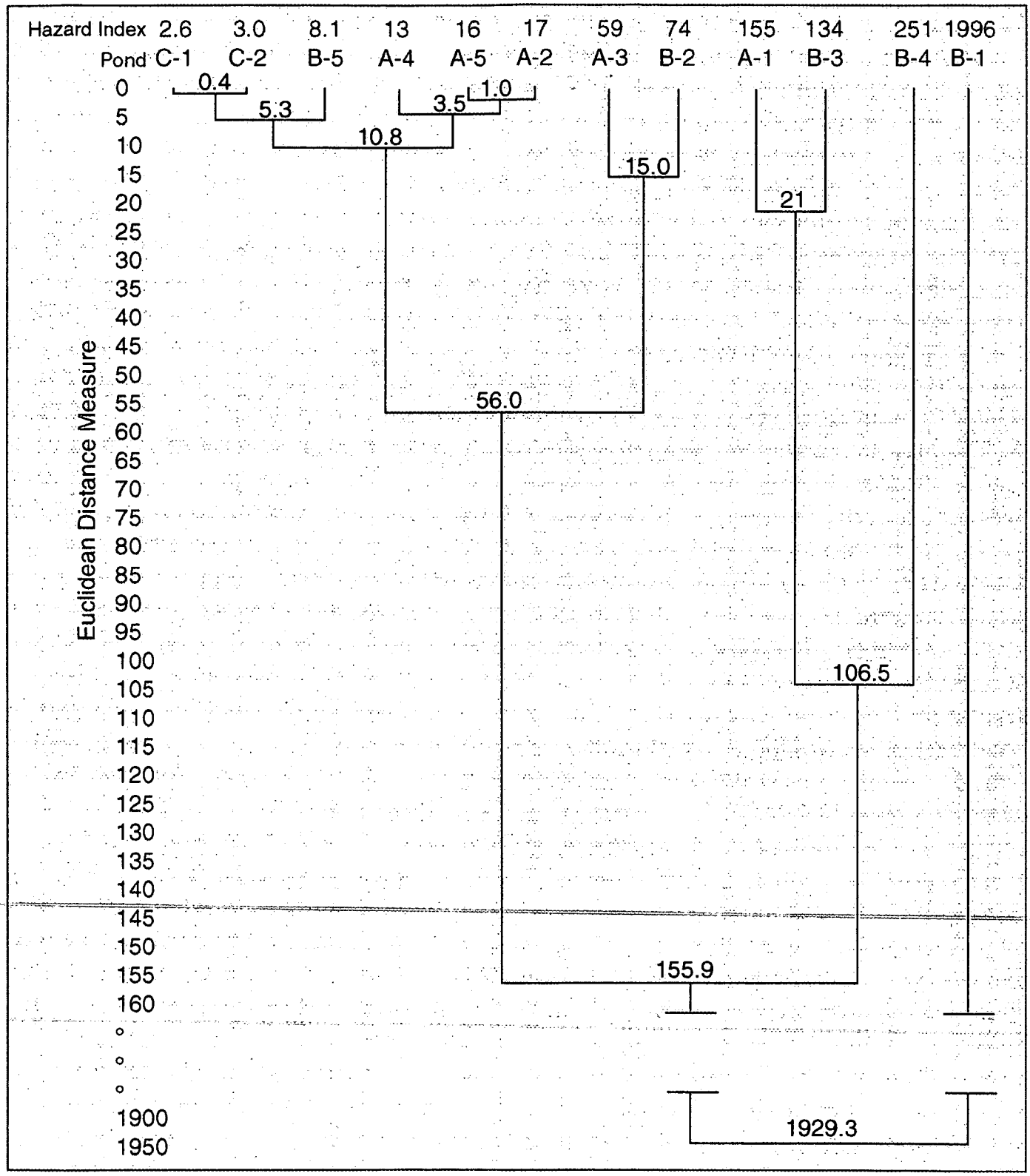

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ERAs for Woman Creek and Walnut Creek Watersheds at RFETS

Cluster Analysis Dendrogram Hazard Index

September 1995 | Figure N5-7

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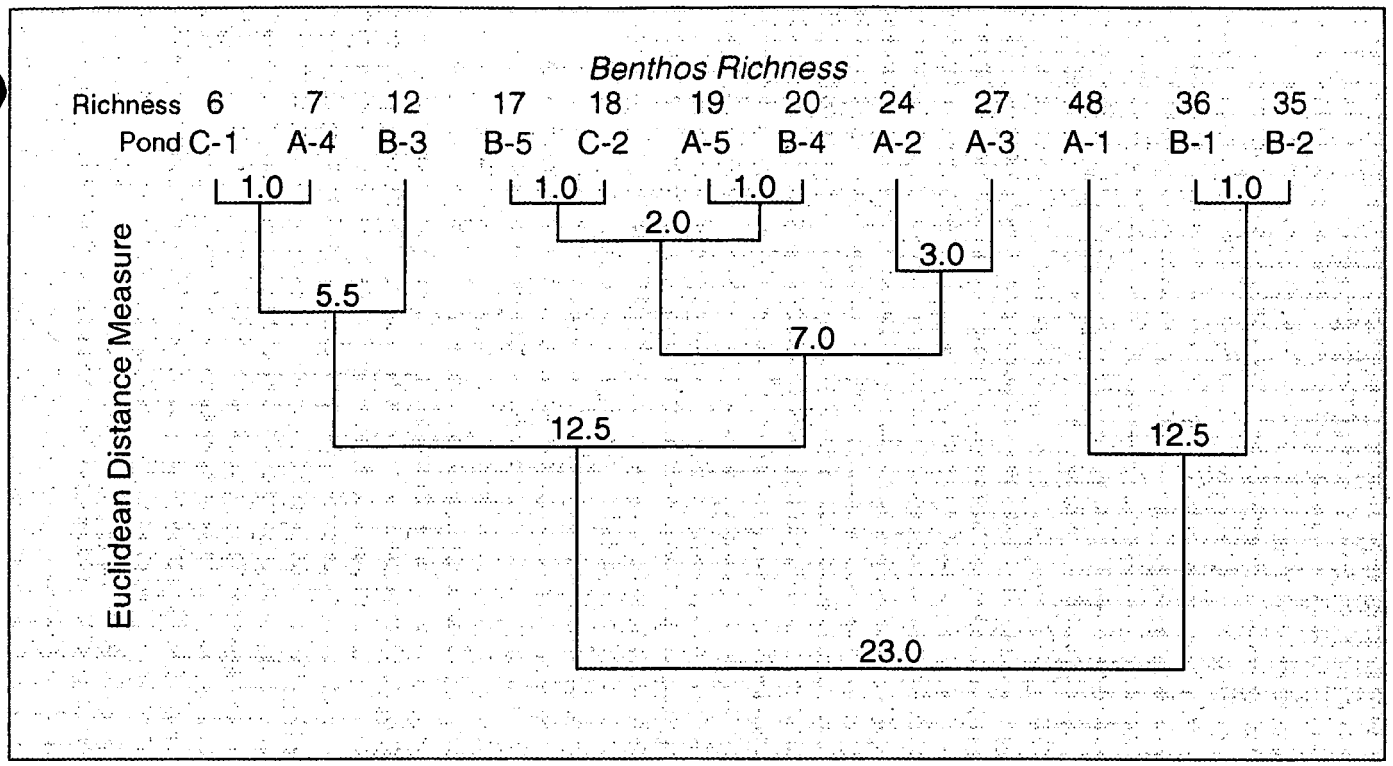

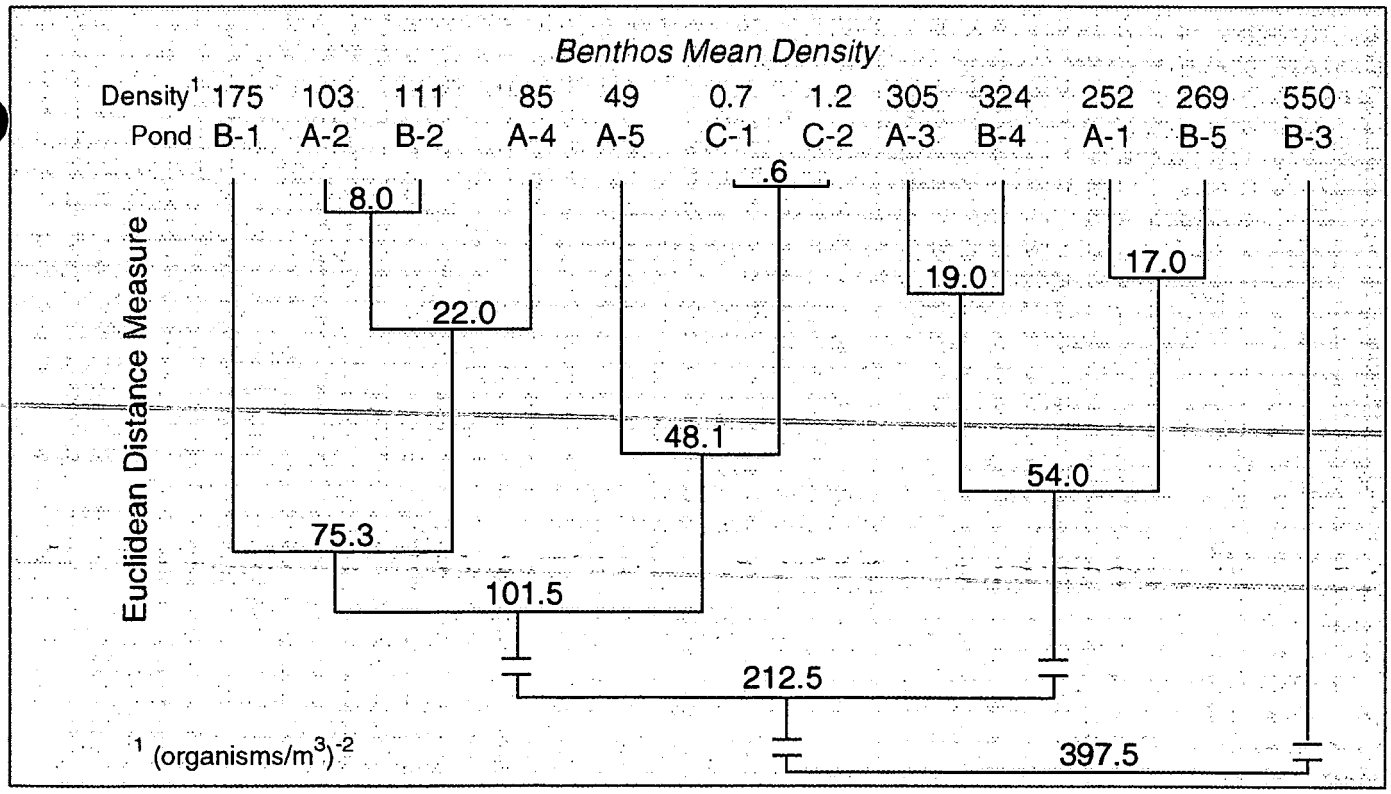

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ERAs for Woman Creek and Walnut Creek Watersheds at RFETS

Cluster Analysis Dendrogram
Single Unit Pattern Expression
Benthos Richness and Density

September 1995	Figure N5-8

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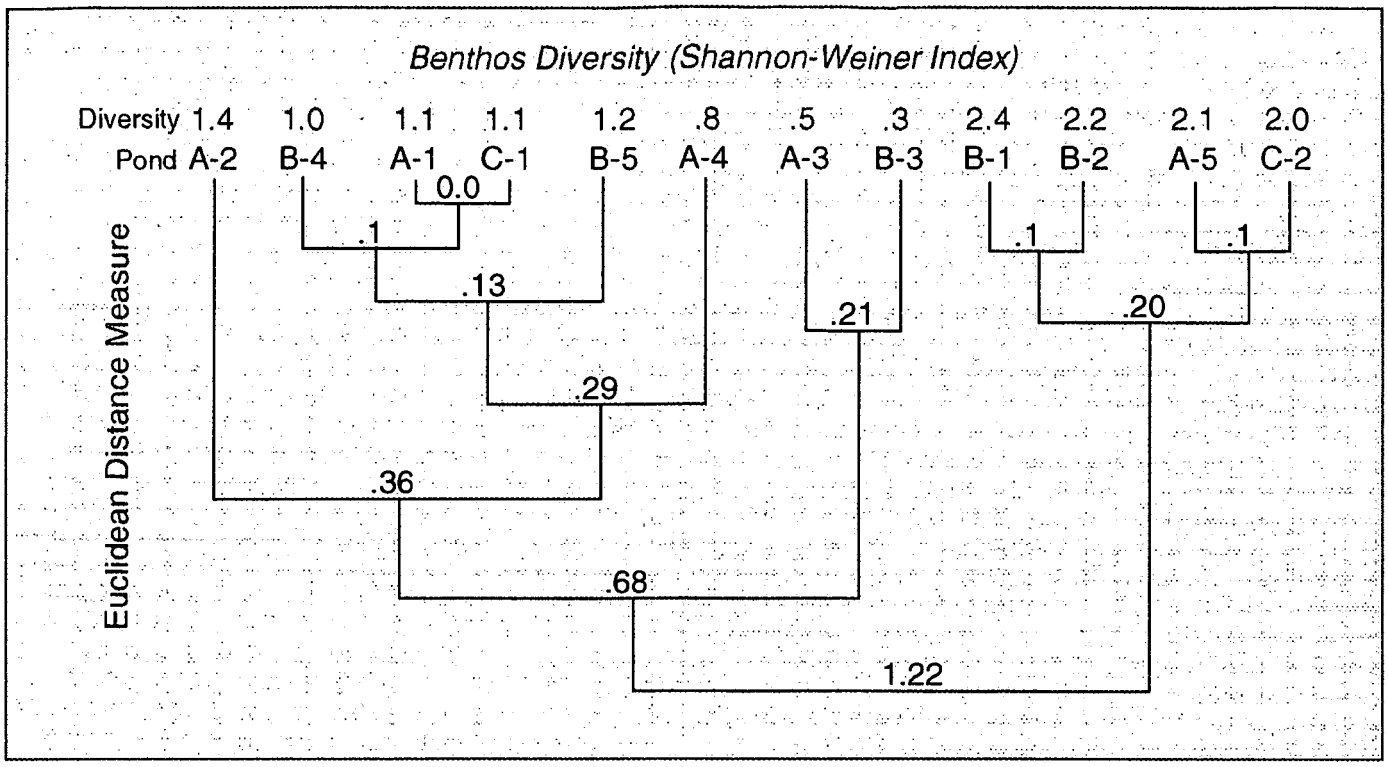

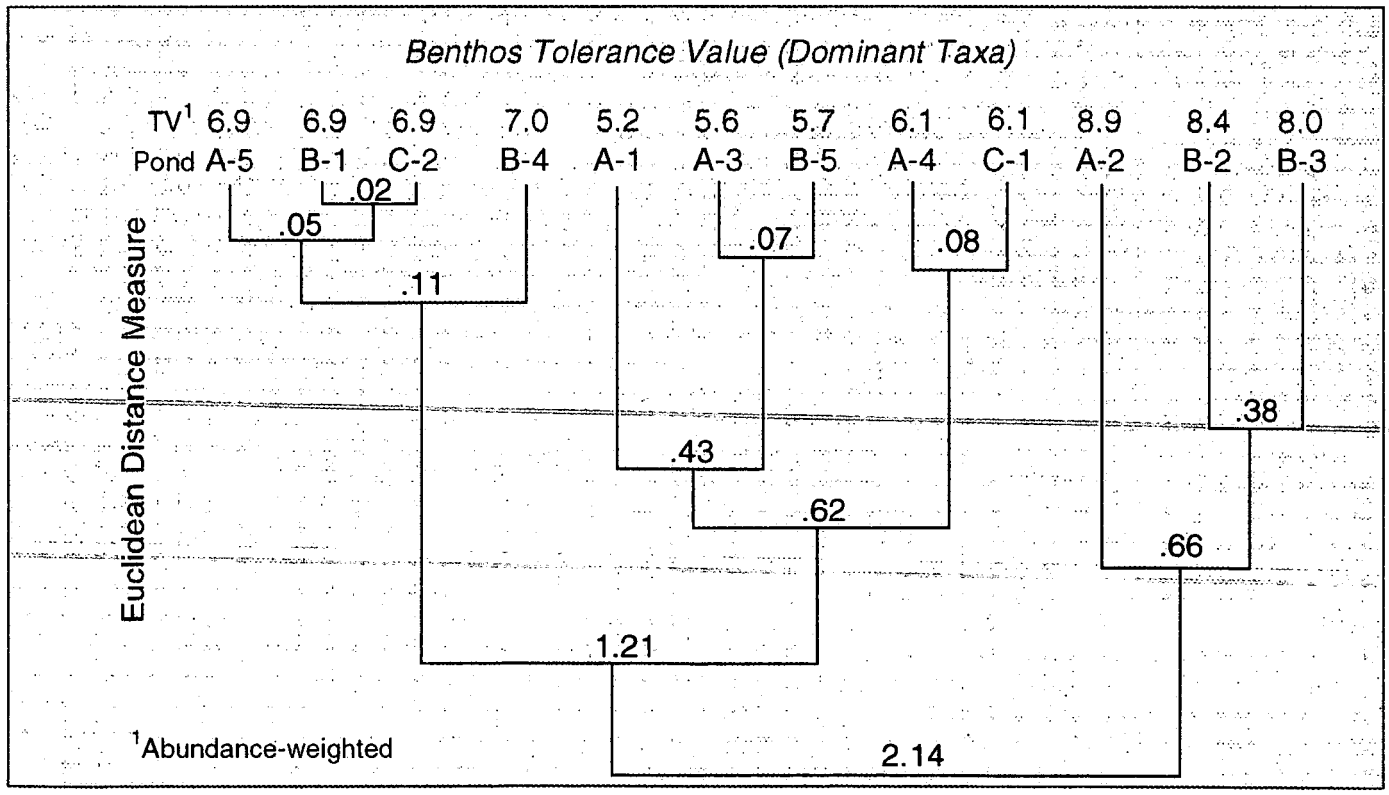

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Golden, Colorado

ERAs for Woman Creek and Walnut Creek Watersheds at RFETS

Cluster Analysis Dendrogram
Single Unit Pattern Expression
Benthos Diversity and
Pollution Tolerance

September 1995	Figure N5-9

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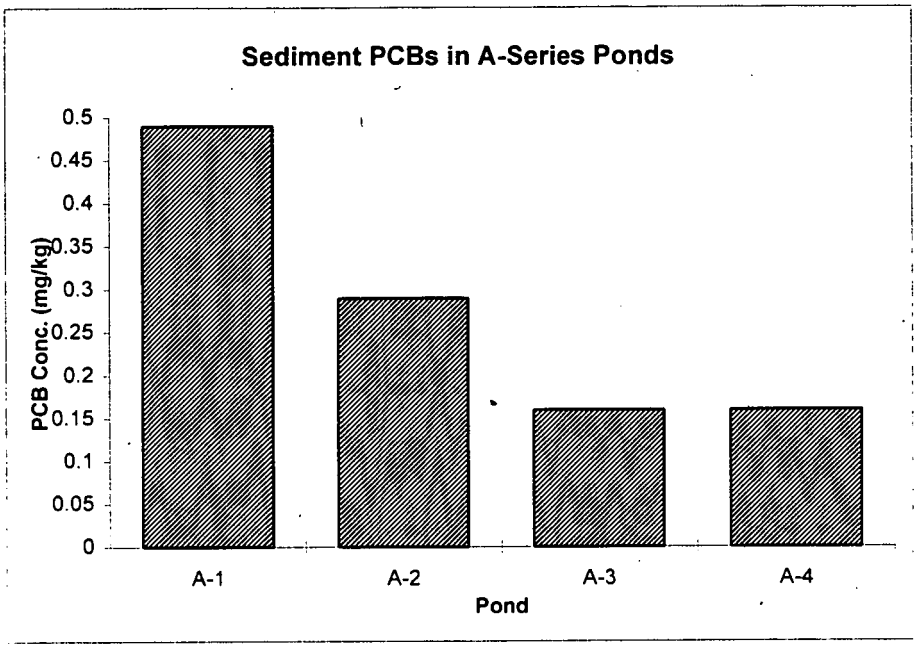
Figure N5-11
Mean of Total PCB Concentrations



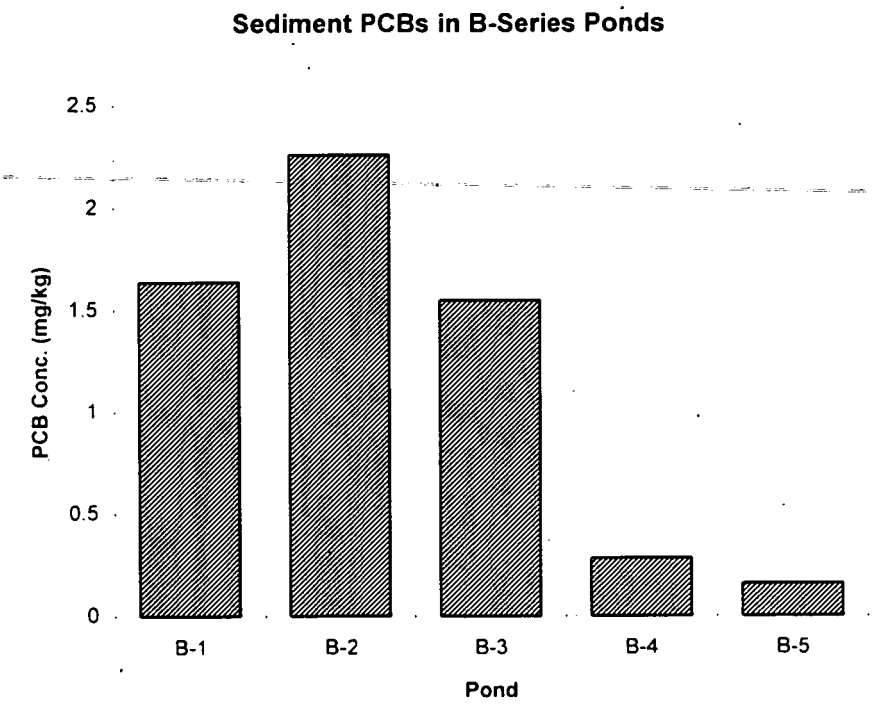
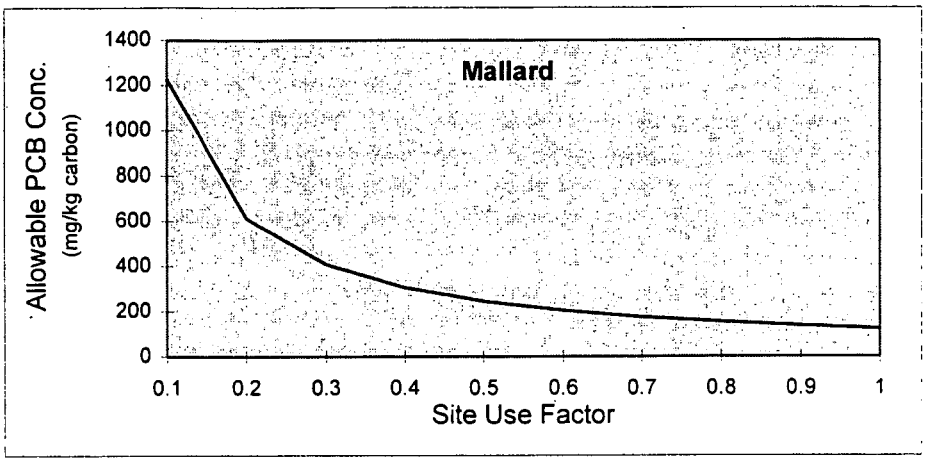
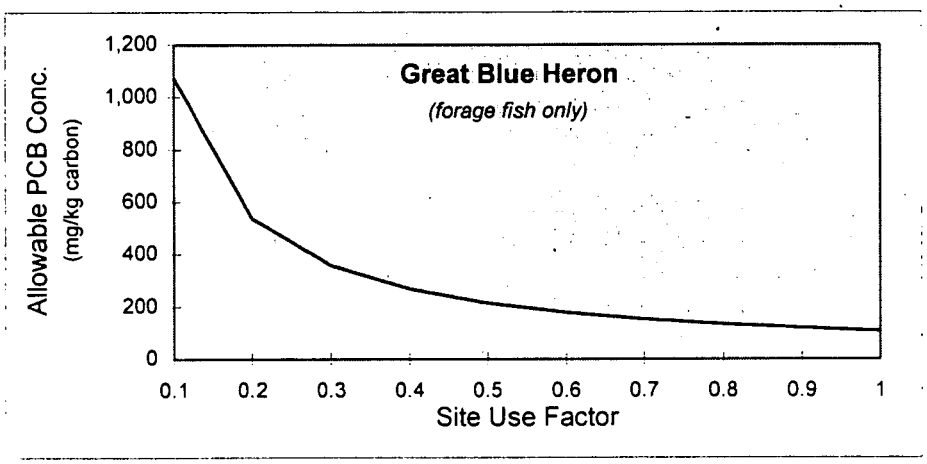


Figure N5-12
Estimation of Allowable PCB Concentrations in Sediments
Based on Different Site Use Factors





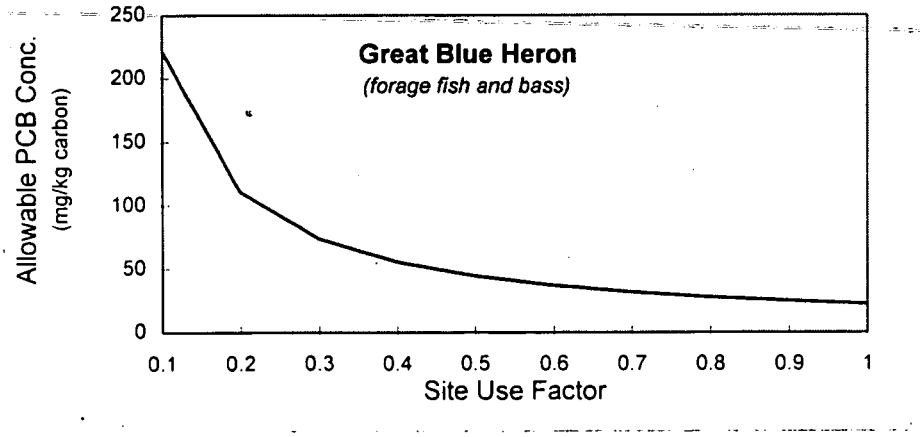


Figure N5-13
Aroclor-1254 Concentrations and Criteria for Protection of Great Blue Heron

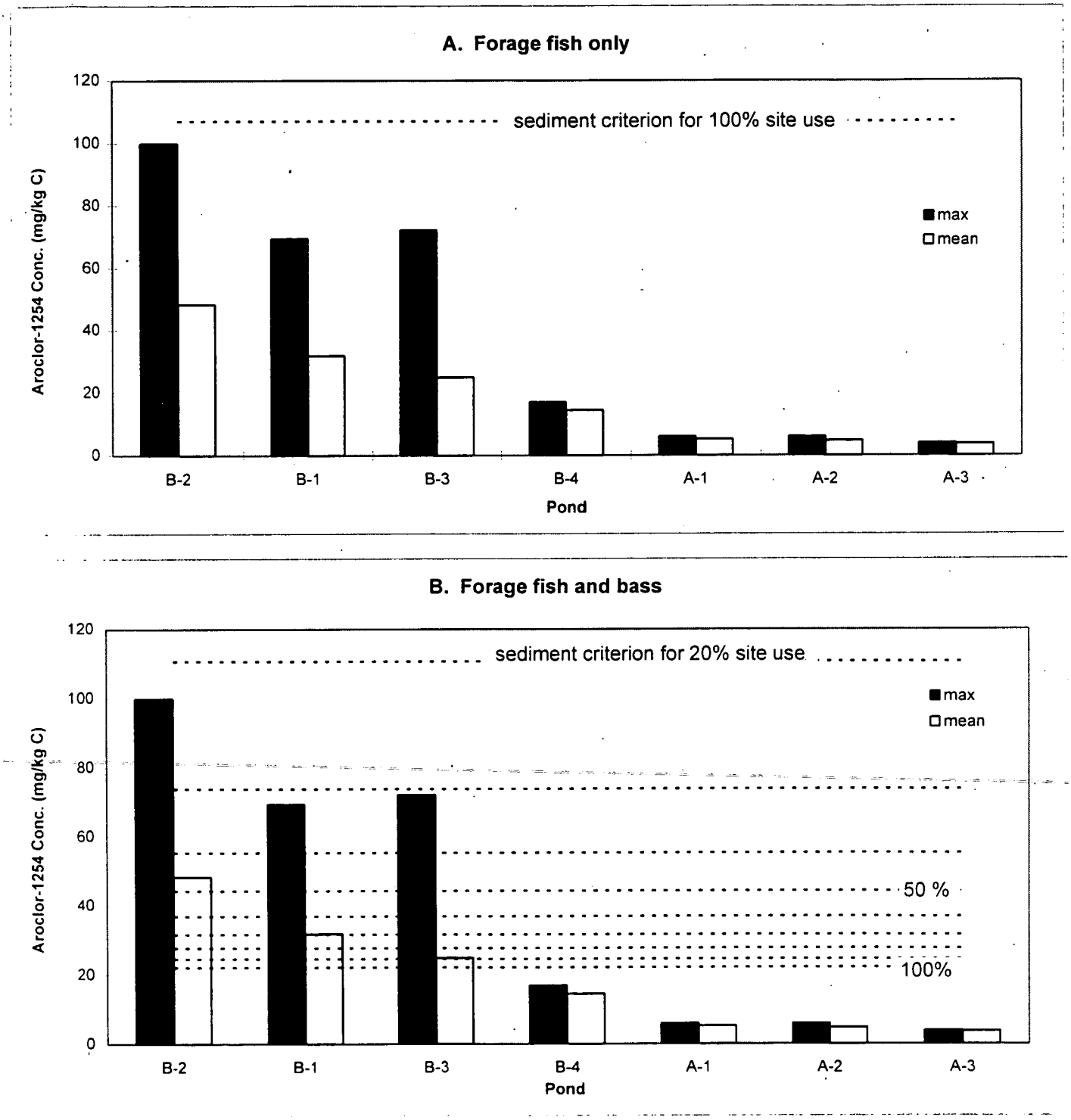
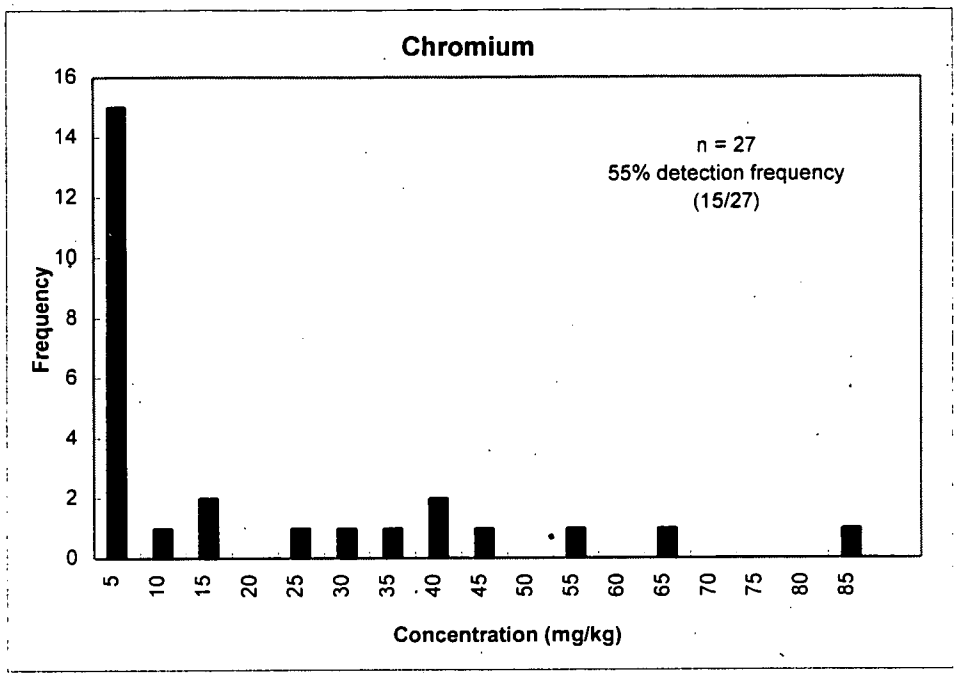


Figure N5-16
Frequency Distribution for Concentrations of Chromium and Lead in Small Mammals from Upper Walnut Creek



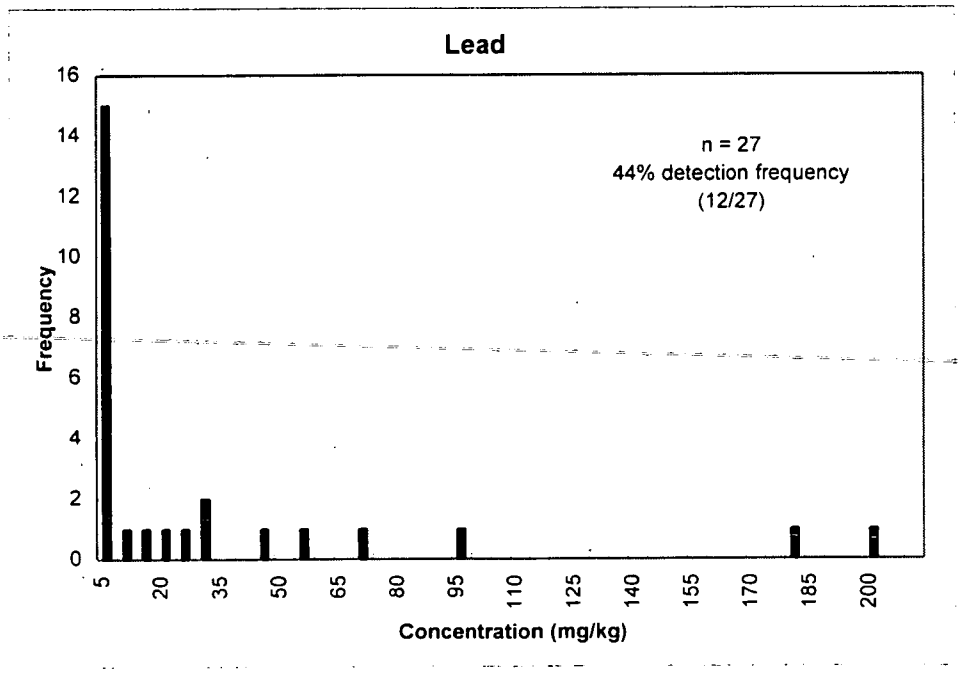
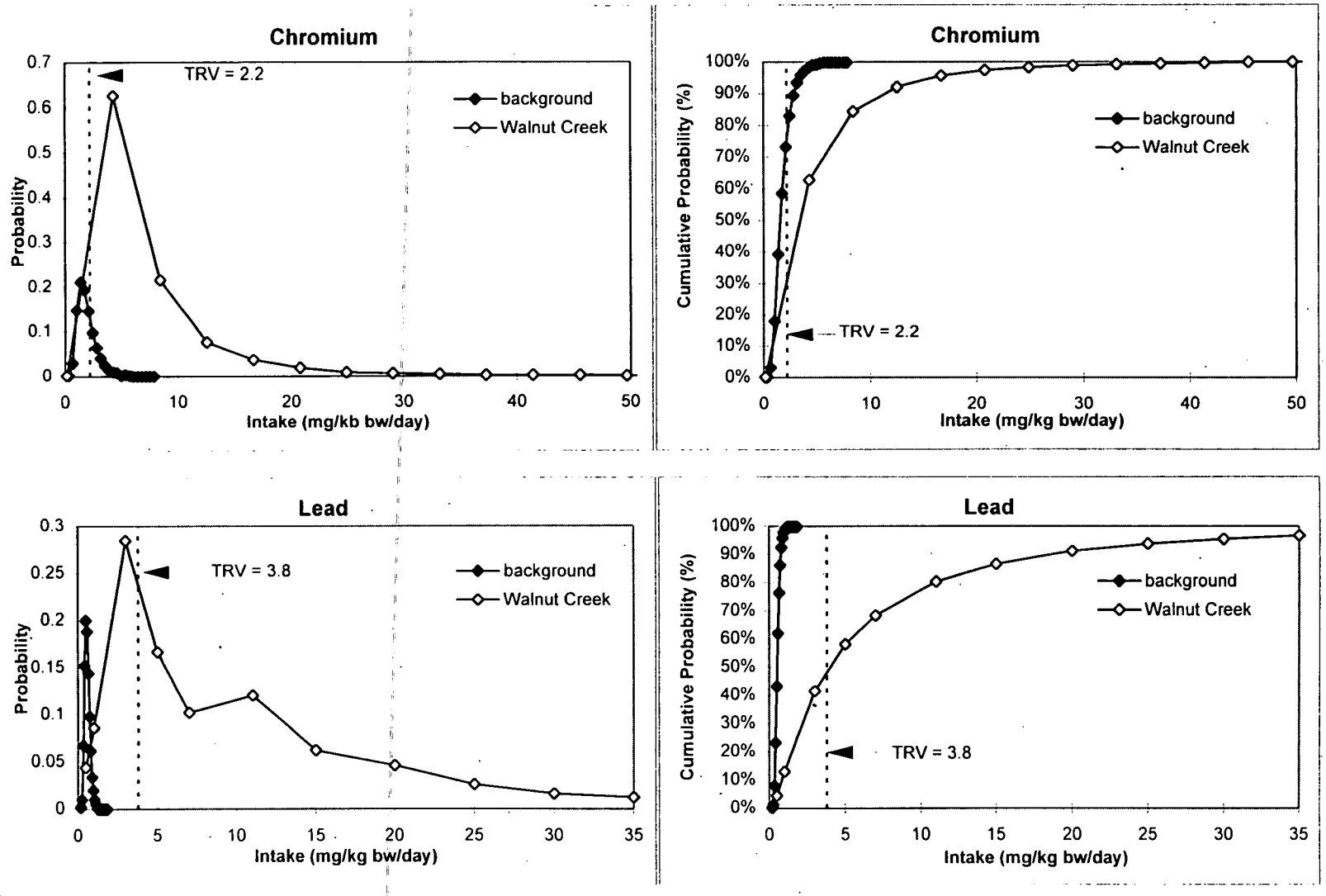


Figure N5-17
American Kestrel Ingestion of Chromium and Lead in Upper Walnut Creek and RFETS Background
Results of Simulations[1]



[1]Intakes estimated from small mammal data; simulations conducted assuming lognormal distribution of data (500 iterations)

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Figure N5-19
HQs of Silver in Sediments of B-Ponds

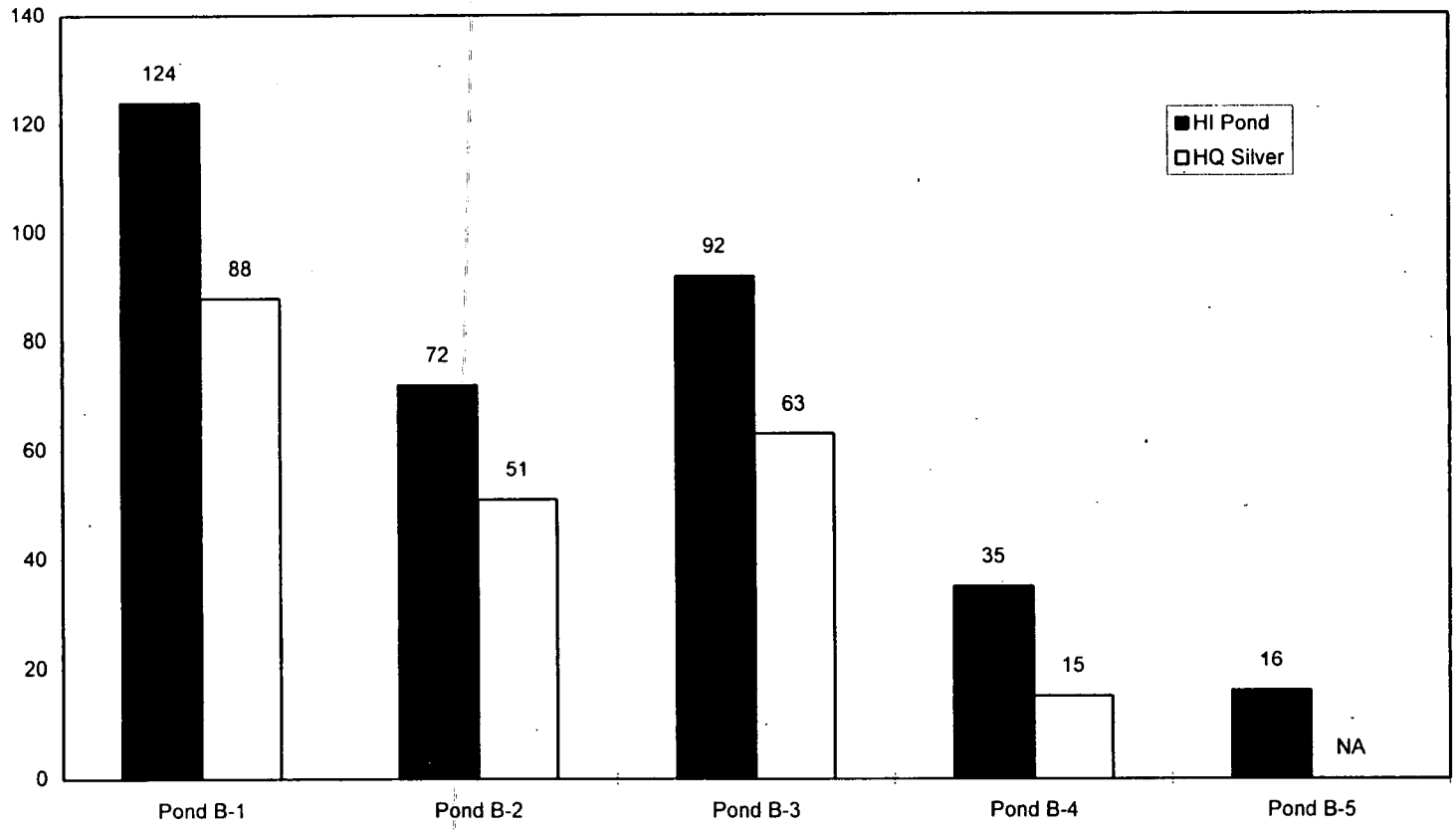

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Figure N5-21
Radionuclide Concentrations in Small Mammal Tissue

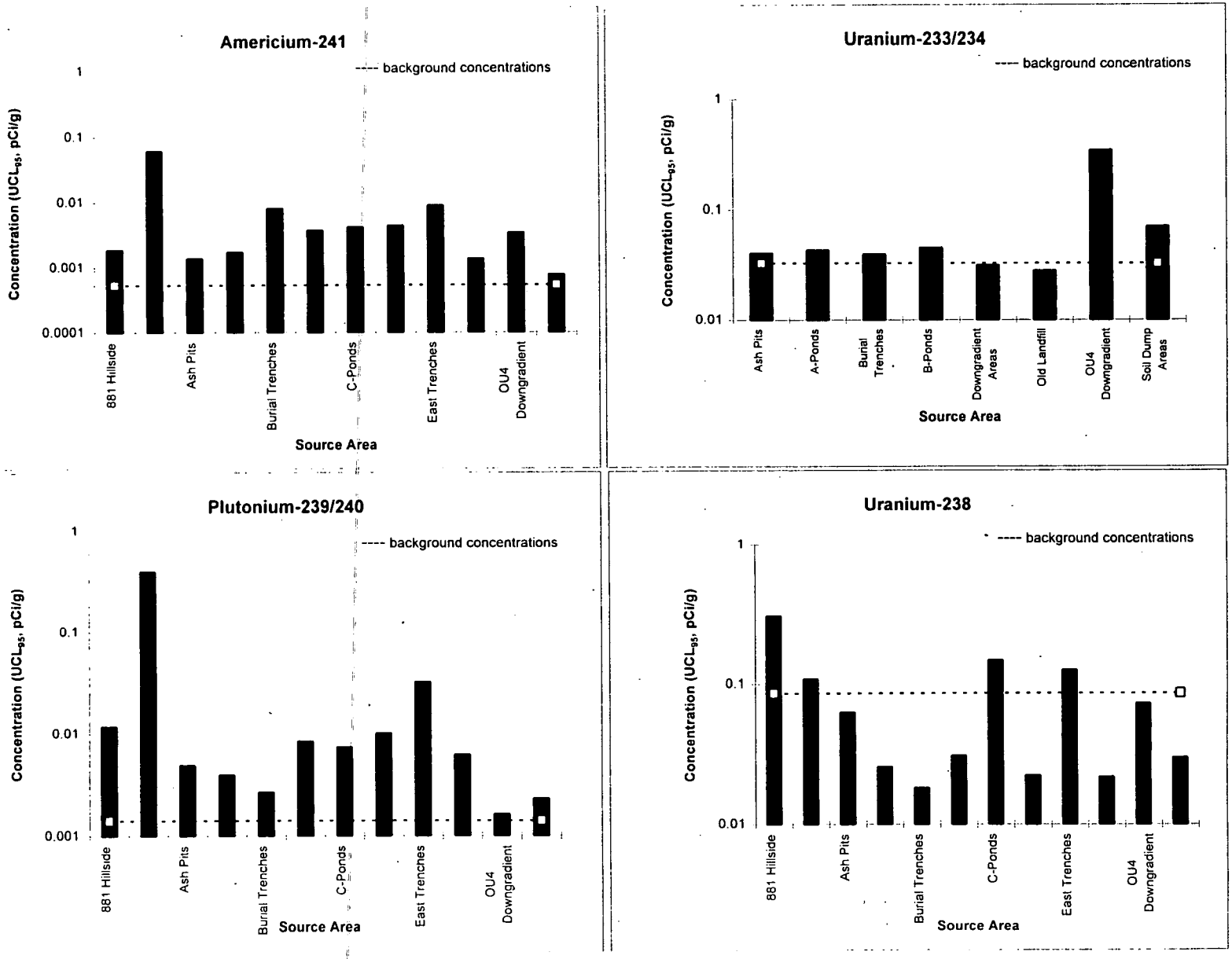

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Figure N5-22
Radionuclide Concentrations in Vegetation Tissue

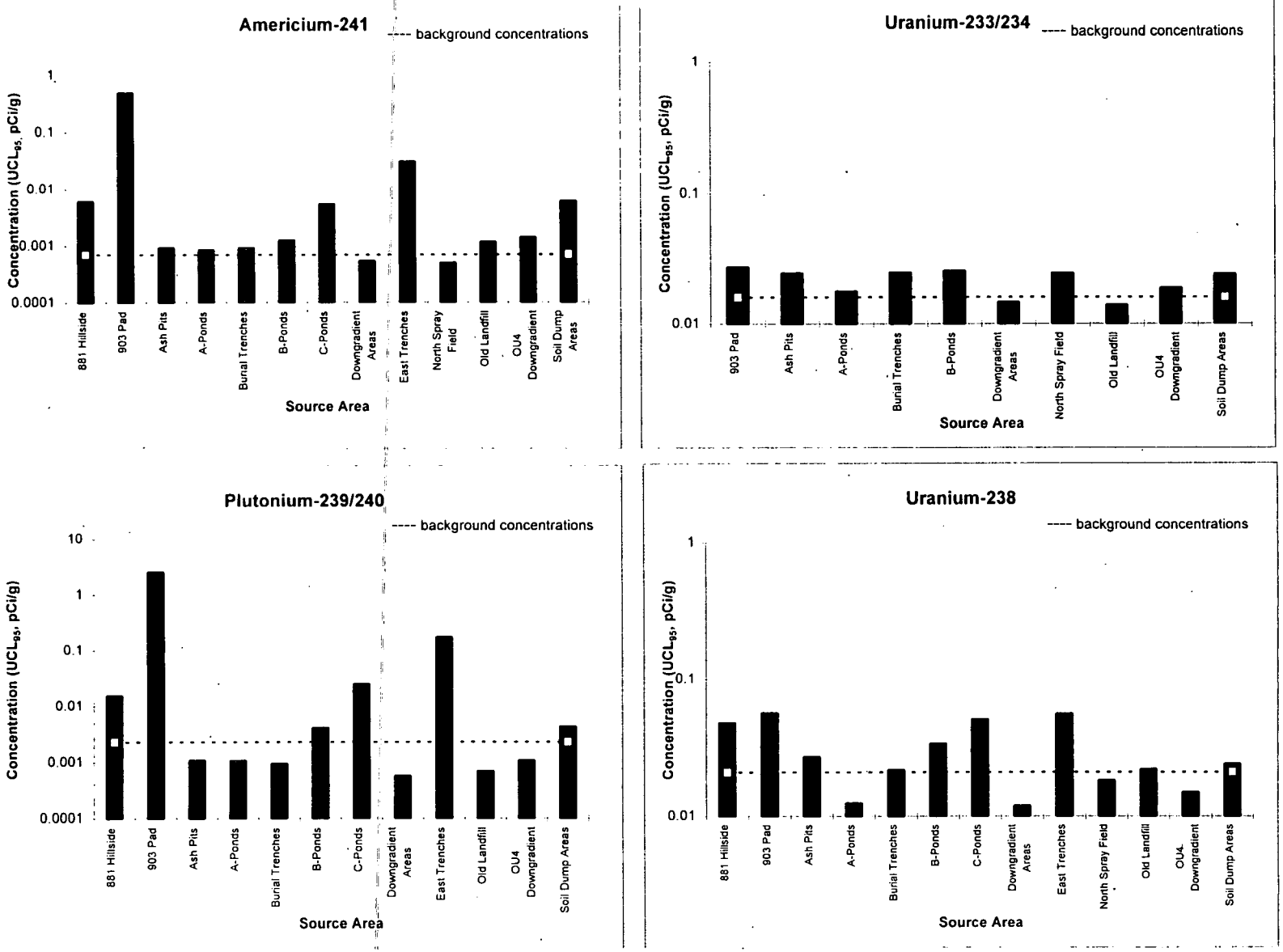

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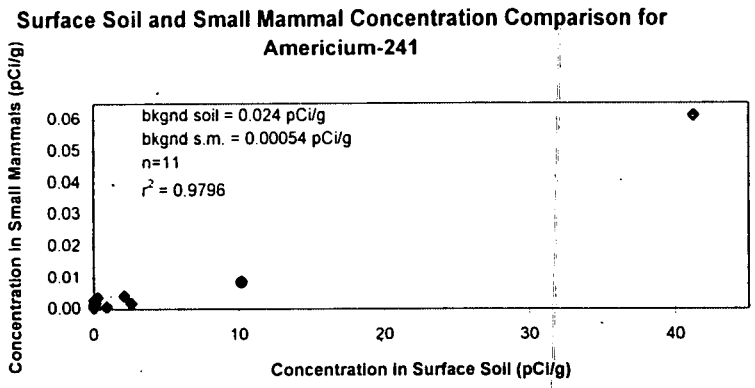
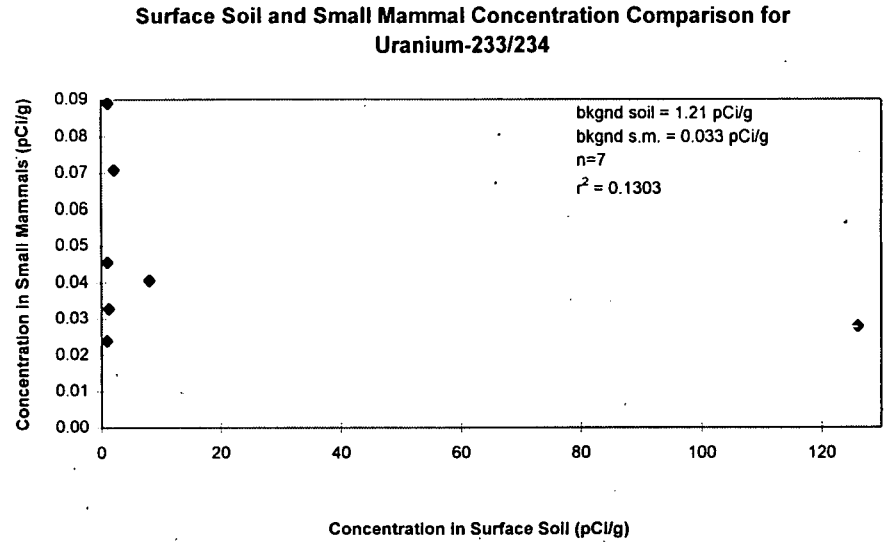
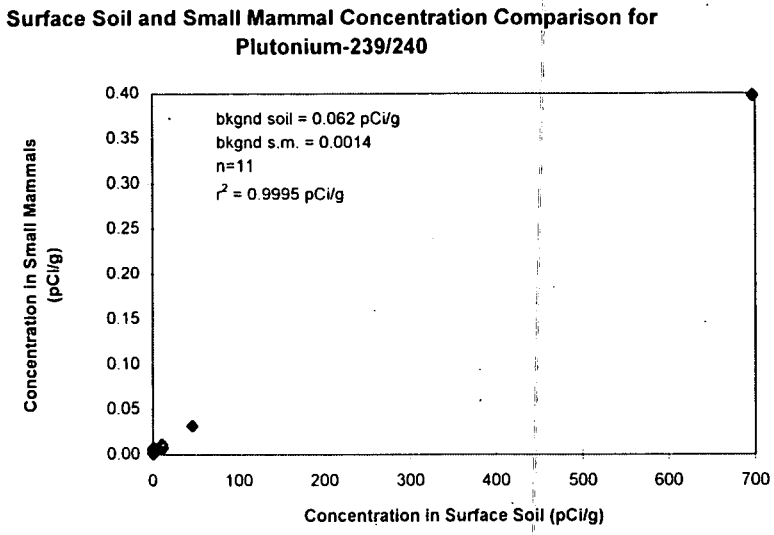
Figure N5-23
Radionuclide Concentrations in Soils vs. Small Mammal Tissue







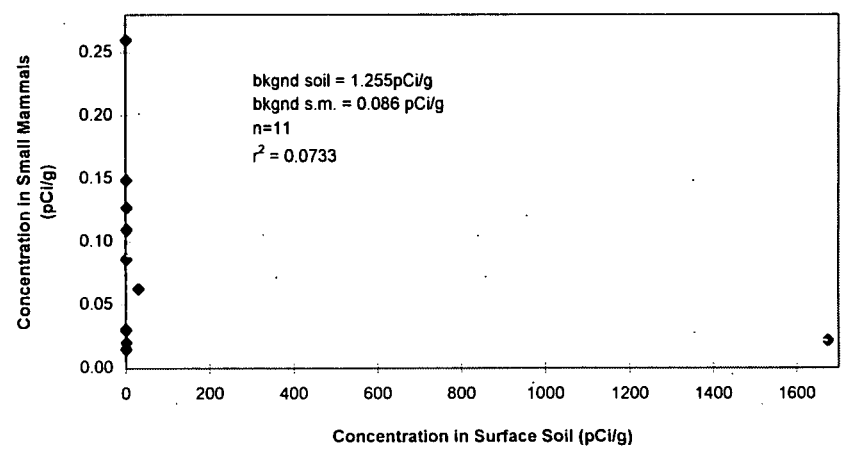


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Table N5-1 through N5-21

22 pages

Table N5-1
Aquatic Life Sample Site Physicochemical Characteristics

Parameter	Units	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	Pond C-1	Pond C-2	Pond D-1	Pond D-2
Sample Date		6/3/94	5/27/94	6/17/95	7/1/94	6/23/94	6/27/94	6/23/94	6/13/94	6/7/94	6/9/94	6/17/94	6/13/94		
Total Volume[1]	10^6 L	6.3	25.4	53.4	11.7	NA	3.0	7.3	2.4	2.3	87.6	NA	NA	NA	NA
Shoreline Length[1]	meters	297.5	419.8	629.2	853.3	378.15	158.7	307.9	210.6	171.6	615.6	266.32	762.37	485.5	619.76
Surface Area[1]	hectares	0.37	0.57	1.14	1.09	0.144	0.11	0.31	0.17	0.11	0.87	0.316	1.56	1.259	2.421
Max. Depth	meters	0.15	2.43	3.80	5.78	4.20	0.46	1.98	0.79	0.91	5.17	3.1	7.2	NA	NA
Water Temp.	°Celsius	29.6	20.1	24.6	25.0	18.8	32.6	29.5	25.8	28.1	24.1	16.8	19.98	NA	NA
Dissolved Oxygen	mg/L	8.8	6.2	7.0	8.2	6.9	6.9	7.3	8	8.2	7.3	5.0	6.07	NA	NA
Dissolved Oxygen	% saturation	141	83	102	121	ND	116	117	117	128	105	ND	ND	NA	NA
Conductivity	siemens	0.46	1.41	0.72	0.56	0.633	1.29	0.74	0.47	0.57	0.54	0.51	0.644	NA	NA
pH	standard unit	10.36	8.02	6.86	8.21	7.5	10.6	10.3	7.26	8.42	8.2	7.0	8.08	NA	NA
Alkalinity[2]	mg/L	65	306	143	194	ND	230	304	81	112	133	ND	153	NA	NA

[1]Maximum value based on high water level
[2]Total alkalinity as mg/L $CaCO_3$
mg/L - milligrams per liter
NA - data not available
ND - not determined

Table N5-2
Contribution of PAH to Sediments Hazard Index

Pond	Hazard Index	PAH Hazard Quotient	Contribution of PAHs to Hazard Index (%)
A-1	155.0	142.2	91.7
A-2	17.0	3.9	22.9
A-3	59.0	47.4	80.3
A-4	13.0	0.0	0.0
A-5	16.0	0.0	0.0
North Walnut Creek	181.0	154.0	85.1
B-1	1,996.0	1,867.2	93.5
B-2	74.0	7.7	10.4
B-3	134.0	50.0	37.3
B-4	251.0	220.1	87.7
B-5	8.1	0.0	0.0
South Walnut Creek	225.0	197.5	87.8
C-1	3.0	0.0	0.0
C-2	2.6	0.0	0.0
Woman Creek	1.2	0.0	0.0

Table N5-3
Pond Benthos Community Structure Summary

Characteristic	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	Pond C-1	Pond C-2	Pond D-1	Pond D-2
Total Richness	48	24	27	7	19	36	35	12	20	17	6	18	13	31
Mean Density	25,256.6	10,354.7	30,557.4	8,509.8	4,960.0	17,591.3	11,145.2	55,047.4	32,415.2	26,919.6	66.4	117.6	24,762.9	4,962.0
Simpson's Diversity	0.65	0.43	0.75	0.57	0.19	0.16	0.16	0.84	0.44	0.44	0.44	0.22	0.75	0.1
Shannon-Weiner Diversity	1.07	1.39	0.53	0.81	2.1	2.35	2.22	0.32	1.04	1.16	1.11	1.95	0.51	2.73
Shannon-Weiner Max.[1]	3.87	3.17	3.29	1.94	2.94	3.58	3.55	2.48	2.99	2.83	1.79	2.89	2.56	3.43
Percent Max. Diversity	27.65	43.85	16.11	41.75	71.43	65.64	62.54	12.90	34.78	40.99	62.01	67.47	19.92	79.59
Number Dominant Taxa	2.9	4	1.7	2.2	7.5	10.5	9.2	1.4	2.8	3.2	3	7	1.7	15.4
Dominant Taxa Density	21,917.7	9,120.4	29,790.8	7,951.2	4,544.0	15,863.4	10,172.9	49,538.8	31,388.8	21,592.8	61.6	105.4	24,204.2	4,482.1
% Density Dominant Taxa	86.7	88.1	97.5	93.4	91.6	90.1	91.3	89.9	96.8	80.2	92.7	89.6	97.7	90.3
Oligochaeta Density	20,241.7	1,676.0	26,257.0	6,145.3	1,720.0	5,014.9	194.9	4,586.2	17,455.0	16,837.7	41.6	42.0	21,255.0	39.0
% Density Oligochaeta	80.1	16.2	85.9	72.2	34.6	28.5	1.8	8.3	55.3	62.5	62.6	35.7	85.8	8
Diptera Density	3,167.8	8,367.1	4,066.5	1,974.9	2,552.0	1,232.5	3,339.0	571.7	12,263.6	5,105.9	24.8	68.4	3,422.1	3,001.1
% Density Diptera	12.5	80.8	13.3	23.2	51.4	7	30	1	37.8	19	37.4	58.1	13.8	60.4

[1]Maximum Shannon-Weiner Diversity based on richness

Table N5-4

Tolerance Values and Densities for Most Common Taxa in Detention Ponds (organism density in number/m^3)

Taxa	TV	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	Pond C-1	Pond C-2	Pond D-1	Pond D-2
Number of Dominant Taxa		3	4	2	2	7	11	9	1	3	3	3	7	2	15
Taxa															
Oligochaeta	5	20,242	1,676	26,257	6,145	1,720	5,015	195		17,955	16,838	42	42	21,255	
Diptera	7						546								
Chaoborus	7		598					559					7		
Chironomidae pupae	6					96									
Chironomus	10		6,548	3,534	1,806	704		2,365		11,563			33	2,949	1,104
Cladopelma	7					312									
Cladotanytarsus	7					816									
Corynonerua	7	845													
Cryptochironomus	8					272									
Dicrontendipes	8														377
Glyptotendipes	7												2		156
Labrundinia	7														104
Paratanytarsus	6														130
Procladius	9		299									13	6		78
Psectrocladius	8	832													598
Pseudochironomus	5														195
Tanypus	7											7	10		
Ephemeroptera	6						338								
Baetis	5						559								
Caenis	7														312
Odonata	9						1,351	533							91
Coenagrion/Enallagma	9														286
Hemiptera															
Corixidae	unk.												6		
Coleoptera															
Haliplus	7						507	234							
Crustacea															
Cladocera	8						377	299			1,962				117
Ostracoda	8						2,079	2,546	49,539	1,871	2,793				
Malacostraca															
Hyalella	8						780	1,117							117
Gastropoda															
Gyraulus	8														312
Physella	8						3,820	2,326							507
Limnophila	8						494								
Pelecypoda															
Sphaeriidae	8					624									
Density-weighted TV		**5.2**	**8.9**	**5.6**	**6.1**	**6.9**	**6.9**	**8.4**	**8.0**	**7.0**	**5.7**	**6.1**	**6.9**	**5.6**	**8.3**

Table N5-4

Tolerance Values and Densities for Most Common Taxa in Detention Ponds (organism density in number/m^3)

Taxa	TV	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	Pond C-1	Pond C-2	Pond D-1	Pond D-2
Taxa Mean TV		6.7	7.8	7.5	7.5	7.3	7.8	8.0	8.0	7.7	7.0	7.0	8.0	7.5	7.9
Weighted TV Rank		1	14	2	6	7	8	13	11	10	4	5	9	3	12

Table N5-5
Sediment Bioassay Test Results

		Hyalella azteca							*Chironomus tentans*			
Test Media	Sample Date	Control % Survival	Test % Survival	Survival T Statistic	Survival $T_{0.05}$ Value	Control Mean Wt.[1]	Test Mean Wt.	Mean Wt. T Statistic	Control % Survival	Test % Survival	Survival T Statistic	Survival $T_{0.05}$ Value
Pond A-1	10/29/92	74[7]	95	NA	NA	0.06	0.11	NA	NA[4]	NA	NA	NA
Pond A-2	11/12/92	74[7]	89	NA	NA	0.06	0.15	NA	NA	NA	NA	NA
Pond A-3	10/21/92	89	76	0.971	2.46	0.13	0.10	NA	82	103[5]	-2.618[6]	2.46
Pond A-4	10/19/92	89	99	-0.777	2.46	0.13	0.17	NA	82	73	1.007	2.46
Pond A-5	11/19/92	38[7]	89	NA	NA	0.06	0.33	NA	NA	NA	NA	NA
Pond B-1	11/16/92	85	91	-1.094	2.18	0.05	0.16	NA	NA	NA	NA	NA
Pond B-2	11/18/92	85	64	3.72[8]	2.18	0.05	0.14	NA	NA	NA	NA	NA
Pond B-3	10/27/92	89	84	0.388	2.46	0.13	0.11	NA	82	88	-0.805	2.46
Pond B-4	10/22/92	89	91	-0.194	2.46	0.13	0.19	NA	82	62	2.416	2.46
Pond B-5	10/20/92	89	60	2.233	2.46	0.13	0.12	NA	82	72	1.208	2.46
Pond C-1[2]	11/9/92	74[7]	80	NA	NA	0.06	0.14	NA	NA	NA	NA	NA
Pond C-1[3]	11/9/92	74[7]	94	NA	NA	0.06	0.10	NA	NA	NA	NA	NA
Pond C-2	11/10/92	74[7]	96	NA	NA	0.06	0.16	NA	NA	NA	NA	NA

[1] Mean Weight in grams
[2] Sediment material from
[3] Sediment material from
[4] Tests not conducted
[5] Sample showed evidence of reproduction
[6] Statistically higher than control; attributed to resident *Chironomus* in test sediments
[7] Control treatment below acceptable test limit of 80 percent survival
[8] Statistically lower than control treatment
NA - data not available

Table N5-6
Community Structure and Hazard Index Correlation

	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	Pond C-1	Pond C-2
Richness	48	24	27	7	19	36	35	12	20	17	6	18
Density	252	103	305	85	49	175	111	550	324	269	0.6	1.2
Diversity	1.1	1.4	0.53	0.81	2.1	2.3	2.2	0.32	1	1.2	1.1	2
Tolerance Value	5.19	8.85	5.59	6.14	6.88	6.92	8.38	8	7.02	5.66	6.06	6.94
Hazard Index	155	17	59	13	16	1996	74	134	251	8.1	2.6	3

	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	Pond C-1	Pond C-2
Richness	1	5	4	11	7	2	3	10	6	9	12	8
Density	8	5	10	4	3	7	6	12	11	9	1	2
Diversity	7.5	5	11	10	3	1	2	12	9	6	7.5	4
Tolerance Value	1	12	2	5	6	7	11	10	9	3	4	8
Hazard Index	10	6	7	4	5	12	8	9	11	3	1	2

Correlation Coefficients (r^2) Values
Measurement Data

	Richness	Density	Diversity	Tolerance Value	Hazard Index
Richness	1				
Density	0.011006	1			
Diversity	0.129632	0.399592	1		
Tolerance Value	0.005185	4.31E-05	0.054014	1	
Hazard Index	0.151428	0.00484	0.166164	0.000785	1

Correlation Coefficients (r^2) Values
Rank Order Data

	Richness	Density	Diversity	Tolerance Value	Hazard Index
Richness	1				
Density	0.086263	1			
Diversity	0.167943	0.230266	1		
Tolerance Value	4.89E-05	0	0.076567	1	
Hazard Index	0.498851	0.46012	0.00011	0.041127	1

Table N5-7
Potential Aroclor-1254 Concentration in Fish Tissue as Estimated from Sediment Data

	Sediments				Estimated from Sediment			
					Fathead Minnows		Largemouth Bass	
Pond	Aroclor-1254 Concentration (µg/kg)	Lab Qualifier	Fraction Organic Carbon	Aroclor-1254 Concentration in Carbon (µg/kg C)	Aroclor-1254 in Lipids (µg/kg)	Aroclor-1254 in Whole Body (µg/kg)[1,2]	Aroclor-1254 in Lipids (µg/kg)	Aroclor-1254 in Whole Body (µg/kg)[1,2]
A-1	44	J	0.014	3,140	10,400	104	50,300	503
	73	J	0.014	5,210	17,200	172	83,400	834
	86	J	0.014	6,140	20,300	203	98,300	983
	86	J	0.014	6,140	20,300	203	98,300	983
	88	J	0.014	6,290	20,700	207	101,000	1,010
mean =	75			5,390	17,800	178	86,200	862
A-2	89	J	0.026	3,420	11,300	113	54,800	548
	130	J	0.026	5,000	16,500	165	80,000	800
	160	J	0.026	6,150	20,300	203	98,500	985
	480	U	0.026	NC	NC	NC	NC	NC
mean =	215			4,860	16,000	160	77,700	777
A-3	45	J	0.012	3,750	12,400	124	60,000	600
	240	U	0.012	NC	NC	NC	NC	NC
	330	U	0.012	NC	NC	NC	NC	NC
	450	U	0.012	NC	NC	NC	NC	NC
	450	U	0.012	NC	NC	NC	NC	NC
mean =	303			3,750	12,400	124	60,000	600
B-1	320	J	0.023	13,900	45,900	459	223,000	2,230
	410	J	0.023	17,800	58,800	588	285,000	2,850
	910		0.023	39,600	131,000	1,310	633,000	6,330
	1100		0.023	47,800	158,000	1,580	765,000	7,650
	1600		0.023	69,600	230,000	2,300	1,110,000	11,100
mean =	868			37,700	126,000	1,250	604,000	6,040
B-2	930		0.038	24,500	80,800	808	392,000	3,920
	1400		0.038	36,800	122,000	1,220	589,000	5,900
	2000		0.038	52,600	174,000	1,740	842,000	8,420
	2100		0.038	55,300	182,000	1,820	884,000	8,840
	3800		0.038	100,000	330,000	3,300	1,600,000	16,000
mean =	2,046			53,800	178,000	1,780	861,000	8,620
B-3	230	J	0.018	12,800	42,200	422	204,000	2,040
	260	J	0.018	14,400	47,700	477	231,000	2,310
	300		0.018	16,700	55,000	550	267,000	2,670
	770		0.018	42,800	141,000	1,410	684,000	6,840
	1300		0.018	72,200	238,000	2,380	1,160,000	11,600
mean =	572			31,800	105,000	1,050	508,000	5,080
B-4	120	J	0.013	9,230	30,500	305	148,000	1,480
	190	J	0.013	14,600	48,200	482	234,000	2,340
	200	J	0.013	15,400	50,800	508	246,000	2,460
	210	J	0.013	16,200	53,300	533	258,000	2,590
	220	J	0.013	16,900	55,800	558	271,000	2,710
mean =	188			14,500	47,700	477	231,000	2,310

U - undetected
J - estimated and below detection limit
NC - not calculated
[1] assume 1% lipid in whole body
[2] BSF = 3.3 for fathead minnow; BSF = 16 for bass

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Table N5-8
Aroclor-1254 in Aquatic Biota Collected from A- and B-Series Detention Ponds

Pond	Biota Type	Number of Samples	Detection Frequency	Mean[1] (µg/kg)	Standard Deviation[1] (µg/kg)
A-1	None	NA	NA	NA	NA
A-2	Benthos	1	1/1	20	NA
A-2	Crayfish	4	0/4	NA	NA
A-2	Largemouth bass	3	3/3	48	9.1
A-3	Crayfish	4	0/4	NA	NA
A-4	Crayfish	3	0/3	NA	NA
A-4	Fathead Minnow	3	3/3	17	5.8
A-5	Crayfish	3	0/3	NA	NA
A-5	Fathead Minnow	5	3/5	73	41
B-1	Salamander larvae	2	2/2	33	9.9
B-2	Salamander larvae	2	2/2	120	21
B-3	None	NA	NA	NA	NA
B-4	Fathead minnow	6	3/6	480	17
B-5	Crayfish	3	0/3	NA	NA
B-5	Fathead minnow	3	3/3	160	17

[1] Mean and standard deviation values were calculated using the values reported for the "real" Aroclor-1254 detections.
NA - not applicable

Table N5-9
Aroclor-1254 Concentration Ratios in Sediment and Biological Tissues[1]

	Concentration in Sediments		Concentration in Biological Tissues		Aroclor-1254 Concentration Ratios	
Pond[2] (species)	Bulk Sediment (µg/kg)	Organic Carbon (µg/kg C)	Whole Body (µg/kg)	Lipids[3] (µg/kg lipid)	Whole Body/Bulk Sediment	Lipid/Organic Carbon (BSF)
A-2 (largemouth bass)	215	8,270	48	4,800	0.2	0.6
A-2 (benthos)	215	8,270	20	2,000	0.1	0.2
B-1 (tiger salamander)	868	37,700	40	4,000	0.0	0.1
B-2 (tiger salamander)	2,050	89,000	134	13,000	0.1	0.2
B-4 (fathead minnow)	188	14,500	480	48,000	2.6	3.3

[1]mean for pond
[2]data presented only for ponds from in which Aroclor-1254 was detected in both sediment and biota
[3]assume 1 % lipids

Table N5-10
Aroclor-1254 Concentrations in Sediment and Fish Tissue Resulting in Ingestion Rates Equivalent to the TRV for Mallard and Great Blue Heron Estimated for Different Levels of Site Use

Species	Trophic Levels Present[1]	PCB Concentration in Sediment (mg/kg carbon)	BSF[2]	Fish Tissue: PCB Concentration in Lipids[3] (mg/kg)	Fish Tissue: PCB Concentration in Whole Body[3] (mg/kg)	Food Ingestion[4] (kg/day)	*a*	Site Use Factor	Body Weight (kg)	TRV (mg/kg bw/day)
Mallard	*fish*	1,230	3.3	4,000	40	0.084	0.9	0.1	1.8	0.17
		613	3.3	2,000	20	0.084	0.9	0.2	1.8	0.17
		409	3.3	1,300	13	0.084	0.9	0.3	1.8	0.17
		307	3.3	1,000	10	0.084	0.9	0.4	1.8	0.17
		245	3.3	810	8.1	0.084	0.9	0.5	1.8	0.17
		204	3.3	680	6.7	0.084	0.9	0.6	1.8	0.17
		175	3.3	580	5.8	0.084	0.9	0.7	1.8	0.17
		153	3.3	510	5.1	0.084	0.9	0.8	1.8	0.17
		136	3.3	450	4.5	0.084	0.9	0.9	1.8	0.17
		123	3.3	400	4.0	0.084	0.9	1	1.8	0.17
Heron	*fish*	1,070	3.3	3,500	35	0.10	0.9	0.1	2.3	0.14
		537	3.3	1,800	18	0.10	0.9	0.2	2.3	0.14
		358	3.3	1,200	12	0.10	0.9	0.3	2.3	0.14
		268	3.3	890	8.9	0.10	0.9	0.4	2.3	0.14
		215	3.3	710	7.1	0.10	0.9	0.5	2.3	0.14
		179	3.3	590	5.9	0.10	0.9	0.6	2.3	0.14
		153	3.3	510	5.1	0.10	0.9	0.7	2.3	0.14
		134	3.3	440	4.4	0.10	0.9	0.8	2.3	0.14
		119	3.3	390	3.9	0.10	0.9	0.9	2.3	0.14
		107	3.3	350	3.5	0.10	0.9	1	2.3	0.14
Heron	*4 - forage fish and aquatic predators*[5]	221	16	3,500	35	0.10	0.9	0.1	2.3	0.14
		111	16	1,800	18	0.10	0.9	0.2	2.3	0.14
		73.8	16	1,200	12	0.10	0.9	0.3	2.3	0.14
		55.3	16	890	8.9	0.10	0.9	0.4	2.3	0.14
		44.3	16	710	7.1	0.10	0.9	0.5	2.3	0.14
		36.9	16	590	5.9	0.10	0.9	0.6	2.3	0.14
		31.6	16	510	5.1	0.10	0.9	0.7	2.3	0.14
		27.7	16	440	4.4	0.10	0.9	0.8	2.3	0.14
		24.6	16	390	3.9	0.10	0.9	0.9	2.3	0.14
		22.1	16	350	3.5	0.10	0.9	1	2.3	0.14

[1]Trophic levels according to ORNL 1994
[2]Ratio of $[PCB]_{lipid} : [PCB]_{organic\ carbon}$ (Macdonald *et al.* 1993)
[3]Assume 1 percent lipid in fish tissue
[4]Dry matter; calculated according to EPA 1993 equation 3-5
[5]Estimated according to Fordham and Regan (1992)

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Table N5-11

A. Summary of Mercury Distribution in OU5

	PCOC	Detection Frequency	Maximum Detected Concentration	Units
Surface Soil	yes	39/91 (43%)	0.66	mg/kg
Subsurface Soil	no	--	--	--
Groundwater	yes	5/17 (29%)	3.0	µg/L
Surface Water	no	--	--	--
dissolved	--	2/35 (6%)	1.0	µg/L
total	--	2/37 (5%)	0.10	µg/L
Stream Sediments	yes	1/8 (12%)	3.1	mg/kg
Pond Sediments	yes	6/6 (100%)	1.6	mg/kg
Fish	N/A	2/13 (15%)	0.47	mg/kg

N/A - not applicable

B. Summary of Mercury Distribution in OU6

	PCOC	Detection Frequency	Maximum Detected Concentration	Units
Surface Soil	yes	70/119 (41%)	0.30	mg/kg
Subsurface Soil	no	72/231 (31%)	0.90	--
Groundwater	yes	11/107(10%)	1.5	µg/L
Surface Water	no	--	--	--
dissolved	no	11/51 (22%)	0.60	µg/L
total	no	17/51 (33%)	1.5	µg/L
Stream Sediments	yes	1/8 (12%)	3.1	mg/kg
Pond Sediments	no	24/56 (43%)	1.5	mg/kg
Fish	N/A	8/12 (67%)	0.060	mg/kg

N/A - not applicable

Table N5-12

A. Chromium in Terrestrial Arthropod (TA) Samples from the OU2 Source Areas

Source Area (SA)	Location	Chemical	Result	Units	Qualifier	Detection Limit
903 Pad	MG09A2	Chromium	2.1	mg/kg		10
903 Pad SA Exp Pt Conc = 131 mg/kg (based on ratio of TA to soil in East Trenches SA)[1]						
East Trenches	MX07A2	Chromium	1.6	mg/kg	U	10
East Trenches	MX03A2	Chromium	2.3	mg/kg		10
East Trenches	MG07A2	Chromium	45	mg/kg	U[2]	10
East Trenches	MG07A2	Chromium	75	mg/kg		10
East Trenches SA Exp Pt Conc = 63.5 mg/kg (UCL_{95})						
Mound Area	no TA data avaliable					
Mound Area SA Exp Pt Conc = 62.8 mg/kg (based on ratio of TA to soil in East Trenches SA)[1]						

U - undetected; analyzed for but not detected
[1]Because adequate TA samples were not available, chromium concentrations were estimated from the ratio of chromium in TAs to chromium in surficial soil for the East Trenches SA.
[2]Contract Required Detection Limit check sample recovery criteria were not met.

B. Chromium in Surficial Soil Samples from the OU2 Source Areas

Source Area (SA)	Location	Chemical	Result	Units	Qualifier	Detection Limit
903 Pad	PT015	Chromium	5.40	mg/kg		2
903 Pad	PT028	Chromium	6.00	mg/kg		2
903 Pad	PT016	Chromium	6.70	mg/kg		2
903 Pad	PT034	Chromium	7.20	mg/kg		2
903 Pad	PT031	Chromium	8.60	mg/kg		2
903 Pad	PT037	Chromium	10.8	mg/kg		2
903 Pad	SS200693	Chromium	10.8	mg/kg		10
903 Pad	SS200493	Chromium	11.3	mg/kg		10
903 Pad	RA026	Chromium	13.5	mg/kg		2
903 Pad	SS200193	Chromium	26.0	mg/kg		10
903 Pad	SS200893	Chromium	29.5	mg/kg		10
881 Hillside/903 Pad	RA030	Chromium	10.0	mg/kg		2
881 Hillside/903 Pad	PT021	Chromium	10.1	mg/kg		2
881 Hillside/903 Pad	RA025	Chromium	11.1	mg/kg		2
881 Hillside/903 Pad	RA019	Chromium	12.8	mg/kg		2
881 Hillside/903 Pad	RA024	Chromium	13.5	mg/kg		2
881 Hillside/903 Pad	RA023	Chromium	14.9	mg/kg		2
881 Hillside/903 Pad	RA022	Chromium	15.5	mg/kg		2
881 Hillside/903 Pad	RA027	Chromium	17.4	mg/kg		2
881 Hillside/903 Pad	RA031	Chromium	77.0	mg/kg		2
881 Hillside/903 Pad	RA031	Chromium	80.5	mg/kg		2
903 Pad SA Exp Pt Conc = 26.8 mg/kg (UCL_{95})[1]						
East Trenches	PT076	Chromium	6.70	mg/kg		2
East Trenches	PT053	Chromium	9.20	mg/kg		2
East Trenches	PT074	Chromium	9.60	mg/kg		2
East Trenches	SS201193	Chromium	9.90	mg/kg		10
East Trenches	PT067	Chromium	10.2	mg/kg		2
East Trenches	PT079	Chromium	10.6	mg/kg		2
East Trenches	PT072	Chromium	11.9	mg/kg		2
East Trenches	SS200793	Chromium	13.0	mg/kg		2
East Trenches	SS201393	Chromium	14.2	mg/kg		10
East Trenches	SS201293	Chromium	15.3	mg/kg		10
East Trenches	SS200993	Chromium	15.5	mg/kg		2
East Trenches SA Exp Pt Conc = 13.0 mg/kg (UCL_{95})						
Mound Area	SS200393	Chromium	9.20	mg/kg		2
Mound Area	SS200293	Chromium	10.2	mg/kg		2
Mound Area SA Exp Pt Conc = 10.2 (maximum detected concentration)						

[1]The 903 Pad SA exposure point concentration includes samples within OU1 (881 Hillside)

Table N5-13
Summary of American Kestrel ECOCs in OU4/OU6 Surface and Subsurface Soils[1]

	OU6				Background	
	Concentration (mg/kg)				Concentration (mg/kg)	
	Mean	Standard Deviation	Mean Different from Background?	Number of Hits > $UTL_{99/99}$	Mean	Standard Deviation
Surface Soils						
Chromium	12	4.6	N	1/119	15	2.5
Lead	29	15	N	2/119	38	6.00
Mercury	0.10[2]	—	Y	0/119	0.10	—
Vanadium	33	11	N	1/119	32	6.00
Subsurface Soils						
Chromium	11	19	N	3/231	20	24
Lead	12	7.8	N	2/231	11	7.00
Mercury	0.10	0.10	N	0/231	0.30	0.60
Vanadium	23	12	N	1/231	32	29

[1]Source: Technical Memorandum No. 4, Human Health Risk Assessment, Walnut Creek Priority Drainage (Operable Unit No. 6)
[2]Detection limit
— - Standard deviation not calculated because of low detection frequency

Table N5-14
Summary of ECOC Concentrations in Small Mammals in the OU4/OU6 Area of the Upper Walnut Creek Watershed

	Chromium		Lead		Mercury		Vanadium	
Source Area	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
OU4 Downgradient	2.4	U	1.2	U	0.18	U	1.5	U
OU4 Downgradient	2.4	U	1.2	U	0.38		1.5	U
OU4 Downgradient	2.5	U	1.3	U	0.17	U	1.6	U
A-Ponds	2.4	U	1.1	U	0.17	U	1.5	U
A-Ponds	2.2	U	0.88	U	0.15	U	1.4	U
A-Ponds	2.3	U	1.1	U	0.18	U	1.5	U
A-Ponds	45		67		3.3	U	28	U
A-Ponds	31		27		1.9	U	20	U
A-Ponds	38		54		2.9	U	24	U
A-Ponds	8.5		6.4		0.64	U	7.1	
A-Ponds	82		200		2.5	U	22	U
A-Ponds	15		11		1.1	U	9.6	U
Soil Dump Areas	2.4	U	1.2	U	0.28		1.5	U
Soil Dump Areas	2.3	U	1.0	U	0.16	U	1.5	U
Soil Dump Areas	2.5	U	1.1	U	0.18	U	1.6	U
Soil Dump Areas	2.4	I	3.5	I	0.24		1.5	U
Soil Dump Areas	2.6	U	1.0	U	0.39		1.7	U
Soil Dump Areas	2.5	U	1.1	U	0.19	U	1.6	U
B-Ponds	2.2	U	1.0	U	0.22		1.4	U
B-Ponds	2.3	U	1.2	U	0.17	U	1.5	U
B-Ponds	2.4	U	0.91	U	0.48		1.5	U
B-Ponds	37		41		2.8	U	23	U
B-Ponds	21	I	30	I	1.6	U	14	U
B-Ponds	55	I	180	I	3.6	U	35	
B-Ponds	11	U	17	U	0.85	U	7.0	U
B-Ponds	65		92		3.6	U	34	U
B-Ponds	28		25		2.0	U	18	U
Minimum	2.2		0.88		0.15		1.4	
Mean[1]	17		28		1.1		9.8	
Maximum	82		200		3.6		35	
Standard Deviation	22		52		—		—	

[1]Means calculated by replacing non-detects (U-qualified) values with instrument detection limits
Q = Qualifier
blank = unqualified
U = analyzed for but not detected
I = interference

Table N5-15
Simulation of ECOC Uptake by American Kestrels Feeding in OU6

ECOC	ECOC Concentrations in Small Mammals in Upper Walnut Creek (mg/kg)				Site Use Factor	Small Mammal Ingestion Rate (kg/kg)	ECOC Intake Rate[1] (mg/kg bw/day)	TRV (mg/kg bw/day)	Probability of Exceeding TRV (%)	Probability of Exceeding Background Intake (%)
	Minimum	Mean	Standard Deviation	Maximum						
Site Intake										
Chromium	2.2	17	22	82	1.0	0.29	3.1	2.2	63	55
Lead	0.90	28	52	200	1.0	0.29	3.9	3.8	50	100
Background Intake										
Chromium	2.1	6.0	3.0	20	1.0	0.29	1.7	2.2	23%	NA
Lead	0.93	1.9	0.60	4.1	1.0	0.29	0.60	3.8	0%	NA

[1] Geometric mean from simulation data; simulation based on lognormal distribution of ECOC concentrations in small mammals.
NA - not applicable

Table N5-16
Subsurface Soil Toluene Concentrations Resulting in Estimated Burrow Air Concentrations ≥ Toxicity Reference Value

Sample Location	Sample Date	(µg/kg)	Qualifier
OU2 East Trenches			
06591	03/03/92	390	—
21893	05/25/93	400	—
06791	02/13/92	480	D
08791	02/21/92	550	D
06591	03/03/92	970	—
21893	05/25/93	2,000	—
OU2 903 Pad			
24093	08/16/93	400	—
10491	12/12/91	430	D
08291	01/22/92	480	D
10291	12/06/91	670	J
10191	12/03/91	1,100	J
10191	12/03/91	1,400	J
22493	04/28/93	2,800	—
22493	04/28/93	3,100	—
24793	08/09/93	7,600	J

Concentration resulting in estimated burrow air concentration ≥ Toxicity Reference Value = 388 µg/kg
Detection Frequency = 155/227
Proportion of Hits > TRV = .04
— - no qualifier (measured value)
D - Estimated value; identified in analysis at secondary dilution
J - Estimated value; data from mass spectophotometer indicate presence of compound but concentration below detection limit

Table N5-17
Subsurface Soil PCOCs with Hazard Quotients > 1 for Vegetation
Detection Frequencies and Variability Among Detected Concentrations

Source Area	Subsurface Soil PCOC	Detection Frequency	Number of Samples with Concentrations ≥TRV	UCL_{95} Concentration (mg/kg)	Maximum Detected Concentration (mg/kg)	Maximun Location	Standard Deviation
OU2 903 Pad	Zinc	114/114	45/114	58.9	200	65912	36.8
OU2 Mound Area	Zinc	11/11	7	69.8	99.1	21793	29.8
OU4 Downgradient	Nitrate/Nitrite	14/14	2	91.2	387	40593	106
	Zinc	14/14	8	68.8	115	40593	23.8
	Lead	14/14	1	66.6	278	40593	70.7
OU5 Ash Pits	Chromium	137/138	18	176	8,310	56893	706
	Nickel	132/138	13	109	4,750	56893	403
	Zinc	138/138	45	151	2,390	55993	317
	Silver	15/116[1]	10	14.7	311	55993	37.9
	Antimony	20/131[1]	54[2]	9.48	149	56893	15.1
	Copper	138/138	8	113	2,920	56393	299
	Lead	138/138	8	55.6	935	55993	125
	Cadmium	18/138	7	3.14	56.9	56393	7.51
OU5 Old Landfill	Copper	81/81	3	262	6,920	59493	770
	Zinc	81/81	35	102	673	59493	122
OU5 C-Ponds	Chromium	5/5	3	62	73.9	50292	26
	Zinc	5/5	2	55.3	58.2	51193	16
OU6 A-Ponds	Zinc	2/2	1	78.5	50.3	41091	7.50
OU6 Soil Dump Areas	Strontium	118/118	72	102	506	78492	78.7
	Zinc	81/81	19	51.1	706	73692	67.8
OU6 North Spray Field	Chromium	44/44	3	28.6	217	63192	34.5
	Zinc	44/44	5	50.4	287	63092	50.5
OU6 Burial Trenches	Strontium	52/53	23	96.2	264	68892	63.6
OU7 Downgradient Area	Nitrate/Nitrite	3/17[1]	1	3230	20,000	71093	4850
	Strontium	19/19	12	101	197	71093	35.0
	Zinc	19/19	17	73.8	99.2	70993	14.0

[1]Detection frequency < 50%
[2]TRV is lower than the detection limit
PCOC - Potential Chemical of Concern
TRV - Toxicity reference value
UCL95 - 95% upper confidence limit of the mean

Table N5-18
Radionuclide Concentrations in Soil vs. Small Mammal Tissue[1]
(pCi/g)

Source Area	Chemical	Surface Soil Concentrations[2]	Small Mammal Concentrations[2]
OU1 881 Hillside	Americium-241	2.61	0.0019
OU 2 903 Pad	Americium-241	41.2	0.061
OU5 Ash Pits	Americium-241	0.0235	0.0014
OU6 B-Ponds	Americium-241	0.270	0.0038
OU5 C-Ponds	Americium-241	2.09	0.0043
OU7 Downgradient Areas	Americium-241	0.0270	0.0030
OU2 East Trenches	Americium-241	10.2	0.0090
OU5 Old Landfill	Americium-241	0.0201	0.0014
OU4 Downgradient	Americium-241	0.133	0.0020
OU6 Soil Dump Areas	Americium-241	0.903	0.00079
Background	Americium-241	0.0235	0.00054
OU1 881 Hillside	Plutonium-239/240	10.8	0.012
OU 2 903 Pad	Plutonium-239/240	697	0.40
OU5 Ash Pits	Plutonium-239/240	0.0567	0.0050
OU6 B-Ponds	Plutonium-239/240	1.03	0.0084
OU5 C-Ponds	Plutonium-239/240	11.8	0.0074
OU7 Downgradient Areas	Plutonium-239/240	0.106	0.0070
OU2 East Trenches	Plutonium-239/240	45.7	0.032
OU5 Old Landfill	Plutonium-239/240	0.0597	0.0063
OU4 Downgradient	Plutonium-239/240	0.217	0.0010
OU6 Soil Dump Areas	Plutonium-239/240	1.77	0.0023
Background	Plutonium-239/240	0.0615	0.0014
OU5 Ash Pits	Uranium-233/234	8.03	0.041
OU6 B-Ponds	Uranium-233/234	1.00	0.046
OU7 Downgradient Areas	Uranium-233/234	0.893	0.024
OU5 Old Landfill	Uranium-233/234	126	0.028
OU4 Downgradient	Uranium-233/234	1.09	0.089
OU6 Soil Dump Areas	Uranium-233/234	2.17	0.071
Background	Uranium-233/234	1.20	0.033
OU1 881 Hillside	Uranium-238	1.37	0.26
OU 2 903 Pad	Uranium-238	2.54	0.11
OU5 Ash Pits	Uranium-238	30.7	0.063
OU6 B-Ponds	Uranium-238	1.10	0.031
OU5 C-Ponds	Uranium-238	1.30	0.15
OU7 Downgradient Areas	Uranium-238	0.939	0.015
OU2 East Trenches	Uranium-238	2.15	0.13
OU5 Old Landfill	Uranium-238	1670	0.022
OU4 Downgradient	Uranium-238	1.16	0.020
OU6 Soil Dump Areas	Uranium-238	1.06	0.030
Background	Uranium-238	1.25	0.086

[1]Omitted source areas do not have data for surface soil, small mammals, or both
[2]The lesser of the maximum detected concentration or the UCL_{95}

Table N5-19

Small Mammal Whole Body Dose Calculation and Comparison with Critical Dose Rate[1]

Receptor	Radionuclide	Sitewide Maximum Tissue Concentration (pCi/g)	dis/min-g	Effective Absorbed Dose (MeV/dis)	ergs/MeV	min/day	ergs/g-rad	Whole Body Dose (pCi/g)	Body Burden Required for Critical Dose Rate (pCi/g)[2]
Small Mammals	Plutonium-239/240	1.1	2.22	53	1.60E-06	1,440	100	2.98E-03	36.8
	Americium-241	0.16	2.22	57	1.60E-06	1,440	100	4.66E-04	34.3
	Uranium-233/234	0.11	2.22	49	1.60E-06	1,440	100	2.76E-04	39.9
	Uranium-238	0.26	2.22	43	1.60E-06	1,440	100	5.72E-04	45.5
							Total	**4.30E-03**	

[1]Calculated using first equation in Section 4.6.1

[2]Recommended dose rate by IAEA is 0.1 rad/day

Table N5-20
Estimated Accumulation of Radionuclides in Two Aquatic Feeding Birds After a Three-Year Exposure[4]

Species[1,2]	Maximum Sediment Concentration (pCi/g)	CR	Exposure Point C_f (pCi/g)	IR (kg/day)	Assimilation a (unitless)	Body Mass (kg)	Biological Half-life[3] (days)	k_e (1/day)	t (days)	Body Burden (pCi/g)	Body Burden Required for Critical Dose Rate[5] (pCi/g)
Americium-241 (Pond B-1)											
Mallard	389.4	0.0098	3.81	0.039	0.001	1.1	20,000	0.000035	1,095	1.45E-01	34.3
Great Blue Heron	389.4	0.0098	3.81	0.18	0.001	2.2	20,000	0.000035	1,095	3.35E-01	
Plutonium-239/240 (Pond B-2)											
Mallard	643.4	0.0054	3.47	0.039	0.001	1.1	65,000	0.000011	1,095	1.34E-01	36.8
Great Blue Heron	643.4	0.0054	3.47	0.18	0.001	2.2	65,000	0.000011	1,095	3.09E-01	
Uranium 233/234 (Pond B-1)											
Mallard	25.22	0.0237	0.598	0.039	0.001	1.1	100	0.00693	1,095	3.06E-03	39.9
Great Blue Heron	25.22	0.0237	0.598	0.18	0.001	2.2	100	0.00693	1,095	7.06E-03	
Uranium-238 (Pond B-1)											
Mallard	43.09	0.0221	0.952	0.039	0.001	1.1	100	0.00693	1,095	4.87E-03	45.5
Great Blue Heron	43.09	0.0221	0.952	0.18	0.001	2.2	100	0.00693	1,095	1.12E-02	

[1] Fish ingestion rate used for mallard exposure estimate due to lack of benthic macroinvertebrate data
[2] Fish ingestion rate used for great blue heron exposure estimate
[3] Values from Killough and McKay (1976)
[4] Calculated using the second equation from Section 4.6.1
[5] Recommended dose rate by IAEA is 0.1 rad/day

C_f Concentration in small mammals trapped at source areas
CR - Concentration ratio from sediments to benthic macroinvertebrates (mallard) and fish (great blue heron)
IR Ingesion rate, based on a site use factor (SUF) of 1.0
a - Asssimilation efficiency
k_e - coefficient of elimination
t - exposure duration (3 years)

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Table N5-21
Estimated Accumulation of Radionuclides in Three Terrestrial Predators After a Three-Year Exposure[4]

Receptor Species[1]	Exposure Point C_f[2] (pCi/g)	IR (kg/day)	Assimilation a (unitless)	Body Mass (kg)	Biological Half-life[3] (days)	k_e (1/day)	t (days)	Body Burden (pCi/g)	Body Burden Required for Critical Dose Rate[5] (pCi/g)
Americium-241 (903 Pad)									
Red-tailed Hawk	6.11E-02	0.098	0.001	1.1	20,000	3.47E-05	1,095	5.85E-03	
Coyote	6.11E-02	0.042	0.001	12	20,000	3.47E-05	1,095	2.30E-04	34.3
American Kestrel	6.11E-02	0.14	0.001	0.12	20,000	3.47E-05	1,095	7.66E-02	
Plutonium-239/240 (903 Pad)									
Red-tailed Hawk	3.97E-01	0.098	0.001	1.1	65,000	1.07E-05	1,095	3.85E-02	
Coyote	3.97E-01	0.042	0.001	12	65,000	1.07E-05	1,095	1.51E-03	36.8
American Kestrel	3.97E-01	0.14	0.001	0.12	65,000	1.07E-05	1,095	5.05E-01	
Uranium 233/234 (OU4 Downgradient)									
Red-tailed Hawk	8.90E-02	0.098	0.001	1.1	100	0.00693	1,095	1.14E-03	
Coyote	8.90E-02	0.042	0.001	12	100	0.00693	1,095	4.49E-05	39.9
American Kestrel	8.90E-02	0.29	0.001	0.12	100	0.00693	1,095	3.10E-02	
Uranium-238 (881 Hillside)									
Red-tailed Hawk	2.60E-01	0.098	0.001	1.1	100	0.00693	1,095	3.34E-03	
Coyote	2.60E-01	0.042	0.001	12	100	0.00693	1,095	1.31E-04	45.5
American Kestrel	2.60E-01	0.14	0.001	0.12	100	0.0069	1,095	4.37E-02	

[1] Small mammal ingestion rates used for red-tailed hawk, coyote, and American kestrel exposure estimate
[2] Source area with highest UCL_{95} for each radionuclide
[3] Values from Killough and McKay (1976)
[4] Calculated using the second equation from Section 4.6.1
[5] Recommended dose rate by IAEA is 0.1 rad/day

Cf - Concentration in small mammals trapped at source areas
IR - Ingesion rate, based on a site use factor (SUF) of 1.0
a - Asssimilation efficiency
Biological half-life -
k_e - coefficient of elimination
t - exposure duration (3 years)

N6. CONCLUSIONS

As described in Section N1, the Walnut Creek and Woman Creek ERAs were conducted to integrate results of RFI/RIs from several OUs and assess ecological risk for sources in each watershed. The ERA was performed using data available from abiotic investigations for each OU, biological data collected during RFI/RI field activities, and other data available from ongoing monitoring programs at RFETS.

The primary focus of the ERA was assessment of the potential toxicity of exposures to PCOCs. PCOCs are environmental contaminants identified as a result of sampling and analysis for each RFI/RI. This information was then used to identify chemicals for which exposure analysis was conducted. The analysis was conducted in two phases. A preliminary risk screen was performed for more than 150 PCOCs to identify the PCOCs that were present at potentially ecotoxic concentrations (Section N3). Screening-level assumptions were adopted to minimize the chance of underestimating risk from a given PCOC. The result of the preliminary risk screen was a list of chemicals, ECOCs, for which potential risk was identified.

The potential risk from exposure to ECOCs was further characterized for key receptor groups. The approach and methods for risk characterization were described in a problem formulation step (Section N4) designed to be consistent with EPA guidance on conducting ERAs (EPA 1994). However, in contrast to the EPA guidance, risk characterization was performed using existing data and toxicity information.

Risk characterization was largely conducted without the benefit of sampling and analysis specifically designed to evaluate effects of ECOCs. However, data were available on concentrations (activities) of metals, radionuclides, and certain organic chemicals (pesticides and PCBs) in aquatic and terrestrial biota in each OU. These data were reliable indicators of exposure and collected to evaluate exposure of upper level consumers to chemicals accumulated in forage or prey (Suter 1993). The main sources of uncertainty and risks to key ecological receptors are summarized in the following sections. Risks are also summarized by watershed, receptor group, ECOC, and ERA source areas in Tables N6-1 and N6-2.

N6.1 SUMMARY OF MAIN SOURCES OF UNCERTAINTY

Many sources of uncertainty are associated with ecological risk assessments or other environmental investigations. Suter *et al.* (1987) identify three main categories of uncertainty sources:

- The fundamentally stochastic (random) nature of the environment
- Incomplete knowledge of the system under study
- Uncertainty associated with execution of the study

The stochastic variability of nature can be quantified and characterized but not reduced, because it is a fundamental property of the system. Some aspects of ecological systems are predictable at some level but the components that are amenable to measurement often have a significant amount of random variability associated with them. Variability within a data set can be reduced by narrowing the scope of sampling to include items of similar qualities, such as collecting only female mice of a certain age and weight. However, the general applicability of the results is proportionately narrowed.

The second source of uncertainty refers to scientific ignorance of the system under study. This source is theoretically reducible, but only at the considerable cost of exhaustive sampling or experimental manipulation. The goal of the RFI/RI and associated risk assessments is not to eliminate uncertainty. Rather, the uncertainty should be characterized in a way that allows it to be used in making informed risk management decisions (EPA 1988a). This type of uncertainty has traditionally been countered by application of conservative assumptions, but this practice can lead to inconsistent estimation of risk, take accurate estimates of uncertainty out of the decision process, and generate "false positives" (Paustenbauch 1990). Nevertheless, assumptions were required in the exposure analyses and toxicity assessments (development of TRVs) because of lack of more accurate or site-specific information. Therefore, where needed, assumptions were conservative to ensure all exposure and risk estimates were biased in one direction and the chance of underestimating risk was minimized (EPA 1994).

The third source of uncertainty involves execution of data collection and analysis. This source of uncertainty includes inappropriate sampling locations, inaccurate or inconsistent sample collection methods, and data recording errors. This type of uncertainty should be addressed in quality assurance plans and site audits. Sampling for the RFETS ERAs was performed in accordance with standard operating procedures for collection of ecological data at the Rocky Flats Plant (EG&G 1994b), and field audits were conducted by independent EG&G and DOE contractors. As noted in Section N1, IAG schedules for individual RFI/RIs did not incorporate adequate time for identification of ECOCs prior to biological field investigations. Thus, data on specific effects of many ECOCs was not available.

Biological tissues samples were collected and analyzed for specific contaminants such as metals, radionuclides, and PCBs. Chemical concentrations in tissues are generally the most reliable indicator of exposure for chemicals, such as these, that are not rapidly metabolized (Suter 1993). The original IAG schedules also did not allow time to monitor natural variation of ecological communities over time. Such data are necessary to determine whether apparent contaminant effects on populations or communities are significant or are within natural variation. However, such data are rarely available for hazardous waste sites and ecological effects are extrapolated from surrogate measures or short-term, such as toxicity tests. Toxicity tests were conducted at RFETS for surface water and sediments but not for soils.

Specific sources of uncertainty, assumptions, and potential effects on interpretation of results are summarized in Table N6-3.

N6.2 SUMMARY OF RISKS TO AQUATIC LIFE

The preliminary risk screen was based on comparisons of chemical concentrations in sediments and surface water to TRVs derived from the literature or calculated using methods recommended by EPA (EPA 1992a). The screen identified several ECOCs in sediments but none for surface water. Sediment ECOCs included volatile and semivolatile organics, PCBs, and metals.

The magnitude of sediment HQ and HI values for some sites in Walnut Creek suggested a high level of toxicity to benthic organisms, especially in the A- and B-series ponds furthest upstream and

closest to the IA of RFETS. HQs exceeded 100 for some chemicals at these sites (Figure N5-5). PAHs were the main contributors to risk estimates at most sites in Walnut Creek, accounting for 90 percent or more of the HI in Ponds A-1 and B-1 (Figure N5-5). Risk estimates were much lower in the Woman Creek watershed where HIs were below 3; no HQ exceeded 2.6. PAHs were also main contributors to risk estimates in Woman Creek.

The risk levels predicted by the HQ and HI calculations were verified using results of sediment toxicity tests and site data on benthic community structure. If estimates of potential toxicity (i.e., TRVs) and exposures were relatively accurate, then the extremely wide range of HI and HQ values should correspond to varying levels of toxicity to test organisms and impacts on benthic communities. Physical stress such as fluctuating water levels and the presence of organisms in upper trophic levels (e.g., fish) represent confounding factors in this analysis. However, if toxicity is an important factor in controlling benthic community structure, then results should indicate some level of correlation between predicted toxicity (i.e., HIs or HQs) and level of impacts.

Correlations were evaluated using cluster analysis and regression methods. Cluster analyses (Ludwig and Reynolds 1988) were conducted to determine whether groups of sites with similar community composition (e.g., total organism density and species richness) also had similar HIs or HQs. Regression methods (Sokal and Rholf 1968) were used to estimate whether the proportion of variation in community structure could be explained by differences in HIs.

Results indicate that predicted toxicity accounts for some of the variation in community composition, but other factors are clearly important. Groups that were identified by cluster analysis based on density, richness, and pollution tolerance were not similar to those identified when the same analysis was conducted using HIs. However, HI did account for about 50 percent of the variation in rank order of ponds with respect to richness (Table N5-6). Results of sediment toxicity testing did not indicate significant toxicity in any of the ponds except Pond B-2, which did not have the highest HIs (Table N5-5).

These results suggest that although toxicity tests do not show robust toxicity, effects of sediment contamination may be manifested in the benthic community structure of the detention ponds. However, other factors such as size, fluctuating water levels, and the presence or absence of upper

trophic levels are also important. Potential toxicity of sediment contaminants, particularly PAHs, may be important factors in limiting aquatic communities if physical stress was reduced through a change in management of the ponds.

It should be noted that the ponds were constructed to minimize offsite transport of contaminants, especially radionuclides, in sediments and surface water. The presence of PAHs and metals in sediments are, in part, a result of runoff from industrial areas and input from the wastewater treatment plant. The fact that sediment contaminant concentrations decrease dramatically with distance downstream indicates that the ponds are effective in attenuating offsite transport of sediment-bound contaminants.

N6.3 SUMMARY OF RISKS TO AQUATIC-FEEDING BIRDS

Sediment contamination may also affect wildlife that feed in contaminated areas. ECOCs identified for aquatic-feeding wildlife included PCBs (Aroclor-1254), DBP, and mercury. Great blue herons and mallards were identified as representative receptors because birds are more sensitive to many contaminants than are mammals.

Aroclor-1254 was detected in sediments of the A- and B-series ponds with the highest concentrations in Ponds B-1 and B-2. Available data on PCB content of aquatic biota indicated negligible levels for birds feeding on fish, amphibians, or invertebrates from the ponds. However, biological tissue data were not available to evaluate the potential risk from all the ponds for which PCBs were detected in sediments. Therefore, site-specific data on uptake of PCBs by aquatic species were used to estimate the maximum concentration in sediments that would ultimately result in exposures of herons and mallards that are equal to or less than the TRV. Estimates were based on the organic carbon content of sediments and calculated for a range of levels of site use by the birds.

Risk estimates also accounted for the effects of food chain length on biomagnification. Accumulation of PCBs in upper level consumers is proportional to the length of the food chain through which PCBs are transferred from sediments to top consumers (Rassmussen *et al.* 1990). Calculations were made for two hypothetical food chains: (1) one in which a species such as fathead

minnows that feed primarily on zooplankton and algae is the primary prey of aquatic-feeding birds, and (2) one in which the main food source is a piscivorous species such as largemouth bass.

Results indicate that risks to herons or mallards are negligible if they feed on fish or invertebrates from lower trophic levels. However, herons may experience toxic exposures if they feed on upper level consumers from Ponds B-1, B-2, or B-3 more than about 40 percent of the time (Figure N5-12). The communities in these ponds currently lack the upper trophic levels, but possible future introduction of predaceous fish or other upper level consumers could result in increased exposure to aquatic birds feeding there. The sediment criteria calculated for evaluating risk can also be used by risk managers in making decisions concerning management of pond sediments.

N6.4 SUMMARY OF RISKS TO TERRESTRIAL-FEEDING RAPTORS

As noted in Section 4.3, chromium, lead, mercury, and vanadium were detected in terrestrial arthropods from OU2 and small mammals from OU4 and OU6 source areas (OU4/6 area) at concentrations that could be toxic to raptors feeding extensively in the areas. American kestrels were selected to represent raptors because they have relatively small home ranges and are known to breed at RFETS.

The preliminary risk estimate for chromium in terrestrial arthropods from OU2 was based on the maximum detected concentration from the East Trenches source area. Chromium concentrations in terrestrial arthropods from the 903 Pad area were estimated based on data from the East Trenches. Thus, data were inadequate to accurately estimate exposures. However, review of the OU2 data suggests that the maximum concentration was anomalously high and its use overestimates risk. The mean chromium concentration in OU2 soils was not elevated compared to background, and chromium was included in the PCOCs because of two samples that exceeded the background $UTL_{99/99}$. The OU2 source areas represent a small portion of the mesic and xeric mixed grassland habitat type at RFETS. Thus, exposure to chromium in OU2 does not appear to represent a significant ecological risk to kestrels given the low magnitude of the exposures, probable overestimate of exposure, and relatively small area involved.

Preliminary risk estimates indicated that chromium, lead, mercury, and vanadium could also present a risk to raptors feeding extensively in the areas around the A- and B-series ponds. Review of data revealed that vanadium and mercury were detected with low frequency and at relatively low concentrations and probably do not represent an ecological risk. However, chromium and mercury concentrations were consistently elevated in small mammal samples collected from the pond margins. The source of the elevated concentrations in small mammals is not clear because neither metal was consistently elevated in soils or dry sediments. They were both included in the PCOCs because of samples that exceeded the $UTL_{99/99}$ for soils and sediments. Few small mammals collected from sites further from the ponds contained detectable quantities of either metal.

Probabilistic exposure estimates indicate that kestrels feeding primarily on small mammals in the OU4/6 areas are likely to ingest chromium and lead at rates that exceed background intakes and TRVs. These estimates must be considered conservative because they assume that kestrels feed only on small mammals and small-mammal samples from the pond areas are probably over-represented in the data set. Further sampling would be required to more accurately evaluate exposures and identify the source of chromium and lead in small mammals.

N6.5 SUMMARY OF RISKS TO SMALL MAMMALS

Preliminary risk estimates indicated little risk to small mammals from ingestion of contaminants in RFETS source areas. Barium and selenium were identified as ECOCs in the (OU6) North Spray Field and OU7 Downgradient source areas, respectively. Both metals were detected at potentially ecotoxic concentrations in vegetation. Risk was evaluated for populations of more common species and individuals of PMJM, a species of special concern at RFETS.

Exposure to barium in the North Spray Field appears to represent little risk to small mammal populations at RFETS. The North Spray Field includes about 0.64 percent of the mesic mixed grassland habitat type in the Walnut Creek watershed and does not appear to contain any resources that are not common in other grassland areas of the site. Thus, a negligible proportion of populations of common grassland species are likely to be affected. However, this source area does include areas identified as potential habitat for PMJM and exposure of individuals of this species is of concern.

The HQ for barium ingestion from the site was 1.05. The TRV for barium was based on concentrations that produced hypertension in laboratory rats (Perry *et al.* 1983 as cited in Opresko *et al.* 1994). The concentration on which the NOAEL was based was the maximum dose in the study and did not affect growth or food or water consumption in experimental animals. Therefore, the level of risk associated with exceeding the TRV is unclear. Thus, the barium concentration in vegetation in this source area may produce some adverse effects in individual animals, but the potential for long-term effects on growth or reproduction is unclear, but appears to be minimal.

The source of selenium in vegetation from the OU7 Downgradient area is not clear. This area was not subject to spray evaporation of water from the landfill pond (DOE 1995e). The vegetation samples from the area may have included selenium accumulators (such as *Astragalus* sp.) that are common at RFETS. The area represents an insignificant proportion of the total mesic grassland habitat RFETS. However, the source area is located within areas identified as probable habitat for PMJM.

The TRV for selenium was based on intakes calculated for background areas of RFETS (0.317 mg/kg-day) because it exceeded the literature-based ecotoxicological benchmark (0.075 mg/kg-day). This suggests that small mammals inhabiting RFETS may be adapted to high-ambient concentrations of selenium that are common in semi-arid areas of the Rocky Mountain west. However, intakes from the OU7 area are more than twice those estimated for background areas and may represent a risk to individuals that spend all of their time there.

The presence of PMJM in the OU7 Downgradient area has not been confirmed. However, confirmed captures have been recorded for areas approximately 2.2 km to the east in riparian habitat along Walnut Creek. The OU7 Downgradient area does not include the well-developed riparian vegetation of these other areas; therefore, it is probably not critical habitat for the PMJM. However, it is possible that individuals dispersing from currently inhabited areas could contact vegetation and soils in the OU7 Downgradient area.

N6.6 SUMMARY OF RISKS TO VEGETATION COMMUNITIES

HQs for several inorganic contaminants and metals exceeded 1 in subsurface soils and sediments in various source areas. The highest HQ for soils was due to nitrates in the OU7 Downgradient area and for silver in sediments of the B-ponds. The risks associated with the PCOCs are uncertain. As noted previously, no obvious areas of vegetation stress were observed during field investigations. It is possible that concentrations for most ECOC metals in soils are within the range tolerated by plant species at RFETS. However, the potential phytotoxicity is not known because soil toxicity tests were not conducted during RFI/RIs.

TRVs were not available for most organic soil or sediment PCOCs. HQs were well below 1 for organic PCOCs for which TRVs were available. However, as with metals, the potential phytotoxicity of most organic PCOCs was not quantified with plant toxicity tests.

N6.7 SUMMARY OF RISKS FROM RADIONUCLIDES

Transuranic radionuclides were identified as PCOCs for most OUs. The ECOC screen indicated relatively few areas with radionuclide concentrations (activities) in soils that exceeded TRVs. Plutonium-239/240 and americium-241 concentrations in soils exceeded TRVs in two locations in the 903 Pad source areas, and uranium-233/234 and uranium-238 concentrations in soils of the Old Landfill exceeded TRVs at two locations. Radionuclides were also elevated in vegetation and small mammals collected from ERA source areas.

The potential risks from radionuclide uptake by biota were evaluated by calculating the internal radiological dose and comparing it to the TRV. The TRV was based on a benchmark value of 0.1 rad/day, which was identified by IAEA (1992) as protective of biological receptors. Results indicated that maximum radionuclide concentrations measured in small mammal resulted in dose rates at least 1,000 times less than the TRV. The potential uptake by predators was also evaluated and indicated that risks to predators were also not significant. Thus, although abiotic media and biota contain elevated concentrations of transuranic radionuclides, risks of adverse effects appear to be negligible.

Table N6-1
Summary of Ecological Risks for Walnut Creek Watershed

Receptor Group	ECOCs	ERA Source Area	Media/Exposure Point	Conclusions
Wide-Ranging Wildlife	None	Not Applicable	Not Applicable	The Tier 3 ECOC screen did not identify ECOCs.
Aquatic Life	Metals and Organics in Sediments	OU6 A-Ponds OU6 B-Ponds	Sediments	Risks are primarily due to PAHs in sediments. However, no toxicity was detected in sediment toxicity tests with *Hyalella azteca*. Importance of sediment contamination is unclear but does not appear to be the to be the primary factor controlling benthic community structure.
Aquatic-Feeding Birds	Aroclor-1254	OU6 A-Ponds OU6 B-Ponds	Pond Sediments	Aroclor-1254 concentrations in sediment exceeded risk-based criteria for ponds B-1, B-2, and B-3 only if top aquatic predators were present. Ponds currently do not support this type of community but could if pond management changed.
	Mercury	OU6 A-Ponds OU6 B-Ponds	Fish Tissue	Mercury was detected in 75% of fish from B-ponds. However, the maximum concentration was detected in B-5, which has the lowest contaminant content. The maximum HQ was 2. Mercury does not appear to represent risk to herons.
	Di-N-butyl phthalate	OU6 A-Ponds OU6 B-Ponds	Sediments	All samples with detectable DBP concentrations were "J" qualified. Only one sample corresponds to an HQ of 2; all other HQs are ≤ 1. DBP does not appear to represent risk to herons or mallards.
Terrestrial-Feeding Raptors	Chromium	OU2 903 Pad OU2 East Trenches	Terrestrial Arthropods	Mean chromium concentration in soils was not greater than the background mean. No clear contaminant source exists. Chromium is not a risk to the kestrel population at RFETS.
	Chromium, Lead	OU4 Downgradient OU6 A-Ponds OU6 B-Ponds	Small Mammals	Chromium and lead were elevated in small mammals from pond areas. The source is unclear because soils and sediments contain low levels. Risks are possible to individual birds feeding in the area, but effects to RFETS population are minimal.
	Mercury, Vanadium	OU4 Downgradient OU6 A-Ponds OU6 B-Ponds	Small Mammals	Mercury and vanadium were detected at low frequency and some concentrations were "J" qualified. Risks appear to be minimal.
Small Mammals	Plutonium-239/240 Americium-241	OU2 903 Pad OU2 East Trenches	Soils	Radionuclides do not present significant risk to terrestrial receptors. Maximum tissue concentrations do not result in dose rates that exceed the TRV (0.1 rad/day).
	Barium	OU6 North Spray Field	Vegetation	The barium HQ of 1.05 indicates that exposures are very close to the NOAEL. Risks to small mammal populations are negligible. Some individual jumping mice might be exposed, but adverse effects would be minimal.
	Selenium	OU7 Downgradient	Vegetation	Selenium exposure exists in a small area but includes habitat for jumping mouse. The source of selenium is not clear. Levels in vegetation were twice that of background. Possible adverse effects to individuals exist, but population effects were negligible due to the small area.
Vegetation	Metals and Organics	Most Source Areas	Soils, Sediments	Nitrates in OU7 and OU4, and silver in B-ponds have the highest risk estimates. However, ecological risk is unclear because vegetation in these areas does not appear stressed.

Table N6-2
Summary of Ecological Risks for Woman Creek Watershed

Receptor Group	ECOCs	ERA Source Area	Media/Exposure Point	Conclusions
Wide-Ranging Wildlife	None	Not Applicable	Not Applicable	The Tier 3 ECOC screen did not identify ECOCs .
Aquatic Life	Metals and organics in sediments	OU2 903 Pad OU5 C-Ponds OU5 Old Landfill	Sediments	Risks are primarily due to PAHs in sediments. However, no toxicity was detected in sediment toxicity tests with *Hyalella azteca*. The importance of sediment contamination is unclear but does not appear to be the primary factor controlling benthic community structure.
Aquatic-Feeding Birds	Aroclor-1254	OU5 C-Ponds	Sediments of SID	Aroclor-1254 concentrations in sediment did not exceed risk-based criteria developed for sediment at RFETS.
	Mercury	OU5 Old Landfill OU5 C-Ponds	Fish Tissue	Mercury was detected in 2 of 24 fish from C-ponds. Mercury was not detected in other fish. Risks are significant only if birds obtain all food from C-1.
	Antimony	OU5 Old Landfill	Sediments	The screening estimate assumes 100% site use. Actual use is much less because the stream supports a small fish population. Risks were not significant when adjusted for realistic site use factor.
Terrestrial-Feeding Raptors	Chromium	OU2 903 Pad OU2 East Trenches	Terrestrial Arthropods	The mean chromium concentration in soils was not greater than background mean. No clear contaminant source exists. Chromium was not a risk to the kestrel population at RFETS.
Small Mammals	Plutonium-239/240 Americium-241	OU2 903 Pad OU2 East Trenches	Soils	Radionuclides do not present significant risk to terrestrial receptors. Maximum tissue concentrations do not result in dose rates that exceed TRVs (0.1 rad/day).
	Uranium-233/234 Uranium-238	OU5 Old Landfill	Soils	See text for plutonium and americium conclusions.
Vegetation	Metals	Most Source Areas	Soils, Sediments	Soils of Ash Pits contained several metals with HQs >1. The highest HQ (7.9) was for chromium. Ecological risk to vegetation communities is minimal because each of the Ash Pits involves relatively small areas.
				Sediments of C-ponds contain mercury at concentrations that exceed TRVs for wetland vegetation. However, growth of vegetation in littoral zone appears normal.

Table N6-3

Sources of Uncertainty and Their Potential Effects on Results and Conclusions of the Walnut Creek and Woman Creek ERAs

Source	Effect	Remark
Toxicity Assessment		
1. Lack of specific toxicity information for exposure of Rocky Flats species to COCs	May over- or underestimate critical effects concentrations	This is especially important in assessment of potential toxicity to vegetation and exposure of small mammals to burrow air. Toxicity information is also lacking for other receptors/chemicals. Exposures for all PCOCs were calculated and presented.
2. Variable endpoints used to set TRVs	Inconsistent estimate of effects	Toxicity information was derived from open literature; standardized tests were not generally available for non-aquatic
3. Use most sensitive species in literature to set TRV	May over- or underestimate critical effects concentrations	Data for most sensitive species were used to protect greater number of species.
4. Estimation of NOEL from other data	May over- or underestimate critical effects concentrations	NOELs are derived from LOELs by dividing by 10. This is probably conservative since NOELs are not usually 0.1 of
Exposure Assessment		
1. Number of samples may not be adequate to estimate exposure	May over- or underestimate exposure if data are not representative of true condition	UCL_{95} or maximum concentration was used to estimate exposure. Conservative assumptions were used in estimating uptake of organic chemicals by aquatic and terrestrial biota to minimize chance of underestimating risk.
2. Use data from all soil depths to estimate vegetation and burrow air exposures	May overestimate exposure if highest concentrations are from depths not accessible by roots or small mammals	Depth information was not uniformly available for subsurface soil (borehole samples) data.
3. Tissue analytes identified before contaminants known	Data on chemicals concentration in biological tissue not available for some	BCFs and transfer coefficients from the literature were used in modeling uptake of some COCs.
4. Abiotic sampling not designed specifically for ecological risk assessment	Data on chemical concentrations in abiotic media may not represent true exposure point concentrations	The exposure assessment adopted a screening level approach that is based on conservative assumptions and is designed to minimize chance of underestimating exposures.
5. Assume all portions of source areas used equally	May over- or underestimate exposure for a given point in source area	Source area boundaries were chosen to include all potentially contaminated areas. UCL_{95} or maximum concentrations were used in exposure estimates to yield conservative exposure estimates.
6. Assume all chemicals in abiotic and biotic sample are bioavailable	May overestimate exposure to radionuclides and metals	Not all contaminants taken up are assimilated. This is especially true for metals which form significant portions of natural rock
7. Assume equilibrium between VOCs in soil and burrow air	May overestimate concentration of VOCs in burrow air	Burrows are usually not closed systems. Therefore, diluting effect of exchange with ambient air not included in exposure

Table N6-3

Sources of Uncertainty and Their Potential Effects on Results and Conclusions of the Walnut Creek and Woman Creek ERAs

Source	Effect	Remark
8. Assignment of frequency distributions in simulation modeling	May over- or underestimate probability of exceeding critical value	Mean values are probably not affected, but values in "tails" of distribution may be over- or under-represented.
9. Use of mean ingestion rates, body weights, and home range sizes in simulation modeling	May over- or underestimate probability of exceeding critical value	Means were used because data from literature were not amenable to statistical analysis.
Effects Assessment		
1. Quality of water and sediment toxicity tests	Lack of confidence in test results	Prescribed temperature and survival of organisms in controls were not met in some tests.
2. Phytotoxicity tests not conducted	Importance of PCOC concentrations exceeding TRVs for vegetation is unvalidated	No obvious areas of vegetative stress were observed during field investigations. Some areas with weedy species may indicate stress to community from physical disturbance and may mask chemical stress.
3. Tissue concentrations or biomarkers not available for some ECOCs	Estimates of exposure and effects uncertain	Specific measures of sublethal physiological stress are needed to evaluate effects of compounds such as PAHs.
4. Tissue concentrations not available for upper level vertebrate consumers	No direct measure of exposure	Conventional methods were supplemented by site-specific data on uptake ratios used to estimate uptake.

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Attachment 1
Exposure Parameters

Attachment 1
Table 1
Bioconcentration Factors

Analyte	Log K_{ow} [1]	Water Solubility	Invertebrate Bioconcentration Factor	Fish Bioconcentration Factor	Source 1	Source 2
Metals						
Aluminum	NA	NA	231	231	ORNL	—
Antimony	NA	NA	1	1	ORNL	—
Arsenic	NA	NA	17	17	ORNL	—
Barium	NA	NA	NA	NA	—	—
Beryllium	NA	NA	19	19	ORNL	—
Cadmium	NA	NA	12,400	12,400	ORNL	—
Chromium (VI)	NA	NA	3	3	ORNL	—
Cobalt	NA	NA	NA	NA	—	—
Copper	NA	NA	290	290	ORNL	—
Lead	NA	NA	45	45	ORNL	—
Lithium	NA	NA	NA	NA	—	—
Manganese	NA	NA	NA	NA	—	—
Mercury	NA	NA	4,300	4,300	AQUIRE	—
Molybdenum	NA	NA	NA	NA	—	—
Nickel	NA	NA	106	106	ORNL	—
Selenium	NA	NA	322	322	AQUIRE	—
Silicon	NA	NA	NA	NA	—	—
Silver	NA	NA	240	1	AWQC for Ag EPA 1980	—
Strontium	NA	NA	100	5	Killough & McKay, estimated from Sr-89	—
Thallium	NA	NA	34	34	ORNL	—
Tin	NA	NA	2,600	2,600	Eisler 1989	—
Vanadium	NA	NA	NA	NA	—	—
Zinc	NA	NA	966	966	ORNL	—
Pesticides, Herbicides, and PCBs						
4,4-DDT	NA	NA	NA	40,142.10	ORNL	—
Aldrin	5.52	NA	NA	9,229.96	Knox, Sabatini & Canter 1993	ORNL estimation
Aroclor-1248	NA	NA	NA	30,338.90	ORNL	—
Aroclor-1254	NA	NA	NA	51,286.10	ORNL	—
Aroclor-1260	NA	NA	NA	660,000	Clemson	Toxicological Profile for Selected PCBs. U.S. Department of Health and Human Services, TP-92/16, 1993.
delta-BHC	NA	NA	NA	6,391.46	ORNL	mixed isomers
Dieldrin	NA	NA	NA	1,720.28	ORNL	—
Endosulfan sulfate	3.66	NA	NA	354.8	Clemson	ORNL estimation
Endrin ketone	NA	NA	NA	NA	—	—
Heptachlor	NA	NA	NA	1,035.62	ORNL	—
Heptachlor epoxide	5.4	NA	NA	7,481.70	Clemson	ORNL estimation
Isophorone	1.67	NA	NA	10.94	Knox, Sabatini & Canter 1993	ORNL estimation
gamma-BHC (Lindane)	NA	NA	NA	395.55	ORNL	—
Methoxychlor	4.4	NA	NA	1,300.17	Knox, Sabatini & Canter 1993	ORNL estimation
Radionuclides						
Americium-241	NA	NA	1,000	25	Killough and McKay 1967	—
Cesium-134	NA	NA	5,000	2,800	Higley and Kuperman 1995 (midpoint of range)	—
Cesium-137	NA	NA	5,000	2,800	Higley and Kuperman 1995 (midpoint of range)	—
Plutonium-238	NA	NA	875	120	Higley and Kuperman 1995 (midpoint of range)	—
Plutonium-239/240	NA	NA	875	120	Higley and Kuperman 1995 (midpoint of range)	—
Radium-226	NA	NA	3,000	1,940	Higley and Kuperman 1995 (midpoint of range)	—

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Bioconcentration Factors

Analyte	Log K_{ow} [1]	Water Solubility	Invertebrate Bioconcentration Factor	Fish Bioconcentration Factor	Source 1	Source 2
Radium-228	NA	NA	3,000	1,940	Higley and Kuperman 1995 (midpoint of range)	—
Strontium-89/90	NA	NA	200	1,204	Higley and Kuperman 1995 (midpoint of range)	—
Tritium	NA	NA	0.9	0.9	Higley and Kuperman 1995 (midpoint of range)	—
Uranium-233/234	NA	NA	16	7.5	Higley and Kuperman 1995 (midpoint of range)	—
Uranium-235	NA	NA	16	7.5	Higley and Kuperman 1995 (midpoint of range)	—
Uranium-238	NA	NA	16	7.5	Higley and Kuperman 1995 (midpoint of range)	—
Semivolatile Organic Compounds						
1,2,4-Trichlorobenzene	4.11	NA	NA	782.71	Knox, Sabatini & Canter 1993	ORNL estimation
1,2-Dichloroethane	NA	NA	NA	7.85	ORNL	—
1,4-Dichlorobenzene	NA	NA	NA	37.50	Clemson	Ambient water quality criteria for dichlorobenzene. EPA440/5-80-039.
2-Chlorophenol	NA	NA	NA	134.00	Clemson	EPA440/5-80-034.
2-Methylphenol (o-cresol)	NA	NA	NA	17.86	ORNL	—
2-Methylnaphthalene	4.11	NA	NA	782.71	Knox, Sabatini & Canter 1993	ORNL estimation
2,4-Dimethylphenol	2.42	NA	NA	40.66	Knox, Sabatini & Canter 1994	ORNL estimation
4-Methylphenol (p-cresol)	1.97	NA	NA	18.50	Clemson	ORNL estimation
4-Nitroanaline	1.37	0.8 g/l	NA	16.10	Clemson	ORNL formula
Acenaphthene	NA	NA	NA	119.00	Clemson	Ambient Water Quality for PAHs EPA 440/5-80-069. 1980.
Acenaphthylene	4.07	NA	NA	729.79	Knox, Sabatini & Canter 1993	ORNL estimation
Anthracene	NA	NA	NA	478.00	Clemson	Ambient Water Quality for PAHs EPA 440/5-80-069. 1980.
Benzo(a)anthracene	NA	NA	NA	4,620.00	Clemson	Ambient Water Quality for PAHs EPA 440/5-80-069. 1980.
Benzo(a)pyrene	NA	NA	NA	25,468.30	ORNL	—
Benzo(b)fluoranthene	NA	NA	NA	11,100.00	Clemson	Ambient Water Quality for PAHs EPA 440/5-80-069. 1980.
Benzo(ghi)perylene	7.1	NA	NA	146,554.78	Knox, Sabatini & Canter 1993	ORNL estimation
Benzo(k)fluoranthene	NA	NA	NA	11,100.00	Clemson	Ambient Water Quality for PAHs EPA 440/5-80-069. 1980.
Benzoic acid	1.88	NA	NA	15.81	Knox, Sabatini & Canter 1993	ORNL estimation
Benzyl alcohol	1.1	NA	NA	4.04	Knox, Sabatini & Canter 1994	ORNL estimation
Bis(2-chloroisopropyl)ether	2.58	NA	NA	53.80	Knox, Sabatini & Canter 1995	ORNL estimation
Bis(2-ethylhexyl)phthalate	NA	NA	NA	4,504.00	ORNL	—
Butyl benzyl phthalate	NA	NA	NA	414.00	Clemson	Ambient Water Quality for Phthalate esters. EPA 440/5-80-067. 1980.
Chrysene	NA	NA	NA	4,620.00	Clemson	Ambient Water Quality for PAHs EPA 440/5-80-069. 1980.
Di-N-butyl phthalate	NA	NA	NA	810.59	ORNL	—
Di-N-octyl phthalate	NA	NA	NA	130.00	Clemson	Ambient Water Quality for Phthalate esters. EPA 440/5-80-067. 1980.
Dibenzo(ah)anthracene	6.36	NA	NA	40,142.09	Knox, Sabatini & Canter 1993	ORNL estimation
Dibenzofuran	4.17	NA	NA	869.36	ORNL	ORNL estimation
Diethyl phthalate	NA	NA	NA	44.38	ORNL	—
Fluoranthene	NA	NA	NA	1,150.00	Clemson	Ambient Water Quality for PAHs EPA 440/5-80-069. 1980.
Fluorene	NA	NA	NA	282.00	Clemson	Ambient Water Quality for PAHs EPA 440/5-80-069. 1980.
Hexachlorobutadiene	NA	NA	NA	2.78	Clemson	Ambient Water Quality Criteria for Hexachlorobutadiene. EPA 440/5-80-053. 1980.

Attachment 1
Table 1
Bioconcentration Factors

Analyte	Log K_{ow}[1]	Water Solubility	Invertebrate Bioconcentration Factor	Fish Bioconcentration Factor	Source 1	Source 2
Hexachloroethane	3.58	NA	NA	309.60	Knox, Sabatini & Canter 1995	ORNL estimation
Indeno(1,2,3-cd)pyrene	7.7	NA	NA	418,793.57	Knox, Sabatini & Canter 1993	ORNL estimation
N-Nitrosodiphenylamine	2.85	NA	NA	86.30	Clemson	ORNL estimation
Napthalene	3.36	NA	NA	210.67	Knox, Sabatini & Canter 1994	ORNL estimation
Pentachlorophenol	5.01	NA	NA	3,781.00	Clemson	ORNL estimation
Phenanthrene	NA	NA	NA	486.00	Clemson	Ambient Water Quality for PAHs EPA 440/5-80-069. 1980.
Phenol	1.5	NA	NA	8.13	Clemson	ORNL estimation
Pyrene	NA	NA	NA	1,100.00	Clemson	Ambient Water Quality for PAHs EPA 440/5-80-069. 1980.
Volatile Organic Compounds						
1,1-Dichloroethane	1.79	NA	NA	13.50	Knox, Sabatini & Canter 1993	ORNL estimation
1,1,1-Trichloroethane	NA	NA	NA	45.96	ORNL	—
1,1,2,2-Tetrachlorethane	2.56	NA	NA	51.95	Knox, Sabatini & Canter 1993	ORNL estimation
1,1-Dichloroethene	NA	NA	NA	24.48	ORNL	—
1,2-Dichloroethane	1.48	NA	NA	7.58	Clemson	ORNL estimation
1,2-Dichloroethene	NA	NA	NA	15.26	ORNL	—
1,3-Dichloropropene	1.41	NA	NA	6.94	Knox, Sabatini & Canter 1993	ORNL estimation
2-Butanone	0.28	NA	NA	0.96	Knox, Sabatini & Canter 1993	ORNL estimation
2-Chloroethyl vinyl ether	1.28	6 g/l	NA	4.57	Clemson	ORNL estimation
4-Methyl-2-pentanone	NA	NA	NA	4.72	ORNL	—
Acetone	NA	NA	NA	0.39	ORNL	—
Benzene	NA	NA	NA	24.48	ORNL	—
Carbon disulfide	2	NA	NA	19.50	Clemson	ORNL estimation
Carbon tetrachloride	NA	NA	NA	83.30	ORNL	—
Chloroethane	1.43	NA	NA	7.19	Knox, Sabatini & Canter 1993	ORNL estimation
Chloromethane	NA	NA	NA	NA	NA	—
Chlorobenzene	2.84	NA	NA	84.80	Knox, Sabatini & Canter 1993	ORNL estimation
Chloroform	2	NA	NA	18.50	ORNL	Clemson
1,3-Dichloropropane[2]	2.28	NA	NA	31.83	Knox, Sabatini & Canter 1993	ORNL estimation
Ethyl benzene	3.13	NA	NA	140.86	Knox, Sabatini & Canter 1993	ORNL estimation
Methylene chloride	NA	NA	NA	5.25	ORNL	—
Styrene	3.16	0.31 g/l	NA	24.30	Clemson	ORNL estimation
Tetrachloroethene	3.4	NA	NA	225.94	Clemson	ORNL estimation
Toluene	NA	NA	NA	69.95	ORNL	—
Total xylenes	NA	NA	NA	159.22	ORNL	—
trans-1,2-Dichloroethene	2.06	NA	NA	21.66	Clemson	ORNL estimation
Trichloroethene	NA	NA	NA	40.66	ORNL	—
Vinyl acetate	0.73	NA	NA	2.11	Knox, Sabatini & Canter 1993	ORNL estimation
Vinyl chloride	NA	NA	NA	6.36	ORNL	—
Water Quality Parameters						
Cyanide	NA	NA	NA	NA	ORNL	—
Nitrate	NA	NA	NA	NA	—	—
Nitrite	NA	NA	NA	NA	—	—

[1]Log K_{ow}s are from Hull and Suter (1994) or Knox, Sabatini and Canter (1993)

[2]Used 1,2-Dichloropropane

Fish BCFs were used for invertebrate BCFs where no invertebrate BCFs were available.

Calculated BCFs used one of two equations: $\log BCF = 0.76 \log K_{ow}$

$\log BCF = 2.791 - 0.564 \times \log(\text{water solubility})$

NA - not applicable

ORNL - Opresko *et al.* 1994

AQUIRE - Aquatic Information Retrieval from EPA

Attachment 1
Table 2
Octanol Water Partition Coefficients (log K_{ow})
and Transfer Coefficients (B Factors)
Used to Estimate Vegetation Exposure Point Concentrations

Analyte	Group	log K_{ow}[1]	B Factor
4,4'-DDT	P	6.19	0.010237172
Aldrin	P	5.52	0.024971234
alpha-BHC	P	3.77	0.256412976
Aroclor-1248	P	6.11	0.01138728
Aroclor-1254	P	6.47	0.00705245
Aroclor-1260	P	6.91	0.00392663
delta-BHC	P	4.14	0.15670397
Dieldrin	P	4.53	0.093252396
Endosulfan sulfate	P	3.66	0.296838344
Endrin ketone	P	NA	NA
gamma-BHC (Lindane)	P	3.7	0.281449188
Heptachlor	P	4.4	0.110866414
Heptachlor epoxide	P	3.65	0.300815354
Methoxychlor	P	4.4	0.110866414
1,2,3-Trichlorobenzene	S	NA	NA
1,2,4-Trichlorobenzene	S	4.11	0.163087246
1,2,4-Trimethylbenzene	S	NA	NA
1,2-Dibromo-3-chloropropane	S	NA	NA
1,3,5-Trimethylbenzene	S	NA	NA
1,3-Dichlorobenzene	S	3.38	0.430883635
1,4-Dichlorobenzene	S	3.39	0.425187022
2-Chlorophenol	S	2.15	2.214623989
2-Methylnaphthalene	S	4.11	0.163087246
2-Methylphenol	S	1.93	2.96797337
4-Methylphenol	S	1.92	3.007737981
4-Nitroaniline	S	1.39	6.089477077
Acenaphthene	S	4.13	0.158803474
Acenaphthylene	S	4.07	0.172004576
Anthracene	S	4.45	0.103728954
Benzo(a)anthracene	S	5.9	0.015059134
Benzo(a)pyrene	S	6	0.013182567
Benzo(b)fluoranthene	S	6.57	0.006173622
Benzo(ghi)perylene	S	7.1	0.003049299
Benzo(k)fluoranthene	S	6.85	0.004253045
Benzoic acid	S	1.88	3.172195904
Benzyl alcohol	S	1.1	8.957771912
Bis(2-chloroisopropyl)ether	S	2.58	1.249568302
Bis(2-ethylhexyl)phthalate	S	4.65	0.079487713
Butyl benzyl phthalate	S	4.78	0.066859019
Chrysene	S	5.61	0.02215236
Di-N-butyl phthalate	S	4.57	0.08841786
Di-N-octyl phthalate	S	9.2	0.00018638
Dibenzo(ah)anthracene	S	6.36	0.00816432
Dibenzofuran	S	4.17	0.150570537
Diethyl phthalate	S	2.35	1.697070952

Attachment 1
Table 2
Octanol Water Partition Coefficients (log K_{ow})
and Transfer Coefficients (B Factors)
Used to Estimate Vegetation Exposure Point Concentrations

Analyte	Group	log K_{ow}[1]	B Factor
Fluoranthene	S	5.22	0.037225454
Fluorene	S	4.18	0.148579879
Hexachlorobutadiene	S	4.78	0.066859019
Hexachloroethane	S	3.58	0.330187023
Indeno(1,2,3-cd)pyrene	S	7.7	0.001372145
Isophorone	S	1.67	4.195077612
N-Nitrosodiphenylamine	S	3.13	0.600979973
Naphthalene	S	3.36	0.442506852
o-Chlorotoluene	S	NA	NA
p-Chlorotoluene	S	NA	NA
Pentachlorophenol	S	5.01	0.049228885
Phenanthrene	S	4.52	0.094501782
Phenol	S	1.46	5.547789829
Pyrene	S	5.09	0.044256799
1,1,1,2-Tetrachloroethane	V	NA	NA
1,1,1-Trichloroethane	V	2.47	1.446571818
1,1,2,2-Tetrachloroethane	V	2.56	1.283275787
1,1,2-Trichloroethane	V	2.18	2.127943046
1,1-Dichloroethane	V	1.79	3.575855824
1,1-Dichloroethene	V	1.84	3.345646102
1,1-Dichloropropene	V	NA	NA
1,2,3-Trichloropropane	V	NA	NA
1,2-Dibromoethane	V	NA	NA
1,2-Dichloroethane	V	1.48	5.402067419
1,2-Dichloropropane	V	2.28	1.862773281
1,3-Dichloropropane	V	NA	NA
2-Butanone	V	0.28	26.67841353
2-Chloroethyl vinyl ether	V	1.28	7.049527353
2-Hexanone	V	1.38	6.171063282
4-Methyl-2-pentanone	V	1.09	9.077787245
Acetone	V	-0.24	53.29911526
Benzene	V	2.12	2.304835848
Bromobenzene	V	NA	NA
Bromochloromethane	V	NA	NA
Bromodichloromethane	V	1.88	3.172195904
Bromoform	V	2.34	1.719808139
Bromomethane	V	1.1	8.957771912
Carbon disulfide	V	2	2.703958364
Carbon tetrachloride	V	2.78	0.95754678
Chlorobenzene	V	2.84	0.884056456
Chloroethane	V	1.43	5.773776918
Chloroform	V	1.9	3.088872627
Chloromethane	V	0.9	11.68960941
cis-1,2-Dichloroethene[2]	V	1.9	3.088872627
cis-1,3-Dichloropropene	V	1.41	5.929526304

Attachment 1
Table 2
Octanol Water Partition Coefficients (log K_{ow})
and Transfer Coefficients (B Factors)
Used to Estimate Vegetation Exposure Point Concentrations

Analyte	Group	log K_{ow}[1]	B Factor
Dibromochloromethane	V	2.08	2.430860295
Dibromomethane	V	NA	NA
Dichlorodifluoromethane	V	2.16	2.185344956
Ethylbenzene	V	3.13	0.600979973
m+p-Xylene[3]	V	3.19	0.554855634
m-Xylene	V	3.2	0.547520015
Methylene chloride	V	1.3	6.864359179
N-Butylbenzene	V	NA	NA
o-Xylene	V	2.95	0.763659924
p-Cymene	V	NA	NA
p-Xylene	V	3.18	0.562289534
sec-Butylbenzene	V	NA	NA
Styrene	V	3.16	0.577457465
tert-Butylbenzene	V	NA	NA
Tetrachloroethene	V	3.6	0.321514082
Toluene	V	2.65	1.138413402
Total xylenes (metals)	V	3.2	0.547520015
trans-1,2-Dichloroethene	V	2.09	2.398722451
trans-1,3-Dichloropropene	V	1.41	5.929526304
Trichloroethene	V	2.53	1.335549534
Trichlorofluoromethane	V	2.53	1.335549534
Vinyl acetate	V	0.73	14.65750328
Vinyl chloride	V	0.6	17.4260919
2,4-Dimethylphenol		2.42	1.546108615

[1]Log K_{ow} are from Hull and Suter (1994) or Knox, Sabatini, and Canter (1993).
[2]Log K_{ow} is the average of the cis and trans isomers.
[3]Log K_{ow} is the average for both isomers.
NA - not applicable

Attachment 1
Table 3
Soil Ingestion Rates[1]

Receptor	Reference Species[2]	Proportion of Soil in Diet[3] (dry weight)	Total Dietary Ingestion Rate (kg/kg/day)	Soil Ingestion Rate (kg/kg/day)
Preble's Meadow Jumping Mouse	Meadow Vole	0.024	0.17	0.004
American Kestrel	Red Fox	0.028	0.29	0.008
Great Blue Heron	Blue-winged Teal	0.02	0.18	0.004
Mallard	Mallard	0.02	0.052	0.001
Coyote	Red Fox	0.028	0.047	0.001
Mule Deer	Meadow Vole	0.024	0.022	0.001
Red-tailed Hawk	Red Fox	0.028	0.098	0.003

[1]Soil ingestion rates were estimated by multiplying the proportion of soil in the diet (EPA 1993) by the total dietary ingestion rate (DOE 1995b).
[2]Where data for receptor species were not available, information on the proportion of soil in the diet of similar "reference" species was used to calculate soil ingestion rates.
[3]Proportions reported at less than a value (i.e., <.02) were considered equal to that value for soil ingestion rate calculations.

Attachment 1
Table 4
Land Area and Length of Streams and Ditches Contained Within Source Areas

Source Area	Area (hectares)	Length of Streams and Ditches Within Source Area (meters)
OU1 881 Hillside	22.303	1,633.339
OU2 903 Pad	27.605	833.372
OU2 East Trenches	39.861	—
OU2 Mound Area	2.256	—
OU4 Downgradient	6.370	400.373
OU5 Ash Pits	19.080	788.141
OU5 C-Ponds	12.759	1,453.193
OU5 Old Landfill	13.532	1,206.800
OU5 Surface Disturbance	1.660	—
OU6 A-Ponds	12.828	1,135.220
OU6 B-Ponds	8.473	816.220
OU6 Burial Trenches	1.040	—
OU6 North Spray Field	4.397	—
OU6 Soil Dump Areas	18.038	—
OU7 Downgradient Areas	2.764	—
OU10 Other Outside Closures	2.690	—
OU11 West Spray Field	45.953	—

Attachment 1
Table 5
Area and Perimeter of Ponds in RFETS and Vicinity

Lake/Pond	Area (hectares)	Perimeter (meters)
Pond A-1	0.365	266.084
Pond A-2	0.570	375.458
Pond A-3	1.142	562.765
Pond A-4	1.086	763.180
Pond A-5	0.144	378.146
Total A1-5	**3.307**	**2,345.633**
Pond B-1	0.106	141.962
Pond B-2	0.314	275.341
Pond B-3	0.171	188.351
Pond B-4	0.109	153.510
Pond B-5	0.875	550.526
Total B1-5	**1.575**	**1,309.690**
Pond C-1	0.316	266.321
Pond C-2	1.560	762.370
Total C1-2	**1.876**	**1,028.691**
Pond D-1	1.259	485.497
Pond D-2	2.421	619.755
Total D1-2	**3.680**	**1,105.252**
OU7 Landfill Pond	0.962	534.575
Rocky Flats Lake	15.546	1,522.708

Attachment 1
Table 6
Site Use Factor Calculations for American Kestrel

Source Area	Ponds Within Home Range of Source Area[1]	Area of Ponds Within Home Range of Source Area[1] (hectares)	Home Range Minus Ponds[2] (hectares)	Source Area Minus Ponds[3] (hectares)	Food SUF	Soil SUF
OU1 881 Hillside	C-1	0.316	37.684	22.303	0.592	0.027
OU2 903 Pad	C-1	0.316	37.684	27.605	0.733	0.027
OU2 East Trenches	B1-4	NA	NA	39.861	1.000	1.000
OU2 Mound Area	B-1	0.106	37.894	2.256	0.060	0.027
OU4 Downgradient	A1-2	0.935	37.065	6.370	0.172	0.027
OU5 Ash Pits	None	0.000	38.000	19.080	0.502	0.026
OU5 C Ponds	C1-2	1.876	36.124	10.883	0.301	0.028
OU5 Old Landfill	None	0.000	38.000	13.532	0.356	0.026
OU5 Surface Disturbance	C-1	0.316	37.684	1.660	0.044	0.027
OU6 A Ponds	A1-5, B1-5	4.882	33.118	9.521	0.287	0.030
OU6 B Ponds	A1-5, B1-5	4.882	33.118	6.898	0.208	0.030
OU6 Burial Trenches	Landfill	0.962	37.038	1.040	0.028	0.027
OU6 North Spray Field	Landfill	0.962	37.038	4.397	0.119	0.027
OU6 Soil Dump Areas	A1-2, B1-4	1.635	36.365	18.038	0.496	0.027
OU7 Downgradient Areas	Landfill	0.962	37.038	2.764	0.075	0.027
OU10 Other Outside Closures	None	0.000	38.000	2.690	0.071	0.026
OU11 West Spray Field	None	NA	NA	45.953	1.000	1.000

[1]Assumes home range is circular and centered around the source area
[2]Home range (DOE 1995b) minus area of ponds within home range of source area
[3]Area of source area minus area of ponds in source area
SUF- site use factor
SUFs for food and soil were calculated as:
(area of source area - area of ponds in source area) / (home range - area of ponds in home range)

Attachment 1
Table 7
Site Use Factor Calculations for Mallard

Source Area	Ponds Within Home Range[1]	Area of Ponds Within Home Range[1] (hectares)	Area of Ponds or Streams in Source Area[2] (hectares)	Source Area Minus Ponds[3] (hectares)	Home Range Minus Ponds[4] (hectares)	Soil SUF	Food SUF	Surface Water SUF	Sediments SUF
OU1 881 Hillside	A1-4, B1-5, C1-2, and Landfill	7.588	0.245	22.303	572.412	0.039	0.000	0.032	0.032
OU2 903 Pad	A1-4, B1-5, C1-2, D-1, and Landfill	8.838	0.125	27.605	571.162	0.048	0.000	0.014	0.014
OU4 Downgradient	A1-4, B1-5, C1-2, and Landfill	7.578	0.060	6.370	572.422	0.011	0.000	0.008	0.008
OU5 Ash Pits	C-1, Rocky Flats Lake	15.862	0.118	19.080	564.138	0.034	0.000	0.007	0.007
OU5 C Ponds	A1-5, B1-5, C1-2, D1-2, and Landfill	11.406	1.876	10.883	568.594	0.019	0.164	0.165	0.165
OU5 Old Landfill	A-1, B1-3, C-1, and Landfill	2.234	0.181	13.532	577.766	0.023	0.000	0.081	0.081
OU6 A Ponds	A1-5, B1-5, C1-2, and Landfill	7.722	3.307	9.521	572.278	0.017	0.428	0.428	0.428
OU6 B Ponds	A1-5, B1-5, C1-2, and Landfill	7.722	1.575	6.862	572.278	0.012	0.204	0.204	0.204

[1]Assumes home range is circular and centered around the source area
[2]For source areas with ponds, only pond areas are used; for source areas without ponds, only stream areas are used (based on an average stream width of 1.5 m); stream lengths are provided in Attachment 1, Table 4
[3]Area of source area (Attachment 1, Table 4) minus area of ponds (if any) in source area
[4]Home range (DOE 1995b) minus area of ponds within home range of source area
SUF- site use factor
SUFs for food, surface water, and sediments for source areas with ponds were calculated as: area of ponds in source area / area of ponds in home range
SUFs for food, surface water, and sediments for source areas without ponds were calculated as:
area of streams in source area / area of ponds in home range
SUFs soils were calculated as: (area of source area - area of ponds in source area) / (home range - area of ponds in home range)

Attachment 1
Table 8
Site Use Factor Calculations for Mule Deer

Source Area	Ponds Within Home Range of Source Area[1]	Area of Ponds Within Home Range of Source Area[1] (hectares)	Home Range Minus Ponds[2] (hectares)	Source Area Minus Ponds[3] (hectares)	Length of Streams and Perimeter of Ponds in Source Area[1,4] (meters)	Food SUF	Soil SUF	Surface Water SUF
OU1 881 Hillside	A-1, B1-3, C1-2	2.832	282.168	22.303	1,633.339	0.079	0.079	0.113
OU2 903 Pad	A1-3, B1-5, C1-2	5.528	279.472	27.605	833.372	0.099	0.099	0.058
OU2 East Trenches	A1-5, B1-5, C1-2	6.758	278.242	39.861	NA	0.143	0.143	NA
OU2 Mound Area	A1-3, B1-5, C1-2	5.528	279.472	2.256	NA	0.008	0.008	NA
OU4 Downgradient	A1-3, B1-5, Landfill	4.614	280.386	6.370	400.373	0.023	0.023	0.028
OU5 Ash Pits	None	NA	285.000	19.080	788.141	0.067	0.067	0.055
OU5 C Ponds	A1-3, B1-5, C1-2	5.528	279.472	10.883	2,481.881	0.039	0.039	0.172
OU5 Old Landfill	C-1	0.316	284.684	13.532	1,206.800	0.048	0.048	0.084
OU5 Surface Disturbance	B1-5, C1-2, D-1	4.710	280.290	1.660	NA	0.006	0.006	NA
OU6 A Ponds	A1-5, B1-5, C1-2, Landfill	7.720	277.280	9.521	3,480.854	0.034	0.034	0.241
OU6 B Ponds	A1-5, B1-5, C1-2, Landfill	7.720	277.280	6.898	2,125.910	0.025	0.025	0.147
OU6 Burial Trenches	A1-3, B1-4, Landfill	3.739	281.261	1.040	NA	0.004	0.004	NA
OU6 North Spray Field	A1-3	2.077	282.923	4.397	NA	0.016	0.016	NA
OU6 Soil Dump Areas	A1-5, B1-5, C1-2, Landfill	7.720	277.280	18.038	NA	0.065	0.065	NA
OU7 Downgradient Areas	A1-3, B1-3, Landfill	4.614	280.386	2.764	NA	0.010	0.010	NA
OU10 Other Outside Closures	Landfill	0.962	284.038	2.690	NA	0.009	0.009	NA
OU11 West Spray Field	None	NA	285.000	45.953	NA	0.161	0.161	NA
				Total (meters)	**12,950.670**			

[1]Assumes home range is circular and centered around the source area
[2]Home range minus area of ponds within home range of source area
[3]Area of source area (Attachment 1, Table 4) minus area of ponds (Attachment 1, Table 5) in source area
[4]From Attachment 1, Tables 4 and 5
NA - not applicable
SUF- site use factor
SUFs for food and soils were calculated as:
(area of source area - area of ponds in source area) / (home range - area of ponds in home range within RFETS boundary)
SUFs for surface water were calculated as:
length of streams and perimeter of ponds within source area / length of streams of ponds within all source areas for which there are surface water samples

Attachment 1
Table 9
Site Use Factor Calculations for Coyote

Source Area	Ponds Within Home Range of Source Area	Area of Ponds Within Home Range [1] (hectares)	Home Range Minus Ponds[2] (hectares)	Source Area Minus Ponds[3] (hectares)	Length of Streams and Perimeter of Ponds in Source Area[1,4] (meters)	Food SUF	Soil SUF	Surface Water SUF
OU1 881 Hillside	A1-5, B1-5, C1-2, D1-2, Landfill	11.400	1,118.600	22.303	1,633.339	0.020	0.020	0.113
OU2 903 Pad	A1-5, B1-5, C1-2, D1-2, Landfill	11.400	1,118.600	27.605	833.372	0.025	0.025	0.058
OU2 East Trenches	A1-5, B1-5, C1-2, D1-2, Landfill	11.400	1,118.600	39.861	—	0.036	0.036	—
OU2 Mound Area	A1-5, B1-5, C1-2, D1-2, Landfill	11.400	1,118.600	2.256	—	0.002	0.002	—
OU4 Downgradient	A1-5, B1-5, C1-2, Landfill	7.720	1,122.280	6.370	400.373	0.006	0.006	0.028
OU5 Ash Pits	A1-2, B1-4, C1-2, Landfill, RFL	20.019	1,109.981	19.080	788.141	0.017	0.017	0.055
OU5 C Ponds	A1-5, B1-5, C1-2, D1-2, Landfill	11.400	1,118.600	10.883	2,481.881	0.010	0.010	0.172
OU5 Old Landfill	A1-5, B1-5, C1-2, D-1, Landfill, RFL	21.278	1,108.722	13.532	1,206.800	0.012	0.012	0.084
OU5 Surface Disturbance	A1-5, B1-5, C1-2, D1-2, Landfill	11.400	1,118.600	1.660	—	0.001	0.001	—
OU6 A Ponds	A1-5, B1-5, C1-2, Landfill	7.378	1,122.622	9.521	3,480.854	0.008	0.008	0.241
OU6 B Ponds	A1-5, B1-5, C1-2, D1-2, Landfill	11.400	1,118.600	6.898	2,125.910	0.006	0.006	0.147
OU6 Burial Trenches	A1-5, B1-5, C1-2, Landfill	7.378	1,122.622	1.040	—	0.001	0.001	—
OU6 North Spray Field	A1-5, B1-5, C1-2, Landfill	7.378	1,122.622	4.397	—	0.004	0.004	—
OU6 Soil Dump Areas	A1-5, B1-5, C1-2, D-1, Landfill	5.732	1,124.268	18.038	—	0.016	0.016	—
OU7 Downgradient Areas	A1-5, B1-5, C1-2, Landfill	7.378	1,122.622	2.764	—	0.002	0.002	—
OU10 Other Outside Closures	A1-5, B1-5, C1-2, Landfill	7.378	1,122.622	2.690	—	0.002	0.002	—
OU11 West Spray Field	B-1, C-1, Landfill, RFL	15.968	1,114.032	45.953	—	0.041	0.041	—
				Total (meters)	**14,423.075**			

[1]Assumes home range is circular and centered around the source area
[2]Home range minus area of ponds within home range of source area
[3]Area of source area (Attachment 1, Table 4) minus area of ponds (Attachment 1, Table 5) in source area
[4]From Attachment 1, Tables 4 and 5
RFL - Rocky Flats Lake
SUF - site use factor
SUFs for food and soils were calculated as:
(area of source area - area of ponds in source area) / (home range - area of ponds in home range within RFETS boundary)
SUFs for surface water were calculated as:
length of streams and perimeter of ponds within source area / length of streams of ponds within all source areas for which there are surface water samples

Attachment 2
Toxicity Reference Values

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Acenaphthene
Form:	Not applicable
Reference:	EPA. 1989. Mouse oral subchronic study with acenaphthene. Study conducted by Hazelton Laboratories, Inc., for the Office of Solid Waste, Washington, DC.
Test Species:	Mice Body weight: 0.3 kg
Study Duration:	90 days
Endpoint:	Hepatotoxicity
Exposure Route:	Gavage (adults)
Dosage:	1, 175, 350, and 700 mg/kg/day
Calculations:	NOAEL = 175 mg/kg/day
Comments:	None
Final NOAEL:	175 mg/kg/day

Compound:	Acenaphthene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryo Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	Not applicable
Calculations:	TEF = 0.001 0.03310 mg/kg/day / 0.001 = 33.10 mg/kg/day
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - 1/day, and (4) no activation of chemical. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to acenaphthene NOAEL.
Final NOAEL:	33.10 mg/kg/d

Compound:	Acenaphthylene
Form:	Not applicable
Reference:	Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183-191.
Test Species:	Mouse Body weight: 0.03 kg (EPA 1988) Food consumption: 0.0055 (ORNL 1994)
Study Duration:	days 7–16 of gestation (during a critical life stage = chronic)
Endpoint:	Reproduction
Exposure Route:	Oral intubation
Dosage:	Three dose levels: 10, 40, and 160 mg/kg/day; LOAEL = 10 mg/kg/day
Calculations:	TEF = 0.001

	NOAEL = 10 mg/kg/day / 10 (LOAEL to NOAEL) = 1.0 mg/kg/day / 0.001 = 1000 mg/kg/day
Comments:	The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to benzo[a]anthracene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL:	1000 mg/kg/day

Compound:	Acetone
Form:	Not applicable
Reference:	McLaughlin, J., et al. 1965. Toxicity of fourteen volatile chemicals as measured by the chick embryo method. American Industrial Hygiene Journal, 25: 282–284
Test Species:	Chicken Egg weight: 0.05 kg Food consumption: 0.008 kg/day (ORNL 1994)
Study Duration:	Preincubation-hatch (single dose)
Endpoint:	Hatching success
Exposure Route:	Egg injection
Dosage:	780 and 1560 mg/kg egg
Calculations:	780 mg/kg/day x 0.1 (LOAEL to NOAEL) = 78 mg/kg/day
Comments:	Assumptions for these calculations are as follows: (1) concentrations in adult are the same as in the egg, (2) chemical does not accumulate in the adult, and (3) eggs were laid 1/day. Values were extrapolated from single exposure.
Final NOAEL:	78.0 mg/kg/day

Compound:	Aldrin
Form:	Dieldrin
Reference:	Mendenhall, V.M., et al. 1983. Breeding success of barn owls (*Tyto alba*) fed low levels of DDE and dieldrin. Arch. Environ. Contam. Toxicol. 12:235-240.
Test Species:	Barn Owl Body weight: 0.466 kg (Johnsgard 1988) Food consumption: wild birds 100-150 g/d; 50-75 g/d captive (Johnsgard 1988) Used median captive food consumption value: 62.5 g/d
Study Duration:	2 years (>10 weeks and during a critical lifestage = chronic)
Endpoint:	Reproduction
Exposure Route:	Oral in diet
Dosage:	Only one dose level applied: 0.58 ppm NOAEL
Calculations:	(0.58 mg dieldrin/kg) (62.5 g food/day) (1 kg/1000 g) /0.466 kg BW = 0.077 mg/kg/d
Comments:	Dieldrin values were extrapolated to aldrin. While 0.58 ppm dieldrin in the diet produced a slight but significant reduction in eggshell thickness, no significant effects on number of eggs laid/pair, number of eggs hatched/pair, percent eggs broken, embryo or nesting mortality was observed. Therefore, this dose was considered to be a chronic NOAEL.
Final NOAEL:	0.077 mg/kg/d

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Anthracene
Form:	Not applicable
Reference:	EPA. 1989. Subchronic toxicity study in mice with anthracene. Final report. Hazelton Laboratories America, Inc. Prepared for the Office of Solid Waste, Washington, DC.
Test Species:	Mice Body weight: 0.03 kg (ORNL 1994)
Study Duration:	at least 90 days
Endpoint:	No treatment-related effects were observed.
Exposure Route:	Gavage (adults)
Dosage:	0, 250, 500, and 1000 mg/kg/day
Calculations:	Not applicable
Comments:	The highest tested dose is the NOAEL.
Final NOAEL:	1000 mg/kg/day

Compound:	Anthracene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143
Test Species:	Chick embryo Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	2.0 mg/kg/egg
Calculations:	2.0 mg/kg/egg x 0.0096 kg embryo wt. = 0.0192 mg/egg x 1 egg / 0.058 = 0.3310 mg/kg/day
Comments:	No effects at this dose (highest dose). Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - 1/day, and (4) no activation of chemical.
Final NOAEL:	0.3310 mg/kg/day

Compound:	Aroclor-1248
Form:	Aroclor-1254
Reference:	Dahlgren, R.B., et al. 1972. Polychlorinated biphenyls: their effects on penned pheasants. Environ. Health. Perspect. 1:89–101.
Test Species:	Ring-necked Pheasant Body weight: 1 kg (EPA 1993)
Study Duration:	17 weeks (>10 wks and during a critical lifestage = chronic)
Endpoint:	Reproduction
Exposure Route:	Weekly oral dose via gelatin capsule
Dosage:	Two dose levels: 12.5 and 50 mg/bird/week; LOAEL = 12.5 mg/bird/week
Calculations:	12.5 mg/bird/week = 1.8 mg/kg/day

Comments:	Aroclor-1254 values were extrapolated to Aroclor-1248. Significantly reduced hatchability was observed in both treatment groups. Therefore, because the study considered exposure throughout a critical lifestage (reproduction), the 12.5 mg/bird/week dose was considered to be a chronic LOAEL.
Final NOAEL:	0.18 mg/kg/d

Compound:	Aroclor-1260
Form:	Not applicable
Reference:	Linder, R.E., et al. 1974. The effect of polychlorinated biphenyls on hepatic microsomal enzymes in the rat. Food Cosmet Toxicol 12:63–77.
Test Species:	Rat Body weight: 0.35 kg (ORNL 1994) Food consumption: 0.028 kg/day (ORNL 1994)
Study Duration:	67 days (<1 yr and during a critical lifestage=chronic)
Endpoint:	Litter size
Exposure Route:	Dietary
Dosage:	Could not obtain primary reference
Calculations:	Not applicable
Comments:	Considered chronic because the rats were exposed during gestation.
Final NOAEL:	6.9 mg/kg/day

Compound:	Aroclor-1260
Form:	Not applicable
Reference:	Hill, E.F., and M.B. Camardese. 1986. Lethal dietary toxicities of environmental contaminants and pesticides to coturnix. USFWS Technical Report 2. Washington, DC.
Test Species:	Coturnix Body weight: 0.090 kg (Dunning 1993) Food consumption: 0.012 (from study controls)
Study Duration:	5 days; subacute
Endpoint:	Death
Exposure Route:	Dietary
Dosage:	Six concentrations ranging from 1500 to 3848 ppm; LOAEL = 1500 ppm
Calculations:	(1500 mg/kg) (0.012 kg/day)/0.09 kg BW x 0.01 UF = 2.0 mg/kg/d
Comments:	LOAEL was taken from lowest dose resulting in mortality, which in this study was the lowest concentration tested.
Final NOAEL:	2.0 mg/kg/d

Compound:	Benzene
Form:	Not applicable
Reference:	McLaughlin, J., et al. 1965. Toxicity of fourteen volatile chemicals as measured by the chick embryo method. American Industrial Hygiene Journal, 25: 282–284
Test Species:	Chicken Body weight: 0.058 Food consumption: 0.008
Study Duration:	Preincubation-hatch (single dose)

Endpoint:	Hatchability
Exposure Route:	Egg injection
Dosage:	75.9, 151.7, 303.4, 775.9 mg/kg egg
Calculations:	75.9 mg/kg/day x 0.1 (LOAEL to NOAEL) =7.59 mg/kg/day
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - 1/day, and (4) no activation of chemical.
Final NOAEL:	7.59 mg/kg/day

Compound:	Benzo[a]anthracene
Form:	Not applicable
Reference:	Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183–191.
Test Species:	Mouse Body weight: 0.03 kg (EPA 1988) Food consumption: 0.0055 (ORNL 1994)
Study Duration:	Days 7–16 of gestation (during a critical life stage = chronic)
Endpoint:	Reproduction
Exposure Route:	Oral intubation
Dosage:	Three dose levels: 10, 40, and 160 mg/kg/day; LOAEL = 10 mg/kg/day
Calculations:	TEF = 0.1 NOAEL = 10 mg/kg/day / 10 (LOAEL to NOAEL) = 1.0 mg/kg/day / 0.1 = 10 mg/kg/day
Comments:	The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to benzo[a]anthracene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL:	10 mg/kg/day

Compound:	Benzo[a]anthracene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryos Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	2.0 mg/kg/day = NOAEL
Calculations:	2.0 mg/kg/egg x 0.0096 kg embryo wt. = 0.0192 mg/egg x 1 egg/day / 0.058 kg = 0.3310 mg/kg/day
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - 1/day, and (4) no activation of chemical.
Final NOAEL:	0.3310 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Benzo[a]pyrene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143
Test Species:	Chick embryos Body weight: 0.058 kg (Brunstrom et al., 1990) Food consumption: 0.008 kg/day (Brunstrom et al., 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	2.0 mg/kg/egg = LOAEL
Calculations:	2.0 mg/kg/egg = LOAEL x 0.0096 kg embryo wt. = 0.0192 mg/egg x 1 egg / 0.058 = 0.3310 mg/kg LOAEL to NOAEL: 0.3310 mg/kg/day x 0.1 = 0.033
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - 1/day, and (4) no activation of chemical.
Final NOAEL:	0.0331 mg/kg/day

Compound:	Benzo[b]fluoranthene
Form:	Not applicable
Reference:	Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183–191.
Test Species:	Mouse Body weight: 0.03 kg (EPA 1988) Food consumption: 0.0055 (ORNL 1994)
Study Duration:	Days 7–16 of gestation (during a critical life stage = chronic)
Endpoint:	Reproduction
Exposure Route:	Oral intubation
Dosage:	Three dose levels: 10, 40, and 160 mg/kg/day; LOAEL = 10 mg/kg/day
Calculations:	TEF = 0.1 NOAEL = 10 mg/kg/day / 10 (LOAEL to NOAEL) = 1.0 mg/kg/day / 0.1 = 10 mg/kg/day
Comments:	The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to benzo[b]fluoranthene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL:	10 mg/kg/day

Compound:	Benzo[b]fluoranthene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryos Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	2.0 mg/kg/day = NOAEL
Calculations:	2.0 mg/kg/egg x 0.0096 kg embryo wt. = 0.0192 mg/egg x 1 egg/day / 0.058 kg = 0.3310 mg/kg/day 0.03 mg/kg/day / 0.1 TEF = 0.33
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - 1/day, and (4) no activation of chemical.
Final NOAEL:	0.33 mg/kg/day

Compound:	Benzo[ghi]perylene
Form:	Not applicable
Reference:	Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183-191.
Test Species:	Mouse Body weight: 0.03 kg (EPA 1988) Food consumption: 0.0055 (ORNL 1994)
Study Duration:	Days 7–16 of gestation (during a critical life stage = chronic)
Endpoint:	Reproduction
Exposure Route:	Oral intubation
Dosage:	Three dose levels: 10, 40, and 160 mg/kg/day; LOAEL = 10 mg/kg/day
Calculations:	TEF = 0.01 NOAEL = 10 mg/kg/day / 10 = 1.0 mg/kg/day / 0.01 = 100 mg/kg/day
Comments:	The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to benzo[ghi]perylene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL:	100 mg/kg/day

Compound:	Benzo[ghi]perylene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryos Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	2.0 mg/kg/egg
Calculations:	NOAEL = 2.0 mg/kg/egg x 0.0096 kg embryo wt. = 0.0192 mg/egg x 1 egg/day / 0.058 kg = 0.3310 mg/kg/day
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - 1/day, and (4) no activation of chemical.
Final NOAEL:	0.3310 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Benzo[k]fluoranthene
Form:	Not applicable
Reference:	Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183-191.
Test Species:	Mouse Body weight: 0.03 kg (EPA 1988) Food consumption: 0.0055 (ORNL 1994)
Study Duration:	Days 7–16 of gestation (during a critical life stage = chronic)
Endpoint:	Reproduction
Exposure Route:	Oral intubation
Dosage:	Three dose levels: 10, 40, and 160 mg/kg/day; LOAEL = 10 mg/kg/day
Calculations:	TEF = 0.1 NOAEL = 10 mg/kg/day / 10 (LOAEL to NOAEL) = 1.0 mg/kg/day / 0.1 = 10 mg/kg/day
Comments:	The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to benzo[k]fluoranthene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL:	10 mg/kg/day

Compound:	Benzo[k]fluoranthene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryos Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	0, 0.05, 0.2, 2.0 mg/kg/egg
Calculations:	NOAEL = 0.2 mg/kg/egg x 0.0096 kg embryo wt. = 0.0019 mg/egg x 1 egg/day / 0.058 kg = 0.033 mg/kg/day
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - 1/day, and (4) no activation of chemical.
Final NOAEL:	0.033 mg/kg/day

Compound:	Benzyl alcohol
Form:	Not applicable
Reference:	Shell Chemical Company. 1986. MRID No. 00077819; HED Doc. No. 002607. Available from EPA. Write to FOI, EPA, Washington, DC 20406.
Test Species:	Beagle dogs Body weight: 12.7 kg (ORNL 1994) Food consumption: 0.301 kg/d (ORNL 1994)
Study Duration:	Two years
Endpoint:	Reduced body weight gain, increased liver and kidney weights
Exposure Route:	Drinking water

Dosage:	0, 25, 125, and 2000 ppm, NOEL = 125 ppm = 3.13 mg/kg/d
Calculations:	None
Comments:	None
Final NOAEL:	3.13 mg/kg/day

Compound:	Bis(2-chloroisopropyl)ether
Form:	Not applicable
Reference:	Mitsumori, K., et al. 1979. Twenty-four month chronic studies of dichlorodiisopropyl ether in mice. Nippon Noyaku Gakkaishi. 4:323–335.
Test Species:	Mice Body weight: 0.03 (ORNL 1994) Food consumption: 0.0055 kg/d (ORNL 1994)
Study Duration:	Two years
Endpoint:	Decreased hemoglobin
Exposure Route:	Oral diet
Dosage:	NOAEL = 35.8 mg/kg/day
Calculations:	None
Comments:	From HEAST.
Final NOAEL:	35.8 mg/kg/day

Compound:	2-Butanone
Form:	Not applicable
Reference:	Cox, G.E., et al. 1975. Toxicity studies in rats with 2-butanol including growth, reproduction, and teratologic observations. Food and Drug Research Laboratories, Inc. Waverly, NY, Report No. 91MR R 1673.
Test Species:	FRDL-Wistar rats Body weight: 0.35 (ORNL 1994) Food consumption: 0.028 kg/d (ORNL 1994)
Study Duration:	Three generations
Endpoint:	Decreased fetal birth weight
Exposure Route:	Oral diet
Dosage:	0, 0.3, 1.0, and 3.0 %; NOAEL = 1771 mg/kg/day
Calculations:	None
Comments:	From IRIS.
Final NOAEL:	35.8 mg/kg/day

Compound:	Butyl benzyl phthalate
Form:	Not applicable
Reference:	Bower, R.K., et al. 1970. Teratogenic effects in the chick embryo caused by esters of phthalic acid. J. Pharmacology and Exp. Theraputics. 171:314–324.
Test Species:	Chick embryo Body weight: 0.058 kg (ORNL 1994) Food consumption: 0.008 kg/day (ORNL 1994)
Study Duration:	Inject at day 3 of incubation
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	0.05 ml/egg (d20 = 1.12 g/ml Source: Merck Index) (47.0% mortality)

Calculations:	0.05 ml/egg x 1.12 g/ml = 0.056 g / 0.058 kg = 0.965 g/kg x 1000 mg/g = 965 mg/kg 965 mg/kg x 0.01 = 96.55 (LOAEL to NOAEL)
Comments:	None.
Final NOAEL:	96.55 mg/kg/day

Compound:	Chrysene
Form:	Not applicable
Reference:	Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183–191.
Test Species:	Mouse Body weight: 0.03 kg (EPA 1988) Food consumption: 0.0055 (ORNL 1994)
Study Duration:	Days 7–16 of gestation (during a critical life stage = chronic)
Endpoint:	Reproduction
Exposure Route:	Oral intubation
Dosage:	Three dose levels: 10, 40, and 160 mg/kg/day; LOAEL = 10 mg/kg/day
Calculations:	TEF = 0.01 NOAEL = 10 mg/kg/day / 10 = 1.0 mg/kg/day / 0.01 = 100 mg/kg/day
Comments:	The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to chrysene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL:	100 mg/kg/day

Compound:	Chrysene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryos Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	2.0 mg/kg/egg = NOAEL
Calculations:	2.0 mg/kg/egg = NOAEL x 0.0096 kg embryo wt. = 0.0192 mg/egg x 1 egg/day / 0.058 kg = 0.3310 mg/kg
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - one/day, and (4) no activation of chemical.
Final NOAEL:	0.3310 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Cobalt
Form:	Cobalt chloride
Reference:	ATSDR. 1991. Toxicity Profile. TP-91/10.
Test Species:	Rat Body weight: 0.35 Food consumption: 0.028 kg/day (ORNL 1994)
Study Duration:	Not specified
Endpoint:	Reproductive effects
Exposure Route:	Not specified
Dosage:	NOAEL = 5 mg/kg/day
Calculations:	None
Comments:	None
Final NOAEL:	5 mg/kg/day

Compound:	Cobalt
Form:	Cobalt Chloride
Reference:	Gilani, S.H., and Y. Alibha. 1990. Teratogenicity of metals to chick embryos. J. Tox. and Env. Health. 30:23–31.
Test Species:	Chick embryos Body weight: 0.058 kg Food consumption: 0.11 kg/day
Study Duration:	12 days
Exposure Route:	Injection into air sacs
Endpoint:	Teratogenicity
Dosage:	0, 1, 4, 7, 10, 50, 100, ug/egg; NOAEL = 1 ug/egg
Calculations:	$\frac{1\ \mu g\ Co}{egg} X \frac{58\ g\ (egg\ weight)}{day} = 0.0172\ \mu g / g = mg / kg$
Comments:	The study is considered chronic because of the critical life stage of exposure. The following assumptions were also made: (1) 100 % deposition of chemical into the egg from the adult, (2) the chemical does not accumulate in other tissues, and (3) one egg is laid each day.
Final NOAEL:	0.0172 mg/kg/day

Compound:	Dibenzo(ah)anthracene
Form:	Not applicable
Reference:	Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183-191.
Test Species:	Mouse Body weight: 0.03 kg (EPA 1988) Food consumption: 0.0055 (ORNL 1994)
Study Duration:	Days 7–16 of gestation (during a critical life stage = chronic)
Endpoint:	Reproduction
Exposure Route:	Oral intubation
Dosage:	Three dose levels: 10, 40, and 160 mg/kg/day; LOAEL = 10 mg/kg/day
Calculations:	TEF = 1 NOAEL = 10 mg/kg/day / 10 = 1.0 mg/kg/day / 1 = 1 mg/kg/day

Comments: The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to benzo[a]anthracene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL: 1 mg/kg/day

Compound: Dibenzo(ah)anthracene
Form: Not applicable
Reference: Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species: Chick embryos
Body weight: 0.058 kg (Brunstrom et al. 1990)
Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration: 18 days
Endpoint: Mortality
Exposure Route: Injection into egg
Dosage: 2.0 mg/kg/day = NOAEL
Calculations: TEF = 1
2.0 mg/kg/egg x 0.0096 kg embryo wt. = 0.0192 mg/egg x
1 egg/day / 0.058 kg x 1= 0.3310 mg/kg/day
Comments: Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - 1/day, and (4) no activation of chemical.
Final NOAEL: 0.3310 mg/kg/day

Compound: 1,1-Dichloroethane
Form: Not applicable
Reference: Hoffman, H.T., et al. 1971. On the inhalation toxicity of 1,1- and 1,2-dichloroethane. Arch. Toxikol. 27:248-265.
Test Species: Rat
Body weight: 0.35 kg (ORNL 1994)
Food consumption: 0.028 kg/day (ORNL 1994)
Study Duration: 13 weeks
Endpoint: No observed effects
Exposure Route: Intermittent inhalation
Dosage: NOEL = 115 mg/kg/day
Calculations: None
Comments: None
Final NOAEL: 115 mg/kg/day

Compound: Di-N-butyl phthalate
Form: Not applicable
Reference: Smith, C.C. 1953. Toxicity of butyl sterate, dibutyl sebacate, dibutyl phthalate and methoxyethyl oleate. Arch. Hyg. Occup. Med. 7:310–318.
Test Species: Male Sprague-Dawley rats
Body weight: 0.35 (ORNL 1994)
Food consumption: 0.028 kg/d (ORNL 1994)
Study Duration: One year

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Endpoint:	Increased mortality
Exposure Route:	Oral diet
Dosage:	0, 0.1, 0.05, 0.25, and 1.25 %; NOAEL = 125 mg/kg/day
Calculations:	None
Comments:	The rats receiving the highest dose had 50 percent mortality in the first week. The remaining animals survived the study with no apparent adverse effects.
Final NOAEL:	125 mg/kg/day

Compound:	Di-N-octyl phthalate
Form:	Di-2-ethylhexyl phthalate
Reference:	Peakall, D.B. 1975. Phthalate esters: occurrence and biological effects. In: Residue Reviews. Vol 54. F.A. Gunther and J.D. Gunther, eds. Springer Verlag, New York.
Test Species:	Rat Body weight: 0.35 kg (ORNL 1994) Food consumption: 0.028 kg/day (ORNL 1994)
Study Duration:	Unknown
Endpoint:	LD50 acute
Exposure Route:	Oral
Dosage:	30 g/kg
Calculations:	NOAELdi-n-octyl phthalate = (LD50)di-n-octyl phthalate *(NOAELdi-2-ethylhexyl phthalate / (LD50)di-2-ethylhexyl phthalate) = (30 g/kg) (400 mg/kg/day / 26.0 g/kg) = 461.54
Comments:	No chronic data for di-n-octyl phthalate could be found. Therefore, a 365-day NOAEL based on a daily concentration was used to approximate an NOAEL for di-n- octyl phthalate. Although the primary reference for di-n-octyl phthalate could not be obtained, the secondary reference is provided. The NOAEL and LD50 values for di-2-ethylhexyl phthalate were found in an EPA document called Ambient Water Quality of phthalate esters, 1980 EPA 440/5-80-067 (copy with butyl benzylphthalate information).
Final NOAEL:	461.54 mg/kg/day

Compound:	Di-N-octyl phthalate
Form:	Not applicable
Reference:	Bower, R.K., et al. 1970. Teratogenic effects in the chick embryo caused by esters of phthalic acid. J. Pharmacology and Experimental Theraputics. 171:314–324.
Test Species:	Chick embryo Egg weight: 0.058 kg (ORNL 1994) Food consumption: 0.008 kg/day (ORNL 1994)
Study Duration:	Injection at day 3 of incubation
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	0.025 ml/egg (d14 = 0.980 g/ml (Source: Merck Index) (25% mortality)
Calculations:	0.025 ml/egg x 0.980 g/ml = 0.024 g/0.058 kg = 0.422 g/kg x 1000 mg/g = 422.4 422.4 x 0.01 = 42.24 (LOAEL to NOAEL)
Comments:	Considered chronic because of the critical life stage of the chicks.
Final NOAEL:	42.24 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Endosulfan sulfate
Form:	Not applicable
Reference:	Gupta, P.K., et al. 1978. Teratogenic and embryotoxic effects of endosulfan in rats. Acta Pharmacology and Toxicology, 42:150.
Test Species:	Rat Body weight: 0.35 kg (ORNL 1994) Food consumption: 0.028 kg/day (ORNL 1994)
Study Duration:	7 days (<1 yr and during a critical lifestage=chronic)
Endpoint:	Fetal mortality, maternal toxicity
Exposure Route:	Oral
Dosage:	5.0 mg/kg/day LOAEL x 0.1 uncertainty factor = 0.5 mg/kg/day NOAEL for endosulfan
Calculations:	NOAELe.s. = LD50e.s. (NOAELs / (LD50)s) = (76 mg/kg) (0.5 mg/kg/day / 110 mg/kg) = 0.3455 mg/kg/day
Comments:	The NOAEL for endosulfan was considered chronic because exposure occurred during a critical life stage.
Final NOAEL:	0.3455 mg/kg/day

Compound:	Endrin ketone
Form:	Endrin
Reference:	Kavlock, R.J., et al. 1981. Perinatal toxicity of endrin in rodents. II. Fetotoxic effcts of prenatal exposure in rats and mice. Toxicology, 21:141–150.
Test Species:	Rat Body weight: 0.35 kg (ORNL 1994) Food consumption: 0.028 kg/day (ORNL 1994)
Study Duration:	14 days (<1 yr and during a critical lifestage=chronic)
Endpoint:	Maternal weights
Exposure Route:	Oral (intubation)
Dosage:	0.450, 0.300, 0.150, 0.075, and 0 mg/kg/day NOAEL = 0.150 mg/kg/day for endrin
Calculations:	NOAELketo-endrin = LD50 keto-endrin x (NOAELendrin / LD50endrin) =0.8 mg/kg (0.15 mg/kg/day / 5.3 mg/kg) = 0.023 mg/kg/day
Comments:	Endrin was used to extrapolate to endrin ketone. The NOAEL for endrin is considered chronic because the exposure occurred during a critical life stage.
Final NOAEL:	0.023 mg/kg/day

Compound:	Fluoranthene
Form:	Not applicable
Reference:	EPA. 1988. 13-week mouse oral subchronic study. Prepared by Toxicity Research Laboratories, Ltd., Muskegon, MI for the Office of Solid Waste, Washington, DC.
Test Species:	Mouse Body weight: 0.03 kg (ORNL 1994) Food consumption: 0.0055 kg/day (ORNL 1994)
Study Duration:	13 weeks
Endpoint:	Nephropathy, body weight, food consumption
Exposure Route:	Gavage

Dosage:	0, 125, 250, and 500 mg/kg/day
Calculations:	NOAEL = 125 mg/kg/day
Comments:	All treated mice exhibited dose dependent nephropathy and increased salivation and liver enzyme levels. These were either not significant, not dose-related, or not considered adverse.
Final NOAEL:	125 mg/kg/day

Compound:	Fluoranthene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryos Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	2.0 mg/kg/egg = NOAEL
Calculations:	2.0 mg/kg/egg = NOAEL x 0.0096 kg embryo wt. = 0.0192 mg/egg x 1 egg/day / 0.058 kg = 0.3310 mg/kg/day
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - one/day, and (4) no activation of chemical.
Final NOAEL:	0.3310 mg/kg/day

Compound:	Fluorene
Form:	Not applicable
Reference:	EPA. 1989. Mouse oral subchronic study. Prepared by Toxicity Research Laboratories, Ltd., Muskegon, MI, for the Office of Solid Waste, Washington, DC.
Test Species:	Mice Body weight: 0.03 kg (ORNL 1994) Food consumption: 0.0055 kg/day (ORNL 1994)
Study Duration:	13 weeks
Endpoint:	Decreased RBC, packed cell volume and hemoglobin
Exposure Route:	Gavage in corn oil
Dosage:	0, 125, 250, and 500 mg/kg/day
Calculations:	None
Comments:	None
Final NOAEL:	125 mg/kg/day

Compound:	Fluorene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Test Species:	Chick embryos Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	2.0 mg/kg/egg = NOAEL
Calculations:	2.0 mg/kg/egg = NOAEL x 0.0096 kg embryo wt. = 0.0192 mg/egg x 1 egg/day / 0.058 kg = 0.3310 mg/kg/day
Comments:	No effects at this dose (highest dose). Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - one/day, and (4) no activation of chemical.
Final NOAEL:	0.33 mg/kg/day

Compound:	Heptachlor
Form:	Not applicable
Reference:	Hill, E.F., and M.B. Camardese. 1986. Lethal dietary toxicities of environmental contaminants and pesticides to coturnix. USDOI, Fish and Wildlife Technical Report 2, Washington, D.C.
Test Species:	Coturnix Body weight: 0.09 kg (Dunning 1993) Food consumption: 0.0094 kg/day (Hill and Camardese 1986)
Study Duration:	5 days (<1 yr and not during a critical lifestage=subchronic)
Endpoint:	Death, LOAEL = 71 ppm dietary
Exposure Route:	Dietary
Dosage:	5 conccentrations between 50 and 200 ppm, 15 birds/treatment and 45 control birds, 14 day old chicks
Calculations:	[(71mg/kg) (0.0094 kg/day) / 0.09 kg bw] x 0.01 UF = 0.074
Comments:	An uncertainty factor of 0.01 was used to calculate LOEL to NOEL and subchronic to chronic.
Final NOAEL:	0.074 mg/kg/day

Compound:	Heptachlor epoxide
Form:	Not applicable
Reference:	Dow Chemical Company. 1958. MRID No. 00061912. Available from EPA. Write to FOI, EPA, Washington, DC. 20460.
Test Species:	Dog Body weight: 12.7 kg
Study Duration:	60 weeks
Endpoint:	Increased liver-to-body weight ratio in males and females
Exposure Route:	Diet
Dosage:	0, 0.5, 2.5, 5, and 7.5 ppm
Calculations:	Not applicable
Comments:	None
Final NOAEL:	0.125 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Heptachlor epoxide
Form:	Not applicable
Reference:	Velsicol Chemical. 1959. (from IRIS)
Test Species:	Rat Body weight: 0.35 kg
Study Duration:	Three generation
Endpoint:	Reproduction
Exposure Route:	Not specified
Dosage:	NOAEL = 0.25 mg/kg/day
Calculations:	Not applicable
Comments:	None
Final NOAEL:	0.25 mg/kg/day

Compound:	Heptachlor epoxide
Form:	Not applicable
Reference:	Stickel, W.H., et al. 1965. Effects of heptachlor-contaminated earthworms on woodcocks. Journal of Wildlife Management, 29:132–146.
Test Species:	Woodcocks Body weight: 0.160 kg (Stickel et al. 1965)
Study Duration:	60 days (<1 yr, not during a critical lifestage=subchronic)
Endpoint:	Death
Exposure Route:	Dietary
Dosage:	0, 0.069 (NOAEL), and 0.33 mg/kg/day
Calculations:	0.069 mg/kg/day NOAEL (subchronic) x 0.1 = 0.0069 mg/kg/day (chronic NOAEL)
Comments:	Only two concentrations were used in this study (0.65 and 2.86). Concentrations ingested per day (0.011 and 0.053 mg/day) were divided by the body weight of male woodcocks to obtain a mg/kg/day concentration. In addition, the study was only 60 days; therefore, it was considered subchronic.
Final NOAEL:	0.0069 mg/kg/day

Compound:	Indeno[1,2,3-cd]pyrene
Form:	not applicable
Reference:	Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183–191.
Test Species:	Mouse Body weight: 0.03 kg (EPA 1988) Food consumption: 0.0055 (ORNL 1994)
Study Duration:	Days 7–16 of gestation (during a critical life stage = chronic)
Endpoint:	Reproduction
Exposure Route:	Oral intubation
Dosage:	Three dose levels: 10, 40, and 160 mg/kg/day; LOAEL = 10 mg/kg/day
Calculations:	TEF = 0.1 NOAEL = 10 mg/kg/day / 10 = 1.0 mg/kg/day / 0.1 = 10 mg/kg/day
Comments:	The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to indeno[1,2,3-c,d]pyrene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL:	10 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Indeno[1,2,3-cd]pyrene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryos Body weight: 0.058 kg (Brunstrom et al., 1990) Food consumption: 0.008 kg/day (Brunstrom et al., 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	0, 0.5, 2.0 mg/kg/egg
Calculations:	NOAEL=0.5 mg/kg/egg x 0.0096 kg embryo wt. = 0.0048 mg/egg x 1 egg/day / 0.058 kg = 0.0828 mg/kg/day
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - one/day, and (4) no activation of chemical.
Final NOAEL:	0.0828 mg/kg/day

Compound:	Isophorone
Form:	Not applicable
Reference:	Nor-Am Agricultural Products, Inc. 1972. MRID No. 00123976. Available from EPA. Write to FOI, EPA, Washington, DC 20460.
Test Species:	Beagle dogs Body weight: 12.7 kg (ORNL 1994) Food consumption: 0.301 kg/day (ORNL 1994)
Study Duration:	90 days
Endpoint:	No observed effects
Exposure Route:	Gelatin capsules
Dosage:	0, 35, 75, and 150 mg/kg/day, 150 mg/kg/day = NOAEL
Calculations:	None
Comments:	No effects were observed.
Final NOAEL:	150 mg/kg/day

Compound:	Manganese
Form:	Manganese sulfate
Reference:	Vohra, P. and F.H. Kratzer. 1968. Zinc, copper and manganese toxicities in turkey poults and their alleviation by EDTA. Poultry Science 47:699–704.
Test Species:	Turkey (domestic) poults Body weight: 0.416 kg (Marrett and Sunde, 1968. Poultry Science 47:511–519.) Water consumption: 0.033 L/day Food consumption: 0.033 kg/day (from controls in study)
Study Duration:	21 days
Exposure Route:	Dietary
Endpoint:	Growth
Dosage:	0, 510, 1020, 2040, 3000, 3620, 4080, 4800 ppm NOAEL = 4080 mg $MnSO_4$ /kg

Calculations: $$\frac{4080\ mg\ MnSO_4}{kg\ food} X \frac{0.0.033\ kg}{day} \ / \ 0.416 kg\ bw \ = \ 323.65\ mg / kg / day$$

Comments: Because the length of the exposure was only 21 days, an uncertainty factor of 0.10 was multiplied by the value calculated as 323.65 mg/kg/day.

Final NOAEL: 32.36 mg/kg/day

Compound: Methylene chloride
Form: Not applicable
Reference: Eivor, E., et al. 1979. Effects of methylene chloride, trichloroethane, trichloroethylene, tetrachloroethylene and toluene on the development of the chick embryo. Toxicology 12:111–119.
Test Species: Chicken
Egg weight: 0.058
Food consumption: 0.008
Study Duration: Single dose at either 6 days or 3 days incubation
Endpoint: Death and malformation
Exposure Route: Egg injection
Dosage: 100, 50, 25 and 5 µmoles/egg
Calculations: 5 µmoles/egg x 1 egg/0.058 kg x .085 mg/1 µmole
= 7.328 mg/kg/day x 0.1 UF = .7328
Comments: Assumptions for these calculations are as follows: (1) concentrations in adult are the same as in the egg, (2) chemical does not accumulate in the adult, and (3) eggs were laid 1/day. Values were extrapolated from single exposure.
Final NOAEL: 0.7328 mg/kg/day

Compound: 2-Methylnaphthalene
Form: Not applicable
Reference: Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183–191.
Test Species: Mouse
Body weight: 0.03 kg (EPA 1988)
Food consumption: 0.0055 (ORNL 1994)
Study Duration: Days 7–16 of gestation (during a critical life stage = chronic)
Endpoint: Reproduction
Exposure Route: Oral intubation
Dosage: Three dose levels: 10, 40, and 160 mg/kg/day;
LOAEL = 10 mg/kg/day
Calculations: TEF = 0.001
NOAEL = 10 mg/kg/day / 10
= 1.0 mg/kg/day / 0.001 = 10 mg/kg/day
Comments: The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to 2-methylnaphthalene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL: 1000 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound: 2-Methylnaphthalene
Form: Not applicable
Reference: Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species: Chick embryo
Body weight: 0.058 kg (Brunstrom et al. 1990)
Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration: 18 days
Endpoint: Mortality
Exposure Route: Injection
Dosage: Not applicable
Calculations: TEF = 0.001
NOAEL = 0.03310 mg/kg/day / 0.001 = 33.10 mg/kg/day
Comments: TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to 2-methylnaphthalene NOAEL.
Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - one/day, and (4) no activation of chemical.
Final NOAEL: 33.10 mg/kg/day

Compound: Molybdenum
Form: Molybdate
Reference: Schroeder, H.A., and M. Mitchner. 1971. Toxic effects of trace elements on the reproduction of mice and rats. Arch. Environ. Health. 23:102–106.
Test Species: Mice
Body weight: 0.03 kg
Water consumption: 0.0075 L/day
Food consumption: 0.0055 kg/day
Study Duration: Three generations
Exposure Route: Dietary (drinking water)
Endpoint: Mortality of young
Dosage: 10mg/L; LOAEL = 10 mg/L
Calculations:

$$\frac{10\ mg\ Mo}{L}\ X\ \frac{0.0075\ L}{day}\ /\ 0.03kg\ bw\ =\ 2.5\ mg/kg/day$$

Comments: This study was considered chronic because it involved exposure during a critical life stage. Because the value reported is an LOAEL, a chronic NOAEL was calculated.
Final NOAEL: 0.25 mg/kg/day

Compound: Molybdenum
Form: NaMoO4
Reference: Nagy, J.G., W. Chappell, and G.M. Ward. 1975. Effects of high molybdenum uptake in mule deer. J. Animal Science. 41: 412.
Test Species: Mule Deer
Body weight: 70 kg (Tech Memo II, S.M. Stoller Corp.)
Food consumption: 1.54 kg/day
Water consumption: 3.08 L/day
Study Duration: 25 days

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Exposure Route: Dietary
Endpoint: Weight, food intake
Dosage: 0, 50, 200, 1000 mg/kg; NOAEL = 1000 mg/kg

Calculations:

$$\frac{1000\ mg\ Mo}{kg\ food} X \frac{1.54\ kg}{day} \ / \ 70kg\ bw \ = \ 22\ mg / kg / day$$

Comments: Because the length of the exposure was only 25 days, an uncertainty factor of 0.10 was multiplied by the value calculated as 22 mg/kg/day.
Final NOAEL: 2.2 mg/kg/day

Compound: Molybdenum
Form: Molybdenum
Reference: Kratzer, F.H. 1958. Effect of dietary molybdenum upon chicks and poults. Proc. Soc. Exp. Biol. Med. 80:483 - 486.
Test Species: Chick
Body weight: 0.134 kg (Elzubeir and Davis 1988)
Water consumption: 0.016 kg/day (allometric equation)
Food consumption: 0.015 L/day (allometric equation)
Study Duration: 4 weeks
Exposure Route: Dietary
Endpoint: Growth
Dosage: 0, 50, 100, 200, 300, 400 mg/kg
Authors calculated NOAEL as 200 mg/kg

Calculations:

$$\frac{200\ mg\ Mo}{kg} X \frac{0.016\ kg\ food}{day} \ / \ 0.134kg\ bw \ = \ 23.88\ mg / kg / day$$

Comments: Study considered a sub-chronic exposure and therefore calculated NOAEL of 23.88 was multiplied by 0.1 to obtain the final NOAEL of 2.38 mg/kg/day.
Final NOAEL: 2.38 mg/kg/day.

Compound: Naphthalene
Form: Not applicable
Reference: Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183–191.
Test Species: Mouse
Body weight: 0.03 kg (EPA 1988)
Food consumption: 0.0055 (ORNL 1994)
Study Duration: Days 7–16 of gestation (during a critical life stage = chronic)
Endpoint: Reproduction
Exposure Route: Oral intubation
Dosage: Three dose levels: 10, 40, and 160 mg/kg/day;
LOAEL = 10 mg/kg/day
Calculations: TEF = 0.001
NOAEL = 10 mg/kg/day / 10
= 1.0 mg/kg/day / 0.001 = 10 mg/kg/day

Comments:	The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to benzo[a]anthracene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL:	1000 mg/kg/day

Compound:	Naphthalene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryo Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	Not applicable
Calculations:	TEF = 0.001 NOAEL=0.03310 mg/kg/day / 0.001 = 33.10 mg/kg/day
Comments:	TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to naphthalene NOAEL. Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - one/day, and (4) no activation of chemical.
Final NOAEL:	33.10 mg/kg/day

Compound:	Nitrate/Nitrite
Form:	Nitrite
Reference:	Shuval, H.I., and N. Gruener. 1972. Epidemiological and toxicological aspects of nitrates and nitrites in the environment. AJPH. 62:1045–1052.
Test Species:	Rat Body weight: 0.35 kg (ORNL 1994) Water consumption: 0.046 L/day
Study Duration:	2 years
Endpoint:	Methemoglobin levels
Exposure Route:	Oral
Dosage:	1, 100, 1000, 2000, and 3000 mg/L, NOAEL = 100 mg/L
Calculations:	(100 mg/L) (0.046 l/day) /0.35 kg = 13.14 mg/kg/day
Comments:	None
Final NOAEL:	13.14 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Nitrate/Nitrite
Form:	Nitrite
Reference:	Adams, A.W., et al. 1966. Effects of nitrate and nitrite in the drinking water on chicks. poults, and laying hens. Poultry Science. 45:1215–1222.
Test Species:	Chicks (4 weeks old) Body weight: 0.262 Water consumption: 0.04 L/day
Study Duration:	2 years
Endpoint:	Growth
Exposure Route:	Drinking water
Dosage:	0, 25, 50, 100, and 200 mg/L, NOAEL = 100 mg/L
Calculations:	(100 mg/L) (0.046 l/day) /0.262 kg = 15.27 mg/kg/day
Comments:	None
Final NOAEL:	15.27 mg/kg/day

Compound:	Pentachlorophenol
Form:	Not applicable
Reference:	Schwetz, B.A., et al. 1978. Results of 2-year toxicity and reproduction studies on pentachlorophenol in rats. In: Chemistry, Pharmacology, and Environmental Toxicology. K.R. Rao, ed. Plenum Press, NY. p. 301.
Test Species:	Rats Body weight: 0.35 kg (ORNL 1994) Food consumption: 0.028 kg/day (ORNL 1994)
Study Duration:	2 years
Endpoint:	Liver and kidney pathology
Exposure Route:	Diet
Dosage:	3, 10, 30 mg/kg/day, 3 mg/kg/day = NOAEL
Calculations:	None
Comments:	None
Final NOAEL:	3 mg/kg/day

Compound:	Pentachlorophenol
Form:	Not applicable
Reference:	Nebeker, A.V., et al. 1994. Toxicity and estimated water quality criteria values in mallard ducklings exposed to pentachlorophenol. Archives of Environmental Contamination and Toxicology. 26:33–36.
Test Species:	Mallard Body weight: 0.15 kg Food consumption: 0.06 kg/day
Study Duration:	11 days
Endpoint:	Growth
Exposure Route:	Dietary
Dosage:	25, 54.2, 105.0, 233.2, 423.2, and 961 ppm; NOAEL = 423.2 ppm
Calculations:	((423 mg pentachlorophenol/kg x 0.06 kg/day)/0.15 kg body weight) x 0.1 (subchronic to chronic) = 16.92mg/kg/day
Comments:	None
Final NOAEL:	16.92 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Phenanthrene
Form:	Not applicable
Reference:	Mackenzie, K.M., and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo[a]pyrene. Biol. Reprod. 24:183–191.
Test Species:	Mouse Body weight: 0.03 kg (EPA 1988) Food consumption: 0.0055 (ORNL 1994)
Study Duration:	Days 7–16 of gestation (during a critical life stage = chronic)
Endpoint:	Reproduction
Exposure Route:	Oral intubation
Dosage:	Three dose levels: 10, 40, and 160 mg/kg/day; LOAEL = 10 mg/kg/day
Calculations:	TEF = 0.001 NOAEL = 10 mg/kg/day / 10 = 1.0 mg/kg/day / 0.001 = 10 mg/kg/day
Comments:	The above information is for benzo[a]pyrene. TEF (toxic equivalence factor) (EPA 1993, Nisbet and LaGoy 1992) used to adjust benzo[a]pyrene NOAEL to phenanthrene NOAEL. See comments for benzo[a]pyrene in ORNL (1994).
Final NOAEL:	1000 mg/kg/day

Compound:	Phenanthrene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryo Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)
Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	2.0 mg/kg/egg = NOAEL
Calculations:	NOAEL=2.0 mg/kg/egg x 0.0096 kg embryo = 0.0192 mg/egg x 1egg/day /0.058 kg = 0.033 mg/kg/day
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - one/day, and (4) no activation of chemical.
Final NOAEL:	0.033 mg/kg/day

Compound:	Phenol
Form:	Not applicable
Reference:	NTP (National Toxicology Program). 1983. Teratologic evaluation of phenol in CD rats and mice. Report prepared by Research Triangle Institute, Research Triangle Park, NC. NTIS PB83-247726. Gov. Rep. Announce. Index. 83(25):6247.
Test Species:	Rats Body weight: 0.35 kg (ORNL 1994) Food consumption: 0.028 kg/day (ORNL 1994)
Study Duration:	2 years

Endpoint:	Reduced fetal body weight
Exposure Route:	Gavage
Dosage:	0, 30, 60, and 120 mg/kg/day, 60 mg/kg/day = NOAEL
Calculations:	None
Comments:	None
Final NOAEL:	60 mg/kg/day

Compound:	Phenol
Form:	Pentachlorophenol
Reference:	Schafer, E.W., et al. 1983. The acute oral toxicity, repellency, and hazard potential of 998 chemicals to one or more species of wild and domestic birds. Arch. Environ. Contam. Toxicol. 12:355–382.
Test Species:	Agelaius phoeniceus Body weight: 0.065 kg (Schafer et al. 1994) Food consumption: 0.014 kg/day (Schafer et al. 1994)
Study Duration:	acute
Endpoint:	Death
Exposure Route:	Oral
Dosage:	Up to 113 ppm (range not given), LD50 > 113 ppm
Calculations:	(113 ppm)[(169.2 mg/kg/d NOEL pcp) / 380 ppm LD50 pcp] = 50.3 mg/kg/day = NOEL
Comments:	Pentachlorophenol was used to extrapolate to phenol. pcp = pentachlorophenol
Final NOAEL:	50.3 mg/kg/day

Compound:	Pyrene
Form:	Not applicable
Reference:	EPA. 1989. Mouse oral subchronic toxicity of pyrene. Study conducted by Toxicity Research Laboratories, Muskegon, MI, for the Office of Solid Waste, Washington, DC.
Test Species:	Mouse Body weight: 0.03 kg (ORNL 1994) Food consumption: 0.0055 kg/day (ORNL 1994)
Study Duration:	13 weeks
Endpoint:	Kidney effects (renal tubular pathology, decreased kidney weights)
Exposure Route:	Gavage
Dosage:	0, 75, 125, and 250 mg/kg/day
Calculations:	Not applicable
Comments:	None
Final NOAEL:	75 mg/kg/day

Compound:	Pyrene
Form:	Not applicable
Reference:	Brunstrom, B., et al. 1990. Embryotoxicity of polycyclic aromatic hydrocarbons (PAHs) in three domestic avian species, and of PAHs and coplanar polychlorinated biphenyls (PCBs) in the common eider. Environmental Pollution 67:133–143.
Test Species:	Chick embryo Body weight: 0.058 kg (Brunstrom et al. 1990) Food consumption: 0.008 kg/day (Brunstrom et al. 1990)

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Study Duration:	18 days
Endpoint:	Mortality
Exposure Route:	Injection into egg
Dosage:	2.0 mg/kg/egg = NOAEL
Calculations:	NOAEL=2.0 mg/kg/egg x 0.0096 kg embryo = 0.0192 mg/egg x 1egg/day / 0.058 kg = 0.3310 mg/kg/day
Comments:	Assumptions: (1) concentration in adults is equivalent to concentration in eggs, (2) chemical does not accumulate in adults, (3) eggs laid - one/day, and (4) no activation of chemical.
Final NOAEL:	0.3310 mg/kg/day

Compound:	Silver
Form:	Silver
Reference:	Toxicological Profile for Silver. 1990. TP-90-24. U.S. Dept. of Health and Human Services. ATSDR. pg. 17.
Test Species:	Rat Body weight: 0.35 kg (ORNL 1994) Water consumption: 0.58 kg/day (allometric) Food consumption: 2.03 L/day (allometric)
Study Duration:	35 weeks
Exposure Route:	Dietary
Endpoint:	Weight loss
Dosage:	Stated LOAEL of 222.2 mg/kg/day
Calculations:	Not aplicable
Comments:	LOAEL of 222.2 mg/kg/day was multiplied by an uncertainty factor of 0.1 for a final NOAEL of 22.22 mg/kg/day.
Final NOAEL:	22.22 mg/kg/day.

Compound:	Silver
Form:	Silver Nitrate
Reference:	Jensen, L.S., R.P. Peterson, and L. Falen. 1974. Inducement of enlarged hearts and muscular dystrophy in turkey poults with dietary silver. Poultry Science 53:57–64.
Test Species:	Turkey Body weight: 0.3152 kg Food consumption: 0.174 kg/day (ORNL 1994)
Study Duration:	5 weeks
Exposure Route:	Dietary
Endpoint:	Growth, cardiac enlargement, decreased hemoglobin levels
Dosage:	3 dose levels: 100, 300, and 900 ppm. Authors calculated an LOEL of 900 ppm and a NOAEL of 300 ppm.

Calculations: $$\frac{300\ mg\ AgNi}{kg\ food} X \frac{0.174\ kg\ food}{day} \ / \ 0.3152 kg\ bw \ = \ 165.61\ mg / kg / day$$

Comments:	No food consumption data was available in the paper for domestic turkeys, therefore food consumption for wild turkey was used based on ORNL (1994).
Final NOAEL:	165.61 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound: Strontium
Form: Strontium carbonate
Reference: Weber, C.W., A.R. Doberenz, R.W.G. Wyckoff, and B.L. Reid. 1968. Strontium metabolism in chicks. Poultry Science. 47:1318–1328.
Test Species: Chicks
Body weight: 0.58 kg (mean weight of control animals at 4 weeks)
Water consumption: 0.016 kg/day
Food consumption: 0.015 L/day
Study Duration: 4 weeks
Exposure Route: Dietary
Endpoint: Weight gain, plasma Na, K, and Ca concentrations
Dosage: 0, 3000, 6000, 12000 mg/kg; NOAEL = 3000 mg/kg

Calculations:

$$\frac{3000\ mg\ St}{kg\ food} X \frac{0.016kg}{day} \ / \ 0.580kg\ bw \ = \ 82.76\ mg\ /\ kg\ /\ day$$

Comments: Because the length of the exposure was only 4 weeks, an uncertainty factor of 0.10 was multiplied by the value calculated as 82.76 mg/kg/day.
Final NOAEL: 8.276 mg/kg/day

Compound: Tetrachloroethene
Form: Not applicable
Reference: Buben, J.A., and E.J. O'Flaherty. 1985. Delineation of the role of metabolism in the hepatotoxicity of trichloroethylene and perchloroethylene: a dose-effects study. Toxicol. Appl. Pharmacol. 78:105–122.
Test Species: Mouse
Body weight: 0.03 kg (ORNL 1994)
Food consumption: 0.0055 kg/day (ORNL 1994)
Study Duration: 6 weeks
Endpoint: Hepatotoxicity
Exposure Route: Gavage
Dosage: 0, 20, 100, 200, 500, 1500, and 2000 mg/kg 5 days/week; NOAEL = 14 mg/kg/day
Calculations: None
Comments: None
Final NOAEL: 14 mg/kg/day

Compound: Tetrachloroethene
Form: Not applicable
Reference: Elovaara, E., et al. 1979. Effects of methylene chloride, trichloroethane, trichloroethylene, tetrachloroethylene and toluene on the development of the chick embryos. Toxicology 12:111–119.
Test Species: Chicken
Egg weight: 0.058 kg
Food consumption: 0.008 kg/day
Study Duration: Single dose at either 2 or 6 days of incubation
Endpoint: Death or malformation
Exposure Route: Egg injection
Dosage: 5, 25, 50, or 100 µmol/egg; LOAEL = 5 µmol/egg

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Calculations:	5 µmol/egg x 1 egg/0.058 kg x 0.1659 mg/µmol x 0.1 (LOAEL->NOAEL) = 1.43 mg/kg/day
Comments:	Assumptions for these calculations are as follows: (1) concentrations in eggs are the same as in the adult ,(2) chemical does not accumulate in the adult, and (3) eggs were laid 1/day. Values were extrapolated from single exposure.
Final NOAEL:	1.43 mg/kg/day

Compound:	Tin
Form:	Inorganic
Reference:	Eisler, R. 1989. Tin Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. USFWS. Patuxent Wildlife Research Center. Laurel, MD. Biological Report 85(1.15). Contaminant Hazard Reviews Report No. 15.
Test Species:	Dog Body weight: 0.35 Food consumption: 0.028 kg/day (ORNL 1994)
Study Duration:	13 weeks
Endpoint:	No observed effect
Exposure Route:	Diet
Dosage:	NOAEL = 25 mg/kg/day
Calculations:	None
Comments:	None
Final NOAEL:	25 mg/kg/day

Compound:	Toluene
Form:	Not applicable
Reference:	Acetone
Reference:	Elovaara, E., et al. 1979. Effects of methylene chloride, trichloroethane, trichloroethylene, tetrachloroethylene and toluene on the development of the chick embryos. Toxicology 12:111–119.
Test Species:	Chicken embryo Egg weight: 0.058 kg Food consumption: 0.08 kg/day
Study Duration:	Single dose at day 2 or 6 of incubation
Endpoint:	Death or malformation
Exposure Route:	Egg injection
Dosage:	5, 25, 50, and100
Calculations:	(25 µmol/egg) (1 egg/.058 kg) (.092 mg/µmol) = 39.66 x 0.1 (LOAEL to NOAEL) = 3.966 mg/kg/day
Comments:	Assumptions for these calculations are as follows: (1) concentrations in eggs are the same as in the adult ,(2) chemical does not accumulate in the adult, and (3) eggs were laid 1/day. Values were extrapolated from single exposure.
Final NOAEL:	3.966 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	1,2,4-Trichlorobenzene
Form:	Not applicable
Reference:	Robinson, K.S., et al. 1981. Multi-generation study of 1,2,4-trichlorobenzene in rats. J. Toxicol. Environ. Health. 8:495–500.
Test Species:	Rat Body weight: 0.35 kg (ORNL 1994) Food consumption: 0.028 kg/d (ORNL 1994)
Study Duration:	3 generations
Endpoint:	Increased adrenal weights
Exposure Route:	Drinking water
Dosage:	0, 25, 100, and 400 ppm, NOAEL = 100 ppm = 14.8 mg/kg/d
Calculations:	None
Comments:	None
Final NOAEL:	14.8 mg/kg/day

Compound:	1,1,1-Trichloroethane
Form:	Not applicable
Reference:	Eivor, E., et al. 1979. Effects of methylene chloride, trichloroethane, trichloroethylene, tetrachloroethylene and toluene on the development of the chick embryo. Toxicology 12:111–119.
Test Species:	Chicken embryo Body weight: 0.058 kg egg
Study Duration:	Single dose at day 3 or 6 of incubation
Endpoint:	Death or malformation
Exposure Route:	Injection into egg
Dosage:	5, 25, 50, and 100 μmol/egg; LOAEL = 5 μmol/egg
Calculations:	(5 μmol/egg) (egg/0.58 kg) (.13342 mg/μmol) (0.1 UF) = = 1.150 mg/kg/day
Comments:	None
Final NOAEL:	1.150 mg/kg/day

Compound:	Trichloroethene
Form:	1,1,1-Trichloroethane
Reference:	Weissman, C.L., et al. 1976 Acute inhalation, oral and intraperitoneal toxicity of trichloroethylene in mice. Chapter 8 In: Methyl chloroform and trichloroethylene in the environment. D.M. Aviado et al., eds. CRC Press, Cleveland OH, 61–63.
Test Species:	Mice Body weight: 0.0225 Food consumption: 0.0055
Study Duration:	24 hours
Endpoint:	Death
Exposure Route:	Gavage
Dosage:	2, 3, 4, 5, and 6 g/kg; LD50 2.85 g/kg
Calculations:	NOAEL = LD50TCE x (NOAELTCA/LD50TCA) NOAEL = 2.85 g/kg x 500 mg/kg/day / 9.7 g/kg) =146.91mg/kg/day

Comments: Only acute lethality data was availabe, therefore a similar structural compound, 1,1,1-trichloroethane, was used to calculate the NOAEL for trichloroethene. 1,1,1-trichloroethane data came from: Torkelson, T.R. et al. 1958. Toxicity of 1,1,1-trichloroethane as determined on laboratory animals and human subjects. American Industrial Hygiene Journal, 19: 353–362.

Final NOAEL: 146.91 mg/kg/day

Compound: Trichloroethene
Form: Not applicable
Reference: Elovaara, E., et al. 1979. Effects of methylene chloride, trichloroethane, trichloroethylene, tetrachloroethylene and toluene on the development of the chick embryos. Toxicology 12:111–119.
Test Species: Chicken
Egg weight: 0.058 kg
Food consumption: 0.008 kg/day
Study Duration: Single dose at either 2 or 6 days of incubation
Endpoint: Death or malformation
Exposure Route: Egg injection
Dosage: 5, 25, 50, or 100 µmol/egg; LOAEL = 5 µmol/egg
Calculations: 5 µmol/egg x 1 egg/0.058 kg x 0.1314 mg/µmol
= 11.33 x 0.1 (LOAEL to NOAEL) = 1.133 mg/kg/day
Comments: Assumptions for these calculations are as follows:
1. Concentrations in egg are the same as in the adult
2. Chemical does not accumulate in the adult
3. Eggs were laid 1/day

Values were extrapolated from single exposure.
Final NOAEL: 1.133 mg/kg/day

Compound: Vanadium
Form: Vanadium pentoxide
Reference: Hill, E.F., and M.B. Camardese. 1986. Lethal Dietary Toxicitites of Environmental Contaminants and Pesticides to Coturnix. USFWS Technical Report #2. Washington, DC.
Test Species: Coturnix
Body weight: 0.09 kg (Dunning 1993)
Water consumption: 0.012 L/day
Food consumption: 0.12 kg/day (from controls in study)
Study Duration: 5 days
Exposure Route: Dietary
Endpoint: Death
Dosage: Five concentrations between 500 and 2000 ppm. 15 birds per treatment.
LOEL = 500 ppm dietary

Calculations:

$$\frac{500\ mg\ Va}{kg\ food} X \frac{0.012\ kg}{day} \ / \ 0.09 kg\ bw = 67\ mg / kg / day$$

Comments: Because the length of the exposure was only 5 days and the calculated effect level was an LOEL, an uncertainty factor of 0.010 was multiplied by the value calculated as 67 mg/kg/day.

Final NOAEL: 0.67 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Compound:	Vinyl acetate
Form:	Not applicable
Reference:	Shaw, D.C. 1988. Vinyl acetate: 104 week oral (drinking water) combined chronic toxicity and carcinogenicicty study in the rat following in vitro exposure, Vol. 1. Hazleton Laboratories, UK. Report No. 5531-5/16. EPA Doc. No. 86-0000265. Fiche No. 0TS0514156.
Test Species:	Rat Body weight: 0.35 kg (ORNL 1994) Food consumption: 0.028 kg/day (ORNL 1994)
Study Duration:	2 years
Endpoint:	Altered kidney and whole body weights
Exposure Route:	Oral
Dosage:	NOAEL = 100 mg/kg/day
Calculations:	None
Comments	None
Final NOAEL:	100 mg/kg/day

Compound:	Xylene
Form:	Not applicable
Reference:	Hill, E.F., and M.B. Camardese. 1986. Lethal dietary toxicities of environmental contaminants and pesticides to Coturnix. US Fish and Wildlife Service technical report # 2. Washington, DC.
Test Species:	Coturnix Body weight: 0.09 kg Food consumption: 0.012 kg/day
Study Duration:	5 days
Endpoint:	Death
Exposure Route:	Diet
Dosage:	3 concentrations between 10,000 and 20,000 ppm
Calculations:	((20,000 mg/kg x 0.012 kg /day)/0.09) x 0.1 (subchronic to chronic) = 267 mg/kg/day
Comments:	No observed effects at high dose
Final NOAEL:	267 mg/kg/day

Attachment 2
Table 1
Descriptions of Studies Used to Calculate Mammalian and Avian Benchmarks

Additional Supporting References:

Dunning, J.B. 1993. Handbook of Avian Body Masses. CRC Press. Boca Raton, FL.

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EPA. 1993. Great lakes water quality initiative criteria documents for the protection of wildlife (proposed): DDT, Mercury, 2,3,7,8-TCDD, PCBs. EPA/822/R-93-007. Office of Science and Technology, Washington, DC.

Johnsgard, P.A. 1988. North American Owls: Biology and Natural History. Smithsonian Institution Press. Washington, DC.

Marrett, L.E., and M.L. Sunde. 1968. The use of turkey poults and chickens as test animals for nitrate and nitrite toxicity. Poultry Science 47:511-519.

Nisbet, I.C.T. and P.K. LaGoy. 1992. Toxic equivalency factors (TEFs) for polycyclic aromatic hyrocarbons (PAHs). Reg. Tox. and Pharm. 16:290-300.

ORNL (Oak Ridge National Laboratory). 1994. Toxicological Benchmarks for Wildlife: 1994 Revision. D.M.Opresko, B.E. Sample, and G.W. Suter II. ES/ER/TM-86/R1. September.

Torkelson, T.R., et al. 1958. Toxicity of 1,1,1-trichloroethane as determined on laboratory animals and human subjects. Ind. Hyg. J. 19:353–362.

Attachment 2
Table 2
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Preble's Meadow Jumping Mouse

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Metals						
Aluminum	Mouse	1.930	Ondreicka *et al.* 1966[1]	2.245	80.009	80.009
Antimony	Mouse	0.125	Schroeder *et al.* 1968[1]	0.145	0.346	0.346
Arsenic	Mouse	0.126	Schroeder and Mitchner 1971[1]	0.147	0.682	0.682
Barium	Rat	5.060	Perry *et al.* 1983[1]	14.217	11.894	14.217
Beryllium	Rat	0.660	Schroeder and Mitchner 1971[1]	1.727	0.035	1.727
Cadmium	Mouse	0.191	Schroeder and Mitchner 1971[1]	0.223	0.479	0.479
Chromium[3]	Rat	2,737.000	Ivankovic and Preussmann 1975[1]	7,161.754	0.407	7,161.754
Cobalt	Rat	5.000	ATSDR, TP-90/10	13.192	3.278	13.192
Copper	Mink	11.710	Aulerich *et al.* 1982[1]	43.327	6.361	43.327
Lead	Rat	8.000	Azar *et al.* 1973[1]	20.933	0.561	20.933
Lithium	Rat	9.390	Marathe and Thomas 1986[1]	24.571	0.638	24.571
Magnesium	—	—	—	NA	256.400	256.400
Manganese	Rat	88.000	Laskey *et al.* 1982[1]	230.264	16.422	230.264
Mercury	Rat	0.006	Knoflach *et al.* 1986[1]	0.017	0.014	0.017
Molybdenum	Mouse	0.250	Schroeder *et al.* 1971[2]	0.291	12.061	12.061
Nickel	Rat	40.000	Ambrose *et al.* 1976[1]	104.666	1.216	104.666
Selenium	Mouse	0.075	Schroeder and Mitchner 1971[1]	0.087	0.317	0.317
Silver	Rat	22.220	USDHHS, ATSDR 1990[2]	58.626	0.743	58.626
Strontium	Rat	263.000	Skoryna 1981[1]	688.177	9.869	688.177
Thallium	Rat	0.007	Formigli *et al.* 1986[1]	0.020	0.697	0.697
Tin	Rat	25.000	USFWS 1989	65.961	9.477	65.961
Vanadium	Rat	0.210	Domingo *et al.* 1986[1]	0.498	2.313	2.313
Zinc	Rat	160.000	Schlicker and Cox 1968[1]	418.663	12.079	418.663

Attachment 2
Table 2
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Preble's Meadow Jumping Mouse

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Pesticides and PCBs						
4,4'-DDT	Rat	0.800	Fitzhugh 1948[1]	2.094	—	2.094
Aldrin	Rat	0.200	Treon and Cleveland 1955[1]	0.523	—	0.523
Aroclor-1248	Rhesus monkey	0.010	Linzey 1987[1]	0.064	—	0.064
Aroclor-1254	White-footed mouse	0.135	Linzey 1987[1]	0.142	—	0.142
Aroclor-1260[4]	Rat	6.900	Linzey 1987[1]	18.205	—	18.205
Dieldrin	Rat	0.020	Treon and Cleveland 1955[1]	0.053	—	0.053
Endosulfan sulfate	Rat	0.346	Gupta *et al.* 1978[1]	0.912	—	0.912
Endrin ketone	Rat	0.023	Kavlock *et al.* 1981[2]	0.061	—	0.061
Heptachlor	Rat	0.800	Eisler 1968[1]	2.094	—	2.094
Heptachlor epoxide	Rat	0.250	IRIS	0.660	—	0.660
Methoxychlor	Rat	4.000	Gray *et al.* 1988[1]	10.554	—	10.554
delta-BHC	Rat	1.600	Grant *et al.* 1977[1]	4.186	—	4.186
gamma-BHC (Lindane)	Rat	0.330	Palmer *et al.* 1978[1]	0.871	—	0.871
Semivolatile Organic Compounds						
1,2,4-Trichlorobenzene	Rat	14.800	IRIS 1994	39.049	—	39.049
1,4-Dichlorobenzene		0.000		659.614	—	659.614
2-Chlorophenol		0.000		13.192	—	13.192
2-Methylnaphthalene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	1,163.433	—	1,163.433
2-Methylphenol		0.000		131.923	—	131.923
4-Nitroaniline		0.000		111.771	—	111.771
Acenaphthene	Mouse	175.000	IRIS	1,163.433	—	1,163.433
Acenaphthylene[6]	—	—	—	NA	—	NA
Anthracene	Mouse	1,000.000	IRIS	1,164.277	—	1,164.277
Benzo(a)anthracene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	11.634	—	11.634
Benzo(a)pyrene	Mouse	1.000	Mckenzie and Angevine 1981[1]	1.163	—	1.163
Benzo(b)fluoranthene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	11.634	—	11.634

Attachment 2
Table 2
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Preble's Meadow Jumping Mouse

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Benzo(ghi)perylene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	116.343	—	116.343
Benzo(k)fluoranthene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	11.634	—	11.634
Benzoic acid	—	—	—	NA	—	NA
Benzyl alcohol	Dog	3.130	IRIS	27.308	—	27.308
Bis(2-chloroisopropyl)ether	Mouse	35.800	HEAST	41.681	—	41.681
Bis(2-ethylhexyl)phthalate	Mouse	18.330	Lamb *et al.* 1987	21.321	—	21.321
Butyl benzyl phthalate	Rat	35.380	IARC Monographs	93.349	—	93.349
Chrysene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	116.343	—	116.343
Di-N-butyl phthalate	Mouse	550.000	IRIS	329.807	—	329.807
Di-N-octyl phthalate	Rat	461.540	Peakell 1975[2]	1,217.647	—	1,217.647
Dibenzo(ah)anthracene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	1.163	—	1.163
Dibenzofuran	—	—	—	NA	—	NA
Fluoranthene	Mouse	125.000	IRIS	145.535	—	145.535
Fluorene	Mouse	125.000	IRIS	145.535	—	145.535
Hexachlorobutadiene		0.000		0.528	—	0.528
Hexachloroethane		0.000		2.638	—	2.638
Indeno(1,2,3-cd)pyrene	Mouse	1.000	Mckenzie and Angevine 1981[1]	11.634	—	11.634
Isophorone	Dog	150.000	IRIS	1,308.678	—	1,308.678
N-Nitrosodiphenylamine		0.000		211.076	—	211.076
Naphthalene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	1,163.433	—	1,163.433
Pentachlorophenol	Rat	3.000	IRIS	7.915	—	7.915
Phenanthrene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	1,163.433	—	1,163.433
Phenol	Rat	60.000	IRIS	158.307	—	158.307
Pyrene	Mouse	75.000	IRIS	87.321	—	87.321
Volatile Organic Compounds						
1,1,1-Trichloroethane	Mouse	1,000.000	Lane *et al.* 1982[1]	1,223.894	—	1,223.894
1,1,2,2-Tetrachloroethane		0.000		NA	—	NA

Attachment 2
Table 2
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Preble's Meadow Jumping Mouse

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
1,1-Dichloroethane	Rat	115.000	HEAST	303.422	—	303.422
1,1-Dichloroethene	Rat	30.000	Quast *et al.* 1983[1]	79.154	—	79.154
1,2-Dichloroethane	Mouse	50.000	Lane *et al.* 1982[1]	61.195	—	61.195
1,2-Dichloroethene	Mouse	45.200	Palmer *et al.* 1979[1]	52.630	—	52.630
1,3-Dichloropropene	Rat	3.000	IRIS	7.915	—	7.915
2-Butanone	Rat	1,771.000	IRIS	4,672.704	—	4,672.704
2-Chloroethyl Vinyl Ether	Rat	0.085	Handbook of Toxic and Hazardous	0.224	—	0.224
4-Methyl-2-pentanone	Rat	25.000	Microbial Associates 1986 [1]	65.416	—	65.416
Acetone	Rat	10.000	EPA 1986	26.167	—	26.167
Benzene	Mouse	26.360	Nawrot and Staples 1979[1]	30.662	—	30.662
Chloroform	Rat	15.000	Palmer *et al.* 1979[1]	39.250	—	39.250
Methylene chloride	Rat	5.850	NCA 1982[1]	15.307	—	15.307
Styrene	Dog	200.000	IRIS	1,744.905	—	1,744.905
Tetrachloroethene	Mouse	14.000	IRIS	16.300	—	16.300
Toluene	Rat	25.980	Nawrot and Staples 1979[1]	30.220	—	30.220
Total xylenes	Mouse	2.060	Marks *et al.* 1982[1]	2.396	—	2.396
Trichloroethene	Mouse	146.910	Weissman 1981[2]	171.044	—	171.044
Vinyl acetate	Rat	100.000	HEAST	263.846	—	263.846
Water Quality Parameters					—	
Nitrate/Nitrite[7]	Rat	13.140	Shuval *et al.* 1972[2]	34.669	0.132	34.669

[1]Based on values used in ORNL 1994
[2]Based on values researched by Clemson University
[3]NOAEL for chromium +3
[4]Same as for aroclor-1254
[5]Mixed isomers for delta-BHC
[6]Values are extrapolated from benzo(a)pyrene
[7]Values are for nitrite
[8]Sullivan (1995)

HEAST - Health Effects Assessment Summary Tables
IRIS - EPA's Integrated Risk Information System

Attachment 2
Table 3
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
American Kestrel

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Metals						
Aluminum	Ringed dove	111.400	Carriere *et al.* 1986[1]	122.688	130.867	130.867
Antimony	—	—	—	NA	—	NA
Arsenic	Brown-headed cowbird	2.460	USFWS 1969[1]	1.846	0.053	1.846
Barium	Chicken	20.860	Johnson *et al.* 1960[1]	21.155	3.103	21.155
Beryllium	—	—	—	NA	0.015	0.015
Cadmium	Mallard	1.450	White and Finley 1978[1]	3.115	0.952	3.115
Chromium	Black duck	1.000	Haseltine *et al.*[1]	2.207	1.113	2.207
Cobalt	Chicken	0.017	Galani and Alibhai 1990[2]	0.040	0.076	0.076
Copper	Chicken	33.210	Mehring *et al.* 1960[1]	33.680	15.637	33.680
Lead	American kestrel	3.850	Pattee 1984[1]	3.850	1.223	3.850
Lithium	—	—	—	NA	0.099	0.100
Magnesium	—	—	—	NA	127.452	127.452
Manganese	Turkey poults	32.360	Vohra and Kratzer 1968[2]	21.089	6.067	21.089
Mercury	Mallard	0.006	Heinz 1979[1]	0.014	—	0.014
Molybdenum	Chicken	2.380	Kratzer 1958[2]	2.497	0.135	2.497
Nickel	Mallard duckling	77.400	Cain and Pafford 1981[1]	146.122	3.021	146.122
Selenium	Mallard	0.400	Heinz *et al.* 1987[1]	0.820	0.372	0.820
Silver	Turkey	165.610	Jensen, Peterson, Falen 1974[2]	2,304.896	—	2,304.896
Strontium	Chicken four weeks	8.280	Weber *et al.* 1968[2]	14.151	2.560	14.151
Thallium	—	—	—	NA	0.007	0.007
Tin	—	—	—	NA	11.455	11.455
Vanadium	Coturnix	0.670	Hill and Camardese 1986[2]	0.616	0.279	0.616
Zinc	Mallard	3.000	Gasaway and Buss 1972[1]	6.445	38.207	38.207

Attachment 2
Table 3
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
American Kestrel

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Pesticides and PCBs						
4,4'-DDT	Brown pelican	0.000	Anderson *et al.* 1975[1]	0.001	—	0.001
Aldrin[3]	Barn owl	0.077	Mendenhall *et al.* 1983[1]	0.122	—	0.122
Aroclor-1248	Ring-necked pheasant	0.180	Dahlgren *et al.* 1972[1]	0.361	—	0.361
Aroclor-1254	Ring-necked pheasant	0.180	Dahlgren *et al.* 1972[1]	0.361	—	0.361
Aroclor-1260	Coturnix	2.000	Dahlgren *et al.* 1972[1]	1.838	—	1.838
Dieldrin	Barn-owl	0.077	Mendenhall *et al.* 1983[1]	0.122	—	0.122
Endosulfan sulfate	—	—	—	NA	—	NA
Endrin ketone	—	—	—	NA	—	NA
Heptachlor	Corturnix	0.074	Hill and Camardese 1986[2]	0.068	—	0.068
Heptachlor epoxide	Woodcock	0.007	No author listed	0.008	—	0.008
Methoxychlor	—	—	—	NA	—	NA
delta-BHC	Japanese quail	0.563	Chakravarty and Lahiri 1986[1]	0.603	—	0.603
gamma-BHC (Lindane)	Mallard	2.000	Chakravarty and Lahiri 1986[1]	4.011	—	4.011
Semivolatile Organic Compounds						
1,2,4-Trichlorobenzene	—	—	—	NA	—	NA
1,4-Dichlorobenzene	—	—	—	NA	—	NA
2,4-Dimethylphenol	—	—	—	NA	—	NA
2-Chlorophenol		0.000		41.477	—	41.477
2-Methylnaphthalene	Chicken	33.100	Brunstrom *et al.* 1990[2]	77.625	—	77.625
2-Methylphenol		0.000		NA	—	NA
4-Nitroaniline		0.000		NA	—	NA
Acenaphthene	Chicken	33.100	Brunstrom *et al.* 1990[2]	77.625	—	77.625
Acenaphthylene	—	—	—	NA	—	NA
Anthracene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.078	—	0.078
Benzo(a)anthracene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.776	—	0.776
Benzo(a)pyrene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.078	—	0.078
Benzo(b)fluoranthene	Chicken	0.330	Brunstrom *et al.* 1990[2]	0.774	—	0.774

Attachment 2
Table 3
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
American Kestrel

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Benzo(ghi)perylene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.776	—	0.776
Benzo(k)fluoranthene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.077	—	0.077
Benzoic acid	—	—	—	NA	—	NA
Benzyl alcohol	—	—	—	NA	—	NA
Bis(2-chloroisopropyl)ether	—	—	—	NA	—	NA
Bis(2-ethylhexyl)phthalate	Ringed dove	1.110	Peakall 1974[1]	1.204	—	1.204
Butyl benzyl phthalate	Chicken embryo	96.550	Bower *et al.* 1970[2]	226.426	—	226.426
Chrysene	Chicken	0.331	Brunstrom et al. 1990[2]	0.776	—	0.776
Di-N-butyl phthalate	Ringed dove	0.111	Peakall 1974[1]	0.121	—	0.121
Di-N-octyl phthalate	Chicken	42.240	Bower *et al.* 1970[2]	99.060	—	99.060
Dibenzo(ah)anthracene[4]	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.078	—	0.078
Dibenzofuran	—	—	—	NA	—	NA
Diethyl Phthalate	Chicken	53.100	Bower et al. 1970[2]	124.528	—	124.528
Fluoranthene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.776	—	0.776
Fluorene	Chicken	0.330	Brunstrom *et al.* 1990[2]	0.774	—	0.774
Hexachlorobutadiene		0.000	Brunstrom *et al.* 1990[2]	4.580	—	4.580
Hexachloroethane		0.000	Brunstrom *et al.* 1990[2]	NA	—	NA
Indeno(1,2,3-cd)pyrene	Chicken	0.828	Brunstrom *et al.* 1990[2]	0.194	—	0.194
Isophorone	—	—	—	NA	—	NA
N-Nitrosodiphenylamine		0.000		NA	—	NA
Naphthalene	Chicken	33.100	Brunstrom *et al.* 1990[2]	77.625	—	77.625
Pentachlorophenol	Mallard	16.920	Nebeker *et al.* 1994[2]	18.432	—	18.432
Phenanthrene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.077	—	0.077
Phenol	Agelaius phoeniceus	50.300	Schafer *et al.* 1983[2]	41.477	—	41.477
Pyrene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.776	—	0.776
Volatile Organic Compounds						
1,1,1-Trichloroethane	Chicken	1.150	Elovaara *et al.* 1979[2]	2.697	—	2.697
1,1,2,2-Tetrachloroethane		0.000		NA	—	NA

Attachment 2
Table 3
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
American Kestrel

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
1,1-Dichloroethane	—	—	—	NA	—	NA
1,1-Dichloroethene	—	—	—	NA	—	NA
1,2-Dichloroethane	Chicken	17.200	Alumot *et al.* 1976[1]	40.286	—	40.286
1,2-Dichloroethene	—	—	—	NA	—	NA
1,3-Dichloropropene	—	—	—	NA	—	NA
2-Butanone	—	—	—	NA	—	NA
2-Chloroethyl Vinyl Ether	—	—	—	NA	—	NA
2-Hexanone	—	—	—	NA	—	NA
4-Methyl-2-pentanone	—	—	—	NA	—	NA
Acetone	Chicken	78.000	McLaughlin *et al.* 1965[2]	182.923	—	182.923
Benzene	Chicken	7.586	McLaughlin *et al.* 1965[2]	17.790	—	17.790
Carbon Disulfide	—	—	—	NA	—	NA
Carbon Tetrachloride	—	—	—	95.403	—	95.403
Chlorobenzene	—	—	—	NA	—	NA
Chloroethane	—	—	—	NA	—	NA
Chloroform	—	—	—	NA	—	NA
Chloromethane	—	—	—	NA	—	NA
Ethylbenzene	—	—	—	NA	—	NA
Methylene chloride	Chicken	0.728	Elovaara *et al.* 1979[2]	1.718	—	1.718
Styrene	Chicken	8.970	Vaino et al. 1977[2]	21.036	—	21.036
Tetrachloroethene	Chicken	1.430	Elovaara *et al.* 1979[2]	3.354	—	3.354
Toluene	Chicken	3.966	Elovaara *et al.* 1979[2]	9.301	—	9.301
Total xylenes	Coturnix	267.000	Hill and Camardese 1986[2]	245.363	—	245.363
Trichloroethene	Chicken	1.133	Elovaara *et al.* 1979[2]	2.657	—	2.657
Vinyl acetate	—	—	—	NA	—	NA
Vinyl Chloride	—	—	—	NA	—	NA
Cis-1,3-Dichloropropene	—	—	—	NA	—	NA
Trans-1,2-Dichloroethene	—	—	—	NA	—	NA

Attachment 2
Table 3
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
American Kestrel

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
O-Xylene	—	—	—	NA	—	NA
Water Quality Parameters						
Nitrate/Nitrite[5]	Chicken	1.530	Adams *et al.* 1966[2]	2.007	0.025	2.007

[1]Based on values used in ORNL 1994
[2]Based on values researched by Clemson University
[3]Dieldrin values are used for aldrin
[4]Dibenzo(ah)anthracene values are extrapolated from benzo(a)pyrene
[5]Values are for nitrite
[6]Sullivan (1995)

Attachment 2
Table 4
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Great Blue Heron

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Metals						
Aluminum	Ringed dove	111.400	Carriere *et al.* 1986[1]	45.851	32.721	45.851
Antimony	—	—	—	NA	0.134	0.134
Arsenic	Brown-headed cowbird	2.460	USFWS 1969[1]	0.690	0.034	0.690
Barium	Chicken	20.860	Johnson *et al.* 1960[1]	7.906	0.661	7.906
Beryllium	—	—	—	NA	0.018	0.018
Cadmium	Mallard	1.450	White and Finley 1978[1]	1.164	0.013	1.164
Chromium	Black duck	1.000	Haseltine *et al.*[1]	0.825	1.551	1.551
Cobalt	Chicken	0.017	Galani and Alibhai 1990[2]	0.015	0.112	0.112
Copper	Chicken	33.210	Mehring *et al.* 1960[1]	12.587	9.931	12.587
Lead	American kestrel	3.850	Pattee 1984[1]	1.439	1.082	1.439
Lithium	—	—	—	NA	0.213	0.213
Magnesium	—	—	—	NA	11.932	11.932
Manganese	Turkey poults	32.360	Vohra and Kratzer 1968[2]	23.173	1.113	23.173
Mercury	Mallard	0.006	Heinz 1979[1]	0.005	0.001	0.005
Molybdenum	Chicken	2.380	Kratzer 1958[2]	0.933	0.200	0.933
Nickel	Mallard duckling	77.400	Cain and Pafford 1981[1]	54.608	0.259	54.608
Selenium	Mallard	0.400	Heinz *et al.* 1987[1]	0.306	0.012	0.306
Silver	Turkey	165.610	Jensen, Peterson, Falen 1974[2]	861.381	0.028	861.381
Strontium	Chicken four weeks	8.280	Weber *et al.* 1968[2]	5.288	1.456	5.288
Thallium	—	—	—	NA	0.046	0.046
Tin	—	—	—	NA	15.433	15.433
Vanadium	Coturnix	0.670	Hill and Camardese 1986[2]	0.230	0.168	0.230
Zinc	Mallard	3.000	Gasaway and Buss 1972[1]	2.409	138.711	138.711

Attachment 2
Table 4
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Great Blue Heron

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Pesticides/PCBs						
4,4'-DDT	Brown pelican	0.000	Anderson *et al.* 1975[1]	0.000	—	0.000
Aldrin[3]	Barn owl	0.077	Mendenhall *et al.* 1983[1]	0.046	—	0.046
Aroclor-1248	Ring-necked pheasant	0.180	Dahlgren *et al.* 1972[1]	0.135	—	0.135
Aroclor-1254	Ring-necked pheasant	0.180	Dahlgren *et al.* 1972[1]	0.135	—	0.135
Aroclor-1260	Coturnix	2.000	Dahlgren *et al.* 1972[1]	0.690	—	0.687
Dieldrin	Barn owl	0.077	Mendenhall *et al.* 1983[1]	0.046	—	0.046
Endosulfan sulfate	—	—	—	NA	—	NA
Endrin ketone	—	—	—	NA	—	NA
Heptachlor	Coturnix	0.074	Hill and Camardese 1986[2]	0.025	—	0.025
Heptachlor epoxide	Woodcock	0.007	No author listed	0.003	—	0.003
Methoxychlor	—	—	—	NA	—	NA
delta-BHC	Japanese quail	0.563	Vos *et al.* 1971[1]	0.226	—	0.226
gamma-BHC (Lindane)	Mallard	2.000	Chakravarty and Lahiri 1986[1]	1.500	—	1.500
Semivolatile Organic Compounds						
1,2,4-Trichlorobenzene	—	—	—	NA	—	NA
1,4-Dichlorobenzene				NA	—	NA
2-Chlorophenol		0.000		15.501	—	15.501
2-Methylnaphthalene	Chicken	33.100	Brunstrom *et al.* 1990[2]	29.010	—	29.010
2-Methylphenol		0.000		NA	—	NA
4-Nitroaniline		0.000		NA	—	NA
Acenaphthene	Chicken	33.100	Brunstrom *et al.* 1990[2]	29.010	—	29.010
Acenaphthylene	—	—	—	NA	—	NA
Anthracene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.023	—	0.023
Benzo(a)anthracene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.290	—	0.290
Benzo(a)pyrene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.029	—	0.029
Benzo(b)fluoranthene	Chicken	0.330	Brunstrom *et al.* 1990[2]	0.289	—	0.289
Benzo(ghi)perylene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.290	—	0.290

Attachment 2
Table 4
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Great Blue Heron

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Benzo(k)fluoranthene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.029	—	0.029
Benzoic acid	—	—	—	NA	—	NA
Benzyl alcohol	—	—	—	NA	—	NA
Bis(2-chloroisopropyl)ether	—	—	—	NA	—	NA
Bis(2-ethylhexyl)phthalate	Ringed dove	1.110	Peakall 1974[1]	0.450	—	0.450
Butyl benzyl phthalate	Chicken embryo	96.550	Bower *et al.* 1970[2]	84.619	—	84.619
Chrysene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.290	—	0.290
Di-N-butyl phthalate	Ringed dove	0.111	Peakall 1974[1]	0.045	—	0.045
Di-N-octyl phthalate	Chicken	42.240	Bower *et al.* 1970[2]	37.020	—	37.020
Dibenzo(ah)anthracene[4]	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.029	—	0.029
Dibenzofuran	—	—	—	NA	—	NA
Fluoranthene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.290	—	0.290
Fluorene	Chicken	0.330	Brunstrom *et al.* 1990[2]	0.289	—	0.289
Hexachlorobutadiene		0.000	Brunstrom *et al.* 1990[2]	1.712	—	1.712
Hexachloroethane		0.000	Brunstrom *et al.* 1990[2]	NA	—	NA
Indeno(1,2,3-cd)pyrene	Chicken	0.828	Brunstrom *et al.* 1990[2]	0.073	—	0.073
Isophorone	—	—	—	NA	—	NA
N-Nitrosodiphenylamine		0.000		NA	—	NA
Naphthalene	Chicken	33.100	Brunstrom *et al.* 1990[2]	29.010	—	29.010
Pentachlorophenol	Mallard	16.920	Nebeker *et al.* 1994[2]	6.888	—	6.888
Phenanthrene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.029	—	0.029
Phenol	Agelaius phoeniceus	50.300	Schafer *et al.* 1983[2]	15.501	—	15.501
Pyrene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.290	—	0.290
Volatile Organic Compounds						
1,1,1-Trichloroethane	Chicken	1.150	Elovaara *et al.* 1979[2]	1.008	—	1.008
1,1,2,2-Tetrachloroethane		0.000		NA	—	NA
1,1-Dichloroethane	—	—	—	NA	—	NA
1,1-Dichloroethene	—	—	—	NA	—	NA

Attachment 2
Table 4
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Great Blue Heron

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
1,2-Dichloroethane	Chicken	17.200	Alumot *et al.* 1976[1]	15.067	—	15.067
1,2-Dichloroethene	—	—	—	NA	—	NA
1,3-Dichloropropene	—	—	—	NA	—	NA
2-Butanone	—	—	—	NA	—	NA
2-Chloroethyl Vinyl Ether	—	—	—	NA	—	NA
4-Methyl-2-pentanone	—	—	—	NA	—	NA
Acetone	Chicken	78.000	McLaughlin *et al.* 1965[2]	68.362	—	68.362
Benzene	Chicken	7.586	McLaughlin *et al.* 1965[2]	6.650	—	6.649
Chloroform	—	—	—	NA	—	NA
Methylene chloride	Chicken	0.733	Elovaara *et al.* 1979[2]	0.642	—	0.642
Styrene	Chicken	8.970	Vaino et al. 1977[2]	7.862	—	7.862
Tetrachloroethene	Chicken	1.430	Elovaara *et al.* 1979[2]	1.253	—	1.253
Toluene	Chicken	3.966	Elovaara *et al.* 1979[2]	3.476	—	3.476
Total xylenes	Coturnix	267.000	Hill and Camardese 1986[2]	91.697	—	91.697
Trichloroethene	Chicken	1.133	Elovaara *et al.* 1979[2]	0.993	—	0.993
Vinyl acetate	—	—	—	NA	—	NA
Water Quality Parameters						
Nitrate/Nitrite[5]	Chicken	1.530	Adams *et al.* 1966[2]	0.750	0.943	0.750

[1]Based on values used in ORNL 1994
[2]Based on values researched by Clemson University
[3]Dieldrin values are used for aldrin
[4]Dibenzo(ah)anthracene values are extrapolated from benzo(a)pyrene
[5]Values are for nitrite
[6]Sullivan (1995)

Attachment 2
Table 5
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Mallard

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Metals						
Aluminum	Ringed dove	111.400	Carriere *et al.* 1986[1]	57.422	26.770	57.422
Antimony	—	—	—	NA	0.132	0.132
Arsenic	Mallard	5.135	USFWS 1969[1]	5.128	0.099	5.128
Barium	Chicken	20.860	Johnson *et al.* 1960[1]	9.901	1.816	9.901
Beryllium	—	—	—	NA	0.015	0.015
Cadmium	Mallard	1.450	White and Finley 1978[1]	1.458	0.970	1.458
Chromium	Black duck	1.000	Haseltine *et al.* [1]	1.033	0.080	1.033
Cobalt	Chicken	0.017	Galani and Alibhai 1990[2]	0.019	0.445	0.445
Copper	Chicken	33.210	Mehring *et al.* 1960[1]	15.763	0.365	15.763
Lead	American kestrel	3.850	Pattee 1984[1]	1.802	0.103	1.802
Lithium	—	—	—	NA	0.243	0.243
Magnesium	—	—	—	NA	36.287	36.287
Manganese	Turkey poults	32.360	Vohra and Kratzer 1968[2]	49.511	2.491	49.511
Mercury	Mallard	0.006	Heinz 1979[1]	0.006	0.024	0.024
Molybdenum	Chicken	2.380	Kratzer 1958[2]	1.169	1.478	1.478
Nickel	Mallard duckling	77.400	Cain and Pafford 1981[1]	68.390	0.243	68.390
Selenium	Mallard	0.400	Heinz *et al.* 1987[1]	0.384	0.079	0.384
Silver	Turkey	165.610	Jensen, Peterson, Falen 1974[2]	1,078.772	0.128	1,078.772
Strontium	Chicken four weeks	8.280	Weber *et al.* 1968[2]	6.623	3.147	6.623
Thallium	—	—	—	NA	0.105	0.105
Tin	—	—	—	NA	4.519	4.519
Vanadium	Mallard	11.380	Hill and Camardese 1986[2]	11.500	0.369	11.499
Zinc	Mallard	3.000	Gasaway and Buss 1972[1]	3.017	1.210	3.017

Attachment 2
Table 5
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Mallard

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Pesticides and PCBs						
4,4'-DDT	Brown pelican	0.000	Anderson *et al.* 1975[1]	0.000	—	0.000
Aldrin[3]	Barn owl	0.077	Mendenhall *et al.* 1983[1]	0.057	—	0.057
Aroclor-1248	Ring-necked pheasant	0.180	Dahlgren *et al.* 1972[1]	0.172	—	0.172
Aroclor-1254	Ring-necked pheasant	0.150	Dahlgren *et al.* 1972[1]	0.172	—	0.172
Aroclor-1260	Coturnix	2.000	Dahlgren *et al.* 1972[1]	0.860	—	0.860
Dieldrin	Barn-owl	0.077	Mendenhall *et al.* 1983[1]	0.057	—	0.057
Endosulfan sulfate	—	—	—	NA	—	NA
Endrin ketone	—	—	—	NA	—	NA
Heptachlor	Coturnix	0.074	Hill and Camardese 1986[2]	0.032	—	0.032
Heptachlor epoxide	Woodcock	0.007	No author listed	0.004	—	0.004
Methoxychlor	—	—	—	NA	—	NA
delta-BHC	Japanese quail	0.563	Vos *et al.* 1971[1]	0.287	—	0.287
gamma-BHC (Lindane)	Mallard	2.000	Chakravarty and Lahiri 1986[1]	2.000	—	2.000
Semivolatile Organic Compounds						
1,2,4-Trichlorobenzene	—	—	—	NA	—	NA
1,4-Dichlorobenzene	—	—	—	NA	—	NA
2-Chlorophenol		0.000		19.413	—	19.413
2-Methylnaphthalene	Chicken	33.100	Brunstrom *et al.* 1990[2]	36.331	—	36.331
2-Methylphenol		0.000		NA	—	NA
4-Nitroaniline		0.000		NA	—	NA
Acenaphthene	Chicken	33.100	Brunstrom *et al.* 1990[2]	36.331	—	36.331
Acenaphthylene	—	—	—	NA	—	NA
Anthracene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.029	—	0.029
Benzo(a)anthracene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.363	—	0.363
Benzo(b)pyrene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.036	—	0.036
Benzo(b)fluoranthene	Chicken	0.330	Brunstrom *et al.* 1990[2]	0.362	—	0.362
Benzo(ghi)perylene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.363	—	0.363

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Table 5
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Mallard

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Benzo(k)fluoranthene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.036	—	0.036
Benzoic acid	—	—	—	NA	—	NA
Benzyl alcohol	—	—	—	NA	—	NA
Bis(2-chloroisopropyl)ether	—	—	—	NA	—	NA
Bis(2-ethylhexyl)phthalate	Ringed dove	1.110	Peakall 1974[1]	0.573	—	0.573
Butyl benzyl phthalate	Chicken embryo	96.550	Bower *et al.* 1970[2]	105.980	—	105.975
Chrysene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.363	—	0.363
Di-N-butyl phthalate	Ringed dove	0.111	Peakall 1974[1]	0.057	—	0.057
Di-N-octyl phthalate	Chicken	42.240	Bower *et al.* 1970[2]	46.363	—	46.363
Dibenzo(ah)anthracene[4]	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.036	—	0.036
Dibenzofuran	—	—	—	NA	—	NA
Diethyl Phthalate	Chicken	53.100	Bower et al. 1970[2]	58.284	—	58.284
Fluoranthene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.363	—	0.363
Fluorene	Chicken	0.330	Brunstrom *et al.* 1990[2]	0.362	—	0.362
Hexachlorobutadiene		0.000	Brunstrom *et al.* 1990[2]	2.143	—	2.143
Hexachloroethane		0.000	Brunstrom *et al.* 1990[2]	NA	—	NA
Indeno(1,2,3-cd)pyrene	Chicken	0.828	Brunstrom *et al.* 1990[2]	0.091	—	0.091
Isophorone	—	—	—	NA	—	NA
N-Nitrosodiphenylamine		0.000		NA	—	NA
Naphthalene	Chicken	33.100	Brunstrom *et al.* 1990[2]	36.331	—	36.331
Pentachlorophenol	Mallard	16.920	Nebeker *et al.* 1994[2]	16.920	—	16.920
Phenanthrene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.036	—	0.036
Phenol	Agelaius phoeniceus	50.300	Schafer *et al.* 1983[2]	19.413	—	19.413
Pyrene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.363	—	0.363
Volatile Organic Compounds						
1,1,1-Trichloroethane	Chicken	1.150	Elovaara *et al.* 1979[2]	1.262	—	1.262
1,1,2,2-Tetrachloroethane		0.000		NA	—	NA
1,1-Dichloroethane	—	—	—	NA	—	NA

Attachment 2
Table 5
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Mallard

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
1,1-Dichloroethene	—	—	—	NA	—	NA
1,2-Dichloroethane	Chicken	17.200	Alumot *et al.* 1976b[1]	19.169	—	19.169
1,2-Dichloroethene	—	—	—	NA	—	NA
1,3-Dichloropropene	—	—	—	NA	—	NA
2-Butanone	—	—	—	NA	—	NA
2-Chloroethyl vinyl ether	—	—	—	NA	—	NA
2-Hexanone	—	—	—	NA	—	NA
4-Methyl-2-pentanone	—	—	—	NA	—	NA
Acetone	Chicken	78.000	McLaughlin *et al.* 1965[2]	85.614	—	85.614
Benzene	Chicken	7.586	McLaughlin *et al.* 1965[2]	8.327	—	8.327
Carbon disulfide	—	—	—	NA	—	NA
Carbon tetrachloride	—	—	—	44.652	—	44.652
Chlorobenzene	—	—	—	NA	—	NA
Chloroethane	—	—	—	NA	—	NA
Chloroform	—	—	—	NA	—	NA
Chloromethane	—	—	—	NA	—	NA
Ethylbenzene	—	—	—	NA	—	NA
Methylene chloride	Chicken	0.733	Elovaara *et al.* 1979[2]	0.804	—	0.804
Styrene	Chicken	8.970	Elovaara *et al.* 1979[2]	9.846	—	9.846
Tetrachloroethene	Chicken	1.430	Elovaara *et al.* 1979[2]	1.570	—	1.570
Toluene	Chicken	3.966	Elovaara *et al.* 1979[2]	4.353	—	4.353
Total xylenes	Coturnix	267.000	Hill and Camardese 1986[2]	114.839	—	114.839
Trichloroethene	Chicken	1.133	Elovaara *et al.* 1979[2]	1.244	—	1.244
Vinyl acetate	—	—	—	NA	—	NA
Vinyl chloride	—	—	—	NA	—	NA
cis-1,3-dichloropropene	—	—	—	NA	—	NA
trans-1,2-dichloroethene	—	—	—	NA	—	NA
O-Xylene	—	—	—	NA	—	NA

Attachment 2
Table 5
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Mallard

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Water Quality Parameters						
Nitrite	Chicken	1.530	Adams et al. 1966[2]	0.939	—	0.939
Nitrate/Nitrite[5]	Chicken	1.530	Adams *et al.* 1966[2]	0.939	0.054	0.939

[1]Based on values used in ORNL 1994
[2]Based on values researched by Clemson University
[3]Dieldrin values are used for aldrin
[4]Dibenzo(ah)anthracene values are extrapolated from benzo(a)pyrene
[5]Values are for nitrite
[6]Sullivan (1995)

Attachment 2
Table 6
NOAELS and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Coyote

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[8] (mg/kg)	TRV (mg/kg)
Metals						
Aluminum	Mouse	1.930	Ondreicka *et al.* 1966[1]	0.261	20.639	20.639
Antimony	Mouse	0.125	Schroeder *et al.* 1968[1]	0.017	0.170	0.170
Arsenic	Mouse	0.126	Schroeder and Mitchner 1971[1]	0.017	0.063	0.063
Barium	Rat	5.060	Perry *et al.* 1983[1]	1.654	1.548	1.654
Beryllium	Rat	0.660	Schroeder and Mitchner 1971[1]	0.201	0.017	0.201
Cadmium	Mouse	0.191	Schroeder and Mitchner 1971[1]	0.026	1.352	0.135
Chromium[3]	Rat	2,737.000	Ivankovic and Preussmann 1975[1]	832.996	0.352	832.996
Cobalt	Rat	5.000	ATSDR, TP-90/10	1.510	0.278	1.510
Copper	Mink	11.710	Aulerich *et al.* 1982[1]	5.041	1.089	5.041
Lead	Rat	8.000	Azar *et al.* 1973[1]	2.435	0.148	2.435
Lithium	Rat	9.390	Marathe and Thomas 1986[1]	2.856	0.318	2.856
Magnesium	—	—	—	NA	51.154	51.154
Manganese	Rat	88.000	Laskey *et al.* 1982[1]	26.783	1.617	26.783
Mercury	Rat	0.006	Knoflach *et al.* 1986[1]	0.002	0.001	0.002
Molybdenum	Mouse	0.250	Schroeder *et al.* 1971[2]	0.033	0.768	0.768
Nickel	Rat	40.000	Ambrose *et al.* 1976[1]	12.174	1.038	12.174
Selenium	Mouse	0.075	Schroeder and Mitchner 1971[1]	0.010	0.137	0.137
Silver	Rat	22.220	USDHHS, ATSDR 1990[2]	6.711	0.058	6.711
Strontium	Rat	263.000	Skoryna 1981[1]	80.043	2.680	80.043
Thallium	Rat	0.007	Formigli *et al.* 1986[1]	0.002	0.074	0.074
Tin	Rat	25.000	USFWS 1989	7.551	4.035	7.551
Vanadium	Rat	0.210	Domingo *et al.* 1986[1]	0.058	0.255	0.255
Zinc	Rat	160.000	Schlicker and Cox 1968[1]	48.696	4.836	48.696

Attachment 2
Table 6
NOAELS and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Coyote

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[8] (mg/kg)	TRV (mg/kg)
Pesticides and PCBs						
4,4'-DDT	Rat	0.800	Fitzhugh 1948[1]	0.243	—	0.243
Aldrin	Rat	0.200	Treon and Cleveland 1955[1]	0.061	—	0.061
Aroclor-1248[4]	Rhesus monkey	0.010	Linzey 1987[1]	0.007	—	0.007
Aroclor-1254	White-footed mouse	0.135	Linzey 1987[1]	0.059	—	0.059
Aroclor-1260[4]	Rat	6.900	Linzey 1987[1]	2.084	—	2.084
Dieldrin	Rat	0.020	Treon and Cleveland 1955[1]	0.006	—	0.006
Endosulfan sulfate	Rat	0.346	Gupta *et al.* 1978[1]	0.104	—	0.104
Endrin ketone	Rat	0.023	Kavlock *et al.* 1981[2]	0.007	—	0.007
Heptachlor	Rat	0.800	Eisler 1968[1]	0.243	—	0.243
Heptachlor epoxide	Dog	0.125	IRIS	0.125	—	0.125
Methoxychlor	Rat	4.000	Gray *et al.* 1988[1]	1.208	—	1.208
delta-BHC[5]	Rat	1.600	Grant *et al.* 1977[1]	0.006	—	0.006
gamma-BHC (Lindane)	Rat	8.000	Palmer *et al.* 1978[1]	2.435	—	2.435
Semivolatile Organic Compounds						
1,2,4-Trichlorobenzene	Rat	14.800	IRIS 1994	4.470	—	4.470
1,4-Dichlorobenzene		0.000		75.506	—	75.506
2-Chlorophenol		0.000		1.510	—	1.510
2-Methylnaphthalene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	135.026	—	135.026
2-Methylphenol		0.000		15.101	—	15.101
4-Nitroaniline		0.000		12.794	—	12.794
Acenaphthene	Mouse	175.000	IRIS	23.323	—	135.026
Acenaphthylene	—	—	—	NA	—	NA
Anthracene	Mouse	1,000.000	IRIS	133.274	—	133.274
Benzo(a)anthracene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	1.350	—	1.350
Benzo(a)pyrene	Mouse	1.000	Mckenzie and Angevine 1981[1]	0.135	—	0.135
Benzo(b)fluoranthene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	1.350	—	1.350
Benzo(ghi)perylene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	13.503	—	13.503

Attachment 2
Table 6
NOAELS and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Coyote

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[8] (mg/kg)	TRV (mg/kg)
Benzo(k)fluoranthene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	1.350	—	1.350
Benzoic acid	—	—	—	NA	—	NA
Benzyl alcohol	Dog	3.130	IRIS	3.126	—	3.126
Bis(2-chloroisopropyl)ether	Mouse	35.800	HEAST	4.771	—	4.771
Bis(2-ethylhexyl)phthalate	Mouse	18.330	Lamb *et al.* 1987	2.480	—	2.480
Butyl benzyl phthalate	Rat	35.380	IARC Monographs	10.686	—	10.686
Chrysene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	13.503	—	13.503
Di-N-butyl phthalate	Mouse	550.000	IRIS	74.412	—	74.412
Di-N-octyl phthalate	Rat	461.540	Peakell 1975[2]	139.384	—	139.384
Dibenzo(ah)anthracene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	0.135	—	0.135
Dibenzofuran	—	—	—	NA	—	NA
Fluoranthene	Mouse	125.000	IRIS	16.659	—	16.659
Fluorene	Mouse	125.000	IRIS	16.659	—	16.659
Hexachlorobutadiene		0.000		0.060	—	0.060
Hexachloroethane		0.000		0.302	—	0.302
Indeno(1,2,3-cd)pyrene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	1.350	—	1.350
Isophorone	Dog	150.000	IRIS	149.804	—	149.804
N-Nitrosodiphenylamine		0.000		24.162	—	24.162
Naphthalene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	135.026	—	135.026
Pentachlorophenol	Rat	3.000	IRIS	0.906	—	0.906
Phenanthrene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	135.026	—	135.026
Phenol	Rat	60.000	IRIS	18.121	—	18.121
Pyrene	Mouse	75.000	IRIS	9.996	—	9.996
Volatile Organic Compounds						
1,1,1-Trichloroethane	Mouse	1,000.000	Lane *et al.* 1982[1]	142.350	—	142.350
1,1,2,2-Tetrachloroethane		0.000		NA	—	NA
1,1-Dichloroethane	Rat	115.000	HEAST	34.733	—	34.733
1,1-Dichloroethene	Dog	2.500	Quast *et al.* 1983[1]	2.497	—	2.497

Attachment 2
Table 6
NOAELS and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Coyote

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[8] (mg/kg)	TRV (mg/kg)
1,2-Dichloroethane	Mouse	50.000	Lane *et al.* 1982[1]	7.118	—	7.118
1,2-Dichloroethene	Mouse	45.200	Palmer *et al.* 1979[1]	6.020	—	6.024
1,3-Dichloropropene	Rat	3.000	IRIS	0.906	—	0.906
2-Butanone	Rat	1,771.000	IRIS	534.882	—	534.882
2-Chloroethyl Vinyl Ether	Rat	0.085	Handbook of Toxic and Hazardous Che	0.026	—	0.026
4-Methyl-2-pentanone	Rat	25.000	Microbial Associates 1986 [1]	7.609	—	7.609
Acetone	Rat	10.000	EPA 1986	3.043	—	3.043
Benzene	Mouse	26.360	Nawrot and Staples 1979[1]	3.567	—	3.567
Chloroform	Rat	15.000	Palmer *et al.* 1979[1]	4.565	—	4.565
Methylene chloride	Rat	5.850	NCA 1982[1]	1.780	—	1.780
Styrene	Dog	200.000	IRIS	199.738	0.008	199.738
Tetrachloroethene	Mouse	14.000	IRIS	1.866	—	1.866
Toluene	Rat	25.980	Nawrot and Staples 1979[1]	5.510	—	3.515
Total xylenes	Mouse	2.060	Marks *et al.* 1982[1]	0.279	—	0.279
Trichloroethene	Mouse	146.910	Weissman 1980[2]	19.579	—	19.579
Vinyl acetate	Rat	100.000	HEAST	30.202	—	30.202
Water Quality Parameters						
Nitrate/Nitrite[7]	Rat	13.140	Shuval *et al.* 1972[2]	3.969	0.051	3.969

[1]Based on values used in ORNL 1994
[2]Based on values researched by Clemson University
[3]NOAEL for chromium +3
[4]Same as for aroclor-1254
[5]Mixed isomers for delta-BHC
[6]Values are extrapolated from benzo(a)pyrene
[7]Values are for nitrite
[8]Sullivan (1995)

HEAST - Health Effects Assessment Summary Tables
IRIS - EPA's Integrated Risk Information System

Attachment 2
Table 7
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Mule Deer

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[8] (mg/kg)	TRV (mg/kg)
Metals						
Aluminum	Mouse	1.930	Ondreicka *et al.* 1966[1]	0.149	21.331	21.331
Antimony	Mouse	0.125	Schroeder *et al.* 1968[1]	0.009	0.009	0.009
Arsenic	Mouse	0.126	Schroeder and Mitchner 1971[1]	0.120	0.120	0.120
Barium	Rat	5.060	Perry *et al.* 1983[1]	0.945	2.154	2.154
Beryllium	Rat	0.660	Schroeder and Mitchner 1975[1]	0.115	0.003	0.115
Cadmium	Mouse	0.191	Schroeder and Mitchner 1971[1]	0.015	0.048	0.048
Chromium[3]	Rat	2,737.000	Ivankovic and Preussmann 1975[1]	476.065	0.074	476.065
Cobalt	Rat	5.000	ATSDR, TP-91/10	0.856	0.565	0.856
Copper	Mink	11.710	Aulerich *et al.* 1982[1]	2.880	0.378	2.880
Lead	Rat	8.000	Azar *et al.* 1973[1]	1.391	0.076	1.391
Lithium	Rat	9.390	Marathe and Thomas 1986[1]	1.633	0.029	1.633
Magnesium	—	—	—	NA	46.422	46.422
Manganese	Rat	88.000	Laskey *et al.* 1982[1]	15.306	3.306	15.306
Mercury	Rat	0.006	Knoflach *et al.* 1986[1]	0.001	0.002	0.002
Molybdenum	Mule deer	3.230	—	2.200	2.154	2.200
Nickel	Rat	40.000	Ambrose *et al.* 1976[1]	6.957	0.197	6.957
Selenium	Mouse	0.075	Schroeder and Mitchner 1971[1]	0.006	0.054	0.054
Silver	Rat	22.220	USDHHS, ATSDR 1990[2]	3.806	0.127	3.806
Strontium	Rat	263.000	Skoryna 1981[1]	45.745	1.308	45.745
Thallium	Rat	0.007	Formigli *et al.* 1986[1]	0.001	0.114	0.114
Tin	Rat	25.000	USFWS 1989	4.282	1.681	4.282
Vanadium	Rat	0.210	Domingo *et al.* 1986[1]	0.034	0.399	0.399
Zinc	Rat	160.000	Schlicker and Cox 1968[1]	27.830	0.826	27.830

Attachment 2
Table 7
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Mule Deer

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[8] (mg/kg)	TRV (mg/kg)
Pesticides and PCBs						
4,4'-DDT	Rat	0.800	Fitzhugh 1948[1]	0.139	—	0.139
Aldrin	Rat	0.200	Treon and Cleveland 1955[1]	0.034	—	0.034
Aroclor-1248	Rhesus monkey	0.010	Linzey 1987[1]	0.004	—	0.004
Aroclor-1254	White-footed mouse	0.135	Linzey 1987[1]	0.009	—	0.009
Aroclor-1260[4]	Rat	6.900	Linzey 1987[1]	1.182	—	1.182
Dieldrin	Rat	0.020	Treon and Cleveland 1955[1]	0.003	—	0.003
Endosulfan sulfate	Rat	0.346	Gupta *et al.* 1978[1]	0.059	—	0.059
Endrin ketone	Rat	0.023	Kavlock *et al.* 1981[2]	0.004	—	0.004
Heptachlor	Rat	0.800	Eisler 1968[1]	0.139	—	0.139
Heptachlor epoxide	Dog	0.125	IRIS	0.071	—	0.071
Methoxychlor	Rat	4.000	Gray *et al.* 1988[1]	0.685	—	0.685
delta-BHC[5]	Rat	1.600	Grant *et al.* 19771	0.278	—	0.278
gamma-BHC (Lindane)	Rat	8.000	Palmer *et al.* 1978[1]	1.391	—	1.391
Semivolatile Organic Compounds						
1,2,4-Trichlorobenzene	Rat	14.800	IRIS	2.535	—	2.535
1,4-Dichlorobenzene		0.000		42.825	—	42.825
2-Chlorophenol		0.000		0.856	—	0.856
2-Methylnaphthalene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	77.285	—	77.285
2-Methylphenol		0.000		8.565	—	8.565
4-Nitroaniline		0.000		7.257	—	7.257
Acenaphthene	Mouse	175.000	IRIS	77.285	—	77.285
Acenaphthylene	—	—	—	NA	—	NA
Anthracene	Mouse	1,000.000	IRIS	75.590	—	75.590
Benzo(a)anthracene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	0.773	—	0.773
Benzo(a)pyrene	Mouse	1.000	Mckenzie and Angevine 1981[1]	0.077	—	0.077
Benzo(b)fluoranthene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	0.773	—	0.773
Benzo(ghi)perylene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	7.728	—	7.728

Attachment 2
Table 7
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Mule Deer

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[8] (mg/kg)	TRV (mg/kg)
Benzo(k)fluoranthene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	0.773	—	0.773
Benzoic acid	—	—	—	NA	—	NA
Benzyl alcohol	Dog	3.130	IRIS	1.773	—	1.773
Bis(2-chloroisopropyl)ether	Mouse	35.800	HEAST.1994	2.706	—	2.706
Bis(2-ethylhexyl)phthalate	Mouse	18.330	Lamb *et al.* 1987	1.417	—	1.417
Butyl benzyl phthalate	Rat	35.380	IARC Monographs	6.061	—	6.061
Chrysene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	7.728	—	7.728
Di-N-butyl phthalate	Mouse	550.000	Lamb *et al.* 1987	42.527	—	42.527
Di-N-octyl phthalate	Rat	461.540	Peakall 1975[2]	79.055	—	79.055
Dibenzo(ah)anthracene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	0.077	—	0.077
Dibenzofuran	—	—	—	NA	—	NA
Fluoranthene	Mouse	125.000	IRIS	9.449	—	9.449
Fluorene	Mouse	125.000	IRIS	9.449	—	9.449
Hexachlorobutadiene		0.000		0.034	—	0.034
Hexachloroethane		0.000		0.171	—	0.171
Indeno(1,2,3-cd)pyrene	Mouse	1.000	Mckenzie and Angevine 1981[1]	0.773	—	0.773
Isophorone	Dog	150.000	IRIS	84.965	—	84.965
N-Nitrosodiphenylamine		0.000		13.704	—	13.704
Naphthalene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	77.285	—	77.285
Pentachlorophenol	Rat	3.000	IRIS	0.514	—	0.514
Phenanthrene[6]	Mouse	1.000	Mckenzie and Angevine 1981[1]	77.285	—	77.285
Phenol	Rat	60.000	IRIS	10.278	—	10.278
Pyrene	Mouse	75.000	IRIS	5.669	—	5.669
Volatile Organic Compounds						
1,1,1-Trichloroethane	Mouse	1,000.000	Lane *et al* 1982[1]	81.354	—	81.354
1,1,2,2-Tetrachloroethane		0.000		NA	—	NA
1,1-Dichloroethane	Rat	115.000	HEAST	19.699	—	19.699
1,1-Dichloroethene	Dog	2.500	Quast *et al.* 1983[1]	1.416	—	1.416

Attachment 2
Table 7
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Mule Deer

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[8] (mg/kg)	TRV (mg/kg)
1,2-Dichloroethane	Mouse	50.000	Lane *et al.* 1982[1]	4.068	—	4.068
1,2-Dichloroethene	Mouse	45.200	Palmer *et al.* 1979[1]	3.417	—	3.417
1,3-Dichloropropene	Rat	3.000	IRIS	0.514	—	0.514
2-Butanone	Rat	1,771.000	IRIS	303.372	—	303.372
2-Chloroethyl vinyl ether	Rat	0.085	Handbook of Toxic and Hazardous Che	0.015	—	0.015
4-Methyl-2-pentanone	Rat	25.000	Microbial Associates 1986 [1]	4.348	—	4.348
Acetone	Rat	10.000	EPA 1986	1.739	—	1.739
Benzene	Mouse	26.360	Nawrot and Staples 1979[1]	2.038	—	2.038
Chloroform	Rat	15.000	Palmer *et al.* 1979[1]	2.609	—	2.609
Methylene chloride	Rat	5.850	NCA 1982[1]	1.018	—	1.018
Styrene	Dog	200.000	IRIS	113.287	—	113.287
Tetrachloroethene	Mouse	14.000	IRIS	1.058	—	1.058
Toluene	Rat	25.980	Nawrot and Staples 1979[1]	2.008	—	2.008
Total xylenes	Mouse	2.060	Marks *et al.* 1982[1]	0.159	—	0.159
Trichloroethene	Mouse	146.910	Weissman 1980[2]	11.105	—	11.105
Vinyl acetate	Rat	100.000	HEAST	17.130	—	17.130
Water Quality Parameters						NA
Nitrate/Nitrite[7]	Rat	13.140	Shuval *et al.* 1972[2]	2.251	0.006	2.251

[1]Based on values used in ORNL 1994
[2]Based on values researched by Clemson University
[3]NOAEL for chromium +3
[4]Same as for aroclor-1254
[5]Mixed isomers for delta-BHC
[6]Values are extrapolated from benzo(a)pyrene
[7]Values are for nitrite
[8]Sullivan (1995)

HEAST - Health Effects Assessment Summary Tables
IRIS - EPA's Integrated Risk Information System

Attachment 2
Table 8
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Red-tailed Hawk

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Metals						
Aluminum	Ringed dove	111.400	Carriere *et al.* 1986[1]	58.820	53.637	58.820
Antimony	—	—	—	NA	—	NA
Arsenic	Brown-headed cowbird	2.460	USFWS 1969[1]	0.885	0.020	0.885
Barium	Chicken	20.860	Johnson *et al.* 1960[1]	10.142	1.566	10.142
Beryllium	—	—	—	NA	0.006	0.006
Cadmium	Mallard	1.450	White and Finley 1978[1]	1.494	0.256	1.494
Chromium	Black duck	1.000	Haseltine *et al.*[1]	1.058	0.736	1.058
Cobalt	Chicken	0.017	Galani and Alibhai 1990[2]	0.019	0.028	0.028
Copper	Chicken	33.210	Mehring *et al.* 1960[1]	16.147	2.199	16.147
Lead	American kestrel	3.850	Pattee 1984[1]	1.846	0.326	1.846
Lithium	—	—	—	NA	0.037	0.037
Magnesium	—	—	—	NA	80.217	80.217
Manganese	Turkey poults	32.360	Vohra and Kratzer 1968[2]	12.701	2.685	12.701
Mercury	Mallard	0.006	Heinz 1979[1]	0.007	—	0.007
Molybdenum	Chicken	2.380	Kratzer 1958[2]	1.197	0.051	1.197
Nickel	Mallard duckling	77.400	Cain and Pafford 1981[1]	70.054	2.077	70.054
Selenium	Mallard	0.400	Heinz *et al.* 1987[1]	0.393	0.259	0.393
Silver	Turkey	165.610	Jensen, Peterson, Falen 1974[2]	1,105.027	—	1,105.027
Strontium	Chicken four weeks	8.280	Weber *et al.* 1968[2]	6.784	1.673	6.784
Thallium	—	—	—	NA	0.003	0.003
Tin	—	—	—	NA	7.914	7.914
Vanadium	Coturnix	0.670	Hill and Camardese 1986[2]	0.295	0.105	0.295
Zinc	Mallard	3.000	Gasaway and Buss 1972[1]	3.090	10.863	10.863

Attachment 2
Table 8
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Red-tailed Hawk

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Pesticides and PCBs						
4,4'-DDT	Brown pelican	0.000	Anderson *et al.* 1975[1]	0.000	—	0.000
Aldrin[3]	Barn owl	0.077	Mendenhall *et al.* 1983[1]	0.059	—	0.059
Aroclor-1248	Ring-necked pheasant	0.180	Dahlgren *et al.* 1972[1]	0.173	—	0.173
Aroclor-1254	Ring-necked pheasant	0.180	Dahlgren *et al.* 1972[1]	0.173	—	0.173
Aroclor-1260	Coturnix	2.000	Dahlgren *et al.* 1972[1]	0.881	—	0.881
Dieldrin	Barn-owl	0.077	Mendenhall *et al.* 1983[1]	0.059	—	0.059
Endosulfan sulfate	—	—	—	NA	—	NA
Endrin ketone	—	—	—	NA	—	NA
Heptachlor	Coturnix	0.074	Hill and Camardese 1986[2]	0.033	—	0.033
Heptachlor epoxide	Woodcock	0.007	No author listed	0.004	—	0.004
Methoxychlor	—	—	—	NA	—	NA
delta-BHC	Japanese quail	0.567	Vos *et al.* 1971[1]	0.289	—	0.289
gamma-BHC (Lindane)	Mallard	2.000	Chakravarty and Lahiri 1986[1]	1.923	—	1.923
Semivolatile Organic Compounds						
1,2,4-Trichlorobenzene	—	—	—	NA	—	NA
1,4-Dichlorobenzene	—	—	—	NA	—	NA
2,4-Dimethylphenol	—	—	—	NA	—	NA
2-Chlorophenol		0.000		19.885	—	19.885
2-Methylnaphthalene	Chicken	33.100	Brunstrom *et al.* 1990[2]	37.215	—	37.215
2-Methylphenol		0.000		NA	—	NA
4-Methylphenol	—	—	—	NA	—	NA
4-Nitroaniline		0.000		NA	—	NA
Acenaphthene	Chicken	33.100	Brunstrom *et al.* 1990[2]	37.215	—	37.215
Acenaphthylene	—	—	—	NA	—	NA
Anthracene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.037	—	0.037
Benzo(a)anthracene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.372	—	0.372
Benzo(a)pyrene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.037	—	0.037

Attachment 2
Table 8
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Red-tailed Hawk

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Benzo(b)fluoranthene	Chicken	0.330	Brunstrom *et al.* 1990[2]	0.371	—	0.371
Benzo(ghi)perylene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.372	—	0.372
Benzo(k)fluoranthene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.037	—	0.037
Benzoic acid	—	—	—	NA	—	NA
Benzyl alcohol	—	—	—	NA	—	NA
Bis(2-chloroisopropyl)ether	—	—	—	NA	—	NA
Bis(2-ethylhexyl)phthalate	Ringed dove	1.110	Peakall 1974[1]	0.577	—	0.577
Butyl benzyl phthalate	Chicken embryo	96.550	Bower *et al.* 1970[2]	108.554	—	108.554
Chrysene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.372	—	0.372
Di-N-butyl phthalate	Ringed dove	0111	Peakall 1974[1]	0.058	—	0.058
Di-N-octyl phthalate	Chicken	42.240	Bower *et al.* 1970[2]	47.492	—	47.492
Dibenzo(ah)anthracene[4]	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.037	—	0.037
Dibenzofuran	—	—	—	NA	—	NA
Diethyl Phthalate	Chicken	53.100	Bower et al. 1970[2]	59.702	—	59.702
Fluoranthene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.372	—	0.372
Fluorene	Chicken	0.330	Brunstrom *et al.* 1990[2]	0.371	—	0.371
Hexachlorobutadiene		0.000	Brunstrom *et al.* 1990[2]	2.196	—	2.196
Hexachloroethane		0.000	Brunstrom *et al.* 1990[2]	NA	—	NA
Indeno(1,2,3-cd)pyrene	Chicken	0.828	Brunstrom *et al.* 1990[2]	0.093	—	0.093
Isophorone	—	—	—	NA	—	NA
N-Nitrosodiphenylamine		0.000		NA	—	NA
Naphthalene	Chicken	33.100	Brunstrom *et al.* 1990[2]	37.215	—	37.215
Pentachlorophenol	Mallard	16.920	Nebeker *et al.* 1994[2]	8.837	—	8.837
Phenanthrene	Chicken	0.033	Brunstrom *et al.* 1990[2]	0.037	—	0.037
Phenol	Agelaius phoeniceus	50.300	Schafer *et al.* 1983[2]	19.885	—	19.885
Pyrene	Chicken	0.331	Brunstrom *et al.* 1990[2]	0.372	—	0.372
Volatile Organic Compounds						
1,1,1-Trichloroethane	Chicken	1.150	Elovaara *et al.* 1979[2]	1.293	—	1.293

Attachment 2
Table 8
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Red-tailed Hawk

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
1,1,2,2-Tetrachloroethane		0.000		NA	—	NA
1,1-Dichloroethane	—	—	—	NA	—	NA
1,1-Dichloroethene	—	—	—	NA	—	NA
1,2-Dichloroethane	Chicken	17.200	Alumot *et al.* 1976[1]	19.314	—	19.314
1,2-Dichloroethene	—	—	—	NA	—	NA
1,3-Dichloropropene	—	—	—	NA	—	NA
2-Butanone	—	—	—	NA	—	NA
2-Chloroethyl vinyl ether	—	—	—	NA	—	NA
2-Hexanone	—	—	—	NA	—	NA
4-Methyl-2-pentanone	—	—	—	NA	—	NA
Acetone	Chicken	78.000	McLaughlin *et al.* 1965[2]	87.698	—	87.698
Benzene	Chicken	7.586	McLaughlin *et al.* 1965[2]	8.530	—	8.529
Carbon disulfide	—	—	—	NA	—	NA
Carbon tetrachloride	—	—	—	45.738	—	45.738
Chlorobenzene	—	—	—	NA	—	NA
Chloroethane	—	—	—	NA	—	NA
Chloroform	—	—	—	NA	—	NA
Chloromethane	—	—	—	NA	—	NA
Ethylbenzene	—	—	—	NA	—	NA
Methylene chloride	Chicken	0.733	Elovaara *et al.* 1979[2]	0.824	—	0.824
Styrene	Chicken	8.970	Elovaara *et al.* 1979[2]	10.085	—	10.085
Tetrachloroethene	Chicken	1.430	Elovaara *et al.* 1979[2]	1.608	—	1.608
Toluene	Chicken	3.660	Elovaara *et al.* 1979[2]	4.459	—	4.459
Total xylenes	Coturnix	267.000	Hill and Camardese 1986[2]	117.633	—	117.633
Trichloroethene	Chicken	1.133	Elovaara *et al.* 1979[2]	1.274	—	1.274
Vinyl acetate	—	—	—	NA	—	NA
Vinyl chloride	—	—	—	NA	—	NA
cis-1,3-Dichloropropene	—	—	—	NA	—	NA

Attachment 2
Table 8
NOAELs and TRVs Used in Estimating Risks to Wildlife Receptors from Exposure to PCOCs
Red-tailed Hawk

PCOC	Test Species	Test Species NOAEL (mg/kg/day)	Source	Receptor Species NOAEL (mg/kg/day)	Background Intake[6] (mg/kg)	TRV (mg/kg)
Trans-1,2-Dichloroethene	—	—	—	NA	—	NA
O-Xylene	—	—	—	NA	—	NA
Water Quality Parameters						
Nitrate/Nitrite[5]	Chicken	1.530	Adams *et al.* 1966[2]	0.962	0.009	0.962

[1]Based on values used in ORNL 1994
[2]Based on values researched by Clemson University
[3]Dieldrin values are used for aldrin
[4]Dibenzo(ah)anthracene values are extrapolated from benzo(a)pyrene
[5]Values are for nitrite
[6]Sullivan (1995)

Attachment 2
Table 9
Phytotoxicity Data Derived from Experiments Conducted in Soil

Chemical	Soil Type	% OM	pH	Plant Species	DUR	Soil NOEC	Soil LOEL	Growth Parameter	Reference
Inorganics									
Cyanide (NaCN)	Yolo Loam Soil and $CaCO_3$	NA	7.5	Bush beans	11	NA	50 LOAEC	Dry weight	Wallace *et al.* 1977
Organics									
1,1,1-Trichloroethane	Agricultural loam	1.6	7.5	Lettuce	14	NA	200	EC_{20}[1]	Hulzebos *et al.* 1993
1,1,2,2-Tetrachloroethane[2]	Agricultural loam	1.6	7.5	Lettuce	14	NA	200	EC_{20}[1]	Hulzebos *et al.* 1993
1,1-Dichloroethene[3]	Agricultural loam	1.6	7.5	Lettuce	14	NA	200	EC_{20}[1]	Hulzebos *et al.* 1993
1,2-Dichloroethane[2]	Agricultural loam	1.6	7.5	Lettuce	14	NA	200	EC_{20}[1]	Hulzebos *et al.* 1993
1,2-Dichloroethene[3]	Agricultural loam	1.6	7.5	Lettuce	14	NA	200	EC_{20}[1]	Hulzebos *et al.* 1993
1,4-Dichlorobenzene	Agricultural loam	1.6	7.5	Lettuce	14	NA	50	EC_{20}[1]	Hulzebos *et al.* 1993
2-Chlorophenol	Agricultural loam	1.6	7.5	Lettuce	14	NA	10	EC_{20}[1]	Hulzebos *et al.* 1993
2-Methylphenol	Agricultural loam	1.6	7.5	Lettuce	14	NA	20	EC_{20}[1]	Hulzebos *et al.* 1993
4-Methylphenol[4]	Agricultural loam	1.6	7.5	Lettuce	14	NA	20	EC_{20}[1]	Hulzebos *et al.* 1993
Acenaphthene	Agricultural loam	1.6	7.5	Lettuce	14	NA	5	EC_{20}[1]	Hulzebos *et al.* 1993
Anthracene	Loam, Cornish grit, and sand	<3%	NA	*Sorghum bicolor*	21	>1,000	NA	Shoot weight and phytoxicity	Windeatt *et al.* 1991
Anthracene	Loam, Cornish grit, and sand	<3%	NA	Sunflower	21	10	NA	Shoot weight and phytoxicity	Windeatt *et al.* 1991
Anthracene	Loam, Cornish grit, and sand	<3%	NA	Mungbean	21	10	NA	Shoot weight and phytoxicity	Windeatt *et al.* 1991
Chlorobenzene	Agricultural loam	1.6	7.5	Lettuce	14	na	200	EC_{20}[1]	Hulzebos *et al.* 1993
Chloroethane[2]	Agricultural loam	1.6	7.5	Lettuce	14	na	200	EC_{20}[1]	Hulzebos *et al.* 1993
Dibenzofuran	Agricultural loam	1.6	7.5	Lettuce	14	na	49.6	EC_{20}[1]	Hulzebos *et al.* 1993
Diethyl phthalate	Agricultural loam	1.6	7.5	Lettuce	14	na	30	EC_{20}[1]	Hulzebos *et al.* 1993
Hexachloroethane	Loam, Cornish grit, and sand	<3%	NA	*Sorghum*	21	10	NA	Total fresh weight	Windeatt *et al.* 1991
Hexachloroethane	Loam, Cornish grit, and sand	<3%	NA	Sunflower	21	100	NA	Total fresh weight	Windeatt *et al.* 1991
Hexachloroethane	Loam, Cornish grit, and sand	<3%	NA	Mungbean	21	100	NA	Total fresh weight	Windeatt *et al.* 1991
Naphthalene	Loam, Cornish grit, and sand	<3%	NA	*Sorghum*	21	100	NA	Total fresh weight	Windeatt *et al.* 1991
Naphthalene	Loam, Cornish grit, and sand	<3%	NA	Sunflower	21	>1,000	NA	Total fresh weight	Windeatt *et al.* 1991
Naphthalene	Loam, Cornish grit, and sand	<3%	NA	Soybean	21	100	NA	Total fresh weight	Windeatt *et al.* 1991
Pentachlorophenol	Loam, Cornish grit, and sand	<3%	NA	*Sorghum*	21	2	NA	Total fresh weight	Windeatt *et al.* 1991
Pentachlorophenol	Loam, Cornish grit, and sand	<3%	NA	Sunflower	21	1	NA	Total fresh weight	Windeatt *et al.* 1991

Attachment 2
Table 9
Phytotoxicity Data Derived from Experiments Conducted in Soil

Chemical	Soil Type	% OM	pH	Plant Species	DUR	Soil NOEC	Soil LOEL	Growth Parameter	Reference
Pentachlorophenol	Loam, Cornish grit, and sand	<3%	NA	Soybean	21	10	NA	Total fresh weight	Windeatt *et al.* 1991
Pentachlorophenol	Loam, Cornish grit, and sand	<3%	NA	Oat	21	1	NA	Total fresh weight	Windeatt *et al.* 1991
Pentachlorophenol	Loam, Cornish grit, and sand	<3%	NA	Tomato	21	1	NA	Total fresh weight	Windeatt *et al.* 1991
Phenol	Agricultural loam	1.6	7.5	Lettuce	14	NA	20	EC_{20}[1]	Hulzebos *et al.* 1993
Styrene	Agricultural loam	1.6	7.5	Lettuce	14	NA	60	EC_{20}[1]	Hulzebos *et al.* 1993
Tetrachloroethene	Agricultural loam	1.6	7.5	Lettuce	14	NA	200	EC_{20}[1]	Hulzebos *et al.* 1993
Total xylenes[5]	Agricultural loam	1.6	7.5	Lettuce	14	NA	200	EC_{20}[1]	Hulzebos *et al.* 1993
Trichloroethene[3]	Agricultural loam	1.6	7.5	Lettuce	14	NA	200	EC_{20}[1]	Hulzebos *et al.* 1993

[1]The EC_{50} values in Hulzebos *et al.* (1993) were extrapolated to EC_{20} values by dividing by a factor of 5 (ORNL 1994).
[2]Soil benchmark is based on 1,1,1-trichloroethane.
[3]Soil benchmark is based on 1,1,1-trichloroethane and tetrachloroethene.
[4]Soil benchmark is based on 2-methylphenol.
[5]Soil benchmark is based on o-xylene.
All chemical concentrations in soils and plants are mg of the element/kg medium.
Cation exchange capacity (CEC) not reported in these studies.

EC20 - benchmark chemical concentration based on 20% reduction in plant growth
OM - % organic matter in the soil
DUR (D) - Exposure duration in days
NOEC - no observed effects concentration
LOEL - lowest observed effects level
LOAEC - lowest observed adverse effects concentration
NA - data not available

Attachment 2
Table 10
Vegetation TRVs (Soil)

Subsurface Soil PCOC[1]	Vegetation Benchmark[2]	Units	Vegetation Benchmark Criteria	Vegetation Benchmark Source	Background UCL_{95} Concentration[3]	Units	Vegetation TRV
Metals							
Aluminum	50.00	mg/kg	EC20	ORNL 1994	14,600.00	mg/kg	14,600.00
Antimony	5.00	mg/kg	EC20	ORNL 1994	7.14	mg/kg	7.14
Arsenic	10.00	mg/kg	EC20	ORNL 1994	4.42	mg/kg	10.00
Barium	500.00	mg/kg	EC20	ORNL 1994	112.00	mg/kg	500.00
Beryllium	10.00	mg/kg	EC20	ORNL 1994	5.46	mg/kg	10.00
Cadmium	3.00	mg/kg	EC20	ORNL 1994	0.68	mg/kg	3.00
Chromium	1.00	mg/kg	EC20	ORNL 1994	22.90	mg/kg	22.90
Cobalt	25.00	mg/kg	EC20	ORNL 1994	8.55	mg/kg	25.00
Copper	100.00	mg/kg	EC20	ORNL 1994	14.70	mg/kg	100.00
Lead	50.00	mg/kg	EC20	ORNL 1994	12.00	mg/kg	50.00
Lithium	2.00	mg/kg	EC20	ORNL 1994	—	—	2.00
Manganese	500.00	mg/kg	EC20	ORNL 1994	275.00	mg/kg	500.00
Mercury	0.30	mg/kg	EC20	ORNL 1994	0.27	mg/kg	0.30
Molybdenum	2.00	mg/kg	EC20	ORNL 1994	16.90	mg/kg	16.90
Nickel	30.00	mg/kg	EC20	ORNL 1994	23.30	mg/kg	30.00
Selenium	1.00	mg/kg	EC20	ORNL 1994	1.45	mg/kg	1.45
Silver	2.00	mg/kg	EC20	ORNL 1994	7.42	mg/kg	7.42
Strontium	NA	—	—	—	62.90	mg/kg	62.90
Vanadium	2.00	mg/kg	EC20	ORNL 1994	36.30	mg/kg	36.30
Zinc	50.00	mg/kg	EC20	ORNL 1994	44.90	mg/kg	50.00
Pesticides, Herbicides, and PCBs							
4,4'-DDT	NA	—	—	—	—	—	NA
alpha-BHC	NA	—	—	—	—	—	NA
Aroclor-1254[4]	40,000.00	µg/kg	EC20	ORNL 1994	—	—	40,000.00
Aroclor-1260[4]	40,000.00	µg/kg	EC20	ORNL 1994	—	—	40,000.00
Heptachlor epoxide	NA	—	—	—	—	—	NA
Semivolatile Organic Compounds							
1,4-Dichlorobenzene	50,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	50,000.00

Attachment 2
Table 10
Vegetation TRVs (Soil)

Subsurface Soil PCOC[1]	Vegetation Benchmark[2]	Units	Vegetation Benchmark Criteria	Vegetation Benchmark Source	Background UCL_{95} Concentration[3]	Units	Vegetation TRV
2-Chlorophenol	10,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	10,000.00
2-Methylnaphthalene	NA	—	—	—	—	—	NA
2-Methylphenol	20,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	20,000.00
4-Methylphenol[6]	20,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	20,000.00
4-Nitroaniline	NA	—	—	—	—	—	NA
Acenaphthene	5,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	5,000.00
Acenaphthylene	NA	—	—	—	—	—	NA
Anthracene	10,000.00	µg/kg	NOEC	Windeatt *et al.* 1991	—	—	10,000.00
Benzo(a)anthracene	NA	—	—	—	—	—	NA
Benzo(a)pyrene	NA	—	—	—	—	—	NA
Benzo(a)fluoranthene	NA	—	—	—	—	—	NA
Benzo(ghi)perylene	NA	—	—	—	—	—	NA
Benzo(k)fluoranthene	NA	—	—	—	—	—	NA
Benzoic acid	NA	—	—	—	—	—	NA
bis(2-ethylhexyl)phthalate[7]	200,000.00	µg/kg	EC20	ORNL 1994	—	—	200,000.00
Butyl benzyl phthalate	NA	—	—	—	—	—	NA
Chrysene	NA	—	—	—	—	—	NA
Di-N-butyl phthalate	200,000.00	µg/kg	EC20	ORNL 1994	—	—	200,000.00
Di-N-octyl phthalate[7]	200,000.00	µg/kg	EC20	ORNL 1994	—	—	200,000.00
Dibenzo(ah)anthracene	NA	—	—	—	—	—	NA
Dibenzofuran	49,600.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	49,600.00
Diethyl phthalate	30,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	30,000.00
Fluoranthene	NA	—	—	—	—	—	NA
Fluorene	NA	—	—	—	—	—	NA
Hexachlorobutadiene	NA	—	—	—	—	—	NA
Hexachloroethane	10,000.00	µg/kg	NOEC	Windeatt *et al.* 1991	—	—	10,000.00
Indeno(1,2,3-cd)pyrene	NA	—	—	—	—	—	NA
Isophorone	NA	—	—	—	—	—	NA
N-Nitrosodiphenylamine	NA	—	—	—	—	—	NA

Attachment 2
Table 10
Vegetation TRVs (Soil)

Subsurface Soil PCOC[1]	Vegetation Benchmark[2]	Units	Vegetation Benchmark Criteria	Vegetation Benchmark Source	Background UCL_{95} Concentration[3]	Units	Vegetation TRV
Naphthalene	100,000.00	µg/kg	NOEC	Windeatt *et al.* 1991	—	—	100,000.00
Pentachlorophenol	1,000.00	µg/kg	NOEC	Windeatt *et al.* 1991	—	—	1,000.00
Phenanthrene	NA	—	—	—	—	—	NA
Phenol	20,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	20,000.00
Pyrene	NA	—	—	—	—	—	NA
Volatile Organic Compounds							
1,1,1-Trichloroethane	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
1,1,2,2-Tetrachloroethane[8]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
1,1-Dichloroethene[9]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
1,2-Dichloroethane[8]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
1,2-Dichloroethene[9]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
2-Butanone	NA	—	—	—	—	—	NA
2-Chloroethyl vinyl ether	NA	—	—	—	—	—	NA
4-Methyl-2-pentanone	NA	—	—	—	—	—	NA
Acetone	NA	—	—	—	—	—	NA
Benzene	NA	—	—	—	—	—	NA
Carbon disulfide	NA	—	—	—	—	—	NA
Carbon tetrachloride	NA	—	—	—	—	—	NA
Chlorobenzene	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
Chloroethane[8]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
Chloroform	NA	—	—	—	—	—	NA
cis-1,3-Dichloropropene	NA	—	—	—	—	—	NA
Ethylbenzene	NA	—	—	—	—	—	NA
Methylene chloride	NA	—	—	—	—	—	NA
Styrene	60,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	60,000.00
Tetrachloroethene	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
Toluene	200,000.00	µg/kg	EC20	ORNL 1994	—	—	200,000.00
Total xylenes[10]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
Trichloroethene[9]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00

Attachment 2
Table 10
Vegetation TRVs (Soil)

Subsurface Soil PCOC[1]	Vegetation Benchmark[2]	Units	Vegetation Benchmark Criteria	Vegetation Benchmark Source	Background UCL_{95} Concentration[3]	Units	Vegetation TRV
Water Quality Parameters							
Cyanide (NaCN)	50.00	mg/kg	LOAEC	Wallace, A. *et al.* 1977	—	—	50.00
Nitrate/Nitrite	NA	—	—	—	19.1	mg/kg	19.10

[1]Radionuclides are not evaluated in the vegetation screen; instead, they are evaluated for small mammals because small mammals are the limiting species.
[2]Soil benchmark values are rounded to one significant figure. Values from Hulzebos *et al.* (1993) are based on a 14-day test because it is more appropriate for chronic exposure.
[3]Background UCL_{95} is based on a 1-tailed test (Sullivan 1995).
[4]Soil benchmark is based on polychlorinated biphenyls (PCBs).
[5]The EC50 values in Hulzebos *et al.* (1993) were extrapolated to EC20 values by dividing by a factor of 5 (ORNL 1994).
[6]Soil benchmark is based on 2-methylphenol.
[7]Soil benchmark is based on di-N-butyl phthalate.
[8]Soil benchmark is based on 1,1,1-trichloroethane.
[9]Soil benchmark is based on 1,1,1-trichloroethane and tetrachloroethene.
[10]Soil benchmark is based on o-xylene.

PCOC - potential chemical of concern
UCL_{95} - 95% upper confidence limit of the true mean
TRV - toxicity reference value
NA - soil benchmark not available
EC20 - benchmark chemical concentration based on 20% reduction in plant growth
ORNL - Oak Ridge National Laboratory (1994)
NOEC - no observed effect concentration
LOAEC - lowest observed effect concentration

Attachment 2
Table 11
Vegetation TRVs (Sediment)[1]

Analyte[1]	Vegetation Benchmark[2]	Units	Vegetation Benchmark Criteria	Vegetation Benchmark Source	Background UCL_{95} Concentration[3]	Units	Vegetation TRV
Metals							
Aluminum	50.00	mg/kg	EC20	ORNL 1994	6,957	mg/kg	6,957
Antimony	5.00	mg/kg	EC20	ORNL 1994	8	mg/kg	7.67
Arsenic	10	mg/kg	EC20	ORNL 1994	3	mg/kg	10.00
Barium	500.00	mg/kg	EC20	ORNL 1994	90	mg/kg	500
Beryllium	10.00	mg/kg	EC20	ORNL 1994	1	mg/kg	10.00
Cadmium	3.00	mg/kg	EC20	ORNL 1994	1	mg/kg	3.00
Chromium	1.00	mg/kg	EC20	ORNL 1994	10	mg/kg	9.80
Cobalt	25.00	mg/kg	EC20	ORNL 1994	7	mg/kg	25.00
Copper	100.00	mg/kg	EC20	ORNL 1994	12	mg/kg	100.00
Lead	50.00	mg/kg	EC20	ORNL 1994	30	mg/kg	50.00
Lithium	2.00	mg/kg	EC20	ORNL 1994	9	—	8.60
Manganese	500.00	mg/kg	EC20	ORNL 1994	1,800	mg/kg	1,800.04
Mercury	0.30	mg/kg	EC20	ORNL 1994	0.1	mg/kg	0.30
Molybdenum	2.00	mg/kg	EC20	ORNL 1994	11	mg/kg	11.00
Nickel	30.00	mg/kg	EC20	ORNL 1994	8	mg/kg	30.00
Selenium	1.00	mg/kg	EC20	ORNL 1994	1	mg/kg	1.00
Silver	2.00	mg/kg	EC20	ORNL 1994	3	mg/kg	2.74
Strontium	NA	—	—	—	50	mg/kg	49.90
Thallium	1.00	mg/kg	EC18	ORNL 1992	1		
Tin	50.00	mg/kg	EC19	ORNL 1993	22		
Vanadium	2.00	mg/kg	EC20	ORNL 1994	22	mg/kg	21.60
Zinc	50.00	mg/kg	EC20	ORNL 1994	72	mg/kg	71.95
Pesticides, Herbicides, and PCBs							
4,4'-DDT	NA	—	—	—	—	—	NA
alpha-BHC	NA	—	—	—	—	—	NA
Aroclor-1254[4]	40,000.00	µg/kg	EC20	ORNL 1994	—	—	40,000.00
Aroclor-1260[4]	40,000.00	µg/kg	EC20	ORNL 1994	—	—	40,000.00
Heptachlor epoxide	NA	—	—	—	—	—	NA
Semivolatile Organic Compounds							
1,4-Dichlorobenzene	50,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	50,000.00
2-Chlorophenol	10,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	10,000.00
2-Methylnaphthalene	NA	—	—	—	—	—	NA
2-Methylphenol	20,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	20,000.00
4-Methylphenol[6]	20,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	20,000.00

Attachment 2
Table 11
Vegetation TRVs (Sediment)[1]

Analyte[1]	Vegetation Benchmark[2]	Units	Vegetation Benchmark Criteria	Vegetation Benchmark Source	Background UCL_{95} Concentration[3]	Units	Vegetation TRV
4-Nitroaniline	NA	—	—	—	—	—	NA
Acenaphthene	5,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	5,000.00
Acenaphthylene	NA	—	—	—	—	—	NA
Anthracene	10,000.00	µg/kg	NOEC	Windeatt *et al.* 1991	—	—	10,000.00
Benzo(a)anthracene	NA	—	—	—	—	—	NA
Benzo(a)pyrene	NA	—	—	—	—	—	NA
Benzo(a)fluoranthene	NA	—	—	—	—	—	NA
Benzo(ghi)perylene	NA	—	—	—	—	—	NA
Benzo(k)fluoranthene	NA	—	—	—	—	—	NA
Benzoic acid	NA	—	—	—	—	—	NA
bis(2-ethylhexyl)phthalate[7]	200,000.00	µg/kg	EC20	ORNL 1994	—	—	200,000.00
Butyl benzyl phthalate	NA	—	—	—	—	—	NA
Chrysene	NA	—	—	—	—	—	NA
Di-N-butyl phthalate	200,000.00	µg/kg	EC20	ORNL 1994	—	—	200,000.00
Di-N-octyl phthalate[7]	200,000.00	µg/kg	EC20	ORNL 1994	—	—	200,000.00
Dibenzo(ah)anthracene	NA	—	—	—	—	—	NA
Dibenzofuran	50,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	50,000.00
Diethyl phthalate	30,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	30,000.00
Fluoranthene	NA	—	—	—	—	—	NA
Fluorene	NA	—	—	—	—	—	NA
Hexachlorobutadiene	NA	—	—	—	—	—	NA
Hexachloroethane	10,000.00	µg/kg	NOEC	Windeatt *et al.* 1991	—	—	10,000.00
Indeno(1,2,3-cd)pyrene	NA	—	—	—	—	—	NA
Isophorone	NA	—	—	—	—	—	NA
N-Nitrosodiphenylamine	NA	—	—	—	—	—	NA
Naphthalene	100,000.00	µg/kg	NOEC	Windeatt *et al.* 1991	—	—	100,000.00
Pentachlorophenol	1,000.00	µg/kg	NOEC	Windeatt *et al.* 1991	—	—	1,000.00
Phenanthrene	NA	—	—	—	—	—	NA
Phenol	20,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	20,000.00
Pyrene	NA	—	—	—	—	—	NA
Volatile Organic Compounds							
1,1,1-Trichloroethane	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
1,1,2,2-Tetrachloroethane[8]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
1,1-Dichloroethene[9]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
1,2-Dichloroethane[8]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00

Attachment 2
Table 11
Vegetation TRVs (Sediment)[1]

Analyte[1]	Vegetation Benchmark[2]	Units	Vegetation Benchmark Criteria	Vegetation Benchmark Source	Background UCL_{95} Concentration[3]	Units	Vegetation TRV
1,2-Dichloroethene[9]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
2-Butanone	NA	—	—	—	—	—	NA
2-Chloroethyl vinyl ether	NA	—	—	—	—	—	NA
4-Methyl-2-pentanone	NA	—	—	—	—	—	NA
Acetone	NA	—	—	—	—	—	NA
Benzene	NA	—	—	—	—	—	NA
Carbon disulfide	NA	—	—	—	—	—	NA
Carbon tetrachloride	NA	—	—	—	—	—	NA
Chlorobenzene	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
Chloroethane[8]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
Chloroform	NA	—	—	—	—	—	NA
cis-1,3-Dichloropropene	NA	—	—	—	—	—	NA
Ethylbenzene	NA	—	—	—	—	—	NA
Methylene chloride	NA	—	—	—	—	—	NA
Styrene	60,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	60,000.00
Tetrachloroethene	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
Toluene	200,000.00	µg/kg	EC20	ORNL 1994	—	—	200,000.00
Total xylenes[10]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
Trichloroethene[9]	200,000.00	µg/kg	EC20[5]	Hulzebos *et al.* 1993	—	—	200,000.00
Water Quality Parameters							
Cyanide (NaCN)	50.00	mg/kg	LOAEC	Wallace, A. *et al.* 1977	—	—	50.00
Nitrate/Nitrite	NA	—	—	—	19.1	mg/kg	19.10

[1]Radionuclides are not evaluated in the vegetation screen; instead, they evaluated for small mammals because small mammals are the limiting
[2]Sediment benchmark values are rounded to one significant figure. Val Hulzebos *et al.* (1993) are based on a 14-day test because it is more appropriate for chronic exposure.
[3]Background UCL_{95} is based on a 1-tailed test (Sullivan 1995).
[4]Sediment benchmark is based on polychlorinated biphenyls (PCBs).
[5]The EC50 values in Hulzebos *et al.* (1993) were extrapolated to EC20 values by dividing by a factor of 5 (ORNL 1994).
[6]Benchmark is based on 2-Methylphenol.
[7]Benchmark is based on di-N-butyl phthalate.
[8]Benchmark is based on 1,1,1-Trichloroethane.
[9]Benchmark is based on 1,1,1-Trichloroethane and Tetrachloroethene.
[10]Benchmark is based on o-Xylene.

PCOC - potential chemical of concern
UCL_{95} - 95% upper confidence limit of the true mean
TRV - toxicity reference value
NA -benchmark not available
EC20 - benchmark chemical concentration based on 20% reduction in plant growth
ORNL - Oak Ridge National Laboratory (1994)
NOEC - no observed effect concentration
LOAEC - lowest observed effect concentration

Attachment 2
Table 12
Surface Water Standards for Aquatic Life*

Analyte	Water Quality Standard[1]	Units	WQS Source
Americium-241	1,300	pCi/L	H&K 1995
Cesium-137	8,200	pCi/L	H&K 1995
Plutonium-239/240	100	pCi/L	H&K 1995
Strontium-89/90	270,000	pCi/L	H&K 1995
Tritium	190,000,000	pCi/L	H&K 1996
Uranium-233/234	4,300	pCi/L	H&K 1995
Uranium-235	4,300	pCi/L	H&K 1995
Uranium-238	4,400	pCi/L	H&K 1995
Antimony	30	µg/L	IRIS
Arsenic	50	µg/L	CWQS
Barium	4	µg/L	ORNL 1994
Lead[2]	27,274	µg/L	CWQS
Lithium	NA	NA	NA
Magnesium	NA	NA	NA
Manganese	50	µg/L	CWQS
Molybdenum	239	µg/L	ORNL 1994
Nickel[2]	11,041	µg/L	CWQS
Strontium	620	µg/L	ORNL 1994
Thallium[3]	15	µg/L	CWQS
Tin	74	µg/L	ORNL 1994
Vanadium	19	µg/L	ORNL 1994
Bis(2-ethylhexyl)phthalate	360	µg/L	IRIS
Di-N-butyl phthalate	3.0	µg/L	IRIS
Benzoic acid	41.6	µg/L	ORNL 1994
Pentachlorophenol[4]	5.7	µg/L	CWQS
1,1,1-Trichloroethane[5]	18,000	µg/L	IRIS
1,1-Dichloroethane	47	µg/L	ORNL 1994
1,1-Dichloroethene	196	µg/L	ORNL 1994
1,2-Dichloroethane[5]	20,000	µg/L	CWQS
1,2-Dichloroethene[5]	31.2	µg/L	CWQS
Acetone	11,200	µg/L	ORNL 1994
Chloroform	1,240	µg/L	CWQS
Methylene chloride	2,240	µg/L	ORNL 1994
Tetrachloroethene	840	µg/L	CWQS
Toluene	176	µg/L	ORNL 1994
Total xylenes	86.2	µg/L	ORNL 1994
Trichloroethene	21,900	µg/L	CWQS
Vinyl acetate	20.8	µg/L	ORNL 1994

*Sitewide Surface Water PCOC List
[1]All values based on Tier II, secondary chronic values calculated using EPA guidelines unless otherwise noted (EPA 1993).
[2]Calculated using the A-series pond's UCL_{95} for hardness of 51,762 ug/L.
[3]chronic LEC
[4]pH dependent standard, the value shown is for pH = 7.0
[5]Acute value

WQS - water quality standard
H&K 1995 - Higley and Kuperman (1995)
ORNL 1994 - Oak Ridge National Laboratory(1994)
CWQS - Colorado Water Quality Standards
IRIS - Integrated Risk Information System
NA - no standard available

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
A-1	Antimony	0.0135	NA	NA	NA	NA	not available	2	7.7	7.7	M	mg/kg
A-1	Chromium	0.0135	NA	NA	NA	NA	not available	81	9.8	81	M	mg/kg
A-1	Cobalt	0.0135	NA	NA	NA	NA	not available	—	6.9	6.9	M	mg/kg
A-1	Copper	0.0135	NA	NA	NA	NA	not available	34	11.9	34	M	mg/kg
A-1	Iron	0.0135	NA	NA	NA	NA	not available	30,000	10216	30000	M	mg/kg
A-1	Magnesium	0.0135	NA	NA	NA	NA	not available	EN	1800	1800	M	mg/kg
A-1	Manganese	0.0135	NA	NA	NA	NA	not available	460	275	460	M	mg/kg
A-1	Potassium	0.0135	NA	NA	NA	NA	not available	EN	1143	1143	M	mg/kg
A-1	Silver	0.0135	NA	NA	NA	NA	not available	1	2.7	2.7	M	mg/kg
A-1	Sodium	0.0135	NA	NA	NA	NA	not available	EN	401	401	M	mg/kg
A-1	Vanadium	0.0135	NA	NA	NA	NA	not available	—	21.6	21.6	M	mg/kg
A-1	Zinc	0.0135	NA	NA	NA	NA	not available	150	71.9	150	M	mg/kg
A-1	Aldrin	0.0135	2.61	K,S&C,93	1.50	AWQC	not available	8.2495	NA	8.24945063	P	µg/kg
A-1	Aroclor-1254	0.0135	5.93	H&S,94	0.014	AWQC	20000	270.0000	NA	270	P	µg/kg
A-1	Aroclor-1260	0.0135	7.02	H&S,95	0.014	AWQC	not available	1979.0730	NA	1979.07296	P	µg/kg
A-1	gamma-BHC (Lindane)	0.0135	3.66	H&S,96	0.080	AWQC	not available	4.9366	NA	4.93655245	P	µg/kg
A-1	Heptachlor	0.0135	4.23	H&S,97	0.0038	AWQC	not available	0.8712	NA	0.87119899	P	µg/kg
A-1	Americium-241	0.0135	NA	NA	NA	NA	not available	46,000	0.3	46000	R	pCi/g
A-1	Gross alpha	0.0135	NA	NA	NA	NA	not available	—	28.1	28.1	R	pCi/g
A-1	Gross beta	0.0135	NA	NA	NA	NA	not available	—	37.9	37.9	R	pCi/g
A-1	Plutonium-239/240	0.0135	NA	NA	NA	NA	not available	520,000	0.94	520000	R	pCi/g
A-1	Radium-226	0.0135	NA	NA	NA	NA	not available	380,000	1.0	380000	R	pCi/g
A-1	Radium-228	0.0135	NA	NA	NA	NA	not available	250,000	2.0	250000	R	pCi/g
A-1	Strontium-89/90	0.0135	NA	NA	NA	NA	not available	6,700	0.28	6700	R	pCi/g
A-1	Uranium-233/234	0.0135	NA	NA	NA	NA	not available	10,000	2.0	10000	R	pCi/g
A-1	Uranium-235	0.0135	NA	NA	NA	NA	not available	10,000	0.07	10000	R	pCi/g
A-1	Uranium-238	0.0135	NA	NA	NA	NA	not available	4,200	1.7	4200	R	pCi/g
A-1	1,2,4-Trichlorobenzene	0.0135	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
A-1	2-Methylnaphthalene	0.0135	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
A-1	Acenaphthene	0.0135	3.76	H&S, 94	74.00	S&M,94	140000	1890.0000	NA	1890	S	µg/kg
A-1	Anthracene	0.0135	4.42	H&S, 94	0.0028	CWQS	not available	0.9942	NA	0.9942413	S	µg/kg
A-1	Benzo(a)anthracene	0.0135	5.6	H&S, 94	0.0028	CWQS	1317000	17779.5000	NA	17779.5	S	µg/kg
A-1	Benzo(a)pyrene	0.0135	6	H&S, 94	0.0028	CWQS	1063000	14350.5000	NA	14350.5	S	µg/kg
A-1	Benzo(b)fluoranthene	0.0135	5.74	K,S&C,93	0.0028	CWQS	not available	20.7726	NA	20.772645	S	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
A-1	Benzo(ghi)perylene	0.0135	6.89	K,S&C,93	0.0028	CWQS	not available	293.4214	NA	293.42141	S	µg/kg
A-1	Benzo(k)fluoranthene	0.0135	6.64	K,S&C,93	0.0028	CWQS	not available	165.0030	NA	165.002985	S	µg/kg
A-1	Benzoic acid	0.0135	2.26	K,S&C,93	41.60	S&M,94	not available	102.1944	NA	102.1944	S	µg/kg
A-1	Bis(2-ethylhexyl)phthalate	0.0135	9.44	H&S, 94	360.00	IRIS	not available	13385551498.2	NA	1.3386E+10	S	µg/kg
A-1	Butyl benzyl phthalate	0.0135	2.18	K,S&C,93	3.00	IRIS	not available	6.1299	NA	6.12992306	S	µg/kg
A-1	Chrysene	0.0135	5.39	K,S&C,93	0.0028	CWQS	not available	9.2788	NA	9.2787997	S	µg/kg
A-1	Di-N-octyl phthalate	0.0135	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	µg/kg
A-1	Dibenzo(ah)anthracene	0.0135	6.22	K,S&C,93	0.0028	CWQS	not available	62.7324	NA	62.7323851	S	µg/kg
A-1	Dibenzofuran	0.0135	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
A-1	Fluoranthene	0.0135	5	H&S, 94	42.00	CWQS	1020000	13770.0000	NA	13770	S	µg/kg
A-1	Fluorene	0.0135	3.7	K,S&C,93	0.0028	CWQS	not available	0.1894	NA	0.18944877	S	µg/kg
A-1	Indeno(1,2,3-cd)pyrene	0.0135	7.49	K,S&C,93	0.0028	CWQS	not available	1168.1317	NA	1168.13167	S	µg/kg
A-1	Naphthalene	0.0135	3.24	H&S, 94	620.0000	AWQC	not available	14545.3929	NA	14545.3929	S	µg/kg
A-1	Phenanthrene	0.0135	4.46	H&S, 94	0.0028	CWQS	123000	1660.5000	NA	1660.5	S	µg/kg
A-1	Phenol	0.0135	1.43	K,S&C,93	2560.00	IRIS	not available	930.1944	NA	930.194428	S	µg/kg
A-1	Pyrene	0.0135	4.81	K,S&C,93	0.0028	CWQS	1311000	17698.5000	NA	17698.5	S	µg/kg
A-1	2-Butanone	0.0135	0.09	K,S&C,93	20800.00	S&M,94	not available	345.4595	NA	345.459471	V	µg/kg
A-1	4-Methyl-2-pentanone	0.0135	0.79	K,S&C,93	164.00	S&M,94	not available	13.6514	NA	13.6514133	V	µg/kg
A-1	Acetone	0.0135	-0.24	H&S, 94	11200.00	S&M,94	not available	87.0065	NA	87.0065185	V	µg/kg
A-1	Benzene	0.0135	2.06	H&S, 94	5300.00	IRIS	not available	8215.0392	NA	8215.03916	V	µg/kg
A-1	Methylene chloride	0.0135	1.28	H&S, 94	4.70	CWQS	not available	1.2090	NA	1.20901483	V	µg/kg
A-1	Toluene	0.0135	2.65	H&S, 94	17500.00	AWQC	not available	105.5290	NA	105.528999	V	µg/kg
A-2	Antimony	0.0259	NA	NA	NA	NA	not available	2	7.671500	7.6715	M	mg/kg
A-2	Chromium	0.0259	NA	NA	NA	NA	not available	81	9.751100	81	M	mg/kg
A-2	Cobalt	0.0259	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg
A-2	Copper	0.0259	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg
A-2	Iron	0.0259	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
A-2	Magnesium	0.0259	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
A-2	Manganese	0.0259	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
A-2	Potassium	0.0259	NA	NA	NA	NA	not available	EN	1143.054800	1143.0548	M	mg/kg
A-2	Silver	0.0259	NA	NA	NA	NA	not available	1	2.742800	2.7428	M	mg/kg
A-2	Sodium	0.0259	NA	NA	NA	NA	not available	EN	401.397500	401.3975	M	mg/kg
A-2	Vanadium	0.0259	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
A-2	Zinc	0.0259	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
A-2	Aldrin	0.0259	2.61	K,S&C,93	1.50	AWQC	not available	15.8267	NA	15.8267238	P	µg/kg
A-2	Aroclor-1254	0.0259	5.93	H&S,94	0.014	AWQC	20000	518.0000	NA	518	P	µg/kg
A-2	Aroclor-1260	0.0259	7.02	H&S,95	0.014	AWQC	not available	3796.8881	NA	3796.88812	P	µg/kg
A-2	gamma-BHC (Lindane)	0.0259	3.66	H&S,96	0.080	AWQC	not available	9.4709	NA	9.47086729	P	µg/kg
A-2	Heptachlor	0.0259	4.23	H&S,97	0.0038	AWQC	not available	1.6714	NA	1.6714114	P	µg/kg
A-2	Americium-241	0.0259	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
A-2	Gross alpha	0.0259	NA	NA	NA	NA	not available	—	28.105000	28.105	R	pCi/g
A-2	Gross beta	0.0259	NA	NA	NA	NA	not available	—	37.909400	37.9094	R	pCi/g
A-2	Plutonium-239/240	0.0259	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
A-2	Radium-226	0.0259	NA	NA	NA	NA	not available	380,000	0.985300	380000	R	pCi/g
A-2	Radium-228	0.0259	NA	NA	NA	NA	not available	250,000	1.988300	250000	R	pCi/g
A-2	Strontium-89/90	0.0259	NA	NA	NA	NA	not available	6,700	0.276600	6700	R	pCi/g
A-2	Uranium-233/234	0.0259	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g
A-2	Uranium-235	0.0259	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
A-2	Uranium-238	0.0259	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g
A-2	1,2,4-Trichlorobenzene	0.0259	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
A-2	2-Methylnaphthalene	0.0259	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
A-2	Acenaphthene	0.0259	3.76	H&S, 94	74.00	S&M,94	140000	3626.0000	NA	3626	S	µg/kg
A-2	Anthracene	0.0259	4.42	H&S, 94	0.0028	CWQS	not available	1.9075	NA	1.90747035	S	µg/kg
A-2	Benzo(a)anthracene	0.0259	5.6	H&S, 94	0.0028	CWQS	1317000	34110.3000	NA	34110.3	S	µg/kg
A-2	Benzo(a)pyrene	0.0259	6	H&S, 94	0.0028	CWQS	1063000	27531.7000	NA	27531.7	S	µg/kg
A-2	Benzo(b)fluoranthene	0.0259	5.74	K,S&C,93	0.0028	CWQS	not available	39.8527	NA	39.8527042	S	µg/kg
A-2	Benzo(ghi)perylene	0.0259	6.89	K,S&C,93	0.0028	CWQS	not available	562.9344	NA	562.934409	S	µg/kg
A-2	Benzo(k)fluoranthene	0.0259	6.64	K,S&C,93	0.0028	CWQS	not available	316.5613	NA	316.561282	S	µg/kg
A-2	Benzoic acid	0.0259	2.26	K,S&C,93	41.60	S&M,94	not available	196.0618	NA	196.061849	S	µg/kg
A-2	Bis(2-ethylhexyl)phthalate	0.0259	9.44	H&S, 94	360.00	IRIS	not available	25680428429.9	NA	2.568E+10	S	µg/kg
A-2	Butyl benzyl phthalate	0.0259	2.18	K,S&C,93	3.00	IRIS	not available	11.7604	NA	11.7603709	S	µg/kg
A-2	Chrysene	0.0259	5.39	K,S&C,93	0.0028	CWQS	not available	17.8015	NA	17.8015491	S	µg/kg
A-2	Di-N-octyl phthalate	0.0259	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	µg/kg
A-2	Dibenzo(ah)anthracene	0.0259	6.22	K,S&C,93	0.00	CWQS	not available	120.3532	NA	120.353243	S	µg/kg
A-2	Dibenzofuran	0.0259	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
A-2	Fluoranthene	0.0259	5	H&S, 94	42.00	CWQS	1020000	26418.0000	NA	26418	S	µg/kg
A-2	Fluorene	0.0259	3.7	K,S&C,93	0.0028	CWQS	not available	0.3635	NA	0.36346098	S	µg/kg
A-2	Indeno(1,2,3-cd)pyrene	0.0259	7.49	K,S&C,93	0.0028	CWQS	not available	2241.0822	NA	2241.08225	S	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
A-2	Naphthalene	0.0259	3.24	H&S, 94	620	AWQC	not available	27905.6057	NA	27905.6057	S	µg/kg
A-2	Phenanthrene	0.0259	4.46	H&S, 94	0.0028	CWQS	123000	3185.7000	NA	3185.7	S	µg/kg
A-2	Phenol	0.0259	1.43	K,S&C,93	2560.00	IRIS	not available	1784.5952	NA	1784.59524	S	µg/kg
A-2	Pyrene	0.0259	4.81	K,S&C,93	0.0028	CWQS	1311000	33954.9000	NA	33954.9	S	µg/kg
A-2	2-Butanone	0.0259	0.09	K,S&C,93	20800.00	S&M,94	not available	662.7704	NA	662.770392	V	µg/kg
A-2	4-Methyl-2-pentanone	0.0259	0.79	K,S&C,93	164.00	S&M,94	not available	26.1905	NA	26.1904893	V	µg/kg
A-2	Acetone	0.0259	-0.24	H&S, 94	11200.00	S&M,94	not available	166.9236	NA	166.923617	V	µg/kg
A-2	Benzene	0.0259	2.06	H&S, 94	5300.00	IRIS	not available	15760.7048	NA	15760.7048	V	µg/kg
A-2	Methylene chloride	0.0259	1.28	H&S, 94	4.70	CWQS	not available	2.3195	NA	2.31951733	V	µg/kg
A-2	Toluene	0.0259	2.65	H&S, 94	17500.00	AWQC	not available	202459.3381	NA	202459.338	V	µg/kg
A-3	Antimony	0.01153	NA	NA	NA	NA	not available	2	7.671500	7.6715	M	mg/kg
A-3	Chromium	0.01153	NA	NA	NA	NA	not available	81	9.751100	81	M	mg/kg
A-3	Cobalt	0.01153	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg
A-3	Copper	0.01153	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg
A-3	Iron	0.01153	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
A-3	Magnesium	0.01153	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
A-3	Manganese	0.01153	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
A-3	Potassium	0.01153	NA	NA	NA	NA	not available	EN	1143.054800	1143.0548	M	mg/kg
A-3	Silver	0.01153	NA	NA	NA	NA	not available	1	2.742800	2.7428	M	mg/kg
A-3	Sodium	0.01153	NA	NA	NA	NA	not available	EN	401.397500	401.3975	M	mg/kg
A-3	Vanadium	0.01153	NA	NA	NA	NA	not available	---	21.598900	21.5989	M	mg/kg
A-3	Zinc	0.01153	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
A-3	Aldrin	0.01153	2.61	K,S&C,93	1.50	AWQC	not available	7.0444	NA	7.04441976	P	µg/kg
A-3	Aroclor-1254	0.01153	5.93	H&S,94	0.014	AWQC	20000	230.5600	NA	230.56	P	µg/kg
A-3	Aroclor-1260	0.01153	7.02	H&S,95	0.014	AWQC	not available	1689.9817	NA	1689.98171	P	µg/kg
A-3	gamma-BHC (Lindane)	0.01153	3.66	H&S,96	0.080	AWQC	not available	4.2155	NA	4.21545012	P	µg/kg
A-3	Heptachlor	0.01153	4.23	H&S,97	0.0038	AWQC	not available	0.7439	NA	0.74393941	P	µg/kg
A-3	Americium-241	0.01153	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
A-3	Gross alpha	0.01153	NA	NA	NA	NA	not available	—	28.105000	28.105	R	pCi/g
A-3	Gross beta	0.01153	NA	NA	NA	NA	not available	—	37.909400	37.9094	R	pCi/g
A-3	Plutonium-239/240	0.01153	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
A-3	Radium-226	0.01153	NA	NA	NA	NA	not available	380,000	0.985300	380000	R	pCi/g
A-3	Radium-228	0.01153	NA	NA	NA	NA	not available	250,000	1.988300	250000	R	pCi/g
A-3	Strontium-89/90	0.01153	NA	NA	NA	NA	not available	6,700	0.276600	6700	R	pCi/g

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
A-3	Uranium-233/234	0.01153	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g
A-3	Uranium-235	0.01153	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
A-3	Uranium-238	0.01153	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g
A-3	1,2,4-Trichlorobenzene	0.01153	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
A-3	2-Methylnaphthalene	0.01153	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
A-3	Acenaphthene	0.01153	3.76	H&S, 94	74.00	S&M,94	140000	1613.9200	NA	1613.92	S	µg/kg
A-3	Anthracene	0.01153	4.42	H&S, 94	0.0028	CWQS	not available	0.8490	NA	0.84900842	S	µg/kg
A-3	Benzo(a)anthracene	0.01153	5.6	H&S, 94	0.0028	CWQS	1317000	15182.3760	NA	15182.376	S	µg/kg
A-3	Benzo(a)pyrene	0.01153	6	H&S, 94	0.0028	CWQS	1063000	12254.2640	NA	12254.264	S	µg/kg
A-3	Benzo(b)fluoranthene	0.01153	5.74	K,S&C,93	0.0028	CWQS	not available	17.7383	NA	17.7383001	S	µg/kg
A-3	Benzo(ghi)perylene	0.01153	6.89	K,S&C,93	0.0028	CWQS	not available	250.5601	NA	250.560149	S	µg/kg
A-3	Benzo(k)fluoranthene	0.01153	6.64	K,S&C,93	0.0028	CWQS	not available	140.9003	NA	140.900326	S	µg/kg
A-3	Benzoic acid	0.01153	2.26	K,S&C,93	41.60	S&M,94	not available	87.2664	NA	87.2664478	S	µg/kg
A-3	Bis(2-ethylhexyl)phthalate	0.01153	9.44	H&S, 94	360.00	IRIS	not available	11430269457.1	NA	1.143E+10	S	µg/kg
A-3	Butyl benzyl phthalate	0.01153	2.18	K,S&C,93	3.00	IRIS	not available	5.2345	NA	5.23450022	S	µg/kg
A-3	Chrysene	0.01153	5.39	K,S&C,93	0.0028	CWQS	not available	7.9234	NA	7.92340763	S	µg/kg
A-3	Di-N-octyl phthalate	0.01153	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	µg/kg
A-3	Dibenzo(ah)anthracene	0.01153	6.22	K,S&C,93	0.0028	CWQS	not available	53.5688	NA	53.56881	S	µg/kg
A-3	Dibenzofuran	0.01153	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
A-3	Fluoranthene	0.01153	5	H&S, 94	42.00	CWQS	1020000	11758.5600	NA	11758.56	S	µg/kg
A-3	Fluorene	0.01153	3.7	K,S&C,93	0.0028	CWQS	not available	0.1618	NA	0.16177522	S	µg/kg
A-3	Indeno(1,2,3-cd)pyrene	0.01153	7.49	K,S&C,93	0.0028	CWQS	not available	997.4979	NA	997.497921	S	µg/kg
A-3	Naphthalene	0.01153	3.24	H&S, 94	620	AWQC	not available	12420.6881	NA	12420.6881	S	µg/kg
A-3	Phenanthrene	0.01153	4.46	H&S, 94	0.0028	CWQS	123000	1417.9440	NA	1417.944	S	µg/kg
A-3	Phenol	0.01153	1.43	K,S&C,93	2560.00	IRIS	not available	794.3171	NA	794.317138	S	µg/kg
A-3	Pyrene	0.01153	4.81	K,S&C,93	0.0028	CWQS	1311000	15113.2080	NA	15113.208	S	µg/kg
A-3	2-Butanone	0.01153	0.09	K,S&C,93	20800.00	S&M,94	not available	294.9968	NA	294.996799	V	µg/kg
A-3	4-Methyl-2-pentanone	0.01153	0.79	K,S&C,93	164.00	S&M,94	not available	11.6573	NA	11.6572958	V	µg/kg
A-3	Acetone	0.01153	-0.24	H&S, 94	11200.00	S&M,94	not available	74.2971	NA	74.2971219	V	µg/kg
A-3	Benzene	0.01153	2.06	H&S, 94	5300.00	IRIS	not available	7015.0349	NA	7015.03492	V	µg/kg
A-3	Methylene chloride	0.01153	1.28	H&S, 94	4.70	CWQS	not available	1.0324	NA	1.0324091	V	µg/kg
A-3	Toluene	0.01153	2.65	H&S, 94	17500.00	AWQC	not available	90113.9479	NA	90113.9479	V	µg/kg
A-4	Antimony	0.01119	NA	NA	NA	NA	not available	2	7.671500	7.6715	M	mg/kg
A-4	Chromium	0.01119	NA	NA	NA	NA	not available	81	9.751100	81	M	mg/kg

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Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
A-4	Cobalt	0.01119	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg
A-4	Copper	0.01119	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg
A-4	Iron	0.01119	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
A-4	Magnesium	0.01119	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
A-4	Manganese	0.01119	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
A-4	Potassium	0.01119	NA	NA	NA	NA	not available	EN	1143.054800	1143.0548	M	mg/kg
A-4	Silver	0.01119	NA	NA	NA	NA	not available	1	2.742800	2.7428	M	mg/kg
A-4	Sodium	0.01119	NA	NA	NA	NA	not available	EN	401.397500	401.3975	M	mg/kg
A-4	Vanadium	0.01119	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
A-4	Zinc	0.01119	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
A-4	Aldrin	0.01119	2.61	K,S&C,93	1.50	AWQC	not available	6.8397	NA	6.83971117	P	µg/kg
A-4	Aroclor-1254	0.01119	5.93	H&S,94	0.014	AWQC	20000	223.8600	NA	223.86	P	µg/kg
A-4	Aroclor-1260	0.01119	7.02	H&S,95	0.014	AWQC	not available	1640.8714	NA	1640.87138	P	µg/kg
A-4	gamma-BHC (Lindane)	0.01119	3.66	H&S,96	0.080	AWQC	not available	4.0930	NA	4.09295049	P	µg/kg
A-4	Heptachlor	0.01119	4.23	H&S,97	0.0038	AWQC	not available	0.7223	NA	0.72232077	P	µg/kg
A-4	Americium-241	0.01119	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
A-4	Gross alpha	0.01119	NA	NA	NA	NA	not available	—	28.105000	28.105	R	pCi/g
A-4	Gross beta	0.01119	NA	NA	NA	NA	not available	—	37.909400	37.9094	R	pCi/g
A-4	Plutonium-239/240	0.01119	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
A-4	Radium-226	0.01119	NA	NA	NA	NA	not available	380,000	0.985300	380000	R	pCi/g
A-4	Radium-228	0.01119	NA	NA	NA	NA	not available	250,000	1.988300	250000	R	pCi/g
A-4	Strontium-89/90	0.01119	NA	NA	NA	NA	not available	6,700	0.276600	6700	R	pCi/g
A-4	Uranium-233/234	0.01119	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g
A-4	Uranium-235	0.01119	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
A-4	Uranium-238	0.01119	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g
A-4	1,2,4-Trichlorobenzene	0.01119	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
A-4	2-Methylnaphthalene	0.01119	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
A-4	Acenaphthene	0.01119	3.76	H&S, 94	74.00	S&M,94	140000	1567.0200	NA	1567.02	S	µg/kg
A-4	Anthracene	0.01119	4.42	H&S, 94	0.0028	CWQS	not available	0.8243	NA	0.82433651	S	µg/kg
A-4	Benzo(a)anthracene	0.01119	5.6	H&S, 94	0.0028	CWQS	1317000	14741.1810	NA	14741.181	S	µg/kg
A-4	Benzo(a)pyrene	0.01119	6	H&S, 94	0.0028	CWQS	1063000	11898.1590	NA	11898.159	S	µg/kg
A-4	Benzo(b)fluoranthene	0.01119	5.74	K,S&C,93	0.0028	CWQS	not available	17.2228	NA	17.2228308	S	µg/kg
A-4	Benzo(ghi)perylene	0.01119	6.89	K,S&C,93	0.0028	CWQS	not available	243.2790	NA	243.278951	S	µg/kg
A-4	Benzo(k)fluoranthene	0.01119	6.64	K,S&C,93	0.0028	CWQS	not available	136.8058	NA	136.805808	S	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
A-4	Benzoic acid	0.01119	2.26	K,S&C,93	41.60	S&M,94	not available	84.7305	NA	84.7305127	S	µg/kg
A-4	Bis(2-ethylhexyl)phthalate	0.01119	9.44	H&S, 94	360.00	IRIS	not available	11098109475.5	NA	1.1098E+10	S	µg/kg
A-4	Butyl benzyl phthalate	0.01119	2.18	K,S&C,93	3.00	IRIS	not available	5.0824	NA	5.08238732	S	µg/kg
A-4	Chrysene	0.01119	5.39	K,S&C,93	0.0028	CWQS	not available	7.6932	NA	7.69315593	S	µg/kg
A-4	Di-N-octyl phthalate	0.01119	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	µg/kg
A-4	Dibenzo(ah)anthracene	0.01119	6.22	K,S&C,93	0.0028	CWQS	not available	52.0121	NA	52.0121175	S	µg/kg
A-4	Dibenzofuran	0.01119	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
A-4	Fluoranthene	0.01119	5	H&S, 94	42.00	CWQS	1020000	11416.8600	NA	11416.86	S	µg/kg
A-4	Fluorene	0.01119	3.7	K,S&C,93	0.0028	CWQS	not available	0.1571	NA	0.15707408	S	µg/kg
A-4	Indeno(1,2,3-cd)pyrene	0.01119	7.49	K,S&C,93	0.0028	CWQS	not available	968.6109	NA	968.51095	S	µg/kg
A-4	Naphthalene	0.01119	3.24	H&S, 94	620	AWQC	not available	12059.7469	NA	12059.7469	S	µg/kg
A-4	Phenanthrene	0.01119	4.46	H&S, 94	0.0028	CWQS	123000	1376.7390	NA	1376.739	S	µg/kg
A-4	Phenol	0.01119	1.43	K,S&C,93	2560.00	IRIS	not available	771.2345	NA	771.234536	S	µg/kg
A-4	Pyrene	0.01119	4.81	K,S&C,93	0.0028	CWQS	1311000	14674.0230	NA	14674.023	S	µg/kg
A-4	2-Butanone	0.01119	0.09	K,S&C,93	20800.00	S&M,94	not available	286.4243	NA	286.424286	V	µg/kg
A-4	4-Methyl-2-pentanone	0.01119	0.79	K,S&C,93	164.00	S&M,94	not available	11.3185	NA	11.3185385	V	µg/kg
A-4	Acetone	0.01119	-0.24	H&S, 94	11200.00	S&M,94	not available	72.1381	NA	72.1380712	V	µg/kg
A-4	Benzene	0.01119	2.06	H&S, 94	5300.00	IRIS	not available	6811.1802	NA	6811.18025	V	µg/kg
A-4	Methylene chloride	0.01119	1.28	H&S, 94	4.70	CWQS	not available	1.0024	NA	1.00240763	V	µg/kg
A-4	Toluene	0.01119	2.65	H&S, 94	17500.00	AWQC	not available	87495.2653	NA	87495.2653	V	µg/kg
A-5	Antimony	0.00862	NA	NA	NA	NA	not available	2	7.671500	7.6715	M	mg/kg
A-5	Chromium	0.00862	NA	NA	NA	NA	not available	81	9.751100	81	M	mg/kg
A-5	Cobalt	0.00862	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg
A-5	Copper	0.00862	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg
A-5	Iron	0.00862	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
A-5	Magnesium	0.00862	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
A-5	Manganese	0.00862	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
A-5	Potassium	0.00862	NA	NA	NA	NA	not available	EN	1143.054800	1143.0548	M	mg/kg
A-5	Silver	0.00862	NA	NA	NA	NA	not available	1	2.742800	2.7428	M	mg/kg
A-5	Sodium	0.00862	NA	NA	NA	NA	not available	EN	401.397500	401.3975	M	mg/kg
A-5	Vanadium	0.00862	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
A-5	Zinc	0.00862	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
A-5	Aldrin	0.00862	2.61	K,S&C,93	1.50	AWQC	not available	5.2674	NA	5.26742699	P	µg/kg
A-5	Aroclor-1254	0.00862	5.93	H&S,94	0.014	AWQC	20000	172.4000	NA	172.4	P	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
A-5	Aroclor-1260	0.00862	7.02	H&S,95	0.014	AWQC	not available	1263.6747	NA	1263.67473	P	µg/kg
A-5	gamma-BHC (Lindane)	0.00862	3.66	H&S,96	0.080	AWQC	not available	3.1521	NA	3.15208016	P	µg/kg
A-5	Heptachlor	0.00862	4.23	H&S,97	0.0038	AWQC	not available	0.5563	NA	0.55627669	P	µg/kg
A-5	Americium-241	0.00862	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
A-5	Gross alpha	0.00862	NA	NA	NA	NA	not available	—	28.105000	28.105	R	pCi/g
A-5	Gross beta	0.00862	NA	NA	NA	NA	not available	—	37.909400	37.9094	R	pCi/g
A-5	Plutonium-239/240	0.00862	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
A-5	Radium-226	0.00862	NA	NA	NA	NA	not available	380,000	0.985300	380000	R	pCi/g
A-5	Radium-228	0.00862	NA	NA	NA	NA	not available	250,000	1.988300	250000	R	pCi/g
A-5	Strontium-89/90	0.00862	NA	NA	NA	NA	not available	6,700	0.276600	6700	R	pCi/g
A-5	Uranium-233/234	0.00862	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g
A-5	Uranium-235	0.00862	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
A-5	Uranium-238	0.00862	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g
A-5	1,2,4-Trichlorobenzene	0.00862	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
A-5	2-Methylnaphthalene	0.00862	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
A-5	Acenaphthene	0.00862	3.76	H&S, 94	74.00	S&M,94	140000	1206.8000	NA	1206.8	S	µg/kg
A-5	Anthracene	0.00862	4.42	H&S, 94	0.0028	CWQS	not available	0.6348	NA	0.63484148	S	µg/kg
A-5	Benzo(a)anthracene	0.00862	5.6	H&S, 94	0.0028	CWQS	1317000	11352.5400	NA	11352.54	S	µg/kg
A-5	Benzo(a)pyrene	0.00862	6	H&S, 94	0.0028	CWQS	1063000	9163.0600	NA	9163.06	S	µg/kg
A-5	Benzo(b)fluoranthene	0.00862	5.74	K,S&C,93	0.0028	CWQS	not available	13.2637	NA	13.2637185	S	µg/kg
A-5	Benzo(ghi)perylene	0.00862	6.89	K,S&C,93	0.0028	CWQS	not available	187.3550	NA	187.355004	S	µg/kg
A-5	Benzo(k)fluoranthene	0.00862	6.64	K,S&C,93	0.0028	CWQS	not available	105.3575	NA	105.357461	S	µg/kg
A-5	Benzoic acid	0.00862	2.26	K,S&C,93	41.60	S&M,94	not available	65.2530	NA	65.253017	S	µg/kg
A-5	Bis(2-ethylhexyl)phthalate	0.00862	9.44	H&S, 94	360.00	IRIS	not available	8546922512.2	NA	8546922512	S	µg/kg
A-5	Butyl benzyl phthalate	0.00862	2.18	K,S&C,93	3.00	IRIS	not available	3.9141	NA	3.91406939	S	µg/kg
A-5	Chrysene	0.00862	5.39	K,S&C,93	0.0028	CWQS	not available	5.9247	NA	5.92468544	S	µg/kg
A-5	Di-N-octyl phthalate	0.00862	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	µg/kg
A-5	Dibenzo(ah)anthracene	0.00862	6.22	K,S&C,93	0.00	CWQS	not available	40.0558	NA	40.0557896	S	µg/kg
A-5	Dibenzofuran	0.00862	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
A-5	Fluoranthene	0.00862	5	H&S, 94	42.00	CWQS	1020000	8792.4000	NA	8792.4	S	µg/kg
A-5	Fluorene	0.00862	3.7	K,S&C,93	0.0028	CWQS	not available	0.1210	NA	0.12096655	S	µg/kg
A-5	Indeno(1,2,3-cd)pyrene	0.00862	7.49	K,S&C,93	0.0028	CWQS	not available	745.8737	NA	745.873706	S	µg/kg
A-5	Naphthalene	0.00862	3.24	H&S, 94	620	AWQC	not available	9287.5027	NA	9287.50275	S	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
A-5	Phenanthrene	0.00862	4.46	H&S, 94	0.0028	CWQS	123000	1060.2600	NA	1060.26	S	µg/kg
A-5	Phenol	0.00862	1.43	K,S&C,93	2560.00	IRIS	not available	593.9464	NA	593.946368	S	µg/kg
A-5	Pyrene	0.00862	4.81	K,S&C,93	0.00	CWQS	1311000	11300.8200	NA	11300.82	S	µg/kg
A-5	2-Butanone	0.00862	0.09	K,S&C,93	20800.00	S&M,94	not available	220.5823	NA	220.58227	V	µg/kg
A-5	4-Methyl-2-pentanone	0.00862	0.79	K,S&C,93	164.00	S&M,94	not available	8.7167	NA	8.71668022	V	µg/kg
A-5	Acetone	0.00862	-0.24	H&S, 94	11200.00	S&M,94	not available	55.5553	NA	55.5552733	V	µg/kg
A-5	Benzene	0.00862	2.06	H&S, 94	5300.00	IRIS	not available	5245.4546	NA	5245.45464	V	µg/kg
A-5	Methylene chloride	0.00862	1.28	H&S, 94	4.70	CWQS	not available	0.7720	NA	0.77197836	V	µg/kg
A-5	Toluene	0.00862	2.65	H&S, 94	17500.00	AWQC	not available	67382.2199	NA	67382.2199	V	µg/kg
B-1	Antimony	0.023	NA	NA	NA	NA	not available	2	7.671500	7.6715	M	mg/kg
B-1	Chromium	0.023	NA	NA	NA	NA	not available	81	9.751100	81	M	mg/kg
B-1	Cobalt	0.023	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg
B-1	Copper	0.023	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg
B-1	Iron	0.023	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
B-1	Magnesium	0.023	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
B-1	Manganese	0.023	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
B-1	Potassium	0.023	NA	NA	NA	NA	not available	EN	1143.054800	1143.0548	M	mg/kg
B-1	Silver	0.023	NA	NA	NA	NA	not available	1	2.742800	2.7428	M	mg/kg
B-1	Sodium	0.023	NA	NA	NA	NA	not available	EN	401.397500	401.3975	M	mg/kg
B-1	Vanadium	0.023	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
B-1	Zinc	0.023	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
B-1	Aldrin	0.023	2.61	K,S&C,93	1.50	AWQC	not available	14.0546	NA	14.0546196	P	µg/kg
B-1	Aroclor-1254	0.023	5.93	H&S,94	0.014	AWQC	20000	460.0000	NA	460	P	µg/kg
B-1	Aroclor-1260	0.023	7.02	H&S,95	0.014	AWQC	not available	3371.7539	NA	3371.75392	P	µg/kg
B-1	gamma-BHC (Lindane)	0.023	3.66	H&S,96	0.080	AWQC	not available	8.4104	NA	8.41042269	P	µg/kg
B-1	Heptachlor	0.023	4.23	H&S,97	0.0038	AWQC	not available	1.4843	NA	1.48426495	P	µg/kg
B-1	Americium-241	0.023	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
B-1	Gross alpha	0.023	NA	NA	NA	NA	not available	—	28.105000	28.105	R	pCi/g
B-1	Gross beta	0.023	NA	NA	NA	NA	not available	—	37.909400	37.9094	R	pCi/g
B-1	Plutonium-239/240	0.023	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
B-1	Radium-226	0.023	NA	NA	NA	NA	not available	380,000	0.985300	380000	R	pCi/g
B-1	Radium-228	0.023	NA	NA	NA	NA	not available	250,000	1.988300	250000	R	pCi/g
B-1	Strontium-89/90	0.023	NA	NA	NA	NA	not available	6,700	0.276600	6700	R	pCi/g
B-1	Uranium-233/234	0.023	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
B-1	Uranium-235	0.023	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
B-1	Uranium-238	0.023	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g
B-1	1,2,4-Trichlorobenzene	0.023	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
B-1	2-Methylnaphthalene	0.023	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
B-1	Acenaphthene	0.023	3.76	H&S, 94	74.00	S&M,94	140000	3220.0000	NA	3220	S	µg/kg
B-1	Anthracene	0.023	4.42	H&S, 94	0.0028	CWQS	not available	1.6939	NA	1.69389259	S	µg/kg
B-1	Benzo(a)anthracene	0.023	5.6	H&S, 94	0.0028	CWQS	1317000	30291.0000	NA	30291	S	µg/kg
B-1	Benzo(a)pyrene	0.023	6	H&S, 94	0.0028	CWQS	1063000	24449.0000	NA	24449	S	µg/kg
B-1	Benzo(b)fluoranthene	0.023	5.74	K,S&C,93	0.0028	CWQS	not available	35.3904	NA	35.3904323	S	µg/kg
B-1	Benzo(ghi)perylene	0.023	6.89	K,S&C,93	0.0028	CWQS	not available	499.9031	NA	499.903143	S	µg/kg
B-1	Benzo(k)fluoranthene	0.023	6.64	K,S&C,93	0.0028	CWQS	not available	281.1162	NA	281.116196	S	µg/kg
B-1	Benzoic acid	0.023	2.26	K,S&C,93	41.60	S&M,94	not available	174.1090	NA	174.108978	S	µg/kg
B-1	Bis(2-ethylhexyl)phthalate	0.023	9.44	H&S, 94	360.00	IRIS	not available	22805013663.6	NA	2.2805E+10	S	µg/kg
B-1	Butyl benzyl phthalate	0.023	2.18	K,S&C,93	3.00	IRIS	not available	10.4436	NA	10.4435726	S	µg/kg
B-1	Chrysene	0.023	5.39	K,S&C,93	0.0028	CWQS	not available	15.8083	NA	15.8083254	S	µg/kg
B-1	Di-N-octyl phthalate	0.023	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	µg/kg
B-1	Dibenzo(ah)anthracene	0.023	6.22	K,S&C,93	0.00	CWQS	not available	106.8774	NA	106.877397	S	µg/kg
B-1	Dibenzofuran	0.023	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
B-1	Fluoranthene	0.023	5	H&S, 94	42.00	CWQS	1020000	23460.0000	NA	23460	S	µg/kg
B-1	Fluorene	0.023	3.7	K,S&C,93	0.0028	CWQS	not available	0.3228	NA	0.32276458	S	µg/kg
B-1	Indeno(1,2,3-cd)pyrene	0.023	7.49	K,S&C,93	0.0028	CWQS	not available	1990.1503	NA	1990.15026	S	µg/kg
B-1	Naphthalene	0.023	3.24	H&S, 94	620	AWQC	not available	24781.0398	NA	24781.0398	S	µg/kg
B-1	Phenanthrene	0.023	4.46	H&S, 94	0.0028	CWQS	123000	2829.0000	NA	2829	S	µg/kg
B-1	Phenol	0.023	1.43	K,S&C,93	2560.00	IRIS	not available	1584.7757	NA	1584.77569	S	µg/kg
B-1	Pyrene	0.023	4.81	K,S&C,93	0.0028	CWQS	1311000	30153.0000	NA	30153	S	µg/kg
B-1	2-Butanone	0.023	0.09	K,S&C,93	20800.00	S&M,94	not available	588.5606	NA	588.56058	V	µg/kg
B-1	4-Methyl-2-pentanone	0.023	0.79	K,S&C,93	164.00	S&M,94	not available	23.2580	NA	23.2579635	V	µg/kg
B-1	Acetone	0.023	-0.24	H&S, 94	11200.00	S&M,94	not available	148.2333	NA	148.233328	V	µg/kg
B-1	Benzene	0.023	2.06	H&S, 94	5300.00	IRIS	not available	13995.9926	NA	13995.9926	V	µg/kg
B-1	Methylene chloride	0.023	1.28	H&S, 94	4.70	CWQS	not available	2.0598	NA	2.05980304	V	µg/kg
B-1	Toluene	0.023	2.65	H&S, 94	17500.00	AWQC	not available	179790.1458	NA	179790.146	V	µg/kg
B-2	Antimony	0.03786	NA	NA	NA	NA	not available	2	7.671500	7.6715	M	mg/kg
B-2	Chromium	0.03786	NA	NA	NA	NA	not available	81	9.751100	81	M	mg/kg
B-2	Cobalt	0.03786	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
B-2	Copper	0.03786	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg
B-2	Iron	0.03786	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
B-2	Magnesium	0.03786	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
B-2	Manganese	0.03786	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
B-2	Potassium	0.03786	NA	NA	NA	NA	not available	EN	1143.054800	1143.0548	M	mg/kg
B-2	Silver	0.03786	NA	NA	NA	NA	not available	1	2.742800	2.7428	M	mg/kg
B-2	Sodium	0.03786	NA	NA	NA	NA	not available	EN	401.397500	401.3975	M	mg/kg
B-2	Vanadium	0.03786	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
B-2	Zinc	0.03786	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
B-2	Aldrin	0.03786	2.61	K,S&C,93	1.50	AWQC	not available	23.1351	NA	23.135126	P	µg/kg
B-2	Aroclor-1254	0.03786	5.93	H&S,94	0.014	AWQC	20000	757.2000	NA	757.2	P	µg/kg
B-2	Aroclor-1260	0.03786	7.02	H&S,95	0.014	AWQC	not available	5550.2002	NA	5550.20016	P	µg/kg
B-2	gamma-BHC (Lindane)	0.03786	3.66	H&S,96	0.080	AWQC	not available	13.8443	NA	13.8442871	P	µg/kg
B-2	Heptachlor	0.03786	4.23	H&S,97	0.0038	AWQC	not available	2.4432	NA	2.44322918	P	µg/kg
B-2	Americium-241	0.03786	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
B-2	Gross alpha	0.03786	NA	NA	NA	NA	not available	—	28.105000	28.105	R	pCi/g
B-2	Gross beta	0.03786	NA	NA	NA	NA	not available	—	37.909400	37.9094	R	pCi/g
B-2	Plutonium-239/240	0.03786	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
B-2	Radium-226	0.03786	NA	NA	NA	NA	not available	380,000	0.985300	380000	R	pCi/g
B-2	Radium-228	0.03786	NA	NA	NA	NA	not available	250,000	1.988300	250000	R	pCi/g
B-2	Strontium-89/90	0.03786	NA	NA	NA	NA	not available	6,700	0.276600	6700	R	pCi/g
B-2	Uranium-233/234	0.03786	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g
B-2	Uranium-235	0.03786	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
B-2	Uranium-238	0.03786	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g
B-2	1,2,4-Trichlorobenzene	0.03786	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
B-2	2-Methylnaphthalene	0.03786	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
B-2	Acenaphthene	0.03786	3.76	H&S, 94	74.00	S&M,94	140000	5300.4000	NA	5300.4	S	µg/kg
B-2	Anthracene	0.03786	4.42	H&S, 94	0.0028	CWQS	not available	2.7883	NA	2.78829449	S	µg/kg
B-2	Benzo(a)anthracene	0.03786	5.6	H&S, 94	0.0028	CWQS	1317000	49861.6200	NA	49861.62	S	µg/kg
B-2	Benzo(a)pyrene	0.03786	6	H&S, 94	0.0028	CWQS	1063000	40245.1800	NA	40245.18	S	µg/kg
B-2	Benzo(b)fluoranthene	0.03786	5.74	K,S&C,93	0.0028	CWQS	not available	58.2557	NA	58.255729	S	µg/kg
B-2	Benzo(ghi)perylene	0.03786	6.89	K,S&C,93	0.0028	CWQS	not available	822.8840	NA	822.884043	S	µg/kg
B-2	Benzo(k)fluoranthene	0.03786	6.64	K,S&C,93	0.0028	CWQS	not available	462.7417	NA	462.741703	S	µg/kg
B-2	Benzoic acid	0.03786	2.26	K,S&C,93	41.60	S&M,94	not available	286.599	NA	286.598518	S	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
B-2	Bis(2-ethylhexyl)phthalate	0.03786	9.44	H&S, 94	360.00	IRIS	not available	37539035535	NA	3.7539E+10	S	µg/kg
B-2	Butyl benzyl phthalate	0.03786	2.18	K,S&C,93	3.00	IRIS	not available	17.1910	NA	17.1910287	S	µg/kg
B-2	Chrysene	0.03786	5.39	K,S&C,93	0.0028	CWQS	not available	26.0219	NA	26.0218783	S	µg/kg
B-2	Di-N-octyl phthalate	0.03786	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	µg/kg
B-2	Dibenzo(ah)anthracene	0.03786	6.22	K,S&C,93	0.0028	CWQS	not available	175.9295	NA	175.929489	S	µg/kg
B-2	Dibenzofuran	0.03786	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
B-2	Fluoranthene	0.03786	5	H&S, 94	42.0	CWQS	1020000	38617.2000	NA	38617.2	S	µg/kg
B-2	Fluorene	0.03786	3.7	K,S&C,93	0.0028	CWQS	not available	0.5313	NA	0.53129856	S	µg/kg
B-2	Indeno(1,2,3-cd)pyrene	0.03786	7.49	K,S&C,93	0.0028	CWQS	not available	3275.9604	NA	3275.96038	S	µg/kg
B-2	Naphthalene	0.03786	3.24	H&S, 94	620	AWQC	not available	40791.7464	NA	40791.7464	S	µg/kg
B-2	Phenanthrene	0.03786	4.46	H&S, 94	0.0028	CWQS	123000	4656.7800	NA	4656.78	S	µg/kg
B-2	Phenol	0.03786	1.43	K,S&C,93	2560.00	IRIS	not available	2608.6786	NA	2608.6786	S	µg/kg
B-2	Pyrene	0.03786	4.81	K,S&C,93	0.0028	CWQS	1311000	49634.4600	NA	49634.46	S	µg/kg
B-2	2-Butanone	0.03786	0.09	K,S&C,93	20800.00	S&M,94	not available	968.8219	NA	968.821894	V	µg/kg
B-2	4-Methyl-2-pentanone	0.03786	0.79	K,S&C,93	164.00	S&M,94	not available	38.2846	NA	38.2846303	V	µg/kg
B-2	Acetone	0.03786	-0.24	H&S, 94	11200.00	S&M,94	not available	244.0049	NA	244.004948	V	µg/kg
B-2	Benzene	0.03786	2.06	H&S, 94	5300.00	IRIS	not available	23038.6209	NA	23038.6209	V	µg/kg
B-2	Methylene chloride	0.03786	1.28	H&S, 94	4.70	CWQS	not available	3.3906	NA	3.39061491	V	µg/kg
B-2	Toluene	0.03786	2.65	H&S, 94	17500.00	AWQC	not available	295950.2140	NA	295950.214	V	µg/kg
B-3	Antimony	0.01805	NA	NA	NA	NA	not available	2	7.671500	7.6715	M	mg/kg
B-3	Chromium	0.01805	NA	NA	NA	NA	not available	81	9.751100	81	M	mg/kg
B-3	Cobalt	0.01805	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg
B-3	Copper	0.01805	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg
B-3	Iron	0.01805	NA	NA	NA	NA	not available	30,000	10216.21990	30000.0	M	mg/kg
B-3	Magnesium	0.01805	NA	NA	NA	NA	not available	EN	1800.03670	1800.0367	M	mg/kg
B-3	Manganese	0.01805	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
B-3	Potassium	0.01805	NA	NA	NA	NA	not available	EN	1143.054800	1143.0548	M	mg/kg
B-3	Silver	0.01805	NA	NA	NA	NA	not available	1	2.742800	2.7428	M	mg/kg
B-3	Sodium	0.01805	NA	NA	NA	NA	not available	EN	401.397500	401.3975	M	mg/kg
B-3	Vanadium	0.01805	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
B-3	Zinc	0.01805	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
B-3	Aldrin	0.01805	2.61	K,S&C,93	1.50	AWQC	not available	11.0317	NA	11.0316542	P	µg/kg
B-3	Aroclor-1254	0.01805	5.93	H&S,94	0.014	AWQC	20000	361.0600	NA	361.06	P	µg/kg
B-3	Aroclor-1260	0.01805	7.02	H&S,95	0.014	AWQC	not available	2646.5336	NA	2646.53363	P	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
B-3	gamma-BHC (Lindane)	0.01805	3.66	H&S,96	0.080	AWQC	not available	6.6015	NA	6.60145047	P	µg/kg
B-3	Heptachlor	0.01805	4.23	H&S,97	0.0038	AWQC	not available	1.1650	NA	1.16501892	P	µg/kg
B-3	Americium-241	0.01805	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
B-3	Gross alpha	0.01805	NA	NA	NA	NA	not available	—	28.105000	28.105	R	pCi/g
B-3	Gross beta	0.01805	NA	NA	NA	NA	not available	—	37.909400	37.9094	R	pCi/g
B-3	Plutonium-239/240	0.01805	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
B-3	Radium-226	0.01805	NA	NA	NA	NA	not available	380,000	0.985300	380000	R	pCi/g
B-3	Radium-228	0.01805	NA	NA	NA	NA	not available	250,000	1.988300	250000	R	pCi/g
B-3	Strontium-89/90	0.01805	NA	NA	NA	NA	not available	6,700	0.276600	6700	R	pCi/g
B-3	Uranium-233/234	0.01805	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g
B-3	Uranium-235	0.01805	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
B-3	Uranium-238	0.01805	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g
B-3	1,2,4-Trichlorobenzene	0.01805	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
B-3	2-Methylnaphthalene	0.01805	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
B-3	Acenaphthene	0.01805	3.76	H&S, 94	74.00	S&M,94	140000	2527.4200	NA	2527.42	S	µg/kg
B-3	Anthracene	0.01805	4.42	H&S, 94	0.0028	CWQS	not available	1.3296	NA	1.32955839	S	µg/kg
B-3	Benzo(a)anthracene	0.01805	5.6	H&S, 94	0.0028	CWQS	1317000	23775.8010	NA	23775.801	S	µg/kg
B-3	Benzo(a)pyrene	0.01805	6	H&S, 94	0.0028	CWQS	1063000	19190.3390	NA	19190.339	S	µg/kg
B-3	Benzo(b)fluoranthene	0.01805	5.74	K,S&C,93	0.0028	CWQS	not available	27.7784	NA	27.7784119	S	µg/kg
B-3	Benzo(ghi)perylene	0.01805	6.89	K,S&C,93	0.0028	CWQS	not available	392.3805	NA	392.380498	S	µg/kg
B-3	Benzo(k)fluoranthene	0.01805	6.64	K,S&C,93	0.0028	CWQS	not available	220.6518	NA	220.651769	S	µg/kg
B-3	Benzoic acid	0.01805	2.26	K,S&C,93	41.60	S&M,94	not available	136.6604	NA	136.660408	S	µg/kg
B-3	Bis(2-ethylhexyl)phthalate	0.01805	9.44	H&S, 94	360.00	IRIS	not available	17899952681.3	NA	1.79E+10	S	µg/kg
B-3	Butyl benzyl phthalate	0.01805	2.18	K,S&C,93	3.00	IRIS	not available	8.1973	NA	8.19729637	S	µg/kg
B-3	Chrysene	0.01805	5.39	K,S&C,93	0.0028	CWQS	not available	12.4082	NA	12.4081608	S	µg/kg
B-3	Di-N-octyl phthalate	0.01805	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	µg/kg
B-3	Dibenzo(ah)anthracene	0.01805	6.22	K,S&C,93	0.0028	CWQS	not available	83.8895	NA	83.8894628	S	µg/kg
B-3	Dibenzofuran	0.01805	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
B-3	Fluoranthene	0.01805	5	H&S, 94	42.00	CWQS	1020000	18414.0600	NA	18414.06	S	µg/kg
B-3	Fluorene	0.01805	3.7	K,S&C,93	0.0028	CWQS	not available	0.2533	NA	0.25334213	S	µg/kg
B-3	Indeno(1,2,3-cd)pyrene	0.01805	7.49	K,S&C,93	0.0028	CWQS	not available	1562.0949	NA	1562.0949	S	µg/kg
B-3	Naphthalene	0.01805	3.24	H&S, 94	620	AWQC	not available	19450.9614	NA	19450.9614	S	µg/kg
B-3	Phenanthrene	0.01805	4.46	H&S, 94	0.0028	CWQS	123000	2220.5190	NA	2220.519	S	µg/kg
B-3	Phenol	0.01805	1.43	K,S&C,93	2560.00	IRIS	not available	1243.9111	NA	1243.91111	S	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
B-3	Pyrene	0.01805	4.81	K,S&C,93	0.0028	CWQS	1311000	23667.4830	NA	23667.483	S	µg/kg
B-3	2-Butanone	0.01805	0.09	K,S&C,93	20800.00	S&M,94	not available	461.9689	NA	461.968876	V	µg/kg
B-3	4-Methyl-2-pentanone	0.01805	0.79	K,S&C,93	164.00	S&M,94	not available	18.2555	NA	18.2554789	V	µg/kg
B-3	Acetone	0.01805	-0.24	H&S, 94	11200.00	S&M,94	not available	116.3503	NA	116.350273	V	µg/kg
B-3	Benzene	0.01805	2.06	H&S, 94	5300.00	IRIS	not available	10985.6372	NA	10985.6372	V	µg/kg
B-3	Methylene chloride	0.01805	1.28	H&S, 94	4.70	CWQS	not available	1.6168	NA	1.61676627	V	µg/kg
B-3	Toluene	0.01805	2.65	H&S, 94	17500.00	AWQC	not available	141119.6306	NA	141119.631	V	µg/kg
B-4	Antimony	0.01289	NA	NA	NA	NA	not available	2	7.671500	7.6715	M	mg/kg
B-4	Chromium	0.01289	NA	NA	NA	NA	not available	81	9.751100	81	M	mg/kg
B-4	Cobalt	0.01289	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg
B-4	Copper	0.01289	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg
B-4	Iron	0.01289	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
B-4	Magnesium	0.01289	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
B-4	Manganese	0.01289	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
B-4	Potassium	0.01289	NA	NA	NA	NA	not available	EN	1143.054800	1143.0548	M	mg/kg
B-4	Silver	0.01289	NA	NA	NA	NA	not available	1	2.742800	2.7428	M	mg/kg
B-4	Sodium	0.01289	NA	NA	NA	NA	not available	EN	401.397500	401.3975	M	mg/kg
B-4	Vanadium	0.01289	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
B-4	Zinc	0.01289	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
B-4	Aldrin	0.01289	2.61	K,S&C,93	1.50	AWQC	not available	7.8755	NA	7.87547553	P	µg/kg
B-4	Aroclor-1254	0.01289	5.93	H&S,94	0.014	AWQC	20000	257.7600	NA	257.76	P	µg/kg
B-4	Aroclor-1260	0.01289	7.02	H&S,95	0.014	AWQC	not available	1889.3550	NA	1889.35498	P	µg/kg
B-4	gamma-BHC (Lindane)	0.01289	3.66	H&S,96	0.080	AWQC	not available	4.7128	NA	4.71276207	P	µg/kg
B-4	Heptachlor	0.01289	4.23	H&S,97	0.0038	AWQC	not available	0.8317	NA	0.83170464	P	µg/kg
B-4	Americium-241	0.01289	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
B-4	Gross alpha	0.01289	NA	NA	NA	NA	not available	—	28.105000	28.105	R	pCi/g
B-4	Gross beta	0.01289	NA	NA	NA	NA	not available	—	37.909400	37.9094	R	pCi/g
B-4	Plutonium-239/240	0.01289	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
B-4	Radium-226	0.01289	NA	NA	NA	NA	not available	380,000	0.985300	380000	R	pCi/g
B-4	Radium-228	0.01289	NA	NA	NA	NA	not available	250,000	1.988300	250000	R	pCi/g
B-4	Strontium-89/90	0.01289	NA	NA	NA	NA	not available	6,700	0.276600	6700	R	pCi/g
B-4	Uranium-233/234	0.01289	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g
B-4	Uranium-235	0.01289	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
B-4	Uranium-238	0.01289	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
B-4	1,2,4-Trichlorobenzene	0.01289	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
B-4	2-Methylnaphthalene	0.01289	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
B-4	Acenaphthene	0.01289	3.76	H&S, 94	74.00	S&M,94	140000	1804.3200	NA	1804.32	S	µg/kg
B-4	Anthracene	0.01289	4.42	H&S, 94	0.0028	CWQS	not available	0.9492	NA	0.94916903	S	µg/kg
B-4	Benzo(a)anthracene	0.01289	5.6	H&S, 94	0.0028	CWQS	1317000	16973.4960	NA	16973.496	S	µg/kg
B-4	Benzo(a)pyrene	0.01289	6	H&S, 94	0.0028	CWQS	1063000	13699.9440	NA	13699.944	S	µg/kg
B-4	Benzo(b)fluoranthene	0.01289	5.74	K,S&C,93	0.0028	CWQS	not available	19.8310	NA	19.8309518	S	µg/kg
B-4	Benzo(ghi)perylene	0.01289	6.89	K,S&C,93	0.0028	CWQS	not available	280.1196	NA	280.119639	S	µg/kg
B-4	Benzo(k)fluoranthene	0.01289	6.64	K,S&C,93	0.0028	CWQS	not available	157.5228	NA	157.522849	S	µg/kg
B-4	Benzoic acid	0.01289	2.26	K,S&C,93	41.6	S&M,94	not available	97.5616	NA	97.5615874	S	µg/kg
B-4	Bis(2-ethylhexyl)phthalate	0.01289	9.44	H&S, 94	360.00	IRIS	not available	12778739830.3	NA	1.2779E+10	S	µg/kg
B-4	Butyl benzyl phthalate	0.01289	2.18	K,S&C,93	3.00	IRIS	not available	5.8520	NA	5.85203321	S	µg/kg
B-4	Chrysene	0.01289	5.39	K,S&C,93	0.0028	CWQS	not available	8.8582	NA	8.85816078	S	µg/kg
B-4	Di-N-octyl phthalate	0.01289	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	µg/kg
B-4	Dibenzo(ah)anthracene	0.01289	6.22	K,S&C,93	0.0028	CWQS	not available	59.8885	NA	59.888517	S	µg/kg
B-4	Dibenzofuran	0.01289	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
B-4	Fluoranthene	0.01289	5	H&S, 94	42.00	CWQS	1020000	13145.7600	NA	13145.76	S	µg/kg
B-4	Fluorene	0.01289	3.7	K,S&C,93	0.0028	CWQS	not available	0.1809	NA	0.18086043	S	µg/kg
B-4	Indeno(1,2,3-cd)pyrene	0.01289	7.49	K,S&C,93	0.0028	CWQS	not available	1115.1764	NA	1115.17637	S	µg/kg
B-4	Naphthalene	0.01289	3.24	H&S, 94	620	AWQC	not available	13886.0018	NA	13886.0018	S	µg/kg
B-4	Phenanthrene	0.01289	4.46	H&S, 94	0.0028	CWQS	123000	1585.2240	NA	1585.224	S	µg/kg
B-4	Phenol	0.01289	1.43	K,S&C,93	2560.00	IRIS	not available	888.0256	NA	888.025614	S	µg/kg
B-4	Pyrene	0.01289	4.81	K,S&C,93	0.0028	CWQS	1311000	16896.1680	NA	16896.168	S	µg/kg
B-4	2-Butanone	0.01289	0.09	K,S&C,93	20800.00	S&M,94	not available	329.7986	NA	329.798641	V	µg/kg
B-4	4-Methyl-2-pentanone	0.01289	0.79	K,S&C,93	164.00	S&M,94	not available	13.0325	NA	13.0325493	V	µg/kg
B-4	Acetone	0.01289	-0.24	H&S, 94	11200.00	S&M,94	not available	83.0622	NA	83.062223	V	µg/kg
B-4	Benzene	0.01289	2.06	H&S, 94	5300.00	IRIS	not available	7842.6241	NA	7842.62405	V	µg/kg
B-4	Methylene chloride	0.01289	1.28	H&S, 94	4.70	CWQS	not available	1.1542	NA	1.15420615	V	µg/kg
B-4	Toluene	0.01289	2.65	H&S, 94	17500.00	AWQC	not available	100745.0174	NA	100745.017	V	µg/kg
B-5	Antimony	0.01008	NA	NA	NA	NA	not available	2	7.671500	7.6715	M	mg/kg
B-5	Chromium	0.01008	NA	NA	NA	NA	not available	81	9.751100	81	M	mg/kg
B-5	Cobalt	0.01008	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg
B-5	Copper	0.01008	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
B-5	Iron	0.01008	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
B-5	Magnesium	0.01008	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
B-5	Manganese	0.01008	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
B-5	Potassium	0.01008	NA	NA	NA	NA	not available	EN	1143.054800	1143.0548	M	mg/kg
B-5	Silver	0.01008	NA	NA	NA	NA	not available	1	2.742800	2.7428	M	mg/kg
B-5	Sodium	0.01008	NA	NA	NA	NA	not available	EN	401.397500	401.3975	M	mg/kg
B-5	Vanadium	0.01008	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
B-5	Zinc	0.01008	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
B-5	Aldrin	0.01008	2.61	K,S&C,93	1.50	AWQC	not available	6.1608	NA	6.16081194	P	µg/kg
B-5	Aroclor-1254	0.01008	5.93	H&S,94	0.014	AWQC	20000	201.6400	NA	201.64	P	µg/kg
B-5	Aroclor-1260	0.01008	7.02	H&S,95	0.014	AWQC	not available	1478.0010	NA	1478.001	P	µg/kg
B-5	gamma-BHC (Lindane)	0.01008	3.66	H&S,96	0.080	AWQC	not available	3.6867	NA	3.6866905	P	µg/kg
B-5	Heptachlor	0.01008	4.23	H&S,97	0.0038	AWQC	not available	0.6506	NA	0.65062432	P	µg/kg
B-5	Americium-241	0.01008	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
B-5	Gross alpha	0.01008	NA	NA	NA	NA	not available	—	28.105000	28.105	R	pCi/g
B-5	Gross beta	0.01008	NA	NA	NA	NA	not available	—	37.909400	37.9094	R	pCi/g
B-5	Plutonium-239/240	0.01008	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
B-5	Radium-226	0.01008	NA	NA	NA	NA	not available	380,000	0.985300	380000	R	pCi/g
B-5	Radium-228	0.01008	NA	NA	NA	NA	not available	250,000	1.988300	250000	R	pCi/g
B-5	Strontium-89/90	0.01008	NA	NA	NA	NA	not available	6,700	0.276600	6700	R	pCi/g
B-5	Uranium-233/234	0.01008	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g
B-5	Uranium-235	0.01008	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
B-5	Uranium-238	0.01008	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g
B-5	1,2,4-Trichlorobenzene	0.01008	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
B-5	2-Methylnaphthalene	0.01008	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	µg/kg
B-5	Acenaphthene	0.01008	3.76	H&S, 94	74.00	S&M,94	140000	1411.4800	NA	1411.48	S	µg/kg
B-5	Anthracene	0.01008	4.42	H&S, 94	0.0028	CWQS	not available	0.7425	NA	0.74251413	S	µg/kg
B-5	Benzo(a)anthracene	0.01008	5.6	H&S, 94	0.0028	CWQS	1317000	13277.9940	NA	13277.994	S	µg/kg
B-5	Benzo(a)pyrene	0.01008	6	H&S, 94	0.0028	CWQS	1063000	10717.1660	NA	10717.166	S	µg/kg
B-5	Benzo(b)fluoranthene	0.01008	5.74	K,S&C,93	0.0028	CWQS	not available	15.5133	NA	15.5133191	S	µg/kg
B-5	Benzo(ghi)perylene	0.01008	6.89	K,S&C,93	0.0028	CWQS	not available	219.1315	NA	219.131456	S	µg/kg
B-5	Benzo(k)fluoranthene	0.01008	6.64	K,S&C,93	0.0028	CWQS	not available	123.2267	NA	123.226673	S	µg/kg
B-5	Benzoic acid	0.01008	2.26	K,S&C,93	41.60	S&M,94	not available	76.3203	NA	76.3202921	S	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
B-5	Bis(2-ethylhexyl)phthalate	0.01008	9.44	H&S, 94	360.00	IRIS	not available	9996528163.3	NA	9996528163	S	µg/kg
B-5	Butyl benzyl phthalate	0.01008	2.18	K,S&C,93	3.00	IRIS	not available	4.5779	NA	4.57791735	S	µg/kg
B-5	Chrysene	0.01008	5.39	K,S&C,93	0.0028	CWQS	not available	6.9295	NA	6.92954508	S	µg/kg
B-5	Di-N-octyl phthalate	0.01008	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	µg/kg
B-5	Dibenzo(ah)anthracene	0.01008	6.22	K,S&C,93	0.0028	CWQS	not available	46.8495	NA	46.8494746	S	µg/kg
B-5	Dibenzofuran	0.01008	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
B-5	Fluoranthene	0.01008	5	H&S, 94	42.00	CWQS	1020000	10283.6400	NA	10283.64	S	µg/kg
B-5	Fluorene	0.01008	3.7	K,S&C,93	0.0028	CWQS	not available	0.1415	NA	0.14148315	S	µg/kg
B-5	Indeno(1,2,3-cd)pyrene	0.01008	7.49	K,S&C,93	0.0028	CWQS	not available	872.3780	NA	872.378039	S	µg/kg
B-5	Naphthalene	0.01008	3.24	H&S, 94	620	AWQC	not available	10862.7149	NA	10862.7149	S	µg/kg
B-5	Phenanthrene	0.01008	4.46	H&S, 94	0.0028	CWQS	123000	1240.0860	NA	1240.086	S	µg/kg
B-5	Phenol	0.01008	1.43	K,S&C,93	2560.00	IRIS	not available	694.6830	NA	694.68298	S	µg/kg
B-5	Pyrene	0.01008	4.81	K,S&C,93	0.00	CWQS	1311000	13217.5020	NA	13217.502	S	µg/kg
B-5	2-Butanone	0.01008	0.09	K,S&C,93	20800.00	S&M,94	not available	257.9943	NA	257.994251	V	µg/kg
B-5	4-Methyl-2-pentanone	0.01008	0.79	K,S&C,93	164.00	S&M,94	not available	10.1951	NA	10.1950777	V	µg/kg
B-5	Acetone	0.01008	-0.24	H&S, 94	11200.00	S&M,94	not available	64.9778	NA	64.977757	V	µg/kg
B-5	Benzene	0.01008	2.06	H&S, 94	5300.00	IRIS	not available	6135.1130	NA	6135.11295	V	µg/kg
B-5	Methylene chloride	0.01008	1.28	H&S, 94	4.70	CWQS	not available	0.9029	NA	0.90291018	V	µg/kg
B-5	Toluene	0.01008	2.65	H&S, 94	17500.00	AWQC	not available	78810.6196	NA	78810.6196	V	µg/kg
C-1	Mercury	0.02533	NA	NA	NA	NA	NA	0.15	2	2	M	mg/kg
C-1	Zinc	0.02533	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
C-1	Americium-241	0.02533	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
C-1	Gross alpha	0.02533	NA	NA	NA	NA	not available	—	28.105000	28.105	R	pCi/g
C-1	Gross beta	0.02533	NA	NA	NA	NA	not available	—	37.909400	37.9094	R	pCi/g
C-1	Plutonium-239/240	0.02533	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
C-1	Uranium-233/234	0.02533	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g
C-1	Uranium-235	0.02533	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
C-1	Uranium-238	0.02533	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g
C-1	Benzoic acid	0.02533	2.26	K,S&C,93	41.60	S&M,94	not available	191.7697	NA	191.769685	S	µg/kg
C-1	Di-N-butyl phthalate	0.02533	4.03	H&S, 94	3.00	IRIS	not available	814.3440	NA	814.343957	S	µg/kg
C-1	Fluoranthene	0.02533	5	H&S, 94	42.00	CWQS	1020000	25839.6600	NA	25839.66	S	µg/kg
C-1	Phenol	0.02533	1.43	K,S&C,93	2560.00	IRIS	not available	1745.5271	NA	1745.52707	S	µg/kg
C-1	Toluene	0.02533	2.65	H&S, 94	17500.00	AWQC	not available	198027.1202	NA	198027.12	V	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
C-2	Mercury	0.019	NA	NA	NA	NA	NA	0.15	2	2	M	mg/kg
C-2	Zinc	0.019	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
C-2	Americium-241	0.019	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
C-2	Plutonium-239/240	0.019	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
C-2	Uranium-233/234	0.019	NA	NA	NA	NA	not available	10,000	1.955900	10000	R	pCi/g
C-2	Uranium-235	0.019	NA	NA	NA	NA	not available	10,000	0.073500	10000	R	pCi/g
C-2	Uranium-238	0.019	NA	NA	NA	NA	not available	4,200	1.689500	4200	R	pCi/g
C-2	Benzoic acid	0.019	2.26	K,S&C,93	41.60	S&M,94	not available	143.8292	NA	143.829156	S	µg/kg
C-2	Di-N-butyl phthalate	0.019	4.03	H&S, 94	3.00	IRIS	not available	610.7660	NA	610.766004	S	µg/kg
C-2	Fluoranthene	0.019	5	H&S, 94	42.00	CWQS	1020000	19380.0000	NA	19380	S	µg/kg
C-2	Phenol	0.019	1.43	K,S&C,93	2560.00	IRIS	not available	1309.1625	NA	1309.16253	S	µg/kg
C-2	Toluene	0.019	2.65	H&S, 94	17500.00	AWQC	not available	148522.2944	NA	148522.294	V	µg/kg
LFP	Aluminum	0.00837	NA	NA	NA	NA	not available	not available	28025.00000	28025	M	mg/kg
LFP	Arsenic	0.00837	NA	NA	NA	NA	not available	8.2	2.969000	8.2	M	mg/kg
LFP	Barium	0.00837	NA	NA	NA	NA	not available	20	90.408000	90.408	M	mg/kg
LFP	Beryllium	0.00837	NA	NA	NA	NA	not available	not available	1.500000	1.5	M	mg/kg
LFP	Calcium	0.00837	NA	NA	NA	NA	not available	EN	4686.655800	4686.6558	M	mg/kg
LFP	Chromium	0.00837	NA	NA	NA	NA	not available	81	9.751100	81	M	mg/kg
LFP	Copper	0.00837	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg
LFP	Iron	0.00837	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
LFP	Lead	0.00837	NA	NA	NA	NA	not available	47	39.400000	46.7	M	mg/kg
LFP	Magnesium	0.00837	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
LFP	Nickel	0.00837	NA	NA	NA	NA	not available	21	8.173800	21	M	mg/kg
LFP	Potassium	0.00837	NA	NA	NA	NA	not available	EN	1143.054800	1143.0548	M	mg/kg
LFP	Selenium	0.00837	NA	NA	NA	NA	not available	not available	1.100000	1.1	M	mg/kg
LFP	Sodium	0.00837	NA	NA	NA	NA	not available	EN	401.397500	401.3975	M	mg/kg
LFP	Strontium	0.00837	NA	NA	NA	NA	not available	—	49.903000	49.903	M	mg/kg
LFP	Vanadium	0.00837	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
LFP	Zinc	0.00837	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
LFP	Cesium-137	0.00837	NA	NA	NA	NA	not available	4800	0.862000	4800	R	pCi/g
LFP	Acenaphthene	0.00837	3.76	H&S, 94	74.00	S&M,94	140000	1171.3800	NA	1171.38	S	µg/kg
LFP	Anthracene	0.00837	4.42	H&S, 94	0.0028	CWQS	not available	0.6162	NA	0.61620866	S	µg/kg
LFP	Benzo(a)anthracene	0.00837	5.6	H&S, 94	0.0028	CWQS	1317000	11019.3390	NA	11019.339	S	µg/kg
LFP	Benzo(a)pyrene	0.00837	6	H&S, 94	0.0028	CWQS	1063000	8894.1210	NA	8894.121	S	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
LFP	Benzo(b)fluoranthene	0.00837	5.74	K,S&C,93	0.0028	CWQS	not available	12.8744	NA	12.8744238	S	µg/kg
LFP	Benzo(ghi)perylene	0.00837	6.89	K,S&C,93	0.0028	CWQS	not available	181.8561	NA	181.856069	S	µg/kg
LFP	Benzo(k)fluoranthene	0.00837	6.64	K,S&C,93	0.0028	CWQS	not available	102.2652	NA	102.265183	S	µg/kg
LFP	Benzoic acid	0.00837	2.26	K,S&C,93	41.60	S&M,94	not available	63.3378	NA	63.3378183	S	µg/kg
LFP	Bis(2-chloroisopropyl)ether	0.00837	1.79	K,S&C,94	NA	NA	not available	—	NA	NA	S	µg/kg
LFP	Bis(2-ethylhexyl)phthalate	0.00837	9.44	H&S, 94	360.00	IRIS	not available	8296067361.9	NA	8296067362	S	µg/kg
LFP	Chrysene	0.00837	5.39	K,S&C,93	0.0028	CWQS	not available	5.7508	NA	5.75079386	S	µg/kg
LFP	Fluoranthene	0.00837	5	H&S, 94	42.00	CWQS	1020000	8534.3400	NA	8534.34	S	µg/kg
LFP	Fluorene	0.00837	3.7	K,S&C,93	0.0028	CWQS	not available	0.1174	NA	0.11741614	S	µg/kg
LFP	Indeno(1,2,3-cd)pyrene	0.00837	7.49	K,S&C,93	0.0028	CWQS	not available	723.9821	NA	723.982053	S	µg/kg
LFP	Phenanthrene	0.00837	4.46	H&S, 94	0.0028	CWQS	123000	1029.1410	NA	1029.141	S	µg/kg
LFP	Pyrene	0.00837	4.81	K,S&C,93	0.0028	CWQS	1311000	10969.1370	NA	10969.137	S	µg/kg
LFP	2-Butanone	0.00837	0.09	K,S&C,93	20800.00	S&M,94	not available	214.1081	NA	214.108103	V	µg/kg
LFP	Acetone	0.00837	-0.24	H&S, 94	11200.00	S&M,94	not available	53.9247	NA	53.9247067	V	µg/kg
LFP	Toluene	0.00837	2.65	H&S, 94	17500.00	AWQC	not available	65404.5283	NA	65404.5283	V	µg/kg
NWC	Arsenic	0.00822	NA	NA	NA	NA	not available	8.2	2.969000	8.2	M	mg/kg
NWC	Barium	0.00822	NA	NA	NA	NA	not available	20	90.408000	90.408	M	mg/kg
NWC	Calcium	0.00822	NA	NA	NA	NA	not available	EN	4686.655800	4686.6558	M	mg/kg
NWC	Cobalt	0.00822	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg
NWC	Iron	0.00822	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
NWC	Magnesium	0.00822	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
NWC	Manganese	0.00822	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
NWC	Strontium	0.00822	NA	NA	NA	NA	not available	—	49.903000	49.903	M	mg/kg
NWC	Vanadium	0.00822	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
NWC	Zinc	0.00822	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
NWC	Americium-241	0.00822	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
NWC	Plutonium-239/240	0.00822	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
NWC	Tritium	0.00822	NA	NA	NA	NA	not available	350,000	263.147500	350000	R	pCi/L
NWC	Acenaphthene	0.00822	3.76	H&S, 94	74.00	S&M,94	140000	1150.2400	NA	1150.24	S	µg/kg
NWC	Anthracene	0.00822	4.42	H&S, 94	0.0028	CWQS	not available	0.6051	NA	0.60508789	S	µg/kg
NWC	Benzo(a)anthracene	0.00822	5.6	H&S, 94	0.0028	CWQS	1317000	10820.4720	NA	10820.472	S	µg/kg
NWC	Benzo(a)pyrene	0.00822	6	H&S, 94	0.0028	CWQS	1063000	8733.6080	NA	8733.608	S	µg/kg
NWC	Benzo(b)fluoranthene	0.00822	5.74	K,S&C,93	0.0028	CWQS	not available	12.6421	NA	12.6420779	S	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
NWC	Benzo(ghi)perylene	0.00822	6.89	K,S&C,93	0.0028	CWQS	not available	178.5741	NA	178.574097	S	µg/kg
NWC	Benzo(k)fluoranthene	0.00822	6.64	K,S&C,93	0.0028	CWQS	not available	100.4196	NA	100.419594	S	µg/kg
NWC	Benzoic acid	0.00822	2.26	K,S&C,93	41.60	S&M,94	not available	62.1948	NA	62.194755	S	µg/kg
NWC	Benzyl alcohol	0.00822	1.98	K,S&C,93	58.00	S&M,94	not available	45.5081	NA	45.5080707	S	µg/kg
NWC	Bis(2-ethylhexyl)phthalate	0.00822	9.44	H&S, 94	360.00	IRIS	not available	8146347489.6	NA	8146347490	S	µg/kg
NWC	Butyl benzyl phthalate	0.00822	2.18	K,S&C,93	3.00	IRIS	not available	3.7306	NA	3.73062577	S	µg/kg
NWC	Chrysene	0.00822	5.39	K,S&C,93	0.0028	CWQS	not available	5.6470	NA	5.64700877	S	µg/kg
NWC	Di-N-butyl phthalate	0.00822	4.03	H&S, 94	3.00	IRIS	not available	264.1081	NA	264.108078	S	µg/kg
NWC	Dibenzofuran	0.00822	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
NWC	Fluoranthene	0.00822	5	H&S, 94	42.00	CWQS	1020000	8380.3200	NA	8380.32	S	µg/kg
NWC	Fluorene	0.00822	3.7	K,S&C,93	0.0028	CWQS	not available	0.1153	NA	0.11529712	S	µg/kg
NWC	Indeno(1,2,3-cd)pyrene	0.00822	7.49	K,S&C,93	0.0028	CWQS	not available	710.9163	NA	710.916284	S	µg/kg
NWC	Naphthalene	0.00822	3.24	H&S, 94	620	AWQC	not available	8852.2184	NA	8852.2184	S	µg/kg
NWC	Phenanthrene	0.00822	4.46	H&S, 94	0.0028	CWQS	123000	1010.5680	NA	1010.568	S	µg/kg
NWC	Pyrene	0.00822	4.81	K,S&C,93	0.0028	CWQS	1311000	10771.1760	NA	10771.176	S	µg/kg
NWC	Acetone	0.00822	-0.24	H&S, 94	11200.00	S&M,94	not available	52.9515	NA	52.9515227	V	µg/kg
NWC	Methylene chloride	0.00822	1.28	H&S, 94	4.70	CWQS	not available	0.7358	NA	0.73579747	V	µg/kg
SWC	Arsenic	0.01089	NA	NA	NA	NA	not available	8.2	2.969000	8.2	M	mg/kg
SWC	Barium	0.01089	NA	NA	NA	NA	not available	20	90.408000	90.408	M	mg/kg
SWC	Calcium	0.01089	NA	NA	NA	NA	not available	EN	4686.655800	4686.6558	M	mg/kg
SWC	Cobalt	0.01089	NA	NA	NA	NA	not available	—	6.856400	6.8564	M	mg/kg
SWC	Iron	0.01089	NA	NA	NA	NA	not available	30,000	10216.219900	30000	M	mg/kg
SWC	Magnesium	0.01089	NA	NA	NA	NA	not available	EN	1800.036700	1800.0367	M	mg/kg
SWC	Manganese	0.01089	NA	NA	NA	NA	not available	460	274.733200	460	M	mg/kg
SWC	Strontium	0.01089	NA	NA	NA	NA	not available	—	49.903000	49.903	M	mg/kg
SWC	Vanadium	0.01089	NA	NA	NA	NA	not available	—	21.598900	21.5989	M	mg/kg
SWC	Zinc	0.01089	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
SWC	Americium-241	0.01089	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
SWC	Plutonium-239/240	0.01089	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
SWC	Tritium	0.01089	NA	NA	NA	NA	not available	350,000	263.147500	350000	R	pCi/L
SWC	Acenaphthene	0.01089	3.76	H&S, 94	74.00	S&M,94	140000	1525.0200	NA	1525.02	S	µg/kg
SWC	Anthracene	0.01089	4.42	H&S, 94	0.0028	CWQS	not available	0.8022	NA	0.80224226	S	µg/kg
SWC	Benzo(a)anthracene	0.01089	5.6	H&S, 94	0.0028	CWQS	1317000	14346.0810	NA	14346.081	S	µg/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
SWC	Benzo(a)pyrene	0.01089	6	H&S, 94	0.0028	CWQS	1063000	11579.2590	NA	11579.259	S	µg/kg
SWC	Benzo(b)fluoranthene	0.01089	5.74	K,S&C,93	0.0028	CWQS	not available	16.7612	NA	16.7612165	S	µg/kg
SWC	Benzo(ghi)perylene	0.01089	6.89	K,S&C,93	0.0028	CWQS	not available	236.7585	NA	236.758476	S	µg/kg
SWC	Benzo(k)fluoranthene	0.01089	6.64	K,S&C,93	0.0028	CWQS	not available	133.1391	NA	133.139075	S	µg/kg
SWC	Benzoic acid	0.01089	2.26	K,S&C,93	41.60	S&M,94	not available	82.4595	NA	82.459526	S	µg/kg
SWC	Benzyl alcohol	0.01089	1.98	K,S&C,93	58.00	S&M,94	not available	60.3359	NA	60.3358586	S	µg/kg
SWC	Bis(2-ethylhexyl)phthalate	0.01089	9.44	H&S, 94	360.00	IRIS	not available	10800652776	NA	1.0801E+10	S	µg/kg
SWC	Butyl benzyl phthalate	0.01089	2.18	K,S&C,93	3.00	IRIS	not available	4.9462	NA	4.9461668	S	µg/kg
SWC	Chrysene	0.01089	5.39	K,S&C,93	0.0028	CWQS	not available	7.4870	NA	7.48696038	S	µg/kg
SWC	Di-N-butyl phthalate	0.01089	4.03	H&S, 94	3.00	IRIS	not available	350.1618	NA	350.161794	S	µg/kg
SWC	Dibenzofuran	0.01089	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	µg/kg
SWC	Fluoranthene	0.01089	5	H&S, 94	42.00	CWQS	1020000	11110.8600	NA	11110.86	S	µg/kg
SWC	Fluorene	0.01089	3.7	K,S&C,93	0.0028	CWQS	not available	0.1529	NA	0.15286411	S	µg/kg
SWC	Indeno(1,2,3-cd)pyrene	0.01089	7.49	K,S&C,93	0.0028	CWQS	not available	942.5525	NA	942.552468	S	µg/kg
SWC	Naphthalene	0.01089	3.24	H&S, 94	620	AWQC	not available	11736.5159	NA	11736.5159	S	µg/kg
SWC	Phenanthrene	0.01089	4.46	H&S, 94	0.0028	CWQS	123000	1339.8390	NA	1339.839	S	µg/kg
SWC	Pyrene	0.01089	4.81	K,S&C,93	0.0028	CWQS	1311000	14280.7230	NA	14280.723	S	µg/kg
SWC	Acetone	0.01089	-0.24	H&S, 94	11200.00	S&M,94	not available	70.2046	NA	70.2045931	V	µg/kg
SWC	Methylene chloride	0.01089	1.28	H&S, 94	4.70	CWQS	not available	0.9755	NA	0.97554063	V	µg/kg
W&I	Antimony	0.00862	NA	NA	NA	NA	not available	2	7.6715	7.6715	M	mg/kg
W&I	Chromium	0.00862	NA	NA	NA	NA	not available	81	9.7511	81	M	mg/kg
W&I	Cobalt	0.00862	NA	NA	NA	NA	not available	—	6.8564	6.8564	M	mg/kg
W&I	Copper	0.00862	NA	NA	NA	NA	not available	34	11.9316	34	M	mg/kg
W&I	Iron	0.00862	NA	NA	NA	NA	not available	30000	10216.2199	30000	M	mg/kg
W&I	Magnesium	0.00862	NA	NA	NA	NA	not available	EN	1800.0367	1800.0367	M	mg/kg
W&I	Manganese	0.00862	NA	NA	NA	NA	not available	460	274.7332	460	M	mg/kg
W&I	Potassium	0.00862	NA	NA	NA	NA	not available	EN	1143.0548	1143.0548	M	mg/kg
W&I	Silver	0.00862	NA	NA	NA	NA	not available	1	2.7428	2.7428	M	mg/kg
W&I	Sodium	0.00862	NA	NA	NA	NA	not available	EN	401.3975	401.3975	M	mg/kg
W&I	Vanadium	0.00862	NA	NA	NA	NA	not available	—	21.5989	21.5989	M	mg/kg
W&I	Zinc	0.00862	NA	NA	NA	NA	not available	150	71.9478	150	M	mg/kg
W&I	Aldrin	0.00862	2.61	K,S&C,93	0.00013	CWQS	not available	0.00045651	NA	0.00045651	P	ug/kg
W&I	Aroclor-1254	0.00862	5.93	H&S,94	0.000044	CWQS	20000	172.4	NA	172.4	P	ug/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
W&I	Aroclor-1260	0.00862	7.02	H&S,95	0.000044	CWQS	not available	3.971549157	NA	3.97154916	P	ug/kg
W&I	Gamma-BHC (Lindane)	0.00862	3.66	H&S,96	0.019	CWQS	not available	0.748619037	NA	0.74861904	P	ug/kg
W&I	Heptachlor	0.00862	4.23	H&S,97	0.00021	CWQS	not available	0.030741607	NA	0.03074161	P	ug/kg
W&I	Americium-241	0.00862	NA	NA	NA	NA	not available	46000	0.3074	46000	R	pCi/g
W&I	Gross alpha	0.00862	NA	NA	NA	NA	not available	—	28.105	28.105	R	pCi/g
W&I	Gross beta	0.00862	NA	NA	NA	NA	not available	—	37.9094	37.9094	R	pCi/g
W&I	Plutonium-239/240	0.00862	NA	NA	NA	NA	not available	520000	0.9405	520000	R	pCi/g
W&I	Radium-226	0.00862	NA	NA	NA	NA	not available	380000	0.9853	380000	R	pCi/g
W&I	Radium-228	0.00862	NA	NA	NA	NA	not available	250000	1.9883	250000	R	pCi/g
W&I	Strontium-89/90	0.00862	NA	NA	NA	NA	not available	6700	0.2766	6700	R	pCi/g
W&I	Uranium-233/234	0.00862	NA	NA	NA	NA	not available	10000	1.9559	10000	R	pCi/g
W&I	Uranium-235	0.00862	NA	NA	NA	NA	not available	10000	0.0735	10000	R	pCi/g
W&I	Uranium-238	0.00862	NA	NA	NA	NA	not available	4200	1.6895	4200	R	pCi/g
W&I	1,2,4-Trichlorobenzene	0.00862	3.16	K,S&C,93	not available	not available	not available	—	NA	NA	S	ug/kg
W&I	2-Methylnaphthalene	0.00862	3.93	K,S&C,93	not available	not available	not available	—	NA	NA	S	ug/kg
W&I	Acenaphthene	0.00862	3.76	H&S, 94	74	S&M,94	140000	1206.8	NA	1206.8	S	ug/kg
W&I	Anthracene	0.00862	4.42	H&S, 94	0.0028	CWQS	not available	0.634841483	NA	0.63484148	S	ug/kg
W&I	Benzo(a)anthracene	0.00862	5.6	H&S, 94	0.0028	CWQS	1317000	11352.54	NA	11352.54	S	ug/kg
W&I	Benzo(a)pyrene	0.00862	6	H&S, 94	0.0028	CWQS	1063000	9163.06	NA	9163.06	S	ug/kg
W&I	Benzo(b)fluoranthene	0.00862	5.74	K,S&C,93	0.0028	CWQS	not available	13.26371853	NA	13.2637185	S	ug/kg
W&I	Benzo(ghi)perylene	0.00862	6.89	K,S&C,93	0.0028	CWQS	not available	187.3550041	NA	187.355004	S	ug/kg
W&I	Benzo(k)fluoranthene	0.00862	6.64	K,S&C,93	0.0028	CWQS	not available	105.3574613	NA	105.357461	S	ug/kg
W&I	Benzoic acid	0.00862	2.26	K,S&C,93	41.6	S&M,94	not available	65.25301703	NA	65.253017	S	ug/kg
W&I	Bis(2-ethylhexyl)phthalate	0.00862	9.44	H&S, 94	360	IRIS	not available	8546922512	NA	8546922512	S	ug/kg
W&I	Butly benzyl phthalate	0.00862	2.18	K,S&C,93	3	IRIS	not available	3.914069388	NA	3.91406939	S	ug/kg
W&I	Chrysene	0.00862	5.39	K,S&C,93	0.0028	CWQS	not available	5.924685439	NA	5.92468544	S	ug/kg
W&I	Di-N-octyl phthalate	0.00862	9.04	H&S, 94	not available	not available	not available	—	NA	NA	S	ug/kg
W&I	Dibenzo(ah)anthracene	0.00862	6.22	K,S&C,93	0.0028	CWQS	not available	40.0557896	NA	40.0557896	S	ug/kg
W&I	Dibenzofuran	0.00862	4.05	H&S, 94	NA	NA	not available	—	NA	NA	S	ug/kg
W&I	Fluoranthene	0.00862	5	H&S, 94	42	CWQS	1020000	8792.4	NA	8792.4	S	ug/kg
W&I	Fluorene	0.00862	3.7	K,S&C,93	0.0028	CWQS	not available	0.120966551	NA	0.12096655	S	ug/kg
W&I	Indeno(1,2,3-cd)Pyrene	0.00862	7.49	K,S&C,93	0.0028	CWQS	not available	745.8737056	NA	745.873706	S	ug/kg

Attachment 2
Table 13
Pond-Specific Sediment Toxicity Reference Values

Pond	Analyte	f_{oc}	log K_{oc}	log K_{oc} Source	Water Quality Standard	Water Quality Standard Source	Interim Sediment Quality Criteria[1]	Sediment Quality Benchmark	Background UCL_{95}[2]	Toxicity Reference Value	Group	Units
W&I	Naphthalene	0.00862	3.24	H&S, 94	0.0028	CWQS	not available	0.041943561	NA	0.04194356	S	ug/kg
W&I	Phenanthrene	0.00862	4.46	H&S, 94	0.0028	CWQS	123000	1060.26	NA	1060.26	S	ug/kg
W&I	Phenol	0.00862	1.43	K,S&C,93	2560	IRIS	not available	593.9463683	NA	593.946368	S	ug/kg
W&I	Pyrene	0.00862	4.81	K,S&C,93	0.0028	CWQS	1311000	11300.82	NA	11300.82	S	ug/kg
W&I	2-butanone	0.00862	0.09	K,S&C,93	20800	S&M,94	not available	220.5822695	NA	220.58227	V	ug/kg
W&I	4-Methyl-2-Pentanone	0.00862	0.79	K,S&C,93	164	S&M,94	not available	8.716680222	NA	8.71668022	V	ug/kg
W&I	Acetone	0.00862	-0.24	H&S, 94	11200	S&M,94	not available	55.55527331	NA	55.5552733	V	ug/kg
W&I	Benzene	0.00862	2.06	H&S, 94	5300	IRIS	not available	5245.454635	NA	5245.45464	V	ug/kg
W&I	Methylene chloride	0.00862	1.28	H&S, 94	4.7	CWQS	not available	0.771978355	NA	0.77197836	V	ug/kg
W&I	Toluene	0.00862	2.65	H&S, 94	17500	H&S, 94	not available	67382.21988	NA	6.74E+04	V	ug/kg
WOM	Copper	0.0175	NA	NA	NA	NA	not available	34	11.931600	34	M	mg/kg
WOM	Mercury	0.0175	NA	NA	NA	NA	not available	0.15	0.1	0.15	M	mg/kg
WOM	Zinc	0.0175	NA	NA	NA	NA	not available	150	71.947800	150	M	mg/kg
WOM	Americium-241	0.0175	NA	NA	NA	NA	not available	46,000	0.307400	46000	R	pCi/g
WOM	Plutonium-239/240	0.0175	NA	NA	NA	NA	not available	520,000	0.940500	520000	R	pCi/g
WOM	Tritium	0.0175	NA	NA	NA	NA	not available	350,000	263.147500	350000	R	pCi/L

[1]Interim Sediment Quality Criterion from EPA
[2]Sullivan 1995
foc - fraction of organic carbon in sediment
Koc - octanol-water partition coefficient
NA - not applicable

H&S, 94 - Hull and Suter (1994)
K,S,&C,93 - Knox, Sabatini, and Canter (1993)
AWQC - Ambient Water Quality Criteria from EPA
CWQS - Colorado Water Quality Standards
S&M,94 - Suter and Mabrey (1994)

Attachment 2
Table 14
RFETS-Specific Radionuclide Benchmark Concentrations[1] for Limiting Species in Soil, Sediment, and Water

Radionuclide	Benchmark in Soil (pCi/g)[2]	Benchmark in Sediment (pCi/g)[3]	Benchmark in Water (pCi/L)[4]
Americium-241	1.9×10^3	4.6×10^4	1.3×10^3
Cesium-137	8.4×10^1	4.8×10^3	8.2×10^3
Plutonium-239/240	3.8×10^3	5.2×10^5	1.0×10^2
Radium-226	5.4×10^0	3.8×10^5	3.8×10^2
Radium-228	3.5×10^0	2.5×10^5	2.5×10^2
Strontium-89/90	1.2×10^2	3.5×10^3	2.7×10^5
Tritium	3.5×10^5	3.5×10^5	1.9×10^8
Uranium-233/234	1.8×10^3	1.0×10^4	4.3×10^3
Uranium-235	1.9×10^3	1.0×10^4	4.3×10^3
Uranium-238	1.6×10^3	4.2×10^3	4.4×10^3

[1]No background comparison was performed because the benchmarks are RFETS-specific.
[2]Soil benchmarks that would cause a 100-mrad/d (1-mGy/d) dose rate to small mammals (limiting species).
[3]Sediment benchmarks that would cause a 100-mrad/d (1-mGy/d) external dose rate to aquatic species (limiting species).
[4]Water concentration benchmarks that would cause a 100-mrad/d (1-mGy/d) dose rate to aquatic species (limiting species).
From Higley and Kuperman (1995), Radiological Benchmarks for Wildlife at Rocky Flats Environmental Technology Site.

Attachment 3
Data Management

Attachment 3
Table 1
Definition of Data Validation Codes

Code	Definition	Include in Data Analysis
A	Acceptable result, usable with qualification	yes
JA	Acceptable result (for estimated value)	yes
P	Undefined	no
R	Rejected result, unacceptable for use	no
V	Valid result, usable without qualification	yes
Y	Analytical results in validation process	yes
Z	Validation not required or performed	no

Attachment 3
Table 2
Definition of Laboratory Qualifiers

Qualifier	Definition	Include in Data Analysis	Detected ("Hit")	Value for Statistical Analysis
+	Inorganics: correlation coefficient for the matrix spike analysis is less than 0.995 (estimated value)	yes	yes	result
*	Inorganics: duplicate analysis is not within control limits (estimated value)	yes	yes	result
	Organics: outside contract-required QC limits	yes	yes	result
A	Organics: identifies TIC as a suspected aldol condensation product	yes, remove to TIC table	no	not included
B	Inorganics: reported value is less than CRDL but greater than IDL	yes	yes	result
	Organics: warns that analyte also detected in blank[1]	yes	yes	result
	Radionuclides: constituent also detected in associated blank whose concentration was greater than CRDL and/or minimum detectable activity (estimated value)	yes	yes	result
C	Organics: pesticide result confirmed by GC/MS	yes	yes	result
	Radionuclides: presence of high TDS in sample increased minimum detectable activity	yes	yes	result
D	Organics: identified in an analysis at a secondary dilution[1]	yes	yes	result
E	Inorganics: value is an estimate due to interference (estimated value)	yes	yes	result
	Organics: compound exceeded calibration range of instrument, sample must be re-analyzed	no	no	not included
F	Organics: compound off scale (estimated value)	yes	yes	result
	Radionuclides: for alpha spectrometry - FWHM exceeded acceptable limits (estimated value)	yes	yes	result
G	Inorganics: native analyte is greater than 4 times spike added	yes	yes	result
	TOC: dilution result exceeded range of instrument, estimated result	yes	yes	result
H	Radionuclides: sample analysis performed outside of method-specified maximum holding time	yes	yes	result
I	Organics: interference with target peak (estimated value)	yes	yes	result
J	Inorganics: value greater than IDL but control sample analysis not within control limits (estimated value)	yes	yes	result
	Organics: MS data indicate presence of compound but below detection limit (estimated value)[1]	yes	yes	result

Attachment 3
Table 2
Definition of Laboratory Qualifiers

Qualifier	Definition	Include in Data Analysis	Detected ("Hit")	Value for Statistical Analysis
JB	Organics: result below detection limit and analyte detected in laboratory blank[1]	yes	no	½ detection limit
K	Result is less than MDL (CRDL) but greater than IDL	yes	yes	result
L	Undefined	no	no	not included
M	Inorganics: duplication injection precision not met (estimated value)	yes	yes	result
N	Inorganics: spiked sample recovery is not within control limits (estimated value) Organics: compound presumed present (TIC)[1]	yes yes, remove to TIC table	yes no	result not included
R	Validation code for rejected data entered in lab qualifier field/unusable data	no	no	not included
S	Inorganics: the reported value determined by the method of standard additions	yes	yes	result
T	Compound found in TCLP extract blank and sample	yes	yes	result
U	Organics and inorganics: analyte analyzed but not detected at the quantitation limit	yes	no	½ detection limit
UC	Organics: pesticide result confirmed but below detection limit	yes	no	½ detection limit
UE	Radionuclides: detection limit reported as result	no	no	not included
UJ	Organics: analyzed but not above the detection limit (estimated value)	yes	no	½ detection limit
UN	Inorganics: spiked sample recovery not within control limits and sample result below detection limit Organics: compound presumed present but below detection limit	yes yes, remove to TIC table	no no	½ detection limit not included
UW	Inorganics: post-digestion spike for GFAA analysis is out of control limits and sample result is below detection limit	yes	no	½ detection limit
UX		yes	no	½ detection limit
V	Validation code for valid data entered into laboratory qualifier field	yes	yes	result
W	Inorganics: post-digestion spike for GFAA analysis is out of control limits while sample absorbance is less than 50% of spike absorbance	yes	yes	result

Attachment 3
Table 2
Definition of Laboratory Qualifiers

Qualifier	Definition	Include in Data Analysis	Detected ("Hit")	Value for Statistical Analysis
X[2]	Inorganics (pre-1992): detection limit greater than normal, sample matrix interference	yes	yes	result
	Organics (pre-1992): laboratory software flag (combines more than one qualifier) - not defined	no (unless accompanied by a validated result)	no	not included
	Other (OU 11 RFI/RI samples): result by calculation defined in GRRASP	yes	yes	result
Y	Organics: indistinguishable isomer in TIC	yes, remove to TIC table	no	not included
	Radionuclides: chemical yield exceeded acceptable limits (estimated value)	yes	yes	result
Z	Organics: "request identification, matrix interference of column"	no	no	not included

[1] Common laboratory contaminants: 2-butanone, acetone, common phthalate esters, methylene chloride, toluene.
[2] Note on use of X qualifiers: X is defined in the GRRASP as a result determined by calculation not by direct laboratory analysis. Therefore, for samples analyzed during the period that GRRASP has been in effect (since January 1992) the results qualified by an X will be treated as estimated values (similar to J). For historic data, when GRRASP was not used by laboratories, an X qualifier has two definitions. For organics, the X is a flag entered manually by the laboratory, but is not defined in RFEDS. Therefore, organic results qualified by X are not considered usable data, unless a validated result is given. For inorganics, an X qualifier indicates that the detection limit for the analyte is higher than normal due to matrix interference. An inorganic qualified with an X will be treated like a J result. The X qualifier is sometimes also used with other qualifiers (for example, UX, XJ). In these cases the meaning of X depends on the analyte and the date of the analysis.

CRDL	contract-required detection limit
FWHM	full width at half maximum (the width of the distribution at a level that is just half the maximum ordinate of the peak)
GC/MS	gas chromatography/mass spectrometry
GFAA	graphic furnace atomic adsorption
GRRASP	General Radiochemistry and Routine Analytical Services Protocol
IDL	instrument detection limit
MDL	method detection limit
MS	matrix spike
OU	operable unit
QC	quality control
RFEDS	Rocky Flats Environmental Database System
RFI/RI	RCRA Facility Investigation/Remedial Investigation
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TIC	tentatively identified compound
TOC	total organic carbon

Attachment 4
Sediment and Surface Water Results

Attachment 4
Table 1
Summary of Sediment ECOC Screen
Walnut Creek Watershed — A-Ponds

Analyte	GRP	OU6 PCOC	Exposure Point Concentration	Units	Toxicity Reference Value	Frequency of Hits	Hazard Quotient
Pond A-1							
Anthracene	S	X	88	µg/kg	0.99	2/5	89
Chrysene	S	X	320	µg/kg	9.3	5/5	34
Benzo(b)fluoranthene	S	X	370	µg/kg	21	3/5	18
Antimony	M	X	29	mg/kg	7.7	2/5	3.8
Magnesium	M	X	4,200	mg/kg	1,800	5/5	2.3
Toluene	V	X	240	µg/kg	110	5/5	2.2
Cobalt	M	X	12	mg/kg	6.9	5/5	1.7
Vanadium	M	X	37	mg/kg	22	5/5	1.7
Aroclor-1254	P	X	350	µg/kg	270	10/10	1.3
Benzo(k)fluoranthene	S	X	200	µg/kg	170	4/5	1.2
						HAZARD INDEX	***160***
Pond A-3							
Chrysene	S	X	230	µg/kg	7.9	5/5	29.1
Benzo(b)fluoranthene	S	X	330	µg/kg	18	4/5	18.3
Antimony	M	X	23	mg/kg	7.7	1/4	3.0
Magnesium	M	X	5,300	mg/kg	1,800	5/5	2.9
Vanadium	M	X	61	mg/kg	22	5/5	2.8
Cobalt	M	X	15	mg/kg	6.9	5/5	2.2
Zinc	M	X	150	mg/kg	150	5/5	1.0
						HAZARD INDEX	***59***
Pond A-2							
Chrysene	S	X	71	µg/kg	18	1/5	3.9
Magnesium	M	X	4,200	mg/kg	1,800	5/5	2.3
Aldrin	P	X	35	µg/kg	15.8000	1/5	2.2
Zinc	M	X	280	mg/kg	150	5/5	1.9
Benzoic acid	S	X	330	µg/kg	200	4/5	1.7
Cobalt	M	X	10	mg/kg	6.9	5/5	1.4
Acetone	V	X	260	µg/kg	170	2/5	1.5
Vanadium	M	X	30	mg/kg	22	5/5	1.4
Aroclor-1254	P	X	270	µg/kg	518	4/9	0.5
						HAZARD INDEX	***17***
Pond A-5							
Benzoic acid	S	X	500	µg/kg	65	4/5	7.7
Acetone	V	X	160	µg/kg	56	1/5	2.9
Cobalt	M	X	12	mg/kg	6.9	5/5	1.7
Magnesium	M	X	3,100	mg/kg	1,800	5/5	1.7
Vanadium	M	X	35	mg/kg	22	5/5	1.6
						HAZARD INDEX	***16***
Pond A-4							
Antimony	M	X	40	mg/kg	7.7	3/4	5.2
Magnesium	M	X	4,700	mg/kg	1,800	5/5	2.6
Vanadium	M	X	51	mg/kg	22	5/5	2.3
Cobalt	M	X	14	mg/kg	6.9	5/5	2.0
Zinc	M	X	140	mg/kg	150	5/5	0.9
						HAZARD INDEX	***13***

TRVs were developed only for sediment PCOCs (pond-specific). PCOCs with all records less than the TRV were not shown above. Therefore, records shown include only pond-specific PCOCs with individual samples' HQ greater than 1.0.

Hazard quotients and hazard indices were rounded to present only two significant figures.

Attachment 4
Table 2
Summary of Sediment ECOC Screen
Walnut Creek Watershed — B-Ponds

Analyte	GRP	OU6 PCOC	Exposure Point Concentration	Units	Toxicity Reference Value	Frequency of Hits	Hazard Quotient
			Pond B-1				
Fluorene	S	X	460	µg/kg	0.32	2/7	1,438
Anthracene	S	X	460	µg/kg	1.7	3/7	271
Chrysene	S	X	1,500	µg/kg	16	6/7	94
Silver	M	X	240	mg/kg	2.7	7/7	89
Benzo(b)fluoranthene	S	X	2,100	µg/kg	35	5/7	60
Heptachlor	P	X	19	µg/kg	1.480	1/7	13
Aroclor-1254	P	X	4,100	µg/kg	460	10/12	8.9
Zinc	M	X	730	mg/kg	150	7/7	4.9
Methylene chloride	V	X	9.0	µg/kg	2.1	1/5	4.3
Benzo(k)fluoranthene	S	X	780	µg/kg	280	5/7	2.8
Copper	M	X	89	mg/kg	34	7/7	2.6
Acetone	V	X	330	µg/kg	150	4/5	2.2
Magnesium	M	X	3,600	mg/kg	1,800	7/7	2.0
Cobalt	M	X	11	mg/kg	6.9	7/7	1.6
Dibenzo(a,h)anthracen	S	X	150	µg/kg	110	1/7	1.4
Vanadium	M	X	30	mg/kg	22	7/7	1.4
Chromium	M	X	65	mg/kg	81	7/7	0.8
						HAZARD INDEX	***2,000***
			Pond B-4				
Anthracene	S	X	100	µg/kg	0.95	5/8	105
Chrysene	S	X	560	µg/kg	8.9	8/8	63
Benzo(b)fluoranthene	S	X	1,000	µg/kg	20	8/8	50
Silver	M	X	40	mg/kg	2.7	3/8	15
Antimony	M	X	26	mg/kg	7.7	2/4	3.4
gamma-BHC(Lindane)	P	X	13	µg/kg	4.7	1/7	2.8
Magnesium	M	X	4,100	mg/kg	1,800	8/8	2.3
Benzo(k)fluoranthene	S	X	330	µg/kg	160	8/8	2.1
Vanadium	M	X	39	mg/kg	22	8/8	1.8
Aroclor-1254	P	X	430	µg/kg	258	10/13	1.7
Zinc	M	X	250	mg/kg	150	8/8	1.7
Cobalt	M	X	10	mg/kg	6.9	8/8	1.4
Copper	M	X	32	mg/kg	34	8/8	0.9
						HAZARD INDEX	***250***

Attachment 4
Table 2
Summary of Sediment ECOC Screen
Walnut Creek Watershed — B-Ponds

Analyte	GRP	OU6 PCOC	Exposure Point Concentration	Units	Toxicity Reference Value	Frequency of Hits	Hazard Quotient
			Pond B-3				
Silver	M	X	170	mg/kg	2.7	7/7	63
Chrysene	S	X	380	µg/kg	12	2/7	32
Benzo(b)fluoranthene	S	X	500	µg/kg	28	5/7	18
Antimony	M	X	69	mg/kg	7.7	2/3	9.0
Aroclor-1254	P	X	1,400	µg/kg	361	10/12	3.9
Copper	M	X	65	mg/kg	34	7/7	1.9
Magnesium	M	X	3,300	mg/kg	1,800	7/7	1.8
Zinc	M	X	240	mg/kg	150	7/7	1.6
Cobalt	M	X	11	mg/kg	6.9	7/7	1.6
Vanadium	M	X	31	mg/kg	22	7/7	1.4
Aroclor-1260	P	X	400	µg/kg	2,646.5	3/10	0.2
						HAZARD INDEX	***130***
			Pond B-2				
Silver	M	X	140	mg/kg	2.7	3/3	52
Chrysene	S	X	200	µg/kg	26	2/4	7.7
Aroclor-1254	P	X	3,300	µg/kg	757	9/10	4.4
Magnesium	M	X	5,700	mg/kg	1,800	4/4	3.2
Acetone	V	X	750	µg/kg	240	3/4	3.1
Cobalt	M	X	12	mg/kg	6.9	4/4	1.7
Manganese	M	X	540	mg/kg	460	4/4	1.2
Vanadium	M	X	24	mg/kg	22	3/3	1.1
						HAZARD INDEX	***74***
			Pond B-5				
Magnesium	M	X	4,500	mg/kg	1,800	5/5	2.5
Vanadium	M	X	47	mg/kg	22	5/5	2.1
Cobalt	M	X	11	mg/kg	6.9	5/5	1.6
Zinc	M	X	140	mg/kg	150	5/5	0.9
Acetone	V	X	59	µg/kg	65	1/5	0.9
						HAZARD INDEX	***8.1***

TRVs were developed only for sediment PCOCs (pond-specific). PCOCs with all records less than the TRV were not shown above. Therefore, records shown include only pond-specific PCOCs with individual samples' HQ greater than 1.0.
Hazard quotients and hazard indices were rounded to present only two significant figures.

Attachment 4
Table 3
Summary of Sediment ECOC Screen
Walnut Creek

Analyte	GRP	PCOC?	Exposure Point Concentration	Units	Toxicity Reference Value	Frequency of Hits	Hazard Quotient
South Walnut Creek							
Anthracene	S	X	110	µg/kg	0.80	1/12	138
Chrysene	S	X	290	µg/kg	7.5	4/12	39
Benzo(b)fluoranthene	S	X	320	µg/kg	17	3/12	19
Methylene chloride	V	X	17	µg/kg	0.98	4/13	17
Zinc	M	X	270	mg/kg	150	12/12	1.8
Benzo(k)fluoranthene	S	X	190	µg/kg	130	3/12	1.5
Magnesium	M	X	2,400	mg/kg	1,800	12/12	1.3
Benzoic acid	S	X	110	µg/kg	83	1/11	1.3
Vanadium	M	X	28	mg/kg	22	12/12	1.3
Barium	M	X	110	mg/kg	90	12/12	1.2
Strontium	M	X	63	mg/kg	50	12/12	1.3
Cobalt	M	X	6.8	mg/kg	6.9	12/12	1.0
Acetone	V	X	62	µg/kg	70	3/13	0.9
Arsenic	M	X	5.0	mg/kg	8.2	12/12	0.6
Manganese	M	X	280	mg/kg	460	12/12	0.6
						HAZARD INDEX	***230***
North Walnut Creek							
Anthracene	S	X	65	µg/kg	0.61	1/11	107
Chrysene	S	X	180	µg/kg	5.7	3/11	32
Benzo(b)fluoranthene	S	X	200	µg/kg	13	2/11	15
Methylene chloride	V	X	7.0	µg/kg	0.74	1/10	9.5
Benzoic acid	S	X	510	µg/kg	62	4/11	8.2
Magnesium	M	X	2,900	mg/kg	1,800	11/11	1.6
Barium	M	X	130	mg/kg	90	11/11	1.4
Cobalt	M	X	9.8	mg/kg	6.9	11/11	1.4
Vanadium	M	X	27	mg/kg	22	11/11	1.2
Manganese	M	X	530	mg/kg	460	11/11	1.2
Strontium	M	X	56	mg/kg	50	11/11	1.1
Acetone	V	X	51	µg/kg	53	1/10	1.0
Zinc	M	X	96	mg/kg	150	11/11	0.6
						HAZARD INDEX	***180***

TRVs were developed only for sediment PCOCs (pond-specific). PCOCs with all records less than the TRV were not shown above. Therefore, records shown include only pond-specific PCOCs with individual samples' HQ greater than 1.0.

Hazard quotients and hazard indices were rounded to present only two significant figures.

Attachment 4
Table 4
Summary of Sediment ECOC Screen
Woman Creek

Analyte	GRP	OU5 PCOC	Exposure Point Concentration	Units	Toxicity Reference Value	Frequency of Hits	Hazard Quotient
Pond C-2							
Benzoic acid	S	X	240	µg/kg	140	1/2	1.7
Zinc	M	X	200	mg/kg	150	3/3	1.3
						HAZARD INDEX	***3.0***
Pond C-1							
Benzoic acid	S	X	490	µg/kg	190	3/3	2.6
						HAZARD INDEX	***2.6***
Woman Creek							
Zinc	M	X	120	mg/kg	150	45/45	0.8
Copper	M	X	15	mg/kg	34	39/45	0.4
						HAZARD INDEX	***1.2***

TRVs were developed only for sediment PCOCs (pond-specific). PCOCs with all records less than the TRV were not shown above. Therefore, records shown include only pond-specific PCOCs with individual samples' HQ greater than 1.0.
Hazard quotients and hazard indices were rounded to present only two significant figures.

Attachment 4
Table 5
Summary of Surface Water PCOCs Exceeding Water Quality Standards

Sitewide PCOCs	OU2 PCOC	Exposure Point Concentration	Water Quality Standards	Units	Detection Frequency	Hazard Quotient
Walnut Creek Watershed						
		OU7 Downgradient Areas				
Barium	X	170	3.8	µg/L	17/23	45
Manganese	X	120	50	µg/L	11/21	2.4
Strontium	X	910	620	µg/L	20/25	1.5
					HAZARD INDEX	***49***
		OU2 903 Pad				
Barium		150	3.8	µg/L	26/32	39
Manganese		180	50	µg/L	30/32	3.6
Strontium		960	620	µg/L	29/32	1.5
Antimony		22	30	µg/L	7/31	0.73
Tin		46	74	µg/L	7/30	0.62
1,2-Dichloroethene		11	31	µg/L	9/31	0.35
					HAZARD INDEX	***46***
		OU6 A-Ponds				
Barium		57	3.8	µg/L	25/25	15
Manganese		68	50	µg/L	25/25	1.4
					HAZARD INDEX	***15***
		OU6 B-Ponds				
Barium		49	3.8	µg/L	26/26	13
Manganese		77	50	µg/L	26/26	1.5
					HAZARD INDEX	***15***
Woman Creek Watershed						
		OU2 903 Pad				
Barium		150	3.8	µg/L	26/32	39
Manganese		180	50	µg/L	30/32	3.6
Strontium		960	620	µg/L	29/32	1.5
Antimony		22	30	µg/L	7/31	0.73
Tin		46	74	µg/L	7/30	0.62
1,2-Dichloroethene		11	31	µg/L	9/31	0.35
					HAZARD INDEX	***46***
		OU5 Old Landfill				
Barium	X	140	3.8	µg/L	30/35	37
Antimony		18	30	µg/L	7/34	0.60
Tin		30	74	µg/L	7/34	0.41
Manganese		19	50	µg/L	26/34	0.38
					HAZARD INDEX	***38***
		OU1 881 Hillside				
Barium		100	3.8	µg/L	141/187	26
Strontium		1,000	620	µg/L	149/184	1.6
Antimony		15	30	µg/L	34/181	0.50
Vanadium		8.1	19	µg/L	50/181	0.43
Manganese		19	50	µg/L	147/184	0.38
					HAZARD INDEX	***29***

Attachment 4
Table 5
Summary of Surface Water PCOCs Exceeding Water Quality Standards

Sitewide PCOCs	OU2 PCOC	Exposure Point Concentration	Water Quality Standards	Units	Detection Frequency	Hazard Quotient
OU5 C-Ponds						
Barium	X	93	3.8	µg/L	48/60	24
Manganese		59	50	µg/L	53/60	1.2
Antimony		20	30	µg/L	14/59	0.67
Vanadium		9.9	19	µg/L	15/59	0.52
					HAZARD INDEX	***26***
OU5 Ash Pits						
Barium	X	65	3.8	µg/L	30/39	17
Manganese		44	50	µg/L	29/39	0.88
					HAZARD INDEX	***18***

Analytes shown above are only those with any individual record exceeding the surface water standard.
UCL_{95} - 95% upper confidence limit of the true mean (based on a 1-tailed test)
Hazard quotients and hazard indices were rounded to present only two significant figures.

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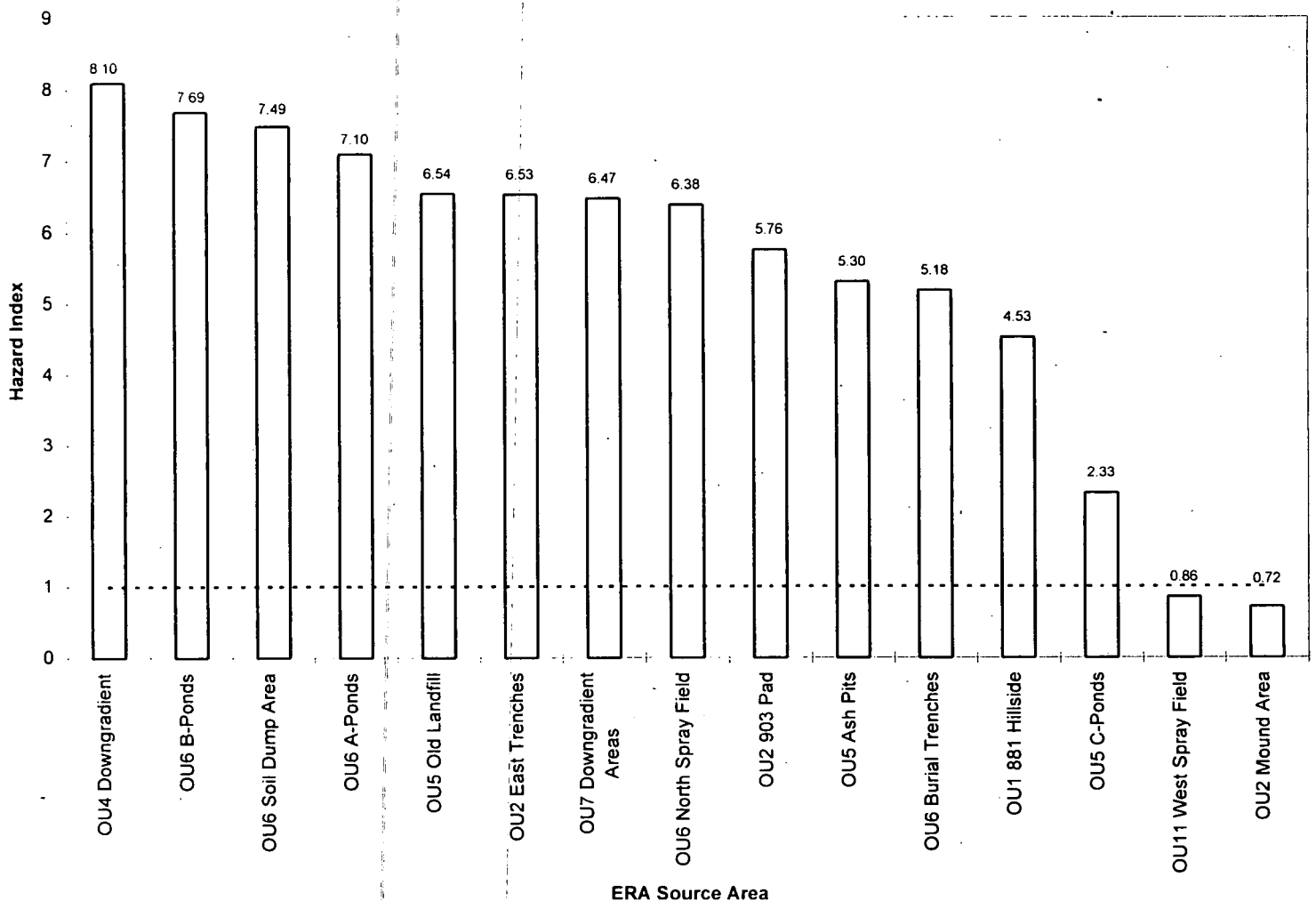
Attachment 5
Wildlife Results

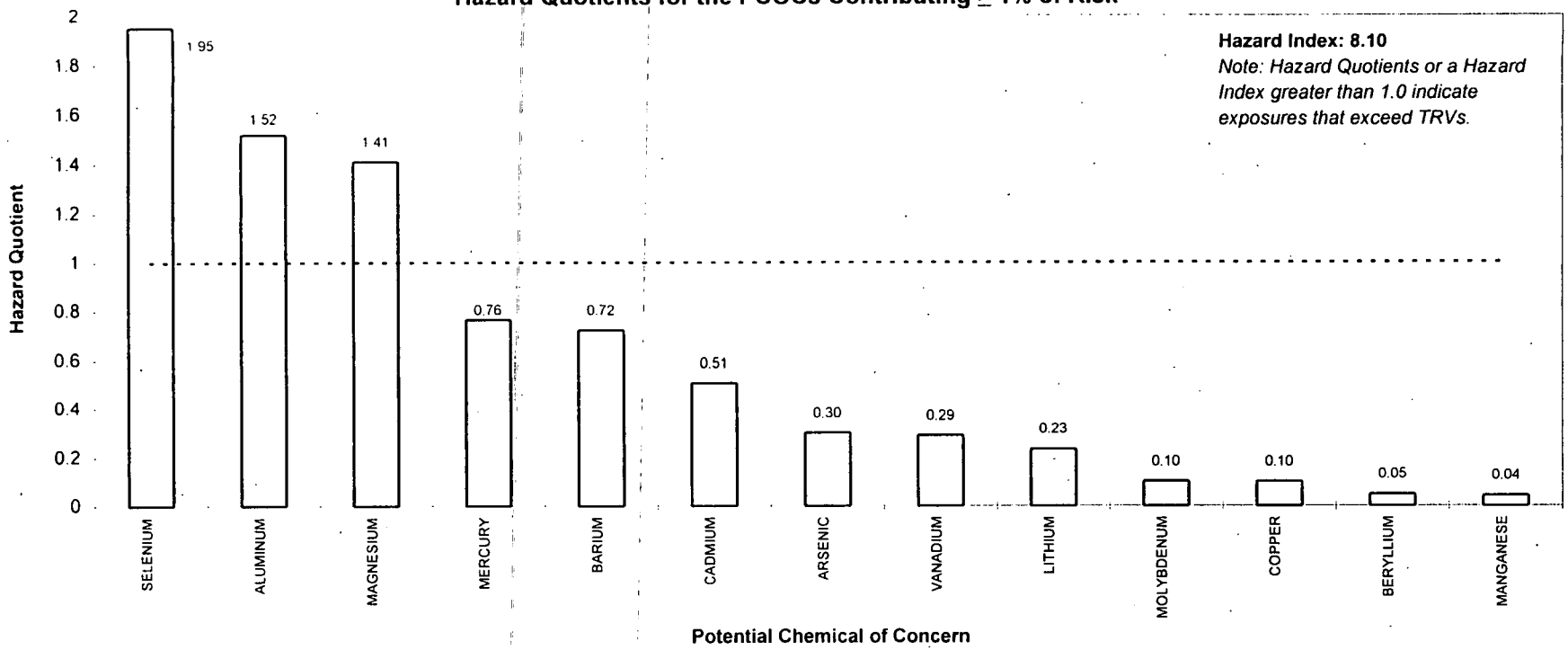
Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice at RFETS

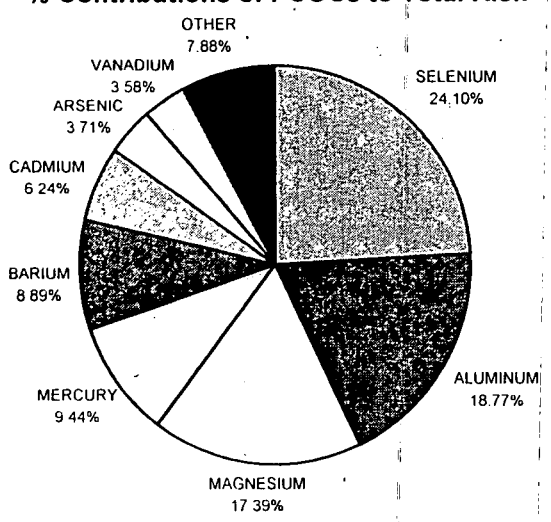


Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU4 Downgradient Source Area at RFETS

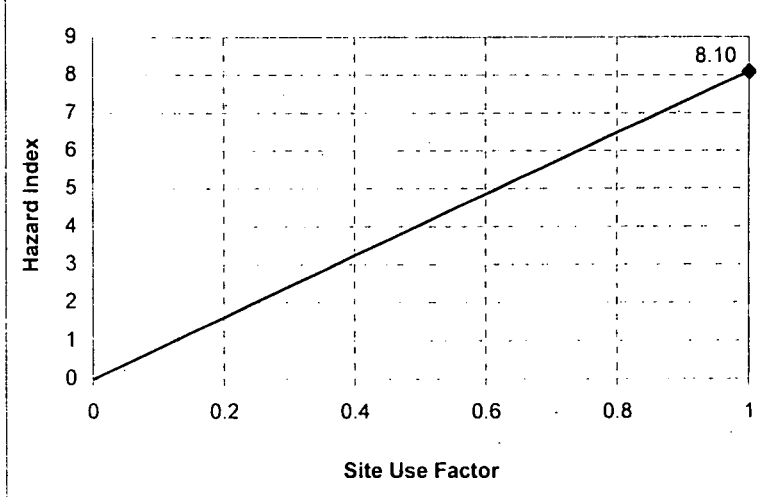
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



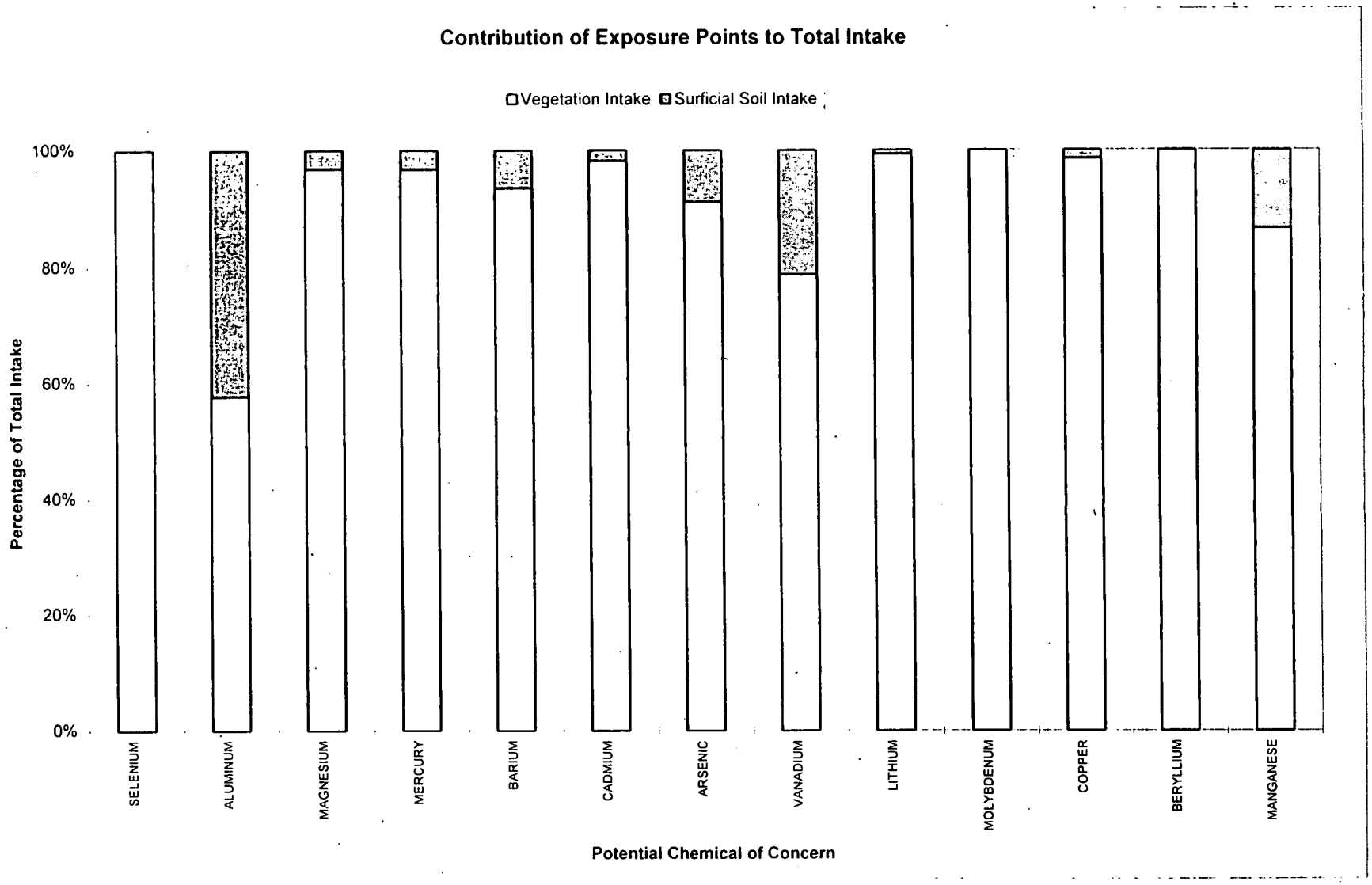
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU4 Downgradient Source Area at RFETS



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU4 Downgradient Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU4 DOWNGRADIENT		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU4	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.004 SUF = 1		IR = I SUF = I		IR = I SUF = I					
SELENIUM		NR	—	3.643		0.619	ND	—	NR	—	NR	—	0.619	0.317	1.95	24.10%
ALUMINUM		NR	—	413.229		70.249	12856.399	51.426	NR	—	NR	—	121.674	80.009	1.52	18.77%
MAGNESIUM		NR	—	2057.159		349.717	2871.518	11.486	NR	—	NR	—	361.203	256.400	1.41	17.39%
MERCURY	X	NR	—	0.075		0.013	0.107	4.27E-04	NR	—	NR	—	0.013	0.017	0.76	9.44%
BARIUM		NR	—	56.333		9.577	165.692	0.663	NR	—	NR	—	10.239	14.217	0.72	8.89%
CADMIUM	X	NR	—	1.400		0.238	1.109	0.004	NR	—	NR	—	0.242	0.479	0.51	6.24%
ARSENIC		NR	—	1.100		0.187	4.565	0.018	NR	—	NR	—	0.205	0.682	0.30	3.71%
VANADIUM		NR	—	3.100		0.527	35.665	0.143	NR	—	NR	—	0.670	2.313	0.29	3.58%
LITHIUM		NR	—	33.600		5.712	9.207	0.037	NR	—	NR	—	5.749	24.571	0.23	2.89%
MOLYBDENUM		NR	—	7.200		1.224	ND	—	NR	—	NR	—	1.224	12.061	0.10	1.25%
COPPER		NR	—	25.140		4.274	16.143	0.065	NR	—	NR	—	4.338	43.327	0.10	1.24%
BERYLLIUM	X	NR	—	0.500		0.085	ND	—	NR	—	NR	—	0.085	1.727	0.05	0.61%
MANGANESE		NR	—	51.289		8.719	337.070	1.348	NR	—	NR	—	10.067	230.264	0.04	0.54%
TIN		NR	—	8.500		1.445	38.477	0.154	NR	—	NR	—	1.599	65.961	0.02	0.30%
STRONTIUM		NR	—	78.059		13.270	52.509	0.210	NR	—	NR	—	13.480	688.177	0.02	0.24%
ZINC		NR	—	42.863		7.287	74.594	0.298	NR	—	NR	—	7.585	418.663	0.02	0.22%
LEAD		NR	—	1.745		0.297	20.053	0.080	NR	—	NR	—	0.377	20.933	0.02	0.22%
NICKEL		NR	—	6.800		1.156	14.767	0.059	NR	—	NR	—	1.215	104.666	0.01	0.14%
ACETONE		NR	—	NR	1.085	0.184	NR	—	NR	—	NR	—	0.184	26.167	0.01	0.09%
THALLIUM		NR	—	ND		—	0.630	0.003	NR	—	NR	—	0.003	0.697	<0.01	0.05%
COBALT		NR	—	ND		—	8.238	0.033	NR	—	NR	—	0.033	13.192	<0.01	0.03%
TOLUENE		NR	—	NR	0.232	0.040	NR	—	NR	—	NR	—	0.040	30.220	<0.01	0.02%
BENZO(a)PYRENE	X	NR	—	NR	NR	—	0.200	0.001	NR	—	NR	—	0.001	1.163	<0.01	<0.01%
METHYLENE CHLORIDE		NR	—	NR	0.078	0.013	NR	—	NR	—	NR	—	0.013	15.307	<0.01	0.01%
NITRATE/NITRITE	X	NR	—	NR		—	3.975	0.016	NR	—	NR	—	0.016	34.669	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALAT	X	NR	—	NR	NR	—	0.978	0.004	NR	—	NR	—	0.004	21.321	<0.01	<0.01%
DIBENZO(a,h)ANTHRACENE		NR	—	NR	NR	—	0.047	1.88E-04	NR	—	NR	—	1.88E-04	1.163	<0.01	<0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	NR	—	0.182	0.001	NR	—	NR	—	0.001	11.634	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	NR	—	0.160	0.001	NR	—	NR	—	0.001	11.634	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	NR	—	0.150	0.001	NR	—	NR	—	0.001	11.634	<0.01	<0.01%
BENZO(k)FLUORANTHENE	X	NR	—	NR	NR	—	0.130	0.001	NR	—	NR	—	0.001	11.634	<0.01	<0.01%
CHROMIUM		NR	—	1.400		0.238	14.049	0.056	NR	—	NR	—	0.294	7161.754	<0.01	<0.01%
TETRACHLOROETHENE		NR	—	NR	0.002	2.97E-04	NR	—	NR	—	NR	—	2.97E-04	16.300	<0.01	<0.01%
PYRENE	X	NR	—	NR	NR	—	0.191	0.001	NR	—	NR	—	0.001	87.321	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	—	NR	NR	—	0.170	0.001	NR	—	NR	—	0.001	93.349	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	NR	—	0.220	0.001	NR	—	NR	—	0.001	116.343	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	NR	—	0.170	0.001	NR	—	NR	—	0.001	116.343	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	NR	—	0.183	0.001	NR	—	NR	—	0.001	145.535	<0.01	<0.01%

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU4 Downgradient Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU4 DOWNGRADIENT		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU4	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.004 SUF = 1		IR = I SUF = I		IR = I SUF = I					
DI-n-BUTYL PHTHALATE	X	NR	—	NR	NR	—	0.079	3.16E-04	NR	—	NR	—	3.16E-04	329.807	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	—	NR	NR	—	0.295	0.001	NR	—	NR	—	0.001	1217.647	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	NR	—	0.074	2.96E-04	NR	—	NR	—	2.96E-04	1163.433	<0.01	<0.01%

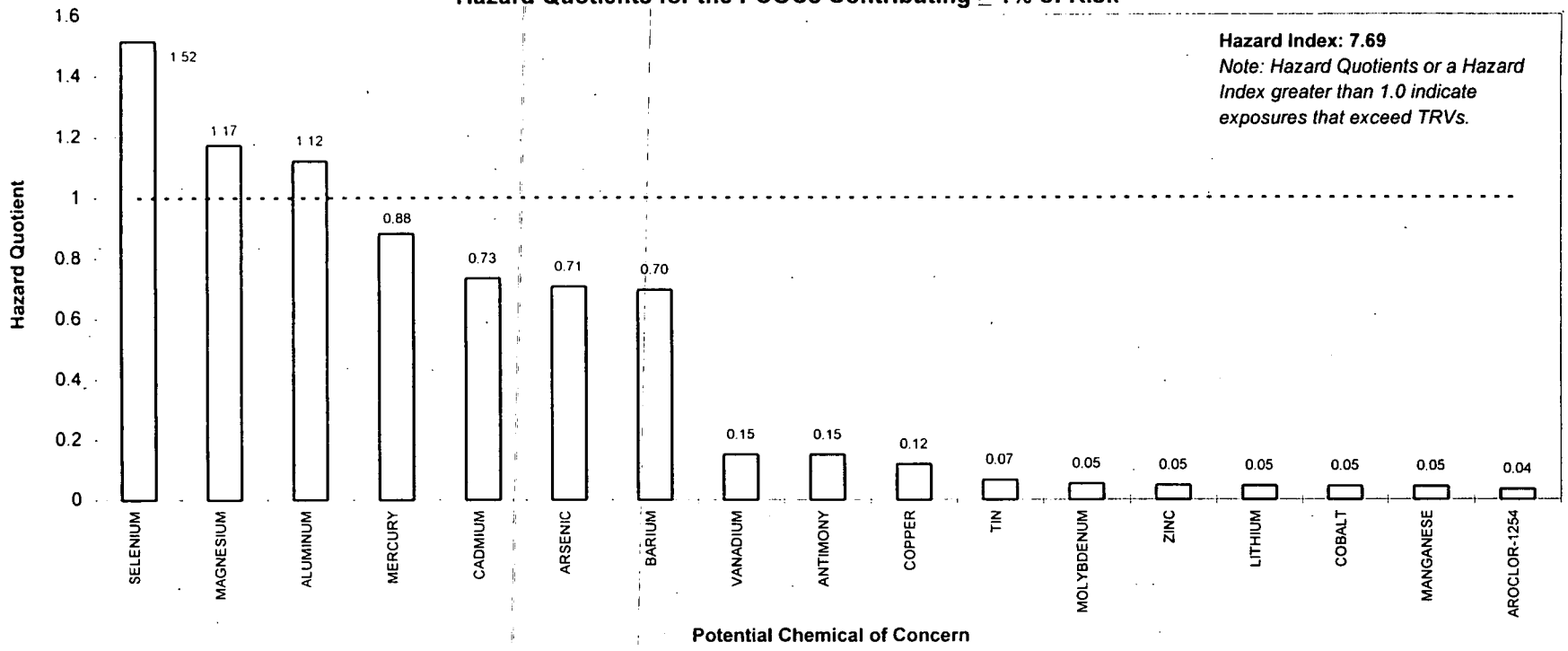
HAZARD INDEX 8.10

Notes:

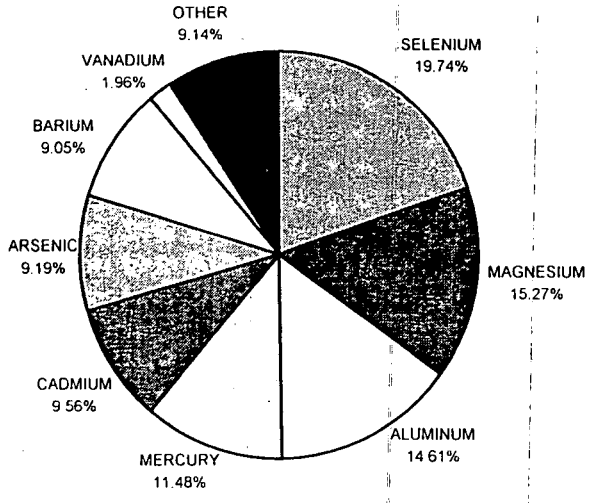
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 B-Ponds Source Area at RFETS

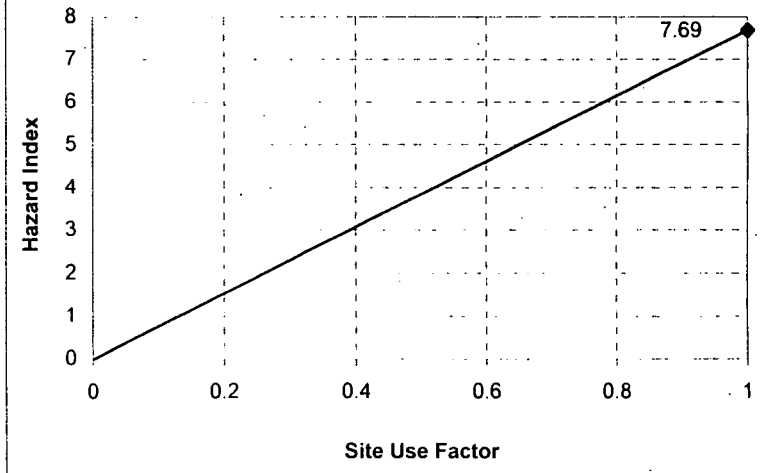
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



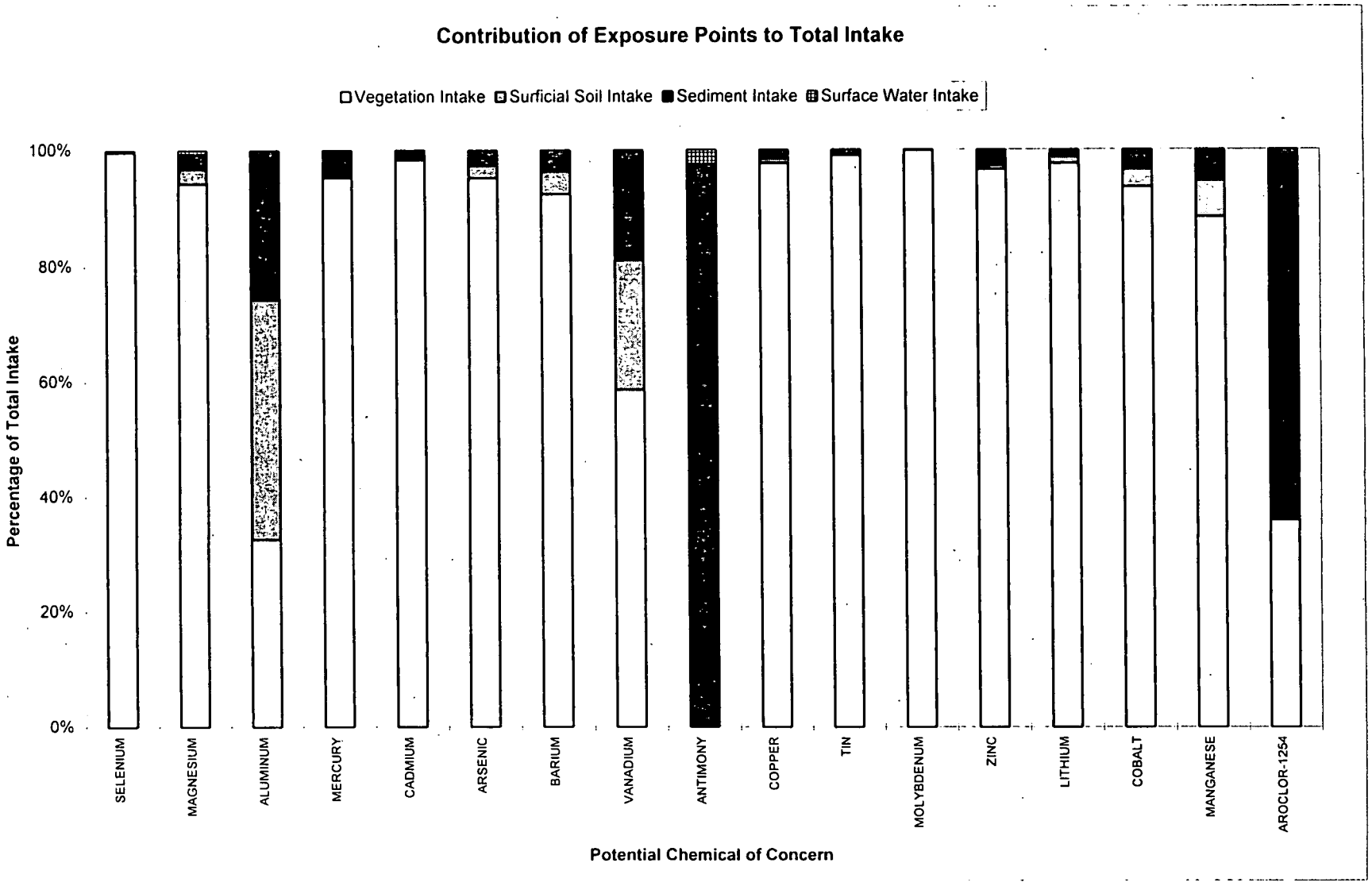
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 B-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 B-Ponds Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 B-PONDS		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment[1]		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
SELENIUM		NR	—	2.818		0.479	ND	—	0.591	0.001	0.002	3.03E-04	0.481	0.317	1.52	19.74%
MAGNESIUM	X	NR	—	1669.753		283.858	3790.000	7.580	3643.654	7.287	15.504	2.326	301.051	256.400	1.17	15.27%
ALUMINUM		NR	—	172.535		29.331	18700.000	37.400	11556.246	23.112	0.264	0.040	89.883	80.009	1.12	14.61%
MERCURY	X	NR	—	0.086		0.015	ND	—	0.340	0.001	2.75E-04	4.13E-05	0.015	0.017	0.88	11.48%
CADMIUM		NR	—	2.034		0.346	ND	—	2.888	0.006	0.001	1.48E-04	0.352	0.479	0.73	9.56%
ARSENIC	X	NR	—	2.700		0.459	5.100	0.010	6.286	0.013	0.002	3.38E-04	0.482	0.682	0.71	9.19%
BARIUM	X	NR	—	53.768		9.141	194.000	0.388	178.739	0.357	0.051	0.008	9.894	14.217	0.70	9.05%
VANADIUM	X	NR	—	1.200		0.204	38.900	0.078	32.781	0.066	0.003	4.28E-04	0.348	2.313	0.15	1.96%
ANTIMONY	X	NR	—	ND		—	ND	—	25.419	0.051	0.009	0.001	0.052	0.346	0.15	1.95%
COPPER	X	NR	—	29.452		5.007	17.000	0.034	42.045	0.084	ND	—	5.125	43.327	0.12	1.54%
TIN		NR	—	25.800		4.386	ND	—	21.229	0.042	0.006	0.001	4.429	65.961	0.07	0.87%
MOLYBDENUM	X	NR	—	3.800		0.646	ND	—	ND	—	0.007	0.001	0.647	12.061	0.05	0.70%
ZINC	X	NR	—	116.031		19.725	64.100	0.128	279.259	0.559	0.026	0.004	20.416	418.663	0.05	0.63%
LITHIUM		NR	—	6.600		1.122	5.900	0.012	6.200	0.012	0.017	0.003	1.149	24.571	0.05	0.61%
COBALT	X	NR	—	3.300		0.561	9.000	0.018	10.133	0.020	0.002	2.37E-04	0.600	13.192	0.05	0.59%
MANGANESE	X	NR	—	53.948		9.171	321.000	0.642	272.520	0.545	0.098	0.015	10.373	230.264	0.05	0.59%
AROCLOR-1254	X	NR	—	0.010		0.002	ND	—	1.543	0.003	NR	—	0.005	0.142	0.04	0.46%
NICKEL	X	NR	—	13.890		2.361	14.600	0.029	19.763	0.040	0.004	0.001	2.431	104.666	0.02	0.30%
LEAD	X	NR	—	1.274		0.217	37.200	0.074	54.428	0.109	0.005	0.001	0.401	20.933	0.02	0.25%
STRONTIUM	X	NR	—	66.453		11.297	25.500	0.051	101.256	0.203	0.255	0.038	11.589	688.177	0.02	0.22%
SILVER	X	NR	—	4.700		0.799	ND	—	92.067	0.184	ND	—	0.983	58.626	0.02	0.22%
AROCLOR-1248		NR	—	ND		—	ND	—	0.165	3.30E-04	NR	—	3.30E-04	0.064	0.01	0.07%
BERYLLIUM		NR	—	ND		—	0.970	0.002	2.933	0.006	1.79E-04	2.69E-05	0.008	1.727	<0.01	0.06%
THALLIUM		NR	—	ND		—	0.230	4.60E-04	0.790	0.002	ND	—	0.002	0.697	<0.01	0.04%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	NR	—	ND	—	12.825	0.026	ND	—	0.026	21.321	<0.01	0.02%
BENZO(a)PYRENE	X	NR	—	NR	NR	—	ND	—	0.398	0.001	ND	—	0.001	1.163	<0.01	0.01%
DIBENZO(a,h)ANTHRACENE	X	NR	—	NR	NR	—	ND	—	0.150	3.00E-04	ND	—	3.00E-04	1.163	<0.01	<0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	NR	—	ND	—	0.854	0.002	ND	—	0.002	11.634	<0.01	<0.01%
CHROMIUM	X	NR	—	5.293		0.900	19.900	0.040	26.369	0.053	0.002	3.32E-04	0.993	7161.754	<0.01	<0.01%
TOLUENE	X	NR	—	NR	0.020	0.003	NR	—	0.278	0.001	ND	—	0.004	30.220	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	NR	—	ND	—	0.429	0.001	ND	—	0.001	11.634	<0.01	<0.01%
BENZO(k)FLUORANTHENE	X	NR	—	NR	NR	—	ND	—	0.411	0.001	ND	—	0.001	11.634	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	NR	—	ND	—	0.350	0.001	ND	—	0.001	11.634	<0.01	<0.01%
ACETONE	X	NR	—	NR	ND	—	NR	—	0.190	3.80E-04	0.011	0.002	0.002	26.167	<0.01	<0.01%
TETRACHLOROETHENE	X	NR	—	NR	ND	—	NR	—	ND	—	0.004	0.001	0.001	16.300	<0.01	<0.01%
PYRENE	X	NR	—	NR	NR	—	ND	—	0.951	0.002	ND	—	0.002	87.321	<0.01	<0.01%
AROCLOR-1260	X	NR	—	ND		—	ND	—	0.166	3.32E-04	NR	—	3.32E-04	18.205	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	NR	—	ND	—	1.128	0.002	ND	—	0.002	145.535	<0.01	<0.01%
gamma-BHC (LINDANE)	X	NR	—	NR	NR	—	ND	—	0.006	1.15E-05	NR	—	1.15E-05	0.871	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	NR	—	ND	—	0.614	0.001	ND	—	0.001	116.343	<0.01	<0.01%

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 B-Ponds Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 B-PONDS		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment[1]		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
BENZO(ghi)PERYLENE	X	NR	—	NR	NR	—	ND	—	0.270	0.001	ND	—	0.001	116.343	<0.01	<0.01%
CHLOROFORM	X	NR	—	NR	ND	—	NR	—	ND	—	0.002	3.00E-04	3.00E-04	39.250	<0.01	<0.01%
1,2-DICHLOROETHENE	X	NR	—	NR	ND	—	NR	—	ND	—	0.003	3.79E-04	3.79E-04	52.625	<0.01	<0.01%
FLUORENE	X	NR	—	NR	NR	—	ND	—	0.351	0.001	ND	—	0.001	145.535	<0.01	<0.01%
1,2,4-TRICHLOROBENZENE	X	NR	—	NR	NR	—	ND	—	0.130	2.60E-04	ND	—	2.60E-04	39.049	<0.01	<0.01%
HEPTACHLOR	X	NR	—	NR	NR	—	ND	—	0.007	1.35E-05	NR	—	1.35E-05	2.094	<0.01	<0.01%
PHENOL	X	NR	—	NR	NR	—	ND	—	0.290	0.001	ND	—	0.001	158.307	<0.01	<0.01%
TRICHLOROETHENE	X	NR	—	NR	ND	—	NR	—	ND	—	0.003	4.31E-04	4.31E-04	171.044	<0.01	<0.01%
1,2-DICHLOROETHANE	X	NR	—	NR	ND	—	NR	—	ND	—	0.001	1.50E-04	1.50E-04	61.195	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	—	NR	NR	—	ND	—	0.110	2.20E-04	ND	—	2.20E-04	93.349	<0.01	<0.01%
METHYLENE CHLORIDE	X	NR	—	NR	ND	—	NR	—	0.009	1.80E-05	ND	—	1.80E-05	15.307	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	NR	—	ND	—	0.744	0.001	ND	—	0.001	1163.433	<0.01	<0.01%
NAPHTHALENE	X	NR	—	NR	NR	—	ND	—	0.351	0.001	ND	—	0.001	1163.433	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	NR	NR	—	ND	—	0.341	0.001	ND	—	0.001	1163.433	<0.01	<0.01%
ANTHRACENE	X	NR	—	NR	NR	—	ND	—	0.326	0.001	ND	—	0.001	1164.277	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	—	NR	NR	—	ND	—	0.250	0.001	ND	—	0.001	1217.647	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	NR	—	ND	—	ND	—	0.001	1.50E-04	1.50E-04	329.807	<0.01	<0.01%
2-METHYLNAPHTHALENE	X	NR	—	NR	NR	—	ND	—	0.170	3.40E-04	ND	—	3.40E-04	1163.433	<0.01	<0.01%
2-BUTANONE	X	NR	—	NR	ND	—	NR	—	0.029	5.83E-05	ND	—	5.83E-05	4672.704	<0.01	<0.01%

[1] Because Preble's meadow jumping mice have been captured in sediments in this source area, exposure from dry sediment intake is estimated.

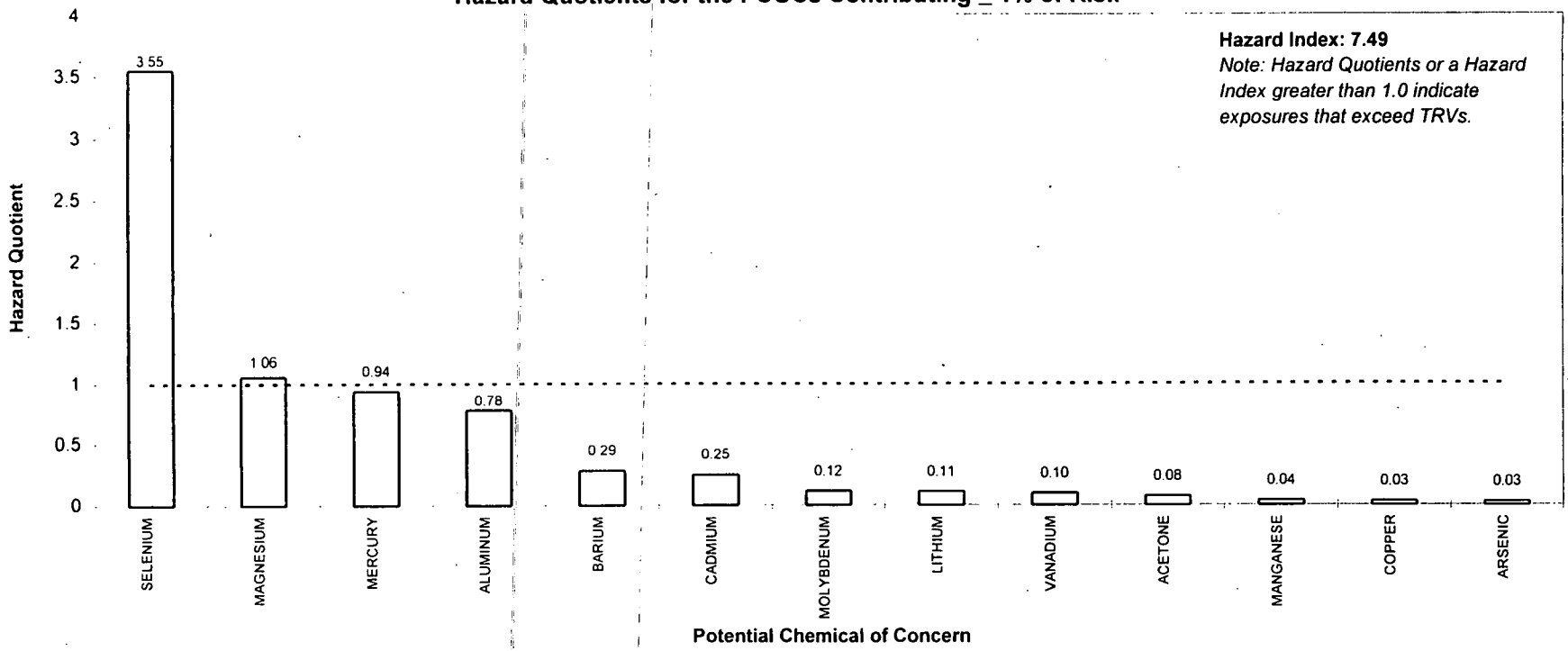
HAZARD INDEX 7.69

Notes:

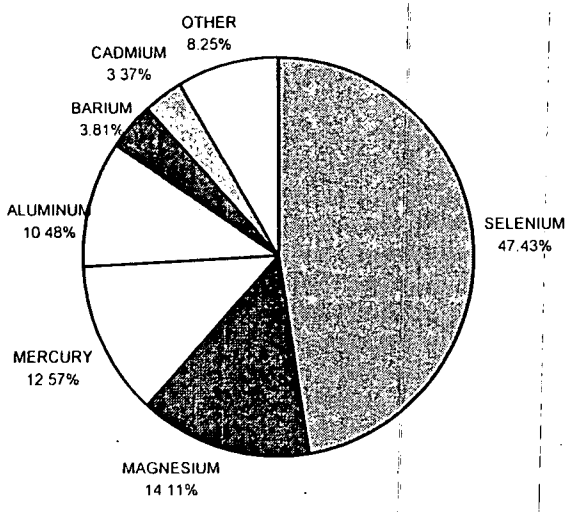
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 Soil Dump Areas Source Area at RFETS

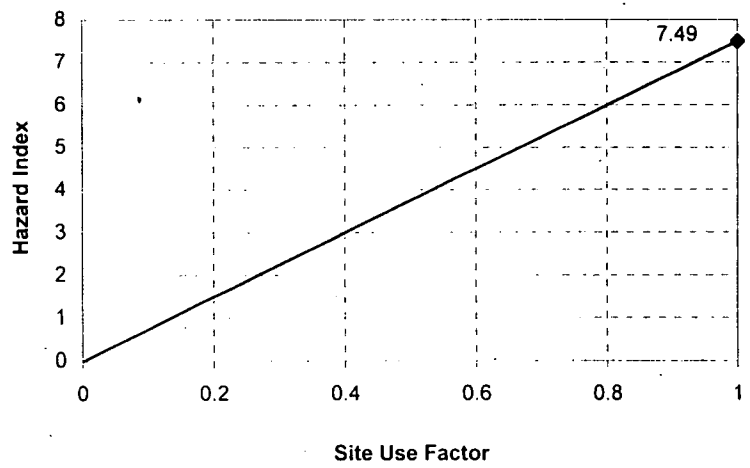
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



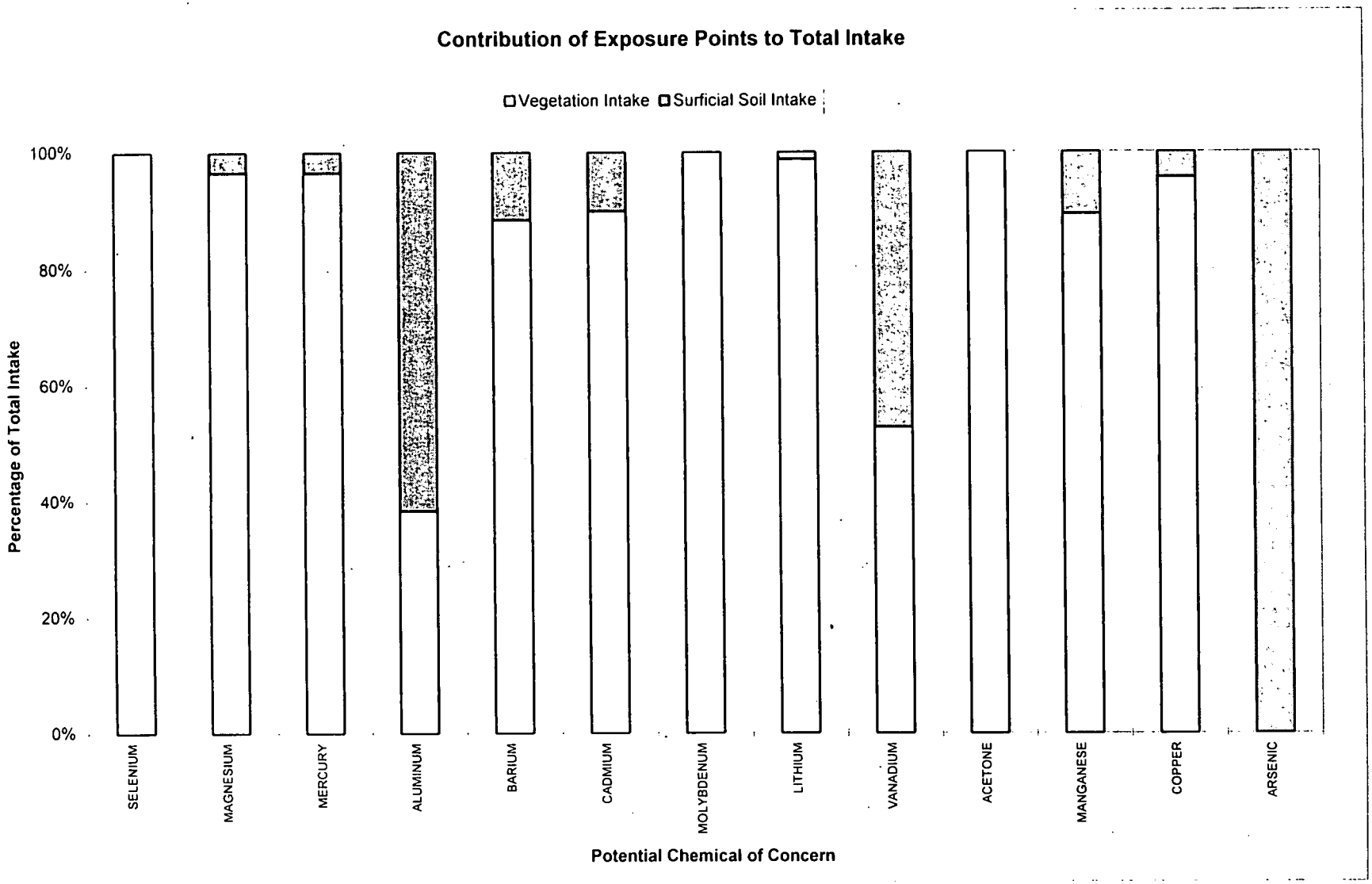
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 Soil Dump Areas Source Area at RFETS



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 Soil Dump Areas Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 SOIL DUMP AREAS		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.004 SUF = 1		IR = I SUF = I		IR = I SUF = I					
SELENIUM		NR	—	6.623		1.126	ND	—	NR	—	NR	—	1.126	0.317	3.55	47.43%
MAGNESIUM	X	NR	—	1537.931		261.448	2354.730	9.419	NR	—	NR	—	270.867	256.400	1.06	14.11%
MERCURY	X	NR	—	0.090		0.015	0.139	0.001	NR	—	NR	—	0.016	0.017	0.94	12.57%
ALUMINUM		NR	—	141.997		24.140	9659.033	38.636	NR	—	NR	—	62.776	80.009	0.78	10.48%
BARIUM	X	NR	—	21.085		3.584	117.141	0.469	NR	—	NR	—	4.053	14.217	0.29	3.81%
CADMIUM		NR	—	0.640		0.109	3.054	0.012	NR	—	NR	—	0.121	0.479	0.25	3.37%
MOLYBDENUM	X	NR	—	8.400		1.428	ND	—	NR	—	NR	—	1.428	12.061	0.12	1.58%
LITHIUM		NR	—	16.100		2.737	9.142	0.037	NR	—	NR	—	2.774	24.571	0.11	1.51%
VANADIUM	X	NR	—	0.710		0.121	26.996	0.108	NR	—	NR	—	0.229	2.313	0.10	1.32%
ACETONE	X	NR	—	NR	11.617	1.975	NR	—	NR	—	NR	—	1.975	26.167	0.08	1.01%
MANGANESE	X	NR	—	48.491		8.243	244.118	0.976	NR	—	NR	—	9.220	230.264	0.04	0.53%
COPPER	X	NR	—	8.057		1.370	15.408	0.062	NR	—	NR	—	1.431	43.327	0.03	0.44%
ARSENIC	X	NR	—	ND		—	4.989	0.020	NR	—	NR	—	0.020	0.682	0.03	0.39%
NICKEL	X	NR	—	12.700		2.159	11.325	0.045	NR	—	NR	—	2.204	104.666	0.02	0.28%
STRONTIUM	X	NR	—	80.644		13.709	37.401	0.150	NR	—	NR	—	13.859	688.177	0.02	0.27%
LEAD	X	NR	—	1.224		0.208	24.511	0.098	NR	—	NR	—	0.306	20.933	0.01	0.20%
AROCLOR-1254	X	NR	—	NR	ND	—	0.429	0.002	NR	—	NR	—	0.002	0.142	0.01	0.19%
ZINC	X	NR	—	32.108		5.458	94.049	0.376	NR	—	NR	—	5.835	418.663	0.01	0.19%
TIN		NR	—	4.400		0.748	22.063	0.088	NR	—	NR	—	0.836	65.961	0.01	0.17%
COBALT	X	NR	—	ND		—	6.279	0.025	NR	—	NR	—	0.025	13.192	<0.01	0.03%
BENZO(a)PYRENE	X	NR	—	NR	0.002	2.91E-04	0.495	0.002	NR	—	NR	—	0.002	1.163	<0.01	0.02%
THALLIUM		NR	—	ND		—	0.260	0.001	NR	—	NR	—	0.001	0.697	<0.01	0.02%
BERYLLIUM		NR	—	ND		—	0.621	0.002	NR	—	NR	—	0.002	1.727	<0.01	0.02%
NITRATE/NITRITE		NR	—	NR		—	7.689	0.031	NR	—	NR	—	0.031	34.669	<0.01	0.01%
DIBENZO(a,h)ANTHRACENE	X	NR	—	NR	ND	—	0.130	0.001	NR	—	NR	—	0.001	1.163	<0.01	0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.050	0.009	2.270	0.009	NR	—	NR	—	0.018	21.321	<0.01	0.01%
BENZO(k)FLUORANTHENE	X	NR	—	NR	2.55E-04	4.34E-05	2.200	0.009	NR	—	NR	—	0.009	11.634	<0.01	0.01%
PENTACHLOROPHENOL		NR	—	NR	0.032	0.006	ND	—	NR	—	NR	—	0.006	7.915	<0.01	0.01%
TOLUENE	X	NR	—	NR	0.112	0.019	NR	—	NR	—	NR	—	0.019	30.220	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	0.001	1.79E-04	0.855	0.003	NR	—	NR	—	0.004	11.634	<0.01	<0.01%
PHENOL	X	NR	—	NR	0.305	0.052	ND	—	NR	—	NR	—	0.052	158.307	<0.01	<0.01%
2-BUTANONE	X	NR	—	NR	7.542	1.282	NR	—	NR	—	NR	—	1.282	4672.704	<0.01	<0.01%
METHYLENE CHLORIDE	X	NR	—	NR	0.021	0.004	NR	—	NR	—	NR	—	0.004	15.307	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.001	2.53E-04	0.526	0.002	NR	—	NR	—	0.002	11.634	<0.01	<0.01%
4-METHYL-2-PENTANONE	X	NR	—	NR	0.036	0.006	NR	—	NR	—	NR	—	0.006	65.416	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	1.36E-04	2.31E-05	0.334	0.001	NR	—	NR	—	0.001	11.634	<0.01	<0.01%
PYRENE	X	NR	—	NR	0.008	0.001	1.337	0.005	NR	—	NR	—	0.007	87.321	<0.01	<0.01%
TOTAL XYLENES		NR	—	NR	0.001	1.86E-04	NR	—	NR	—	NR	—	1.86E-04	2.396	<0.01	<0.01%
TETRACHLOROETHENE	X	NR	—	NR	0.004	0.001	NR	—	NR	—	NR	—	0.001	16.300	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	0.007	0.001	1.376	0.006	NR	—	NR	—	0.007	145.535	<0.01	<0.01%

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 Soil Dump Areas Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 SOIL DUMP AREAS		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.004 SUF = 1		IR = I SUF = I		IR = I SUF = I					
BENZENE	X	NR	—	NR	0.007	0.001	NR	—	NR	—	NR	—	0.001	30.662	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	0.003	4.52E-04	0.577	0.002	NR	—	NR	—	0.003	116.343	<0.01	<0.01%
CHROMIUM	X	NR	—	ND		—	15.651	0.063	NR	—	NR	—	0.063	7161.754	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	ND	—	0.292	0.001	NR	—	NR	—	0.001	116.343	<0.01	<0.01%
FLUORENE	X	NR	—	NR	ND	—	0.232	0.001	NR	—	NR	—	0.001	145.535	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	ND	—	0.473	0.002	NR	—	NR	—	0.002	329.807	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	0.016	0.003	1.056	0.004	NR	—	NR	—	0.007	1163.433	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	—	NR	ND	—	0.072	2.88E-04	NR	—	NR	—	2.88E-04	93.349	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	—	NR	6.60E-05	1.12E-05	0.658	0.003	NR	—	NR	—	0.003	1217.647	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	NR	0.009	0.002	0.244	0.001	NR	—	NR	—	0.002	1163.433	<0.01	<0.01%
ANTHRACENE	X	NR	—	NR	ND	—	0.382	0.002	NR	—	NR	—	0.002	1164.277	<0.01	<0.01%
NAPHTHALENE	X	NR	—	NR	ND	—	0.110	4.40E-04	NR	—	NR	—	4.40E-04	1163.433	<0.01	<0.01%

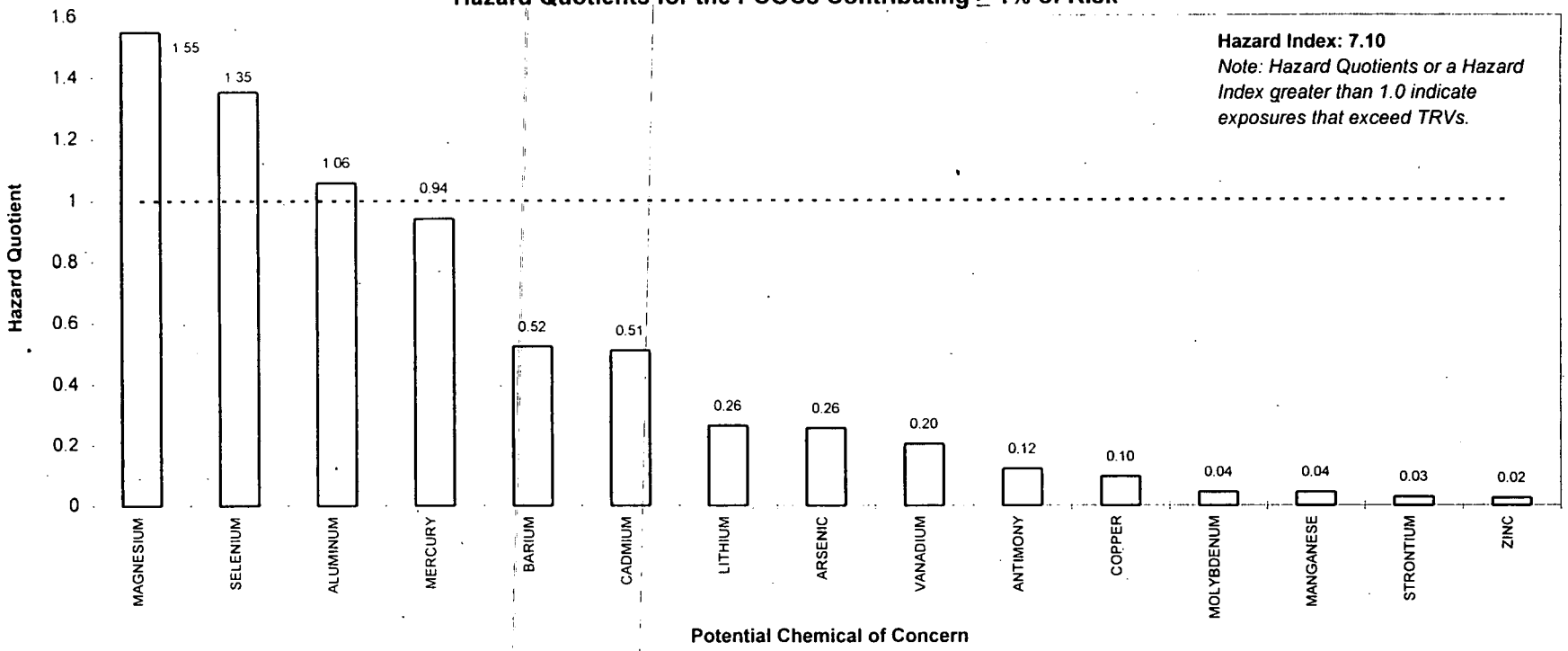
HAZARD INDEX 7.49

Notes:

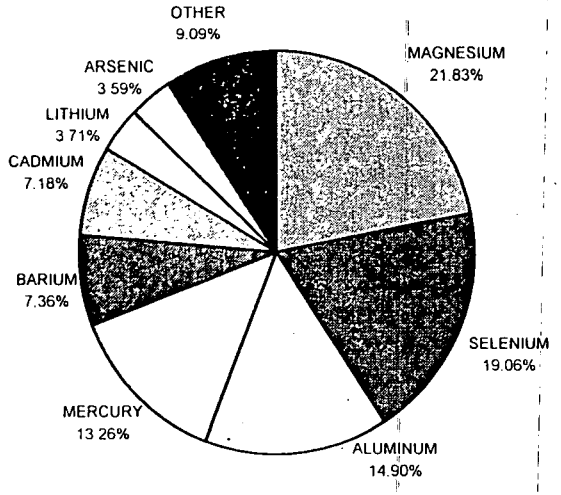
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 A-Ponds Source Area at RFETS

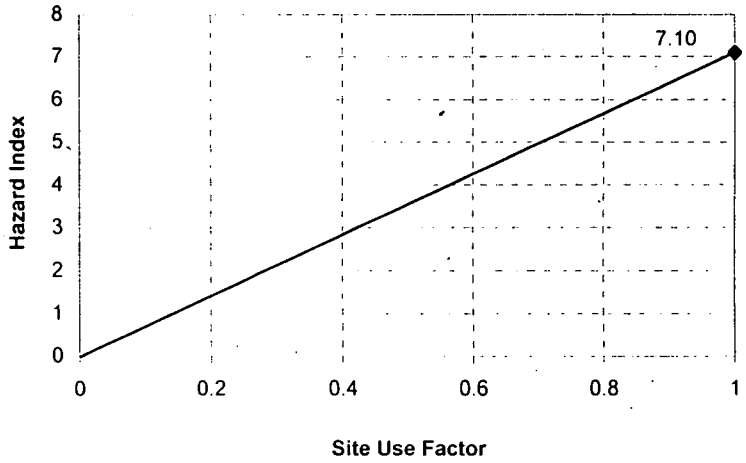
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



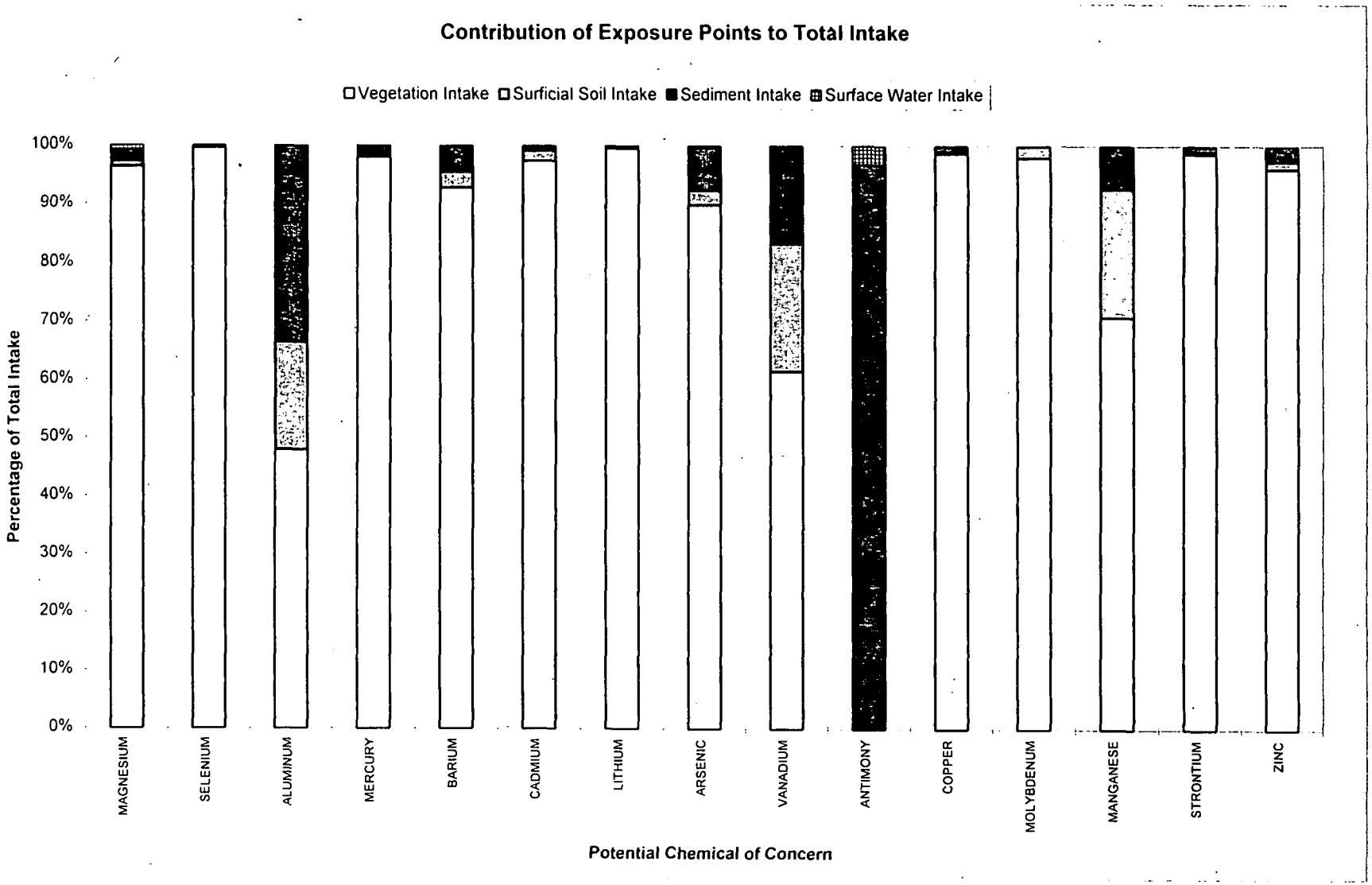
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 A-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 A-Ponds Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 A-PONDS		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment[1]		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
MAGNESIUM	X	NR	—	2252.596		382.941	1880.000	3.760	3921.004	7.842	18.851	2.828	397.371	256.400	1.55	21.83%
SELENIUM		NR	—	2.516		0.428	ND	—	0.640	0.001	0.003	4.92E-04	0.429	0.317	1.35	19.06%
ALUMINUM		NR	—	238.686		40.577	7830.000	15.660	14176.386	28.353	0.405	0.061	84.650	80.009	1.06	14.90%
MERCURY	X	NR	—	0.090		0.015	ND	—	0.142	2.83E-04	1.49E-04	2.24E-05	0.016	0.017	0.94	13.26%
BARIUM	X	NR	—	40.567		6.896	100.000	0.200	163.378	0.327	0.062	0.009	7.432	14.217	0.52	7.36%
CADMIUM		NR	—	1.400		0.238	2.200	0.004	0.945	0.002	0.001	1.44E-04	0.244	0.479	0.51	7.18%
LITHIUM		NR	—	37.901		6.443	4.800	0.010	8.270	0.017	0.031	0.005	6.474	24.571	0.26	3.71%
ARSENIC	X	NR	—	0.920		0.156	2.200	0.004	6.354	0.013	0.004	0.001	0.174	0.682	0.26	3.59%
VANADIUM	X	NR	—	1.700		0.289	51.100	0.102	38.875	0.078	0.002	3.44E-04	0.469	2.313	0.20	2.86%
ANTIMONY	X	NR	—	ND		—	ND	—	20.227	0.040	0.009	0.001	0.042	0.346	0.12	1.71%
COPPER	X	NR	—	24.122		4.101	5.000	0.010	22.165	0.044	0.002	3.15E-04	4.155	43.327	0.10	1.35%
MOLYBDENUM	X	NR	—	3.100		0.527	5.300	0.011	ND	—	0.003	4.62E-04	0.538	12.061	0.04	0.63%
MANGANESE	X	NR	—	42.435		7.214	1110.000	2.220	362.368	0.725	0.179	0.027	10.186	230.264	0.04	0.62%
STRONTIUM	X	NR	—	112.501		19.125	37.100	0.074	73.117	0.146	0.278	0.042	19.387	688.177	0.03	0.40%
ZINC	X	NR	—	57.285		9.739	65.800	0.132	130.564	0.261	0.008	0.001	10.132	418.663	0.02	0.34%
NICKEL	X	NR	—	14.200		2.414	13.100	0.026	17.820	0.036	0.003	4.17E-04	2.476	104.666	0.02	0.33%
TIN		NR	—	5.798		0.986	93.300	0.187	ND	—	ND	—	1.172	65.961	0.02	0.25%
COBALT	X	NR	—	1.000		0.170	7.100	0.014	11.590	0.023	0.001	2.19E-04	0.208	13.192	0.02	0.22%
LEAD	X	NR	—	1.107		0.188	33.000	0.066	26.601	0.053	0.003	4.98E-04	0.308	20.933	0.01	0.21%
ACETONE	X	NR	—	NR	0.693	0.118	NR	—	0.230	4.60E-04	ND	—	0.118	26.167	<0.01	0.06%
AROCLOR-1254	X	NR	—	ND		—	ND	—	0.182	3.64E-04	NR	—	3.64E-04	0.142	<0.01	0.04%
BERYLLIUM		NR	—	ND		—	1.300	0.003	0.710	0.001	ND	—	0.004	1.727	<0.01	0.03%
THALLIUM		NR	—	ND		—	ND	—	0.690	0.001	ND	—	0.001	0.697	<0.01	0.02%
BENZO(a)PYRENE	X	NR	—	NR	NR	—	ND	—	0.282	0.001	ND	—	0.001	1.163	<0.01	0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	NR	—	ND	—	1.241	0.002	ND	—	0.002	21.321	<0.01	<0.01%
TOLUENE	X	NR	—	NR	0.016	0.003	NR	—	0.178	3.55E-04	ND	—	0.003	30.220	<0.01	<0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	NR	—	ND	—	0.312	0.001	ND	—	0.001	11.634	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	NR	—	ND	—	0.270	0.001	ND	—	0.001	11.634	<0.01	<0.01%
ALDRIN	X	NR	—	NR	NR	—	ND	—	0.009	1.84E-05	NR	—	1.84E-05	0.523	<0.01	<0.01%
BENZO(k)FLUORANTHENE	X	NR	—	NR	NR	—	ND	—	0.200	4.00E-04	ND	—	4.00E-04	11.634	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	NR	—	ND	—	0.200	4.00E-04	ND	—	4.00E-04	11.634	<0.01	<0.01%
4,4'-DDT		NR	—	NR	NR	—	0.026	5.20E-05	ND	—	NR	—	5.20E-05	2.094	<0.01	<0.01%
METHYLENE CHLORIDE	X	NR	—	NR	ND	—	NR	—	ND	—	0.002	3.00E-04	3.00E-04	15.307	<0.01	<0.01%
delta-BHC		NR	—	NR	NR	—	0.023	4.60E-05	ND	—	NR	—	4.60E-05	4.186	<0.01	<0.01%
PYRENE	X	NR	—	NR	NR	—	ND	—	0.343	0.001	ND	—	0.001	87.321	<0.01	<0.01%
CHROMIUM	X	NR	—	ND		—	9.000	0.018	13.994	0.028	0.002	2.45E-04	0.046	7161.754	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	NR	—	ND	—	0.405	0.001	ND	—	0.001	145.535	<0.01	<0.01%
SILVER	X	NR	—	ND		—	ND	—	ND	—	0.002	2.79E-04	2.79E-04	58.626	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	NR	—	ND	—	0.268	0.001	ND	—	0.001	116.343	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	NR	—	ND	—	0.210	4.20E-04	ND	—	4.20E-04	116.343	<0.01	<0.01%

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 A-Ponds Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 A-PONDS		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment[1]		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
PHENOL	X	NR	—	NR	NR	—	ND	—	0.110	2.20E-04	ND	—	2.20E-04	158.307	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	NR	—	ND	—	ND	—	0.002	3.00E-04	3.00E-04	329.807	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	NR	—	ND	—	0.311	0.001	ND	—	0.001	1163.433	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	—	NR	NR	—	ND	—	0.130	2.60E-04	ND	—	2.60E-04	1217.647	<0.01	<0.01%
BENZENE	X	NR	—	NR	ND	—	NR	—	0.003	6.00E-06	ND	—	6.00E-06	30.662	<0.01	<0.01%
4-METHYL-2-PENTANONE	X	NR	—	NR	ND	—	NR	—	0.006	1.20E-05	ND	—	1.20E-05	65.416	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	NR	NR	—	ND	—	0.089	1.78E-04	ND	—	1.78E-04	1163.433	<0.01	<0.01%
ANTHRACENE	X	NR	—	NR	NR	—	ND	—	0.088	1.76E-04	ND	—	1.76E-04	1164.277	<0.01	<0.01%
2-BUTANONE	X	NR	—	NR	ND	—	NR	—	0.051	1.02E-04	ND	—	1.02E-04	4672.704	<0.01	<0.01%

[1] Because Preble's meadow jumping mice have been captured in sediments in this source area, exposure from dry sediment intake is estimated.

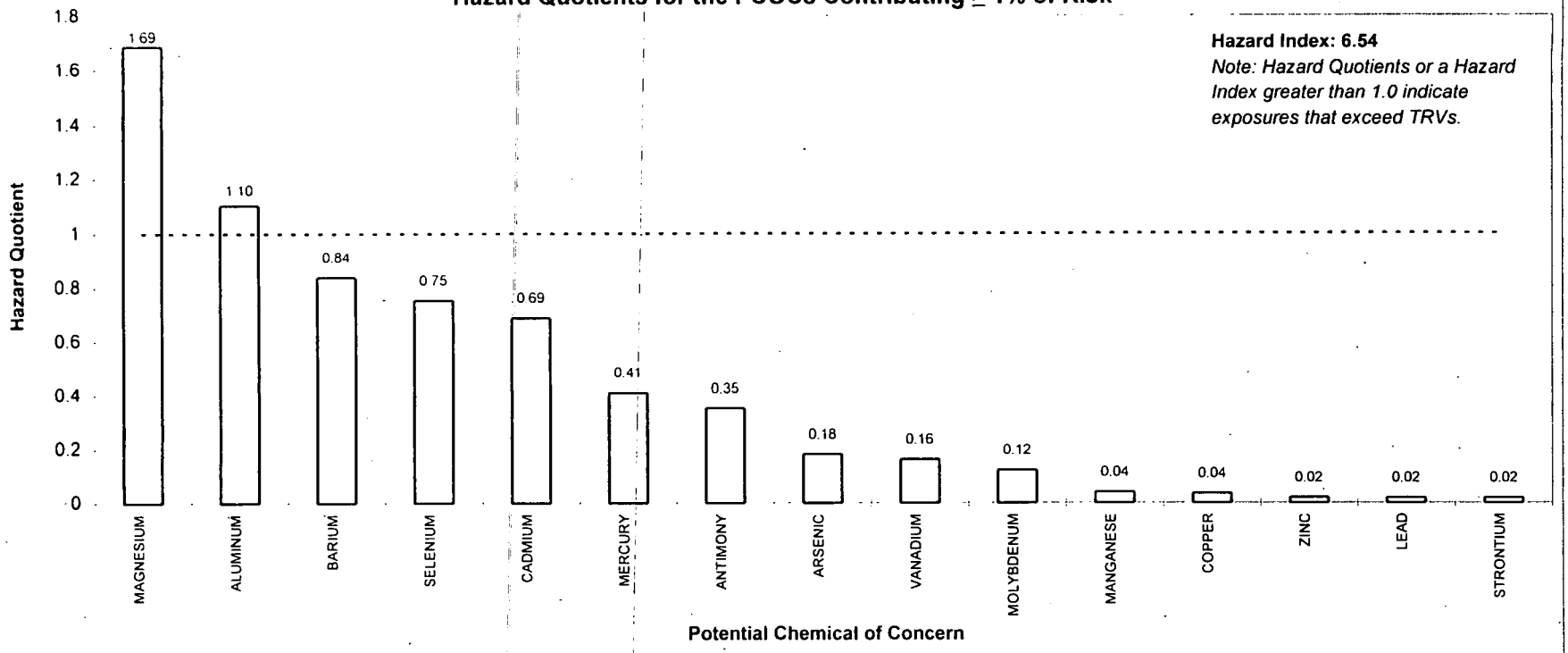
HAZARD INDEX 7.10

Notes:

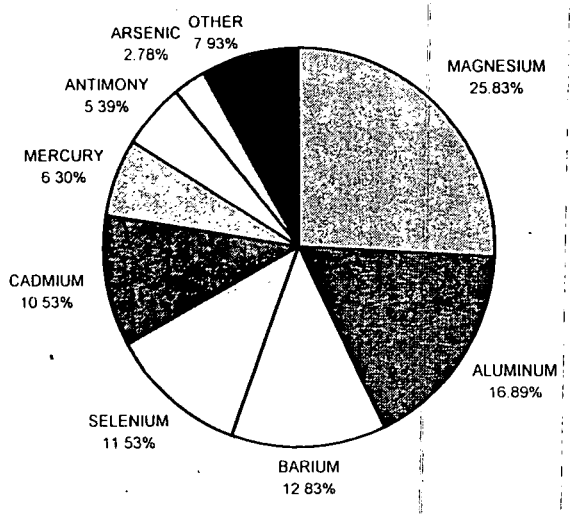
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU5 Old Landfill Source Area at RFETS

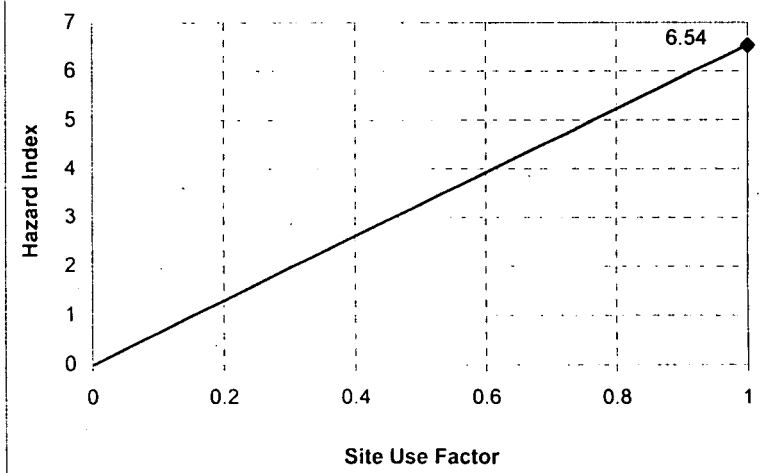
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



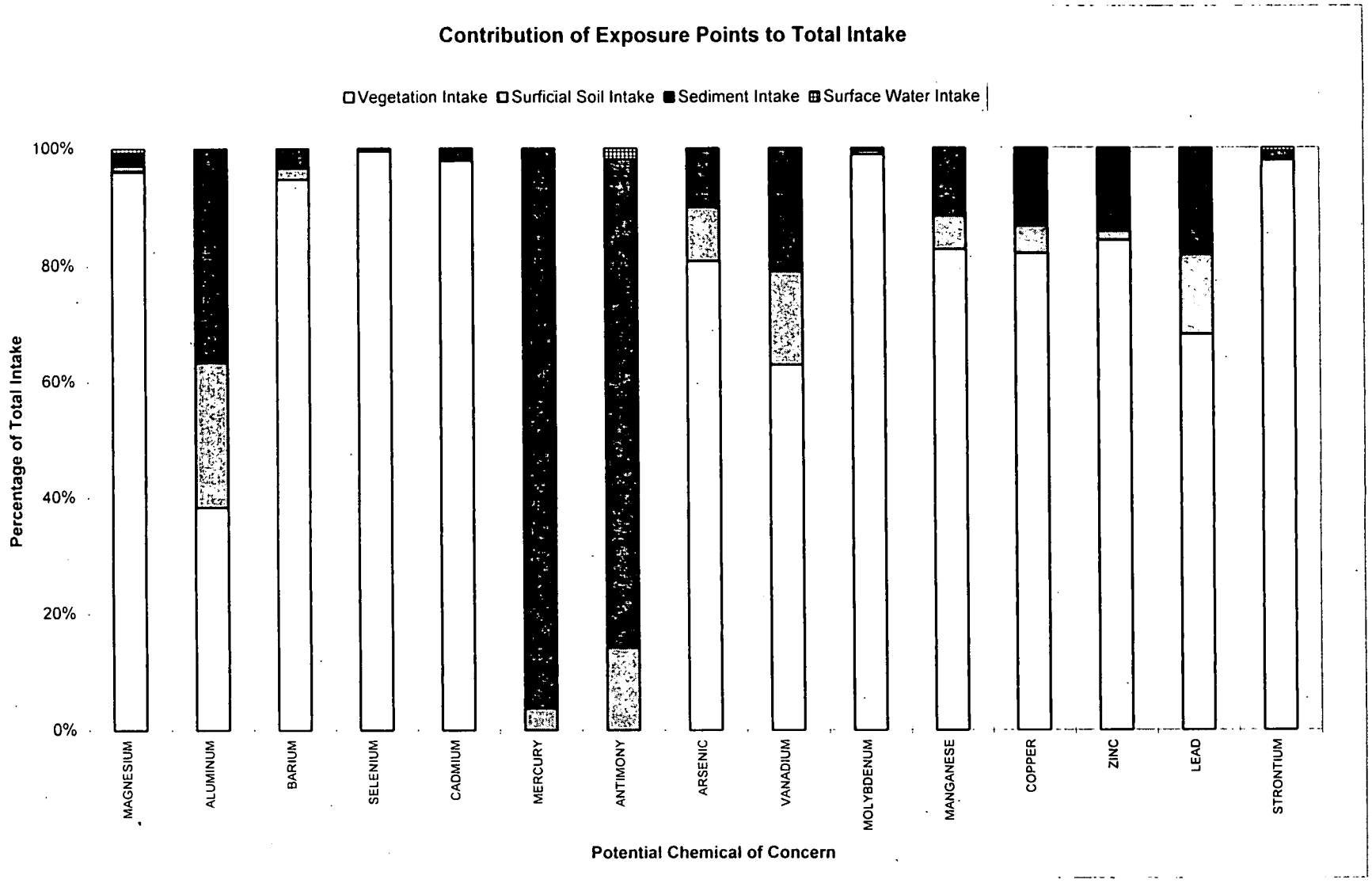
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU5 Old Landfill Source Area at RFETS



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU5 Old Landfill Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU5 OLD LANDFILL		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU5	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
MAGNESIUM		NR	—	2448.896		416.312	2298.534	4.597	4628.783	9.258	19.837	2.976	433.143	256.400	1.69	25.83%
ALUMINUM		NR	—	199.127		33.852	11074.656	22.149	16076.395	32.153	1.471	0.221	88.374	80.009	1.10	16.89%
BARIUM	X	NR	—	66.461		11.298	115.593	0.231	186.000	0.372	0.162	0.024	11.926	14.217	0.84	12.83%
SELENIUM		NR	—	1.400		0.238	0.459	0.001	ND	—	0.003	3.78E-04	0.239	0.317	0.75	11.53%
CADMIUM		NR	—	1.900		0.323	0.880	0.002	2.486	0.005	0.002	2.40E-04	0.330	0.479	0.69	10.53%
MERCURY	X	NR	—	ND		—	0.124	2.48E-04	3.194	0.006	1.11E-04	1.67E-05	0.007	0.017	0.41	6.30%
ANTIMONY	X	NR	—	ND		—	8.677	0.017	51.300	0.103	0.015	0.002	0.122	0.346	0.35	5.39%
ARSENIC		NR	—	0.590		0.100	5.702	0.011	6.100	0.012	0.002	3.21E-04	0.124	0.682	0.18	2.78%
VANADIUM		NR	—	1.400		0.238	30.425	0.061	39.300	0.079	0.008	0.001	0.379	2.313	0.16	2.51%
MOLYBDENUM		NR	—	8.700		1.479	4.400	0.009	3.900	0.008	0.004	0.001	1.496	12.061	0.12	1.90%
MANGANESE		NR	—	47.237		8.030	277.661	0.555	556.331	1.113	0.061	0.009	9.707	230.264	0.04	0.64%
COPPER	X	NR	—	7.863		1.337	37.703	0.075	108.217	0.216	0.006	0.001	1.629	43.327	0.04	0.57%
ZINC	X	NR	—	44.205		7.515	66.571	0.133	634.180	1.268	0.022	0.003	8.920	418.663	0.02	0.33%
LEAD	X	NR	—	1.683		0.286	28.695	0.057	37.926	0.076	0.004	0.001	0.420	20.933	0.02	0.31%
STRONTIUM	X	NR	—	79.000		13.430	30.813	0.062	79.000	0.158	0.484	0.073	13.722	688.177	0.02	0.30%
AROCLOR-1254	X	NR	—	NR	0.001	2.47E-04	0.572	0.001	0.250	0.001	ND	—	0.002	0.142	0.01	0.22%
NICKEL		NR	—	8.000		1.360	14.939	0.030	21.300	0.043	0.009	0.001	1.434	104.666	0.01	0.21%
LITHIUM	X	NR	—	1.100		0.187	8.005	0.016	15.400	0.031	0.013	0.002	0.236	24.571	0.01	0.15%
ACETONE		NR	—	NR	1.397	0.238	ND	—	0.046	9.20E-05	0.022	0.003	0.241	26.167	0.01	0.14%
BENZO(a)PYRENE	X	NR	—	NR	0.030	0.005	2.636	0.005	ND	—	ND	—	0.010	1.163	0.01	0.13%
NITRATE/NITRITE		NR	—	NR		—	NR	—	6.526	0.013	1.490	0.224	0.237	34.669	0.01	0.10%
TIN		NR	—	2.100		0.357	9.714	0.019	ND	—	0.021	0.003	0.380	65.961	0.01	0.09%
SILVER	X	NR	—	1.000		0.170	7.180	0.014	6.597	0.013	0.003	0.001	0.198	58.626	<0.01	0.05%
COBALT	X	NR	—	ND		—	8.348	0.017	10.900	0.022	0.002	3.00E-04	0.039	13.192	<0.01	0.05%
BERYLLIUM		NR	—	ND		—	0.882	0.002	1.700	0.003	0.001	1.42E-04	0.005	1.727	<0.01	0.04%
THALLIUM		NR	—	ND		—	0.310	0.001	0.600	0.001	0.002	2.97E-04	0.002	0.697	<0.01	0.04%
DIBENZO(a,h)ANTHRACENE	X	NR	—	NR	0.003	0.001	0.758	0.002	ND	—	ND	—	0.002	1.163	<0.01	0.03%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.038	0.006	2.850	0.006	0.038	7.60E-05	ND	—	0.012	11.634	<0.01	0.02%
PHENOL	X	NR	—	NR	0.777	0.132	ND	—	ND	—	ND	—	0.132	158.307	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	0.016	0.003	3.179	0.006	ND	—	ND	—	0.009	11.634	<0.01	0.01%
PYRENE	X	NR	—	NR	0.201	0.034	7.090	0.014	0.097	1.94E-04	ND	—	0.049	87.321	<0.01	0.01%
METHYLENE CHLORIDE	X	NR	—	NR	0.042	0.007	ND	—	ND	—	0.003	4.59E-04	0.008	15.307	<0.01	0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	0.001	2.03E-04	2.572	0.005	ND	—	ND	—	0.005	11.634	<0.01	0.01%
TOTAL XYLENES		NR	—	NR	0.003	0.001	ND	—	ND	—	ND	—	0.001	2.396	<0.01	0.01%
FLUORANTHENE	X	NR	—	NR	0.208	0.035	8.267	0.017	0.097	1.94E-04	ND	—	0.052	145.535	<0.01	0.01%
DIELDRIN	X	NR	—	NR	ND	—	0.009	1.85E-05	ND	—	ND	—	1.85E-05	0.053	<0.01	0.01%
HEPTACHLOR EPOXIDE	X	NR	—	NR	0.001	2.20E-04	0.004	8.61E-06	ND	—	ND	—	2.29E-04	0.660	<0.01	0.01%
BENZO(k)FLUORANTHENE	X	NR	—	NR	0.005	0.001	1.694	0.003	ND	—	ND	—	0.004	11.634	<0.01	0.01%
FLUORENE	X	NR	—	NR	0.268	0.046	2.363	0.005	ND	—	ND	—	0.050	145.535	<0.01	0.01%
ENDRIN KETONE	X	NR	—	NR	NO LOG K_{OW}	—	0.009	1.87E-05	ND	—	ND	—	1.87E-05	0.061	<0.01	<0.01%
PENTACHLOROPHENOL	X	NR	—	NR	0.008	0.001	ND	—	ND	—	0.005	0.001	0.002	7.915	<0.01	<0.01%

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU5 Old Landfill Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU5 OLD LANDFILL		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU5	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.023	0.004	0.210	4.20E-04	0.068	1.36E-04	0.002	3.00E-04	0.005	21.321	<0.01	<0.01%
NAPHTHALENE	X	NR	—	NR	1.297	0.221	2.498	0.005	ND	—	ND	—	0.226	1163.433	<0.01	<0.01%
TOLUENE	X	NR	—	NR	0.027	0.005	ND	—	ND	—	ND	—	0.005	30.220	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	0.061	0.010	2.987	0.006	0.041	8.20E-05	ND	—	0.016	116.343	<0.01	<0.01%
TETRACHLOROETHENE		NR	—	NR	0.013	0.002	ND	—	0.001	2.00E-06	ND	—	0.002	16.300	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	0.610	0.104	9.640	0.019	0.082	1.64E-04	ND	—	0.123	1163.433	<0.01	<0.01%
CHROMIUM		NR	—	3.600		0.612	13.088	0.026	22.917	0.046	0.004	0.001	0.685	7161.754	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	—	NR	0.024	0.004	0.220	4.40E-04	ND	—	ND	—	0.005	93.349	<0.01	<0.01%
4-METHYL-2-PENTANONE		NR	—	NR	0.018	0.003	ND	—	ND	—	ND	—	0.003	65.416	<0.01	<0.01%
ISOPHORONE	X	NR	—	NR	0.344	0.058	ND	—	ND	—	ND	—	0.058	1308.678	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	NR	0.258	0.044	2.636	0.005	ND	—	ND	—	0.049	1163.433	<0.01	<0.01%
ANTHRACENE	X	NR	—	NR	0.243	0.041	2.816	0.006	ND	—	ND	—	0.047	1164.277	<0.01	<0.01%
TRICHLOROETHENE		NR	—	NR	0.019	0.003	ND	—	ND	—	0.003	4.31E-04	0.004	171.044	<0.01	<0.01%
2-METHYLNAPHTHALENE	X	NR	—	NR	0.141	0.024	0.944	0.002	ND	—	ND	—	0.026	1163.433	<0.01	<0.01%
ENDOSULFAN SULFATE	X	NR	—	NR	ND	—	0.009	1.75E-05	ND	—	ND	—	1.75E-05	0.912	<0.01	<0.01%
ALDRIN	X	NR	—	NR	ND	—	0.005	9.31E-06	ND	—	ND	—	9.31E-06	0.523	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	0.002	3.95E-04	0.922	0.002	ND	—	ND	—	0.002	116.343	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	0.027	0.005	0.200	4.00E-04	ND	—	ND	—	0.005	329.807	<0.01	<0.01%
METHOXYCHLOR	X	NR	—	NR	ND	—	0.060	1.20E-04	ND	—	ND	—	1.20E-04	10.554	<0.01	<0.01%
CHLOROFORM		NR	—	NR	ND	—	ND	—	ND	—	0.003	3.80E-04	3.80E-04	39.250	<0.01	<0.01%
2-BUTANONE		NR	—	NR	0.234	0.040	ND	—	ND	—	0.006	0.001	0.041	4672.704	<0.01	<0.01%
4,4'-DDT	X	NR	—	NR	ND	—	0.009	1.72E-05	ND	—	ND	—	1.72E-05	2.094	<0.01	<0.01%
AROCLOR-1260		NR	—	NR	0.001	1.07E-04	ND	—	ND	—	ND	—	1.07E-04	18.205	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	—	NR	0.003	4.92E-04	ND	—	ND	—	ND	—	4.92E-04	1223.894	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	—	NR	ND	—	0.083	1.66E-04	ND	—	ND	—	1.66E-04	1217.647	<0.01	<0.01%

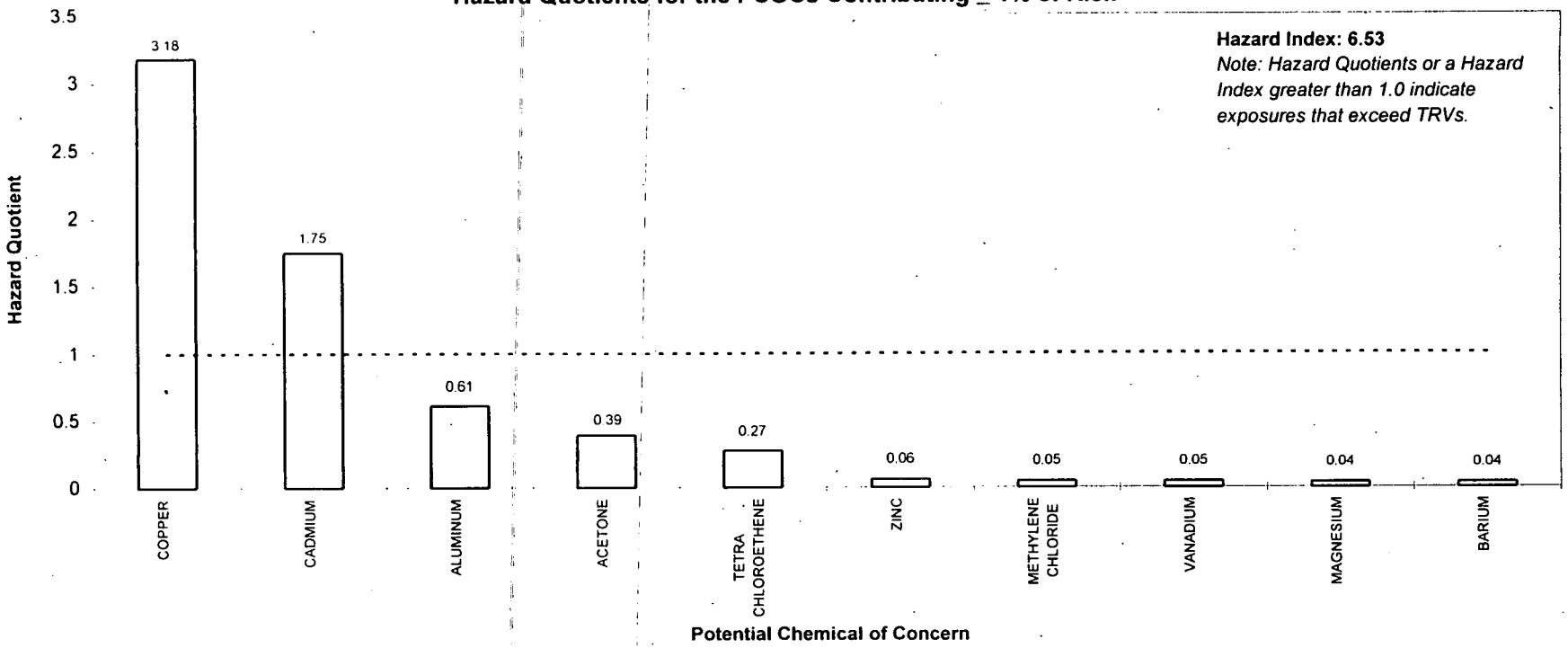
HAZARD INDEX 6.54

Notes:

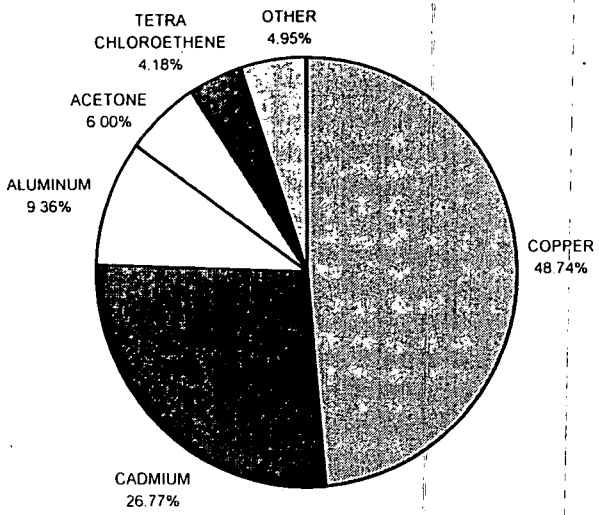
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU2 East Trenches Source Area at RFETS

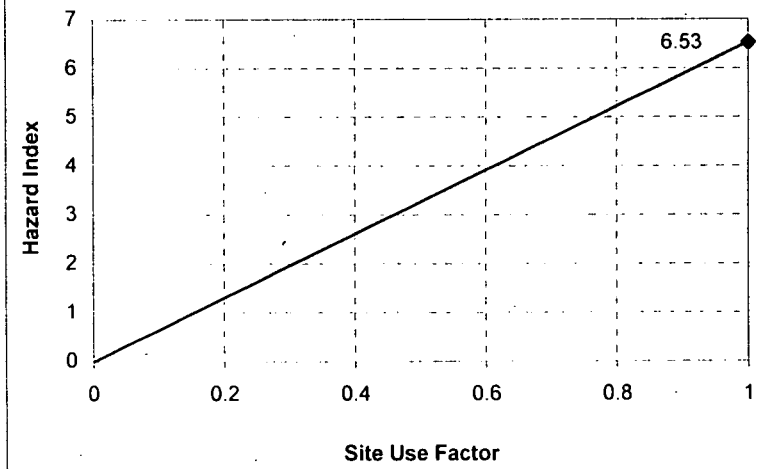
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



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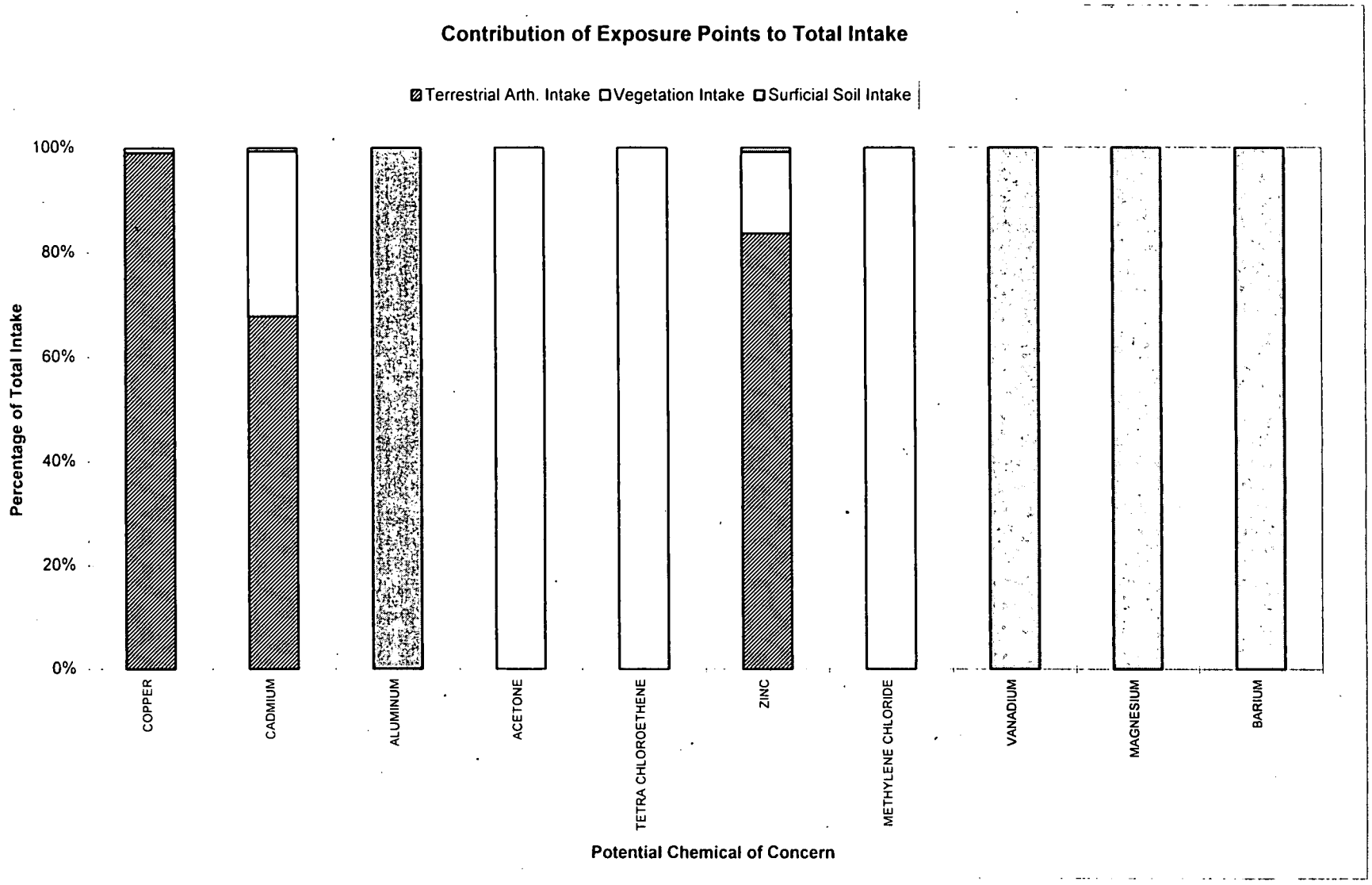


Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU2 East Trenches Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU2 EAST TRENCHES		EXPOSURE POINT												SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water						
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU2	IR = 0.051 SUF = 1		IR = 0.119 SUF = 1			IR = 0.004 SUF = 1		IR = 1 SUF = 1		IR = 1 SUF = 1					
COPPER		2676.866	136.520	10.430		1.241	13.080	0.052	NR	—	NR	—	137.814	43.327	3.18	48.74%
CADMIUM		11.134	0.568	2.217		0.264	1.400	0.006	NR	—	NR	—	0.837	0.479	1.75	26.77%
ALUMINUM		NR	—	NR		—	12216.913	48.868	NR	—	NR	—	48.868	80.009	0.61	9.36%
ACETONE		NR	—	NR	86.139	10.251	NR	—	NR	—	NR	—	10.251	26.167	0.39	6.00%
TETRA CHLOROETHENE		NR	—	NR	37.359	4.446	NR	—	NR	—	NR	—	4.446	16.300	0.27	4.18%
ZINC		426.000	21.726	33.840		4.027	54.004	0.216	NR	—	NR	—	25.969	418.663	0.06	0.95%
METHYLENE CHLORIDE		NR	—	NR	6.373	0.758	NR	—	NR	—	NR	—	0.758	15.307	0.05	0.76%
VANADIUM		NR	—	NR		—	27.790	0.111	NR	—	NR	—	0.111	2.313	0.05	0.74%
MAGNESIUM		NR	—	NR		—	2431.742	9.727	NR	—	NR	—	9.727	256.400	0.04	0.58%
BARIUM		NR	—	NR		—	128.840	0.515	NR	—	NR	—	0.515	14.217	0.04	0.56%
ARSENIC		NR	—	NR		—	5.496	0.022	NR	—	NR	—	0.022	0.682	0.03	0.49%
LEAD	X	ND	—	1.509		0.180	45.985	0.184	NR	—	NR	—	0.364	20.933	0.02	0.27%
SELENIUM		ND	—	ND		—	0.510	0.002	NR	—	NR	—	0.002	0.317	0.01	0.10%
TOTAL XYLENES		NR	—	NR	0.126	0.015	NR	—	NR	—	NR	—	0.015	2.396	0.01	0.10%
MANGANESE		NR	—	NR		—	310.494	1.242	NR	—	NR	—	1.242	230.264	0.01	0.08%
CHLOROFORM		NR	—	NR	1.310	0.156	NR	—	NR	—	NR	—	0.156	39.250	<0.01	0.06%
AROCLOR-1254	X	NR	—	NR	0.003	3.28E-04	ND	—	NR	—	NR	—	3.28E-04	0.142	<0.01	0.04%
COBALT		NR	—	NR		—	7.136	0.029	NR	—	NR	—	0.029	13.192	<0.01	0.03%
LITHIUM		NR	—	NR		—	13.267	0.053	NR	—	NR	—	0.053	24.571	<0.01	0.03%
TIN		NR	—	NR		—	34.188	0.137	NR	—	NR	—	0.137	65.961	<0.01	0.03%
TOLUENE		NR	—	NR	0.453	0.054	NR	—	NR	—	NR	—	0.054	30.220	<0.01	0.03%
BERYLLIUM		NR	—	NR		—	0.590	0.002	NR	—	NR	—	0.002	1.727	<0.01	0.02%
TRICHLOROETHENE		NR	—	NR	1.663	0.198	NR	—	NR	—	NR	—	0.198	171.044	<0.01	0.02%
SILVER		ND	—	0.520		0.062	1.200	0.005	NR	—	NR	—	0.067	58.626	<0.01	0.02%
BENZO(a)PYRENE	X	NR	—	NR	0.002	2.77E-04	0.120	4.80E-04	NR	—	NR	—	0.001	1.163	<0.01	0.01%
CHROMIUM	X	63.475	3.237	7.227		0.860	12.981	0.052	NR	—	NR	—	4.149	7161.754	<0.01	0.01%
1,2-DICHLOROETHENE		NR	—	NR	0.216	0.026	NR	—	NR	—	NR	—	0.026	52.625	<0.01	0.01%
NICKEL		NR	—	NR		—	11.629	0.047	NR	—	NR	—	0.047	104.666	<0.01	0.01%
4-METHYL-2-PENTANONE		NR	—	NR	0.191	0.023	NR	—	NR	—	NR	—	0.023	65.416	<0.01	0.01%
STRONTIUM		NR	—	NR		—	34.852	0.139	NR	—	NR	—	0.139	688.177	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.024	0.003	0.076	3.04E-04	NR	—	NR	—	0.003	21.321	<0.01	<0.01%
BENZENE		NR	—	NR	0.032	0.004	NR	—	NR	—	NR	—	0.004	30.662	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	—	NR	0.813	0.097	NR	—	NR	—	NR	—	0.097	1223.894	<0.01	<0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	0.001	1.34E-04	0.160	0.001	NR	—	NR	—	0.001	11.634	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.003	3.17E-04	0.062	2.48E-04	NR	—	NR	—	0.001	11.634	<0.01	<0.01%
2-BUTANONE		NR	—	NR	1.787	0.213	NR	—	NR	—	NR	—	0.213	4672.704	<0.01	<0.01%
1,1-DICHLOROETHENE		NR	—	NR	0.030	0.004	NR	—	NR	—	NR	—	0.004	79.154	<0.01	<0.01%
PYRENE	X	NR	—	NR	0.009	0.001	0.218	0.001	NR	—	NR	—	0.002	87.321	<0.01	<0.01%
FLUORENE		NR	—	NR	0.026	0.003	ND	—	NR	—	NR	—	0.003	145.535	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	0.007	0.001	0.229	0.001	NR	—	NR	—	0.002	145.535	<0.01	<0.01%
NAPHTHALENE		NR	—	NR	0.093	0.011	ND	—	NR	—	NR	—	0.011	1163.433	<0.01	<0.01%

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU2 East Trenches Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU2 EAST TRENCHES		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU2	IR = 0.051 SUF = 1		IR = 0.119 SUF = 1			IR = 0.004 SUF = 1		IR = I SUF = I		IR = I SUF = I					
CHRYSENE	X	NR	—	NR	0.004	4.61E-04	0.110	4.40E-04	NR	—	NR	—	0.001	116.343	<0.01	<0.01%
4,4'-DDT	X	NR	—	NR	1.15E-04	1.37E-05	ND	—	NR	—	NR	—	1.37E-05	2.094	<0.01	<0.01%
2-METHYLNAPHTHALENE		NR	—	NR	0.060	0.007	ND	—	NR	—	NR	—	0.007	1163.433	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	0.017	0.002	ND	—	NR	—	NR	—	0.002	329.807	<0.01	<0.01%
ACENAPHTHENE		NR	—	NR	0.027	0.003	ND	—	NR	—	NR	—	0.003	1163.433	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	0.024	0.003	0.091	3.64E-04	NR	—	NR	—	0.003	1163.433	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	2.38E-04	2.83E-05	ND	—	NR	—	NR	—	2.83E-05	11.634	<0.01	<0.01%
ANTHRACENE		NR	—	NR	0.018	0.002	ND	—	NR	—	NR	—	0.002	1164.277	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	0.001	6.31E-05	ND	—	NR	—	NR	—	6.31E-05	116.343	<0.01	<0.01%

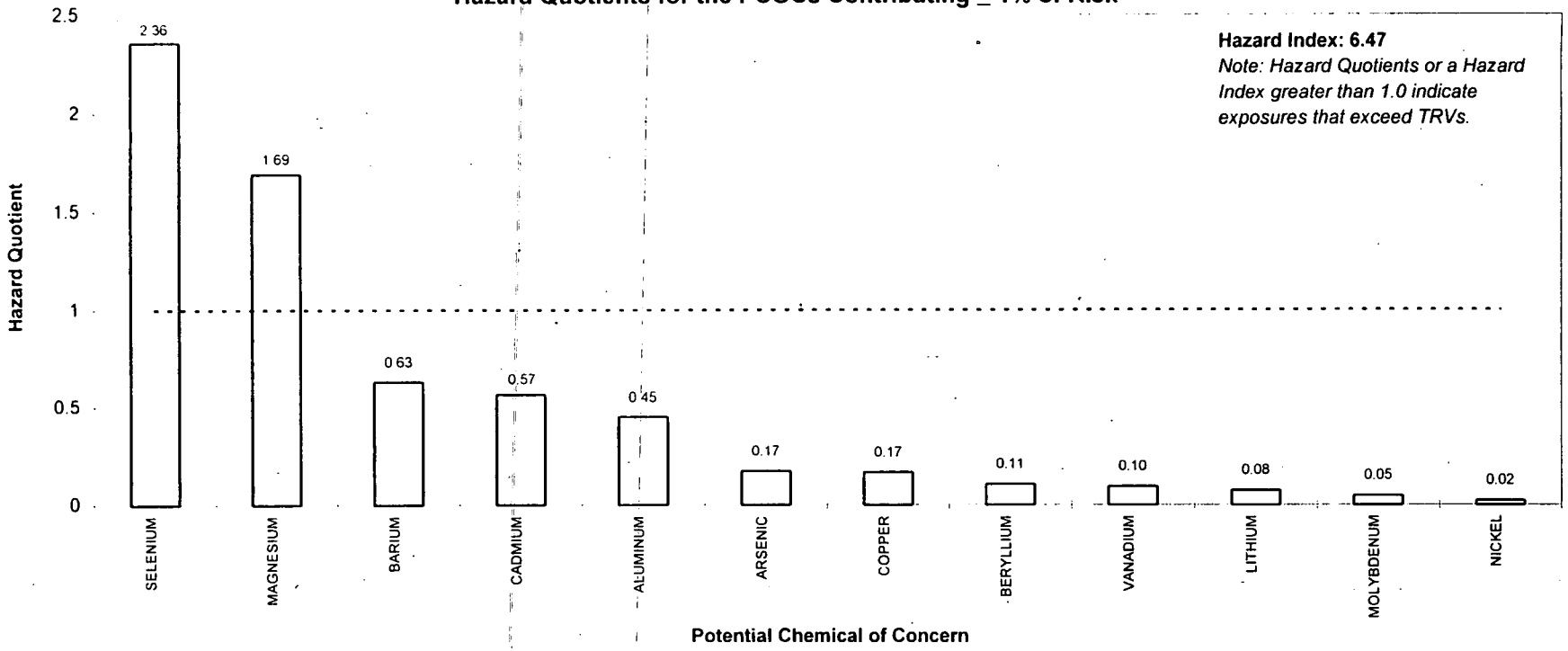
HAZARD INDEX 6.53

Notes:

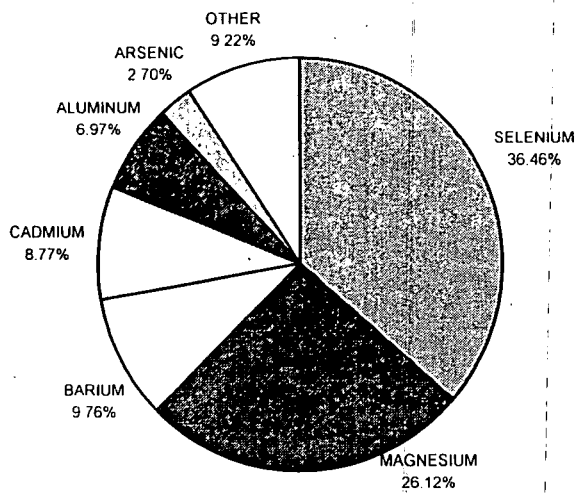
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{ow} = No octonol-water partition coefficient available; LOG K_{ow}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU7 Downgradient Areas Source Area at RFETS

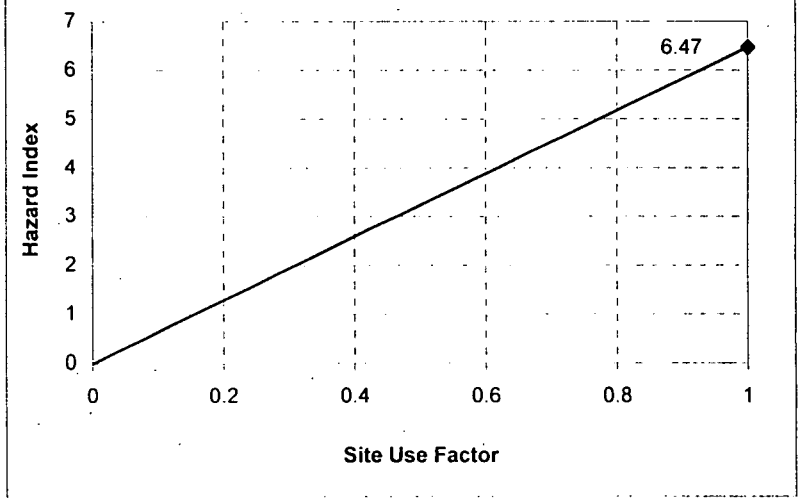
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



% Contributions of PCOCs to Total Risk

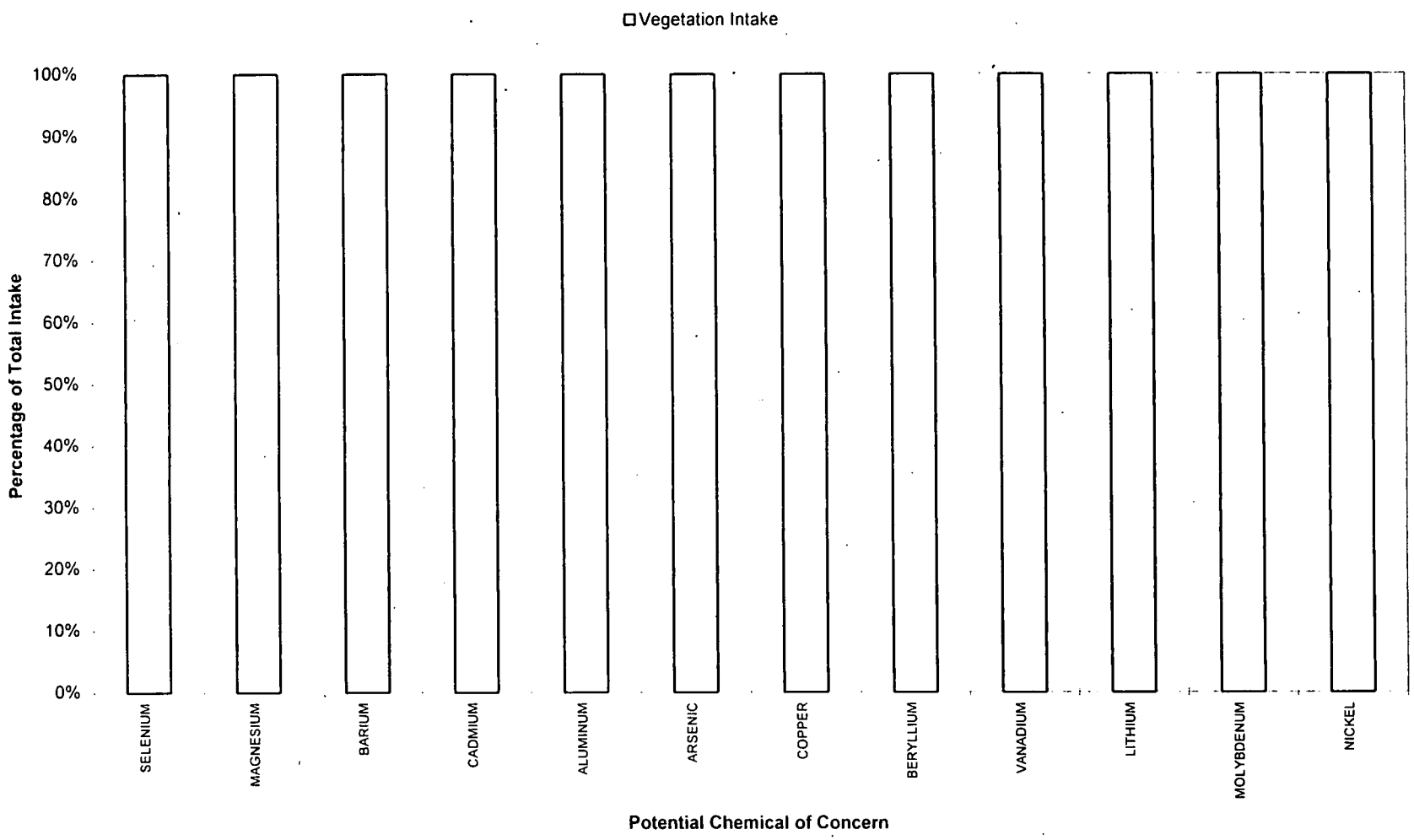


Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU7 Downgradient Areas Source Area at RFETS

Contribution of Exposure Points to Total Intake



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU7 Downgradient Areas Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU7 DOWNGRADIENT AREAS		EXPOSURE POINT												SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water						
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake		Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU7	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.004 SUF = 1		IR = I SUF = I		IR = I SUF = I						
SELENIUM	X	NR	—	4.398		0.748	NR	—	0.651	—	0.007	—		0.748	0.317	2.36	36.46%
MAGNESIUM	X	NR	—	2549.843		433.473	NR	—	3336.582	—	25.696	—		433.473	256.400	1.69	26.12%
BARIUM	X	NR	—	52.799		8.976	NR	—	221.492	—	0.189	—		8.976	14.217	0.63	9.76%
CADMIUM		NR	—	1.600		0.272	NR	—	0.847	—	0.002	—		0.272	0.479	0.57	8.77%
ALUMINUM	X	NR	—	212.406		36.109	NR	—	18053.262	—	0.403	—		36.109	80.009	0.45	6.97%
ARSENIC	X	NR	—	0.700		0.119	NR	—	5.797	—	0.003	—		0.119	0.682	0.17	2.70%
COPPER	X	NR	—	42.778		7.272	NR	—	23.106	—	0.009	—		7.272	43.327	0.17	2.59%
BERYLLIUM	X	NR	—	1.100		0.187	NR	—	1.946	—	ND	—		0.187	1.727	0.11	1.67%
VANADIUM	X	NR	—	1.300		0.221	NR	—	47.764	—	0.007	—		0.221	2.313	0.10	1.48%
LITHIUM	X	NR	—	10.900		1.853	NR	—	11.200	—	0.020	—		1.853	24.571	0.08	1.17%
MOLYBDENUM	X	NR	—	3.500		0.595	NR	—	4.847	—	0.004	—		0.595	12.061	0.05	0.76%
NICKEL	X	NR	—	14.300		2.431	NR	—	15.790	—	0.010	—		2.431	104.666	0.02	0.36%
STRONTIUM	X	NR	—	91.649		15.580	NR	—	59.419	—	0.774	—		15.580	688.177	0.02	0.35%
MANGANESE	X	NR	—	18.571		3.157	NR	—	315.883	—	0.084	—		3.157	230.264	0.01	0.21%
ZINC	X	NR	—	32.779		5.573	NR	—	73.434	—	0.055	—		5.573	418.663	0.01	0.21%
LEAD	X	NR	—	1.532		0.260	NR	—	24.909	—	0.009	—		0.260	20.933	0.01	0.19%
TIN	X	NR	—	3.200		0.544	NR	—	17.600	—	0.030	—		0.544	65.961	0.01	0.13%
TOLUENE	X	NR	—	NR	0.862	0.147	NR	—	0.120	—	0.008	—		0.147	30.220	<0.01	0.08%
NITRATE/NITRITE	X	NR	—	NR		—	10.779	0.043	4.062	—	1.056	—		0.043	34.669	<0.01	0.02%
4-METHYL-2-PENTANONE		NR	—	NR	0.131	0.022	NR	—	ND	—	ND	—		0.022	65.416	<0.01	0.01%
CHROMIUM	X	NR	—	7.413		1.260	NR	—	13.993	—	ND	—		1.260	7161.754	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.014	0.002	NR	—	0.190	—	0.002	—		0.002	21.321	<0.01	<0.01%
TOTAL XYLENES		NR	—	NR	0.001	1.86E-04	NR	—	ND	—	0.004	—		1.86E-04	2.396	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	—	NR	0.020	0.003	NR	—	ND	—	ND	—		0.003	93.349	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.001	1.23E-04	NR	—	0.293	—	ND	—		1.23E-04	11.634	<0.01	<0.01%
PYRENE	X	NR	—	NR	0.005	0.001	NR	—	0.435	—	ND	—		0.001	87.321	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	0.004	0.001	NR	—	0.451	—	ND	—		0.001	145.535	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	0.001	1.62E-04	NR	—	0.314	—	ND	—		1.62E-04	116.343	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	0.009	0.002	NR	—	0.310	—	ND	—		0.002	1163.433	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	—	NR	0.003	4.92E-04	NR	—	ND	—	ND	—		4.92E-04	1223.894	<0.01	<0.01%

HAZARD INDEX 6.47

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
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OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
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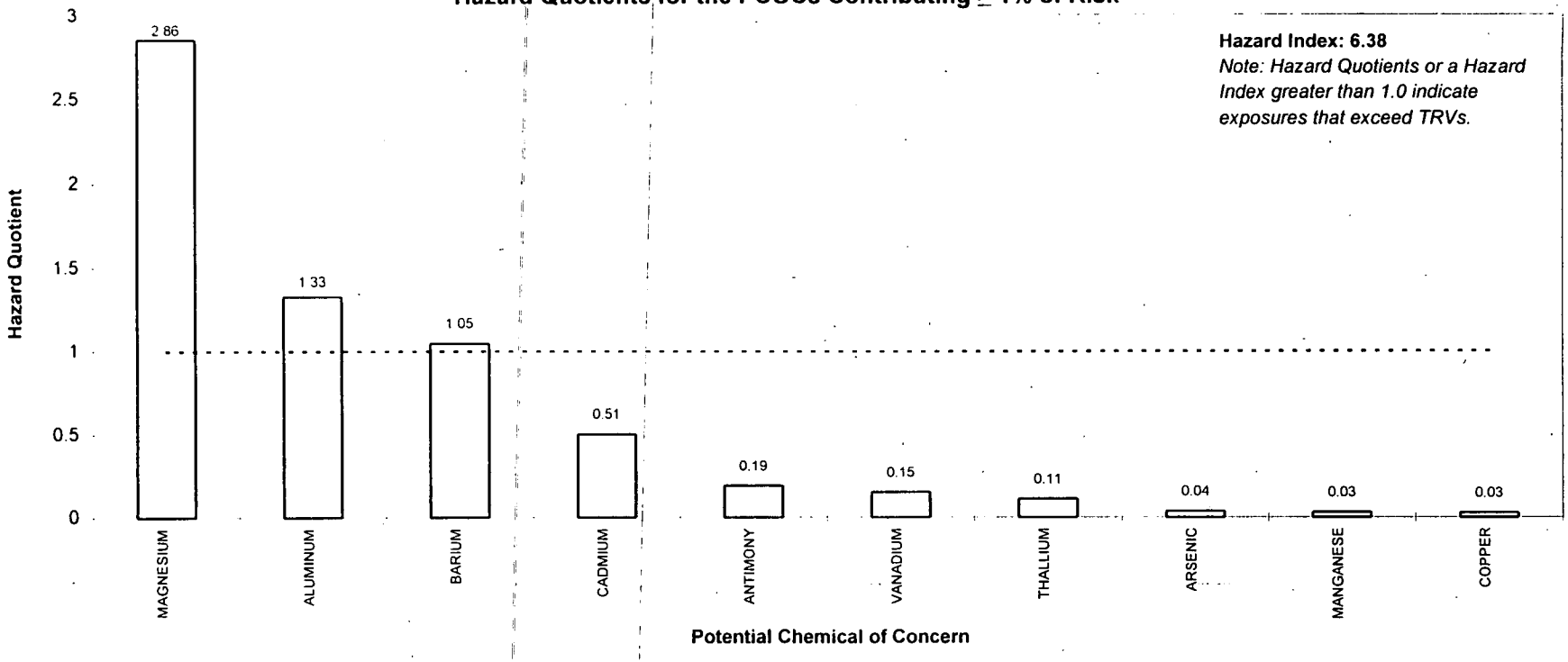
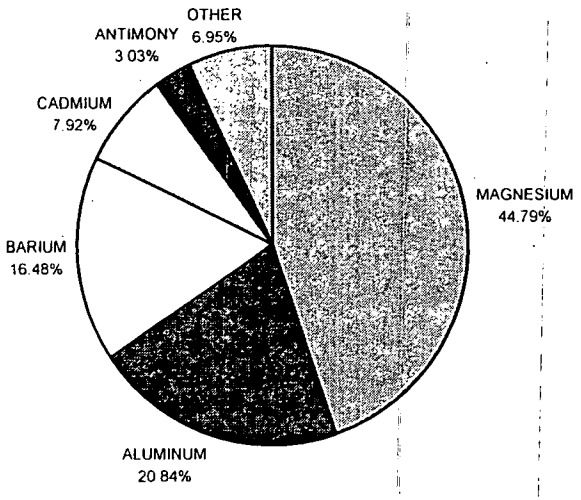
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 North Spray Field Source Area at RFETS

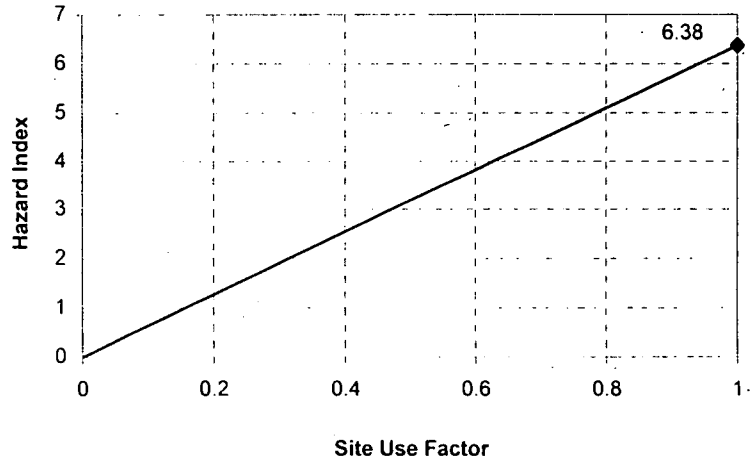
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



% Contributions of PCOCs to Total Risk

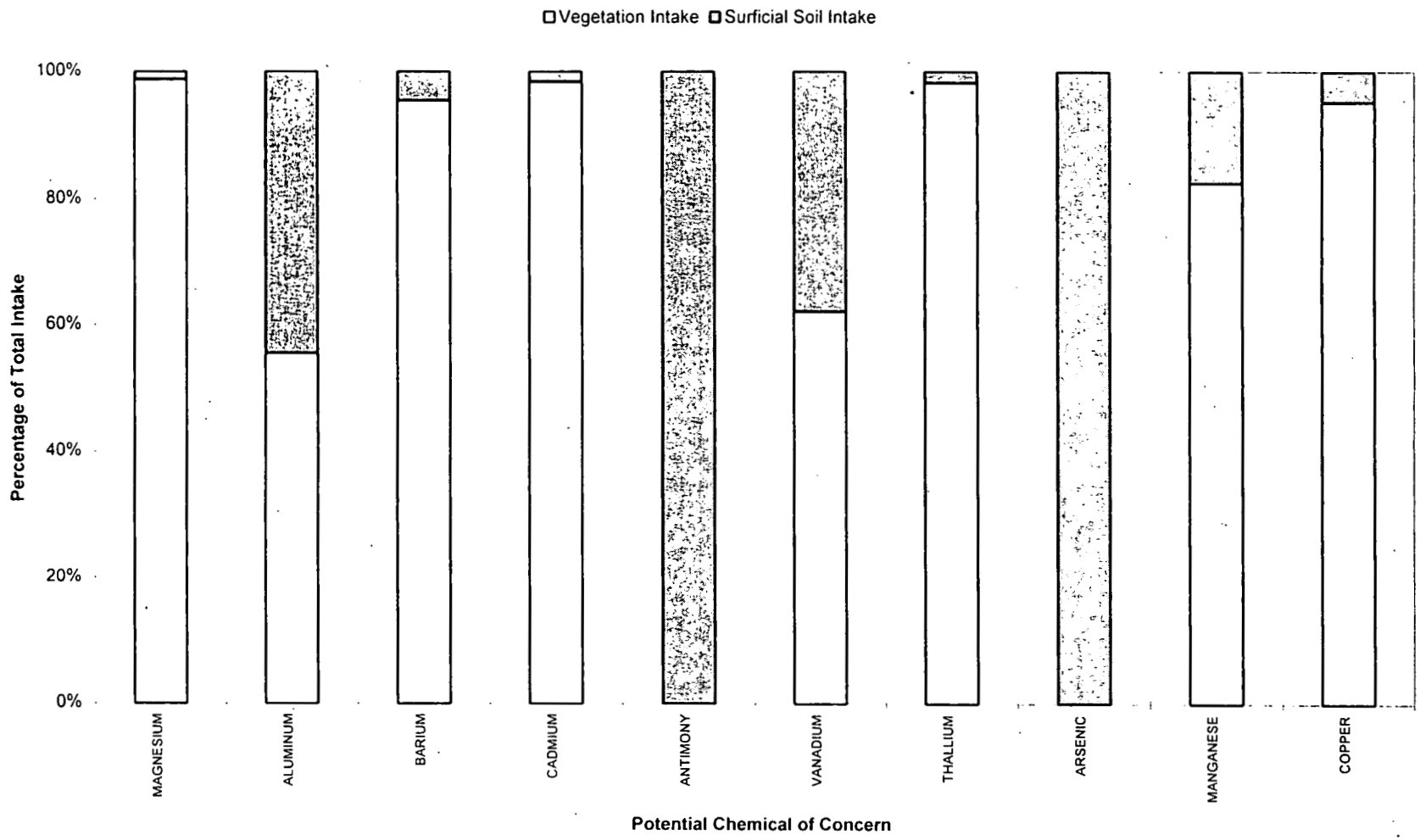


Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 North Spray Field Source Area at RFETS

Contribution of Exposure Points to Total Intake



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 North Spray Field Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 NORTH SPRAY FIELD		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.004 SUF = 1		IR = I SUF = I		IR = I SUF = I					
MAGNESIUM	X	NR	—	4253.480		723.092	2397.398	9.590	NR	—	NR	—	732.681	256.400	2.86	44.79%
ALUMINUM		NR	—	347.535		59.081	11820.163	47.281	NR	—	NR	—	106.362	80.009	1.33	20.84%
BARIUM	X	NR	—	83.888		14.261	170.910	0.684	NR	—	NR	—	14.945	14.217	1.05	16.48%
CADMIUM		NR	—	1.400		0.238	0.990	0.004	NR	—	NR	—	0.242	0.479	0.51	7.92%
ANTIMONY	X	NR	—	ND		—	16.765	0.067	NR	—	NR	—	0.067	0.346	0.19	3.03%
VANADIUM	X	NR	—	1.300		0.221	33.599	0.134	NR	—	NR	—	0.355	2.313	0.15	2.41%
THALLIUM		NR	—	0.450		0.077	0.340	0.001	NR	—	NR	—	0.078	0.697	0.11	1.75%
ARSENIC	X	NR	—	ND		—	6.579	0.026	NR	—	NR	—	0.026	0.682	0.04	0.60%
MANGANESE	X	NR	—	35.254		5.993	315.526	1.262	NR	—	NR	—	7.255	230.264	0.03	0.49%
COPPER	X	NR	—	6.541		1.112	13.985	0.056	NR	—	NR	—	1.168	43.327	0.03	0.42%
LEAD	X	NR	—	1.764		0.300	40.050	0.160	NR	—	NR	—	0.460	20.933	0.02	0.34%
STRONTIUM	X	NR	—	76.343		12.978	31.283	0.125	NR	—	NR	—	13.104	688.177	0.02	0.30%
MERCURY	X	NR	—	ND		—	0.066	2.65E-04	NR	—	NR	—	2.65E-04	0.017	0.02	0.24%
ZINC	X	NR	—	21.241		3.611	48.942	0.196	NR	—	NR	—	3.807	418.663	0.01	0.14%
SELENIUM		NR	—	ND		—	0.574	0.002	NR	—	NR	—	0.002	0.317	0.01	0.10%
NICKEL	X	NR	—	1.700		0.289	15.387	0.062	NR	—	NR	—	0.351	104.666	<0.01	0.05%
COBALT	X	NR	—	ND		—	9.750	0.039	NR	—	NR	—	0.039	13.192	<0.01	0.05%
BERYLLIUM		NR	—	ND		—	0.686	0.003	NR	—	NR	—	0.003	1.727	<0.01	0.03%
LITHIUM		NR	—	ND		—	6.643	0.027	NR	—	NR	—	0.027	24.571	<0.01	0.02%
NITRATE/NITRITE		NR	—	NR		—	1.000	0.004	NR	—	NR	—	0.004	34.669	<0.01	<0.01%
TOLUENE	X	NR	—	NR	0.003	0.001	NR	—	NR	—	NR	—	0.001	30.220	<0.01	<0.01%
CHROMIUM	X	NR	—	ND		—	13.137	0.053	NR	—	NR	—	0.053	7161.754	<0.01	<0.01%

HAZARD INDEX 6.38

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
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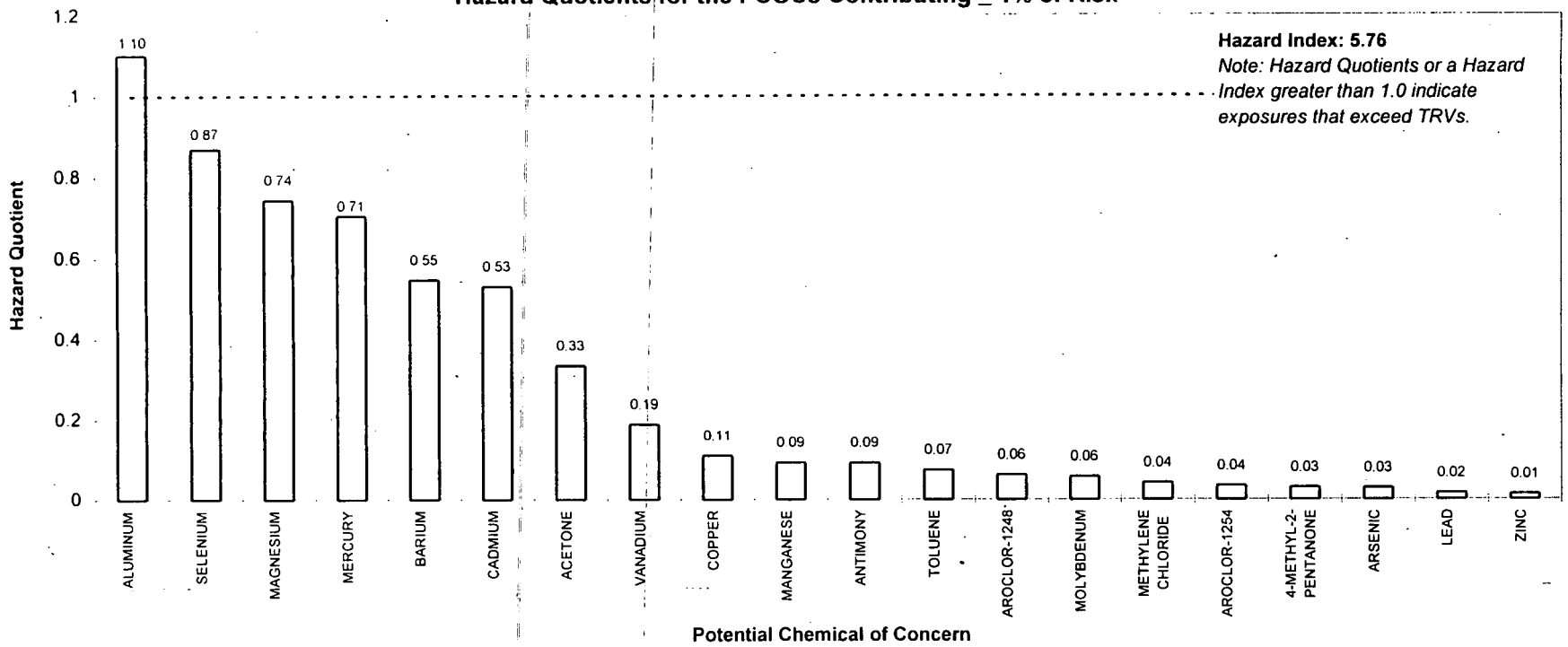
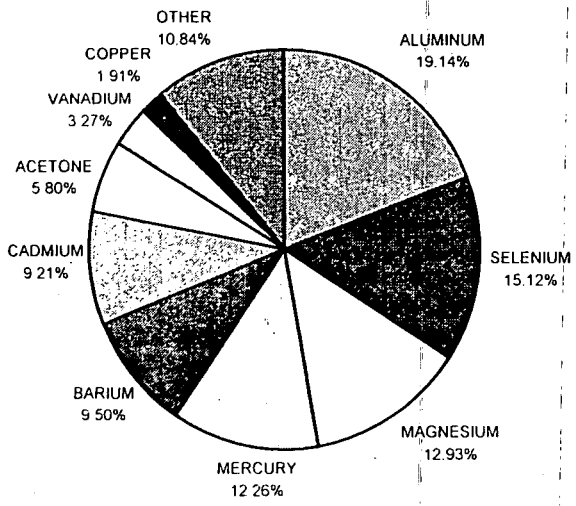
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU2 903 Pad Source Area at RFETS

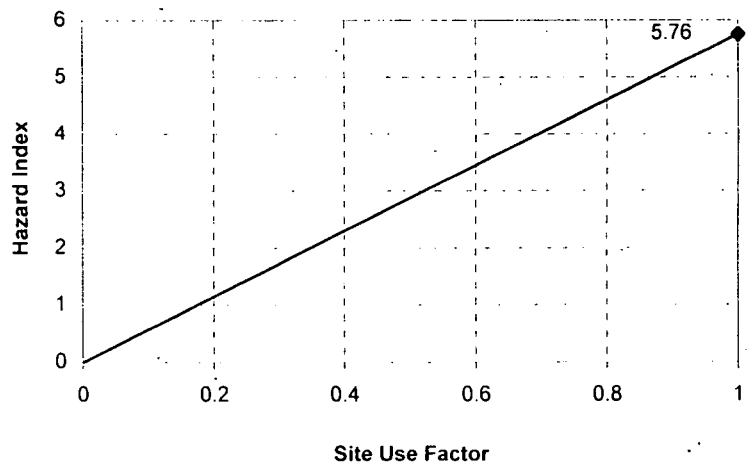
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



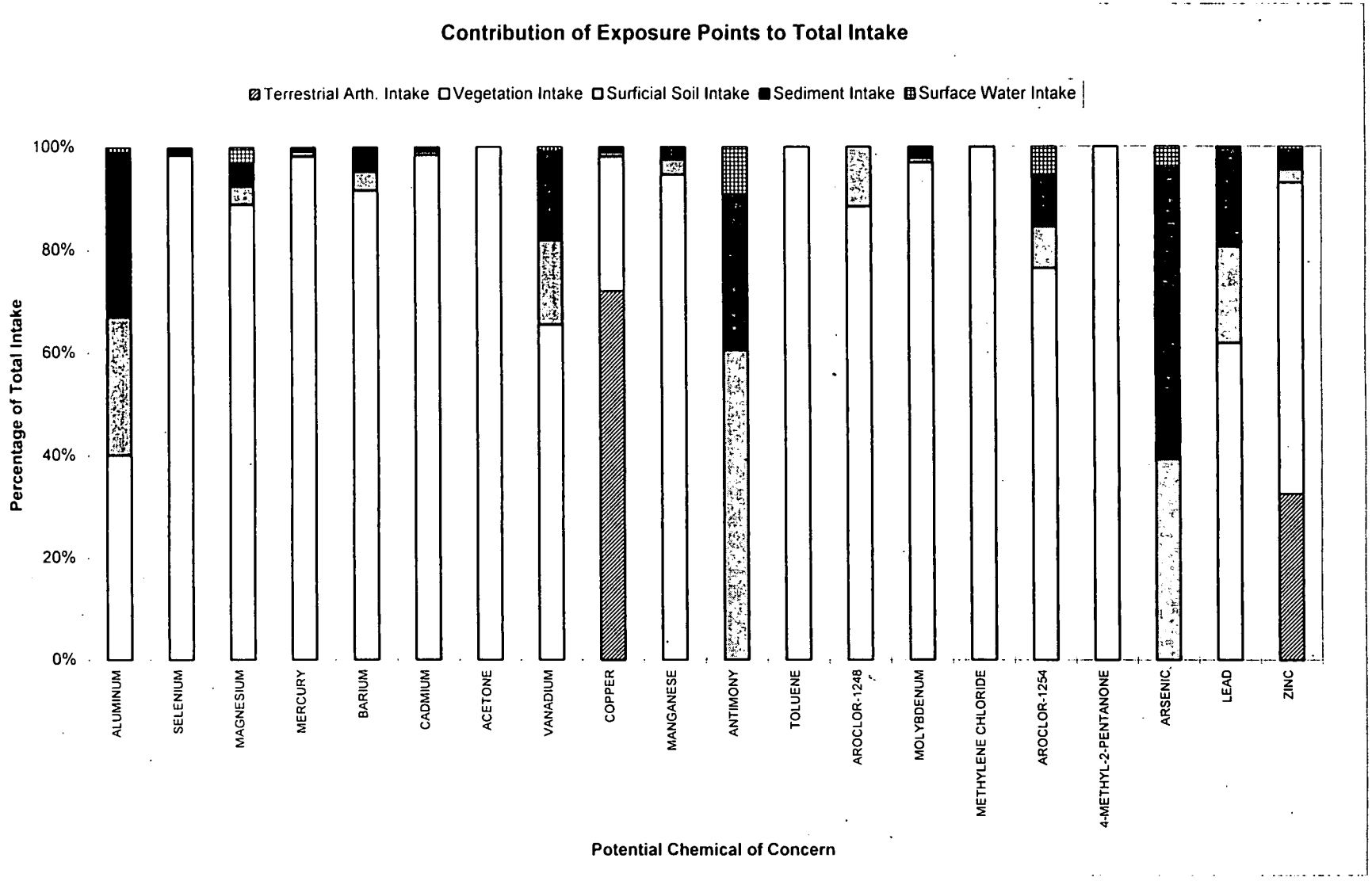
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU2 903 Pad Source Area at RFETS



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU2 903 Pad Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU2 903 PAD		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte[1]	PCOC for OU2	IR = 0.051 SUF = 1		IR = 0.119 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
ALUMINUM		NR	—	297.170		35.363	11886.180	23.772	14104.468	28.209	5.480	0.822	88.166	80.009	1.10	19.14%
SELENIUM		ND	—	2.288		0.272	0.620	0.001	0.880	0.002	0.008	0.001	0.276	0.317	0.87	15.12%
MAGNESIUM		NR	—	1426.036		169.698	3426.354	6.853	4179.821	8.360	39.934	5.990	190.901	256.400	0.74	12.93%
MERCURY		ND	—	0.098		0.012	0.060	1.20E-04	0.040	8.00E-05	1.14E-04	1.71E-05	0.012	0.017	0.71	12.26%
BARIUM		NR	—	59.791		7.115	143.681	0.287	164.776	0.330	0.261	0.039	7.771	14.217	0.55	9.50%
CADMIUM		ND	—	2.100		0.250	0.920	0.002	0.950	0.002	0.002	3.45E-04	0.254	0.479	0.53	9.21%
ACETONE		NR	—	NR	73.447	8.740	NR	—	0.066	1.32E-04	0.013	0.002	8.742	26.167	0.33	5.80%
VANADIUM		NR	—	2.400		0.286	35.681	0.071	37.422	0.075	0.026	0.004	0.436	2.313	0.19	3.27%
COPPER		67.300	3.432	10.420		1.240	21.815	0.044	23.031	0.046	0.024	0.004	4.766	43.327	0.11	1.91%
MANGANESE		NR	—	169.997		20.230	318.236	0.636	236.041	0.472	0.312	0.047	21.385	230.264	0.09	1.61%
ANTIMONY		NR	—	ND		—	9.800	0.020	4.900	0.010	0.020	0.003	0.032	0.346	0.09	1.61%
TOLUENE		NR	—	NR	18.926	2.252	NR	—	0.002	4.00E-06	ND	—	2.252	30.220	0.07	1.29%
AROCLOR-1248		NR	—	NR	0.027	0.003	0.211	4.22E-04	ND	—	ND	—	0.004	0.064	0.06	1.09%
MOLYBDENUM		NR	—	5.700		0.678	3.000	0.006	6.700	0.013	0.016	0.002	0.700	12.061	0.06	1.01%
METHYLENE CHLORIDE		NR	—	NR	5.553	0.661	NR	—	0.009	1.82E-05	0.004	0.001	0.661	15.307	0.04	0.75%
AROCLOR-1254	X	NR	—	NR	0.033	0.004	0.208	4.17E-04	0.260	0.001	0.002	2.82E-04	0.005	0.142	0.04	0.61%
4-METHYL-2-PENTANONE		NR	—	NR	16.929	2.015	NR	—	0.003	6.00E-06	ND	—	2.015	65.416	0.03	0.54%
ARSENIC		NR	—	ND		—	3.998	0.008	5.742	0.011	0.006	0.001	0.020	0.682	0.03	0.51%
LEAD	X	ND	—	1.789		0.213	32.367	0.065	32.749	0.065	0.007	0.001	0.344	20.933	0.02	0.29%
ZINC		36.600	1.867	29.152		3.469	72.699	0.145	109.953	0.220	0.227	0.034	5.735	418.663	0.01	0.24%
CHLOROFORM		NR	—	NR	3.995	0.475	NR	—	ND	—	0.011	0.002	0.477	39.250	0.01	0.21%
COBALT		NR	—	0.830		0.099	7.671	0.015	9.088	0.018	0.011	0.002	0.134	13.192	0.01	0.18%
STRONTIUM		NR	—	46.852		5.575	43.040	0.086	97.592	0.195	1.028	0.154	6.011	688.177	0.01	0.15%
TIN		NR	—	3.500		0.417	33.323	0.067	18.800	0.038	0.053	0.008	0.529	65.961	0.01	0.14%
LITHIUM		NR	—	1.100		0.131	13.592	0.027	12.183	0.024	0.071	0.011	0.193	24.571	0.01	0.14%
NICKEL		NR	—	4.400		0.524	26.987	0.054	17.615	0.035	0.014	0.002	0.615	104.666	0.01	0.10%
THALLIUM		NR	—	ND		—	0.430	0.001	1.000	0.002	ND	—	0.003	0.697	<0.01	0.07%
NITRATE/NITRITE		NR	—	NR		—	3.106	0.006	4.124	0.008	0.793	0.119	0.133	34.669	<0.01	0.07%
SILVER		ND	—	1.300		0.155	ND	—	1.700	0.003	0.005	0.001	0.159	58.626	<0.01	0.05%
TOTAL XYLENES		NR	—	NR	0.049	0.006	NR	—	ND	—	ND	—	0.006	2.396	<0.01	0.04%
BERYLLIUM		NR	—	ND		—	1.200	0.002	0.903	0.002	0.001	1.89E-04	0.004	1.727	<0.01	0.04%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.358	0.043	0.248	4.97E-04	0.540	0.001	ND	—	0.044	21.321	<0.01	0.04%
CHROMIUM	X	131.000	6.681	5.509		0.656	26.789	0.054	14.581	0.029	0.011	0.002	7.421	7161.754	<0.01	0.02%
BENZO(a)PYRENE	X	NR	—	NR	0.005	0.001	0.320	0.001	0.110	2.20E-04	ND	—	0.001	1.163	<0.01	0.01%
TRICHLOROETHENE		NR	—	NR	0.937	0.111	NR	—	ND	—	0.012	0.002	0.113	171.044	<0.01	0.01%
PYRENE	X	NR	—	NR	0.339	0.040	0.644	0.001	0.260	0.001	ND	—	0.042	87.321	<0.01	0.01%
TETRACHLOROETHENE		NR	—	NR	0.035	0.004	NR	—	ND	—	0.006	0.001	0.005	16.300	<0.01	0.01%
FLUORANTHENE	X	NR	—	NR	0.284	0.034	0.689	0.001	0.230	4.60E-04	ND	—	0.036	145.535	<0.01	<0.01%
DIBENZO(a,h)ANTHRACENE		NR	—	NR	ND	—	0.092	1.84E-04	ND	—	ND	—	1.84E-04	1.163	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.004	4.48E-04	0.334	0.001	0.110	2.20E-04	ND	—	0.001	11.634	<0.01	<0.01%

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU2 903 Pad Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU2 903 PAD		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte[1]	PCOC for OU2	IR = 0.051 SUF = 1		IR = 0.119 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
BENZO(b)FLUORANTHENE	X	NR	—	NR	0.001	1.69E-04	0.337	0.001	0.120	2.40E-04	ND	—	0.001	11.634	<0.01	<0.01%
BENZO(k)FLUORANTHENE	X	NR	—	NR	ND	—	0.311	0.001	0.110	2.20E-04	ND	—	0.001	11.634	<0.01	<0.01%
1,2-DICHLOROETHENE		NR	—	NR	0.022	0.003	NR	—	ND	—	0.011	0.002	0.004	52.625	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	0.716	0.085	0.556	0.001	0.190	3.80E-04	ND	—	0.087	1163.433	<0.01	<0.01%
2-BUTANONE		NR	—	NR	2.668	0.317	NR	—	0.011	2.26E-05	ND	—	0.317	4672.704	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	—	NR	0.035	0.004	ND	—	ND	—	ND	—	0.004	93.349	<0.01	<0.01%
BENZYL ALCOHOL		NR	—	NR	ND	—	ND	—	ND	—	0.004	0.001	0.001	27.308	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	ND	—	0.188	3.76E-04	ND	—	ND	—	3.76E-04	11.634	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	0.061	0.007	0.353	0.001	0.065	1.30E-04	0.002	3.00E-04	0.008	329.807	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	0.007	0.001	0.341	0.001	0.140	2.80E-04	ND	—	0.002	116.343	<0.01	<0.01%
1,1-DICHLOROETHENE		NR	—	NR	0.010	0.001	NR	—	ND	—	ND	—	0.001	79.154	<0.01	<0.01%
gamma-BHC (LINDANE)		NR	—	NR	ND	—	ND	—	0.004	8.80E-06	ND	—	8.80E-06	0.871	<0.01	<0.01%
4,4'-DDT	X	NR	—	NR	ND	—	ND	—	0.006	1.10E-05	ND	—	1.10E-05	2.094	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	ND	—	0.191	3.82E-04	ND	—	ND	—	3.82E-04	116.343	<0.01	<0.01%
FLUORENE		NR	—	NR	ND	—	0.190	3.80E-04	ND	—	ND	—	3.80E-04	145.535	<0.01	<0.01%
ACENAPHTHENE		NR	—	NR	0.010	0.001	0.186	3.72E-04	ND	—	ND	—	0.002	1163.433	<0.01	<0.01%
ANTHRACENE		NR	—	NR	0.009	0.001	0.201	4.01E-04	ND	—	ND	—	0.002	1164.277	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	—	NR	0.014	0.002	NR	—	ND	—	ND	—	0.002	1223.894	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	—	NR	1.40E-05	1.67E-06	ND	—	0.210	4.20E-04	ND	—	4.22E-04	1217.647	<0.01	<0.01%

[1] Chromium concentration in terrestrial arthropods is estimated from tissue:soil ratios in the East Trenches source area.

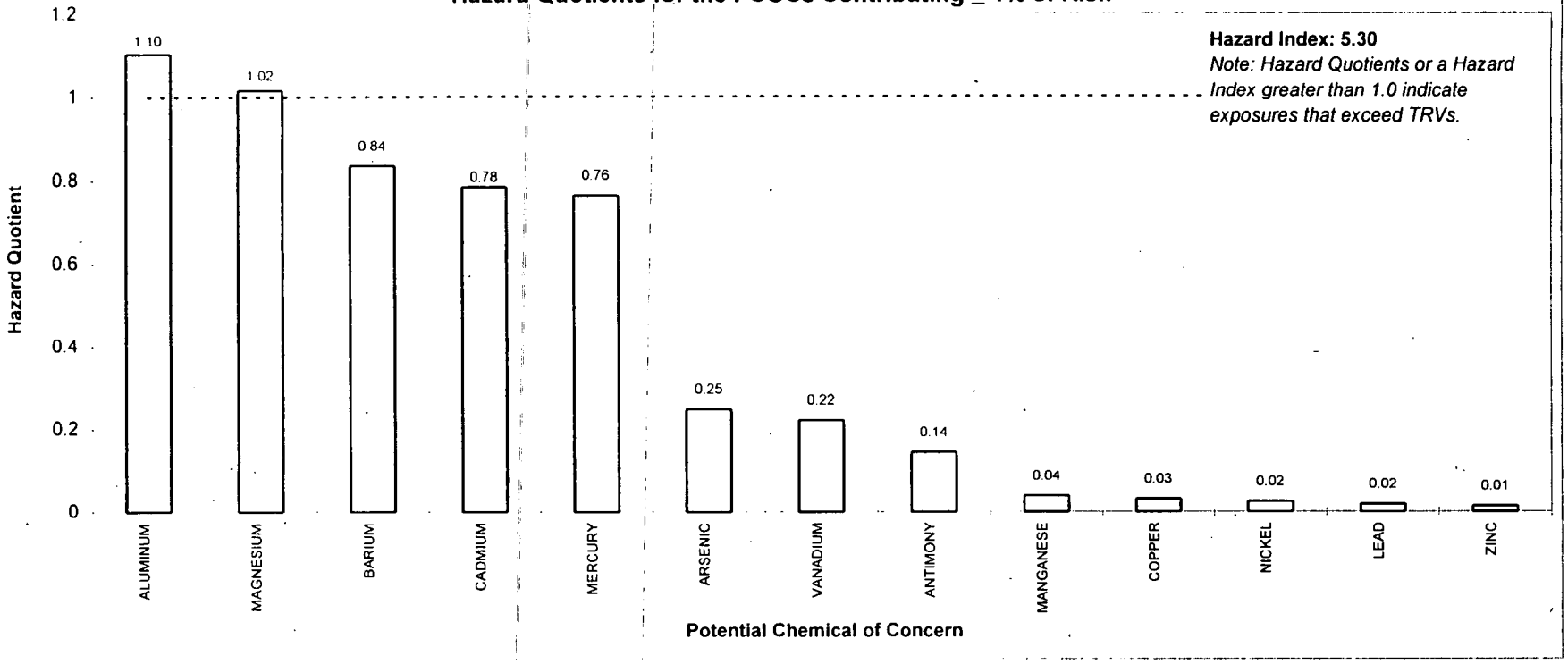
HAZARD INDEX 5.76

Notes:

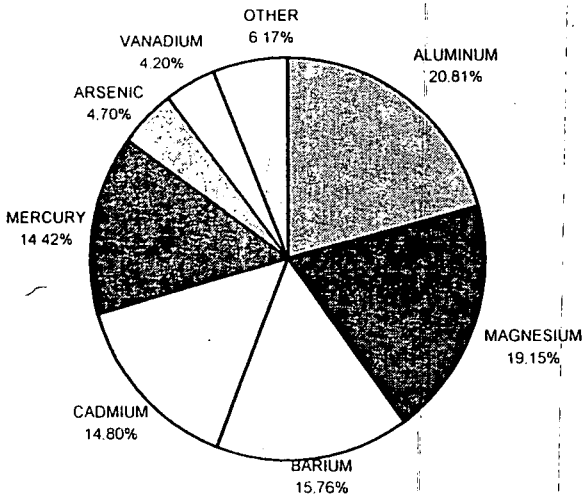
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog).
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU5 Ash Pits Source Area at RFETS

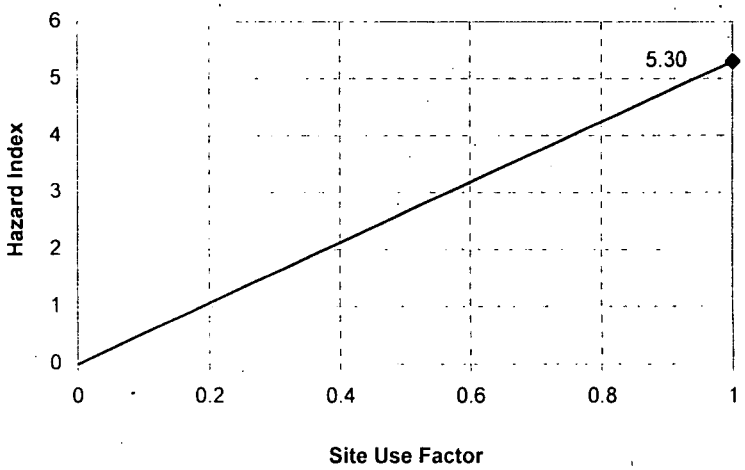
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



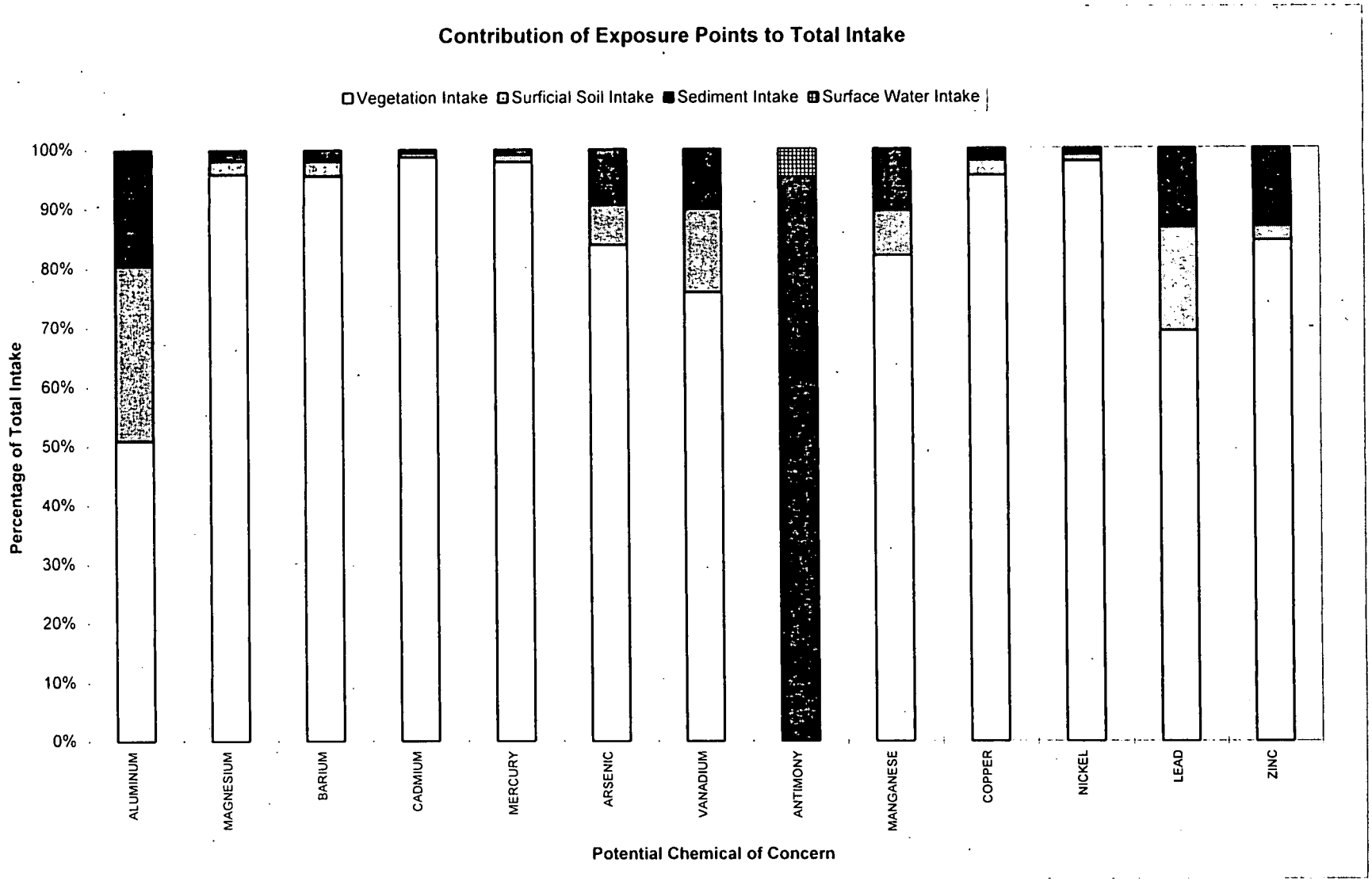
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU5 Ash Pits Source Area at RFETS



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU5 Ash Pits Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU5 ASH PITS		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU5	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
ALUMINUM		NR	—	264.435		44.954	13038.844	26.078	8571.142	17.142	0.855	0.128	88.302	80.009	1.10	20.81%
MAGNESIUM		NR	—	1466.885		249.370	2929.961	5.860	2095.530	4.191	6.862	1.029	260.451	256.400	1.02	19.15%
BARIUM	X	NR	—	66.746		11.347	143.888	0.288	117.818	0.236	0.071	0.011	11.881	14.217	0.84	15.76%
CADMIUM		NR	—	2.179		0.370	1.349	0.003	1.197	0.002	0.001	1.50E-04	0.376	0.479	0.78	14.80%
MERCURY	X	NR	—	0.073		0.012	0.078	1.55E-04	0.056	1.12E-04	1.10E-04	1.65E-05	0.013	0.017	0.76	14.42%
ARSENIC		NR	—	0.840		0.143	5.715	0.011	7.845	0.016	0.002	3.13E-04	0.170	0.682	0.25	4.70%
VANADIUM		NR	—	2.300		0.391	36.213	0.072	25.339	0.051	0.009	0.001	0.515	2.313	0.22	4.20%
ANTIMONY	X	NR	—	ND		—	ND	—	23.639	0.047	0.015	0.002	0.050	0.346	0.14	2.72%
MANGANESE		NR	—	42.730		7.264	337.520	0.675	445.908	0.892	0.148	0.022	8.853	230.264	0.04	0.72%
COPPER	X	NR	—	7.604		1.293	16.938	0.034	13.145	0.026	0.006	0.001	1.354	43.327	0.03	0.59%
NICKEL		NR	—	14.803		2.517	13.578	0.027	14.020	0.028	0.009	0.001	2.573	104.666	0.02	0.46%
LEAD	X	NR	—	1.581		0.269	33.783	0.068	25.470	0.051	0.004	0.001	0.388	20.933	0.02	0.35%
ZINC	X	NR	—	29.216		4.967	69.631	0.139	383.943	0.768	0.018	0.003	5.877	418.663	0.01	0.26%
SELENIUM		NR	—	ND		—	0.410	0.001	1.572	0.003	0.001	1.65E-04	0.004	0.317	0.01	0.24%
STRONTIUM	X	NR	—	45.069		7.662	38.768	0.078	56.300	0.113	0.247	0.037	7.889	688.177	0.01	0.22%
BERYLLIUM		NR	—	0.084		0.014	0.940	0.002	0.969	0.002	0.001	2.05E-04	0.018	1.727	0.01	0.20%
TIN		NR	—	3.200		0.544	16.661	0.033	9.207	0.018	0.019	0.003	0.599	65.961	0.01	0.17%
SILVER	X	NR	—	0.970		0.165	1.807	0.004	2.400	0.005	0.003	4.83E-04	0.174	58.626	<0.01	0.06%
COBALT	X	NR	—	ND		—	8.402	0.017	6.823	0.014	0.007	0.001	0.032	13.192	<0.01	0.05%
THALLIUM		NR	—	ND		—	0.520	0.001	0.280	0.001	ND	—	0.002	0.697	<0.01	0.05%
LITHIUM	X	NR	—	ND		—	10.380	0.021	6.612	0.013	0.009	0.001	0.035	24.571	<0.01	0.03%
NITRATE/NITRITE		NR	—	NR		—	NR	—	16.528	0.033	0.088	0.013	0.046	34.669	<0.01	0.03%
MOLYBDENUM		NR	—	ND		—	0.928	0.002	3.529	0.007	0.020	0.003	0.012	12.061	<0.01	0.02%
ACETONE		NR	—	NR	NR	—	NR	—	1.165	0.002	0.009	0.001	0.004	26.167	<0.01	<0.01%
CHROMIUM		NR	—	1.900		0.323	15.956	0.032	10.564	0.021	0.004	0.001	0.377	7161.754	<0.01	<0.01%
METHYLENE CHLORIDE	X	NR	—	NR	NR	—	NR	—	0.012	2.42E-05	0.005	0.001	0.001	15.307	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	NR	—	NR	—	0.410	0.001	0.001	1.50E-04	0.001	21.321	<0.01	<0.01%
1,2-DICHLOROETHANE		NR	—	NR	NR	—	NR	—	ND	—	0.003	4.61E-04	4.61E-04	61.195	<0.01	<0.01%
CHLOROFORM		NR	—	NR	NR	—	NR	—	0.003	6.00E-06	ND	—	6.00E-06	39.250	<0.01	<0.01%
2-BUTANONE		NR	—	NR	NR	—	NR	—	0.305	0.001	ND	—	0.001	4672.704	<0.01	<0.01%

HAZARD INDEX 5.30

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
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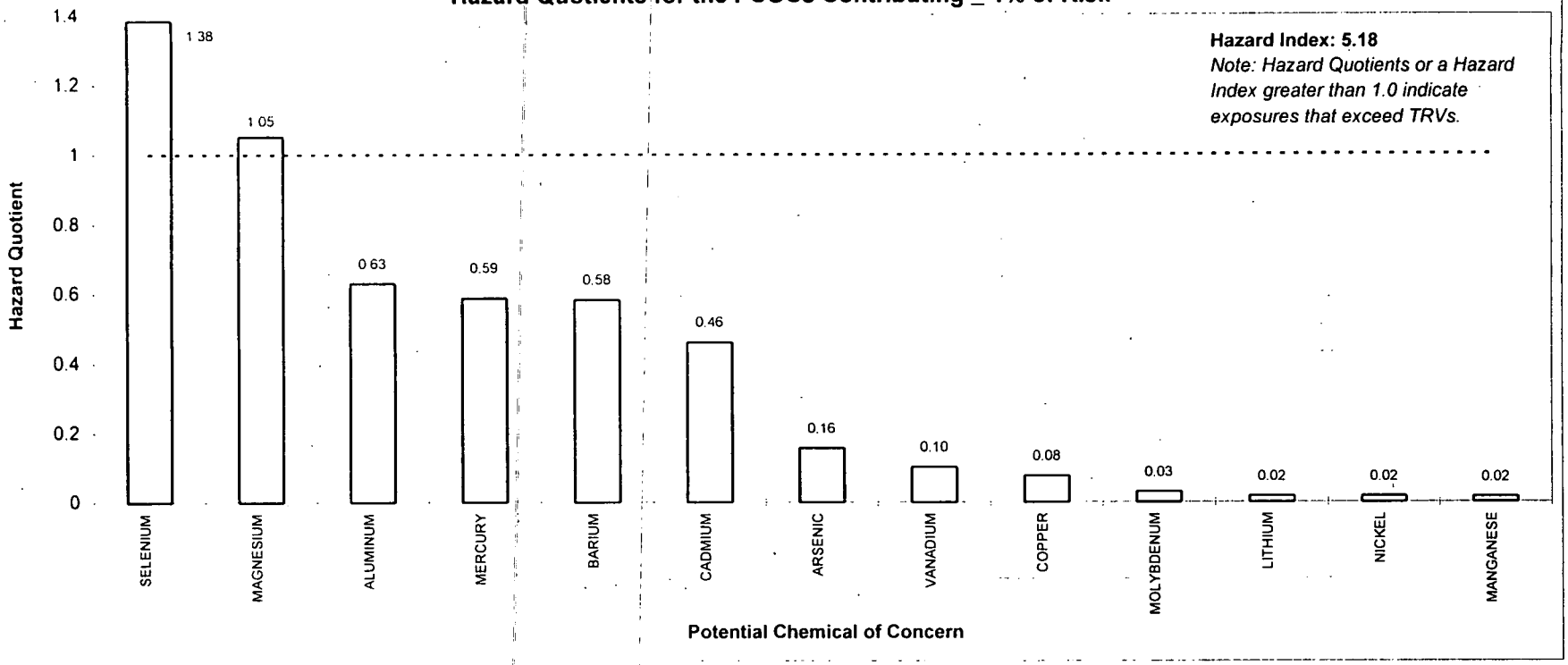
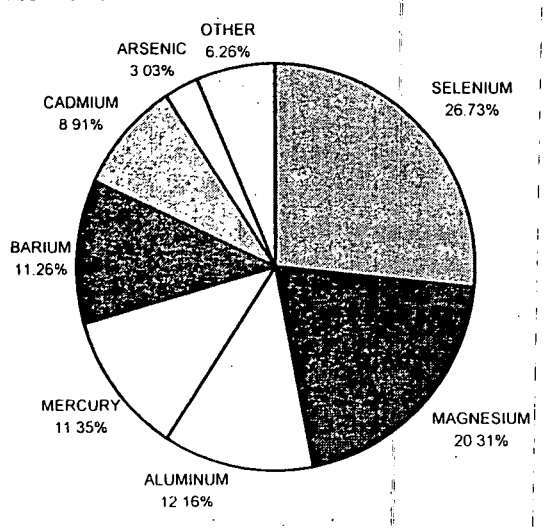
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 Burial Trenches Source Area at RFETS

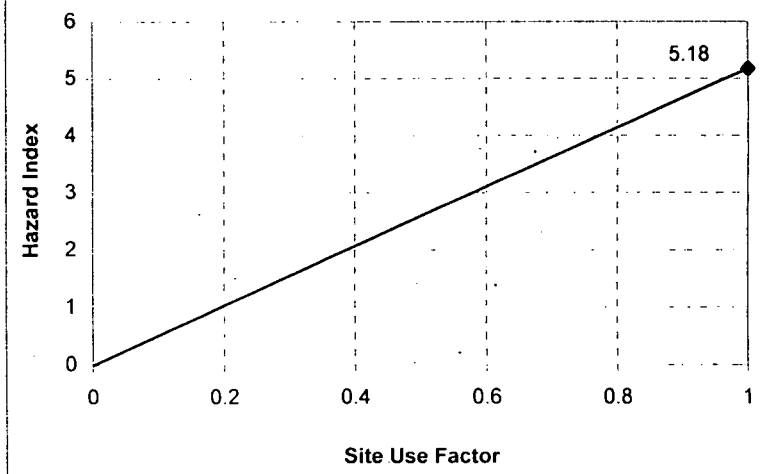
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



% Contributions of PCOCs to Total Risk

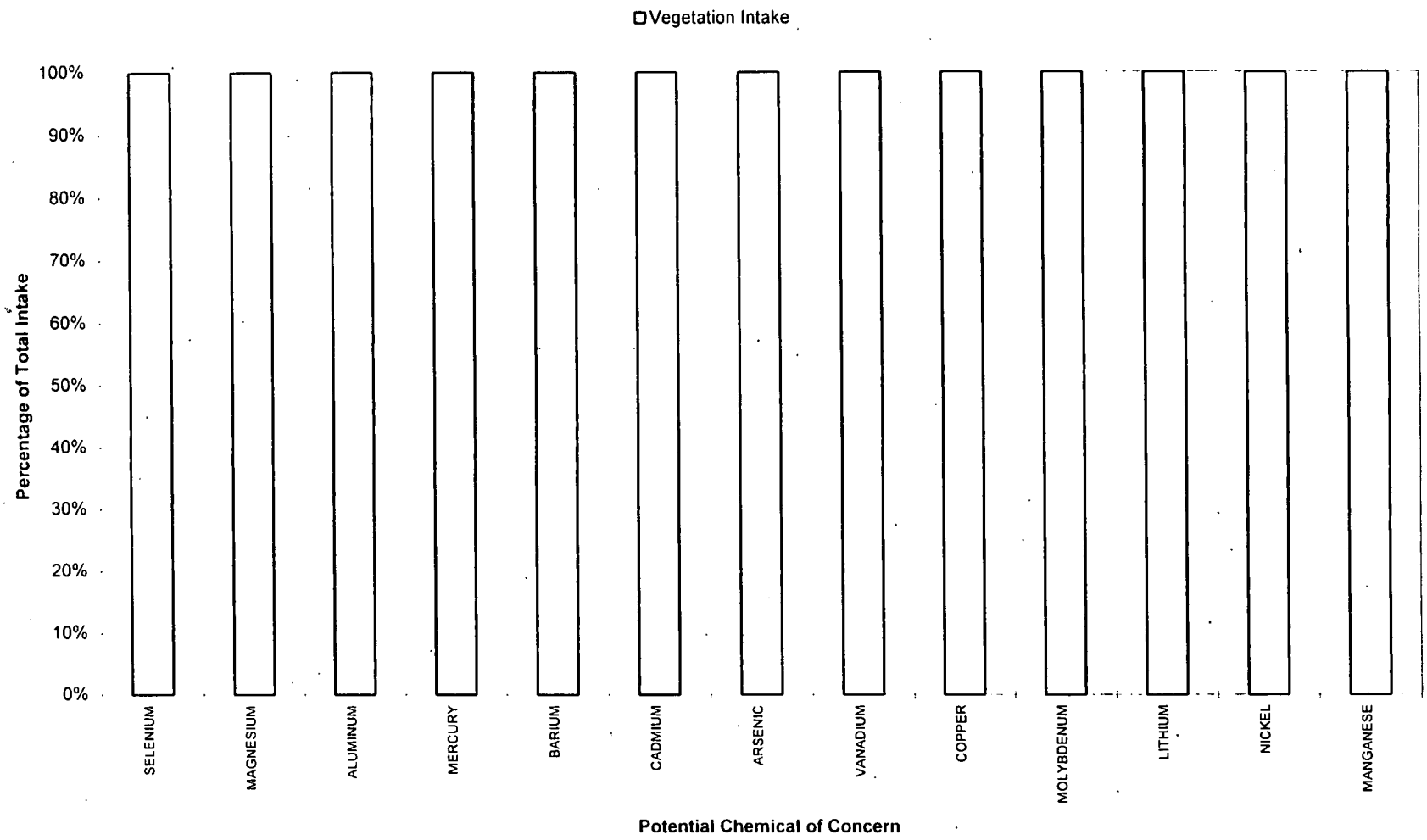


Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 Burial Trenches Source Area at RFETS

Contribution of Exposure Points to Total Intake



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU6 Burial Trenches Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 BURIAL TRENCHES		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.004 SUF = 1		IR = I SUF = I		IR = I SUF = I					
SELENIUM		NR	—	2.580		0.439	NR	—	NR	—	NR	—	0.439	0.317	1.38	26.73%
MAGNESIUM	X	NR	—	1586.864		269.767	NR	—	NR	—	NR	—	269.767	256.400	1.05	20.31%
ALUMINUM		NR	—	296.486		50.403	NR	—	NR	—	NR	—	50.403	80.009	0.63	12.16%
MERCURY	X	NR	—	0.058		0.010	NR	—	NR	—	NR	—	0.010	0.017	0.59	11.35%
BARIUM	X	NR	—	48.775		8.292	NR	—	NR	—	NR	—	8.292	14.217	0.58	11.26%
CADMIUM		NR	—	1.300		0.221	NR	—	NR	—	NR	—	0.221	0.479	0.46	8.91%
ARSENIC	X	NR	—	0.630		0.107	NR	—	NR	—	NR	—	0.107	0.682	0.16	3.03%
VANADIUM	X	NR	—	1.400		0.238	NR	—	NR	—	NR	—	0.238	2.313	0.10	1.99%
COPPER	X	NR	—	19.589		3.330	NR	—	NR	—	NR	—	3.330	43.327	0.08	1.48%
MOLYBDENUM	X	NR	—	2.100		0.357	NR	—	NR	—	NR	—	0.357	12.061	0.03	0.57%
LITHIUM		NR	—	2.500		0.425	NR	—	NR	—	NR	—	0.425	24.571	0.02	0.33%
NICKEL	X	NR	—	10.500		1.785	NR	—	NR	—	NR	—	1.785	104.666	0.02	0.33%
MANGANESE	X	NR	—	21.320		3.624	NR	—	NR	—	NR	—	3.624	230.264	0.02	0.30%
BERYLLIUM		NR	—	0.130		0.022	NR	—	NR	—	NR	—	0.022	1.727	0.01	0.25%
STRONTIUM	X	NR	—	50.056		8.509	NR	—	NR	—	NR	—	8.509	688.177	0.01	0.24%
ZINC	X	NR	—	26.858		4.566	NR	—	NR	—	NR	—	4.566	418.663	0.01	0.21%
LEAD	X	NR	—	1.183		0.201	NR	—	NR	—	NR	—	0.201	20.933	0.01	0.19%
TIN		NR	—	2.900		0.493	NR	—	NR	—	NR	—	0.493	65.961	0.01	0.14%
ACETONE	X	NR	—	NR	1.066	0.181	NR	—	NR	—	NR	—	0.181	26.167	0.01	0.13%
METHYLENE CHLORIDE	X	NR	—	NR	0.371	0.063	NR	—	NR	—	NR	—	0.063	15.307	<0.01	0.08%
TOLUENE	X	NR	—	NR	0.089	0.015	NR	—	NR	—	NR	—	0.015	30.220	<0.01	0.01%
2-BUTANONE	X	NR	—	NR	2.157	0.367	NR	—	NR	—	NR	—	0.367	4672.704	<0.01	<0.01%
4-METHYL-2-PENTANONE	X	NR	—	NR	0.018	0.003	NR	—	NR	—	NR	—	0.003	65.416	<0.01	<0.01%
CHROMIUM	X	NR	—	1.600		0.272	NR	—	NR	—	NR	—	0.272	7161.754	<0.01	<0.01%
TRICHLOROETHENE	X	NR	—	NR	0.028	0.005	NR	—	NR	—	NR	—	0.005	171.044	<0.01	<0.01%
CHLOROFORM	X	NR	—	NR	0.006	0.001	NR	—	NR	—	NR	—	0.001	39.250	<0.01	<0.01%
BENZENE	X	NR	—	NR	0.002	—	NR	—	NR	—	NR	—	3.92E-04	30.662	<0.01	<0.01%

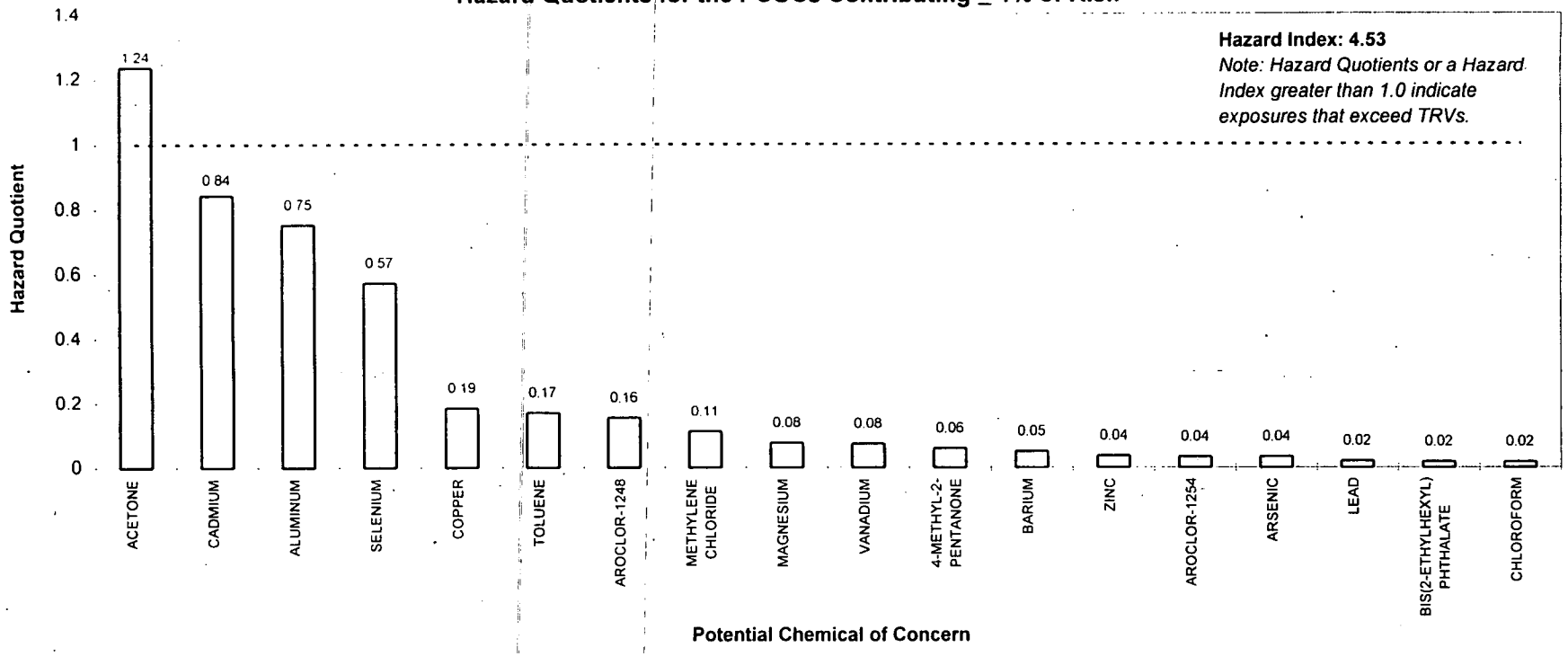
HAZARD INDEX 5.18

Notes:

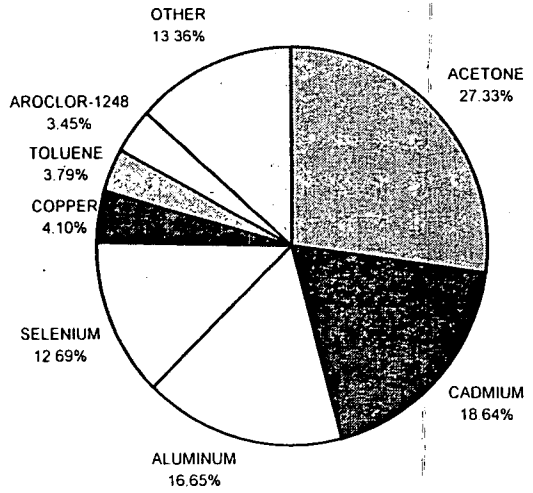
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU1 881 Hillside Source Area at RFETS

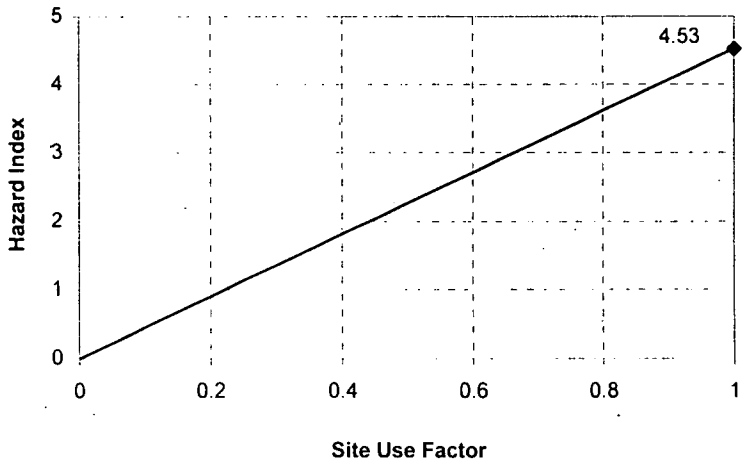
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



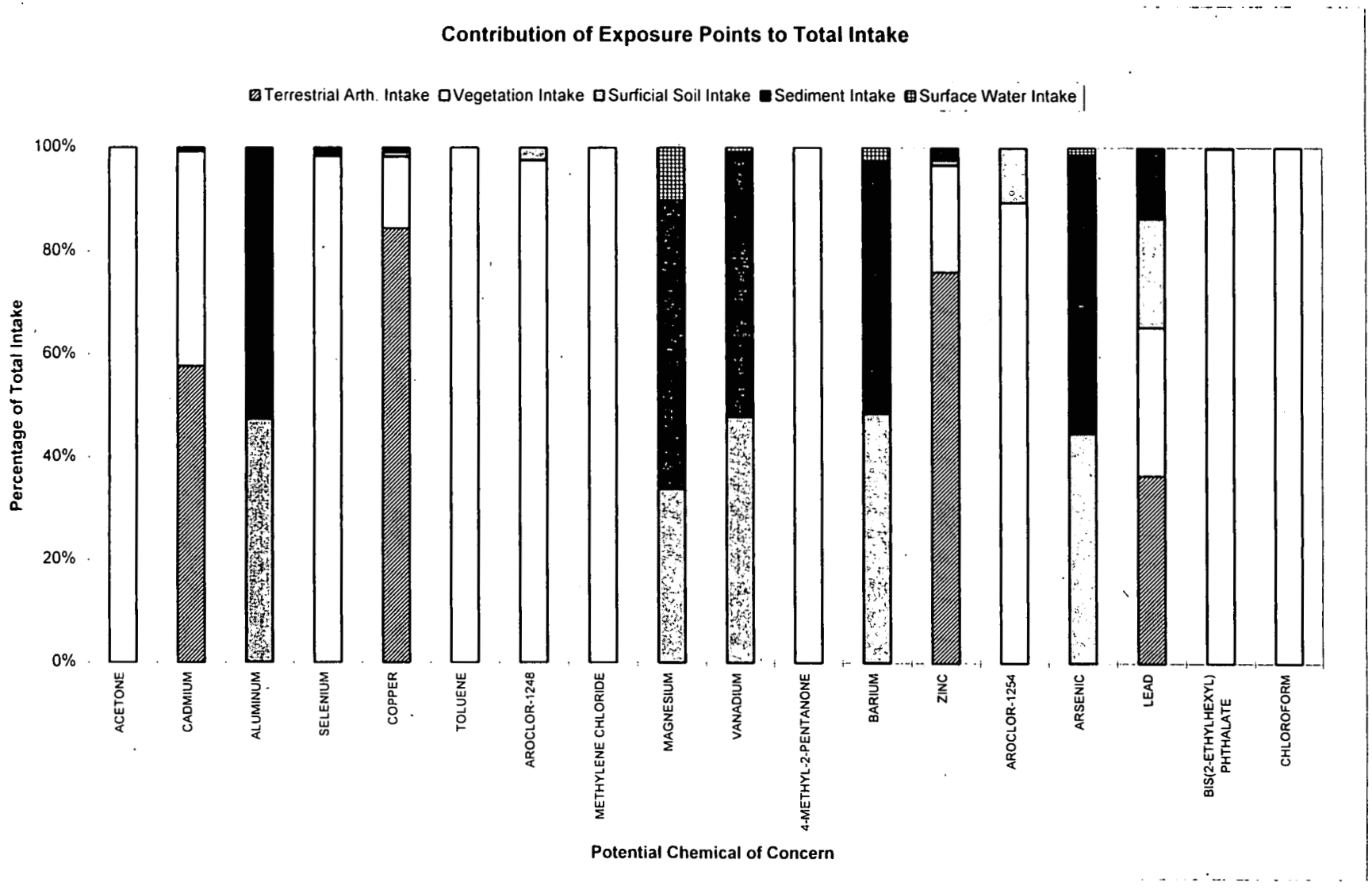
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU1 881 Hillside Source Area at RFETS



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU1 881 Hillside Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU1 881 HILLSIDE		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU1	IR = 0.051 SUF = 1		IR = 0.119 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
ACETONE		NR	—	NR	271.965	32.364	NR	—	0.036	7.20E-05	0.007	0.001	32.365	26.167	1.24	27.33%
CADMIUM		4.567	0.233	1.409		0.168	0.611	0.001	0.827	0.002	0.002	2.41E-04	0.404	0.479	0.84	18.64%
ALUMINUM		NR	—	NR		—	14308.320	28.617	15760.019	31.520	0.926	0.139	60.276	80.009	0.75	16.65%
SELENIUM		ND	—	1.500		0.179	0.511	0.001	0.919	0.002	0.002	2.93E-04	0.182	0.317	0.57	12.69%
COPPER		133.000	6.783	9.256		1.101	35.484	0.071	36.368	0.073	0.009	0.001	8.030	43.327	0.19	4.10%
TOLUENE	X	NR	—	NR	43.577	5.186	NR	—	0.005	1.00E-05	0.003	3.95E-04	5.186	30.220	0.17	3.79%
AROCLOR-1248	X	NR	—	NR	0.082	0.010	0.123	2.47E-04	ND	—	ND	—	0.010	0.064	0.16	3.45%
METHYLENE CHLORIDE		NR	—	NR	14.721	1.752	NR	—	ND	—	0.004	0.001	1.752	15.307	0.11	2.53%
MAGNESIUM		NR	—	NR		—	3418.568	6.837	5670.202	11.340	13.583	2.037	20.215	256.400	0.08	1.74%
VANADIUM		NR	—	NR		—	41.858	0.084	44.881	0.090	0.009	0.001	0.175	2.313	0.08	1.67%
4-METHYL-2-PENTANONE		NR	—	NR	33.985	4.044	NR	—	ND	—	ND	—	4.044	65.416	0.06	1.37%
BARIUM		NR	—	NR		—	179.137	0.358	180.333	0.361	0.123	0.018	0.737	14.217	0.05	1.15%
ZINC		242.000	12.342	28.068		3.340	85.548	0.171	186.114	0.372	0.051	0.008	16.233	418.663	0.04	0.86%
AROCLOR-1254	X	NR	—	NR	0.037	0.004	0.257	0.001	ND	—	ND	—	0.005	0.142	0.04	0.78%
ARSENIC		NR	—	NR		—	5.377	0.011	6.464	0.013	0.002	3.06E-04	0.024	0.682	0.04	0.78%
LEAD		3.258	0.166	1.100		0.131	48.003	0.096	30.594	0.061	0.003	0.001	0.455	20.933	0.02	0.48%
BIS(2-ETHYLHEXYL) PHTHALATE		NR	—	NR	3.395	0.404	ND	—	0.280	0.001	0.002	3.00E-04	0.405	21.321	0.02	0.42%
CHLOROFORM		NR	—	NR	5.967	0.710	NR	—	ND	—	ND	—	0.710	39.250	0.02	0.40%
NITRATE/NITRITE		NR	—	NR		—	2.111	0.004	6.793	0.014	2.624	0.394	0.411	34.669	0.01	0.26%
MERCURY		ND	—	ND		—	0.054	1.08E-04	ND	—	1.18E-04	1.77E-05	1.25E-04	0.017	0.01	0.16%
ANTIMONY		NR	—	NR		—	ND	—	ND	—	0.015	0.002	0.002	0.346	0.01	0.13%
MANGANESE		NR	—	NR		—	312.554	0.625	335.402	0.671	0.063	0.009	1.305	230.264	0.01	0.13%
2-BUTANONE		NR	—	NR	119.240	14.190	NR	—	0.011	2.20E-05	0.005	0.001	14.190	4672.704	<0.01	0.07%
COBALT		NR	—	NR		—	8.343	0.017	11.094	0.022	0.007	0.001	0.040	13.192	<0.01	0.07%
PYRENE	X	NR	—	NR	2.156	0.257	0.693	0.001	0.310	0.001	ND	—	0.259	87.321	<0.01	0.07%
BERYLLIUM		NR	—	NR		—	1.257	0.003	0.809	0.002	0.001	1.36E-04	0.004	1.727	<0.01	0.05%
LITHIUM		NR	—	NR		—	9.473	0.019	10.000	0.020	0.021	0.003	0.042	24.571	<0.01	0.04%
FLUORANTHENE	X	NR	—	NR	1.763	0.210	0.762	0.002	0.380	0.001	ND	—	0.212	145.535	<0.01	0.03%
THALLIUM		NR	—	NR		—	0.510	0.001	ND	—	0.002	2.95E-04	0.001	0.697	<0.01	0.03%
TIN		NR	—	NR		—	43.094	0.086	ND	—	0.024	0.004	0.090	65.961	<0.01	0.03%
SILVER		ND	—	0.540		0.064	ND	—	ND	—	0.003	0.001	0.065	58.626	<0.01	0.02%
BENZO(a)PYRENE	X	NR	—	NR	0.006	0.001	0.311	0.001	ND	—	ND	—	0.001	1.163	<0.01	0.02%
NICKEL		NR	—	NR		—	29.863	0.060	14.200	0.028	0.008	0.001	0.089	104.666	<0.01	0.02%
STRONTIUM		NR	—	NR		—	61.651	0.123	121.257	0.243	0.413	0.062	0.428	688.177	<0.01	0.01%
MOLYBDENUM		NR	—	NR		—	1.926	0.004	ND	—	0.018	0.003	0.006	12.061	<0.01	0.01%
PHENANTHRENE	X	NR	—	NR	4.472	0.532	0.559	0.001	0.190	3.80E-04	ND	—	0.534	1163.433	<0.01	0.01%
PENTACHLOROPHENOL		NR	—	NR	0.019	0.002	ND	—	ND	—	ND	—	0.002	7.915	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.008	0.001	0.327	0.001	ND	—	ND	—	0.002	11.634	<0.01	<0.01%
DIBENZO(a,h)ANTHRACENE	X	NR	—	NR	ND	—	0.092	1.84E-04	ND	—	ND	—	1.84E-04	1.163	<0.01	<0.01%
TOTAL XYLENES	X	NR	—	NR	0.002	1.96E-04	NR	—	ND	—	0.001	1.50E-04	3.46E-04	2.396	<0.01	<0.01%
TRICHLOROETHENE	X	NR	—	NR	0.187	0.022	NR	—	ND	—	0.003	3.88E-04	0.023	171.044	<0.01	<0.01%

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU1 881 Hillside Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU1 881 HILLSIDE		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU1	IR = 0.051 SUF = 1		IR = 0.119 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
TETRACHLOROETHENE	X	NR	—	NR	0.015	0.002	NR	—	ND	—	0.003	4.23E-04	0.002	16.300	<0.01	<0.01%
CHROMIUM		ND	—	5.535		0.659	34.997	0.070	23.900	0.048	0.004	0.001	0.777	7161.754	<0.01	<0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	0.002	2.87E-04	0.314	0.001	0.190	3.80E-04	ND	—	0.001	11.634	<0.01	<0.01%
BENZO(k)FLUORANTHENE	X	NR	—	NR	0.002	2.33E-04	0.297	0.001	0.110	2.20E-04	ND	—	0.001	11.634	<0.01	<0.01%
1,2-DICHLOROETHANE	X	NR	—	NR	0.027	0.003	NR	—	ND	—	0.003	3.99E-04	0.004	61.195	<0.01	<0.01%
1,1-DICHLOROETHENE	X	NR	—	NR	0.040	0.005	NR	—	ND	—	0.003	3.80E-04	0.005	79.154	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	ND	—	0.204	4.07E-04	ND	—	ND	—	4.07E-04	11.634	<0.01	<0.01%
FLUORENE	X	NR	—	NR	0.028	0.003	0.193	3.86E-04	ND	—	ND	—	0.004	145.535	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	0.012	0.001	0.361	0.001	0.190	3.80E-04	ND	—	0.003	116.343	<0.01	<0.01%
DI-n-BUTYL PHTHALATE		NR	—	NR	0.056	0.007	ND	—	ND	—	ND	—	0.007	329.807	<0.01	<0.01%
BENZYL ALCOHOL		NR	—	NR	ND	—	0.203	4.06E-04	ND	—	ND	—	4.06E-04	27.308	<0.01	<0.01%
1,2-DICHLOROETHENE	X	NR	—	NR	ND	—	NR	—	ND	—	0.002	3.00E-04	3.00E-04	52.625	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	NR	0.040	0.005	0.195	3.90E-04	ND	—	ND	—	0.005	1163.433	<0.01	<0.01%
NAPHTHALENE	X	NR	—	NR	0.040	0.005	0.110	2.20E-04	ND	—	ND	—	0.005	1163.433	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	ND	—	0.205	4.10E-04	ND	—	ND	—	4.10E-04	116.343	<0.01	<0.01%
ANTHRACENE	X	NR	—	NR	0.027	0.003	0.202	4.05E-04	ND	—	ND	—	0.004	1164.277	<0.01	<0.01%
ALDRIN		NR	—	NR	ND	—	ND	—	ND	—	1.00E-05	1.50E-06	1.50E-06	0.523	<0.01	<0.01%
1,1-DICHLOROETHANE	X	NR	—	NR	ND	—	NR	—	ND	—	0.003	3.77E-04	3.77E-04	303.422	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	—	NR	0.009	0.001	ND	—	ND	—	ND	—	0.001	1217.647	<0.01	<0.01%
1,1,1-TRICHLOROETHANE	X	NR	—	NR	0.007	0.001	NR	—	ND	—	0.003	3.77E-04	0.001	1223.894	<0.01	<0.01%

HAZARD INDEX 4.53

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
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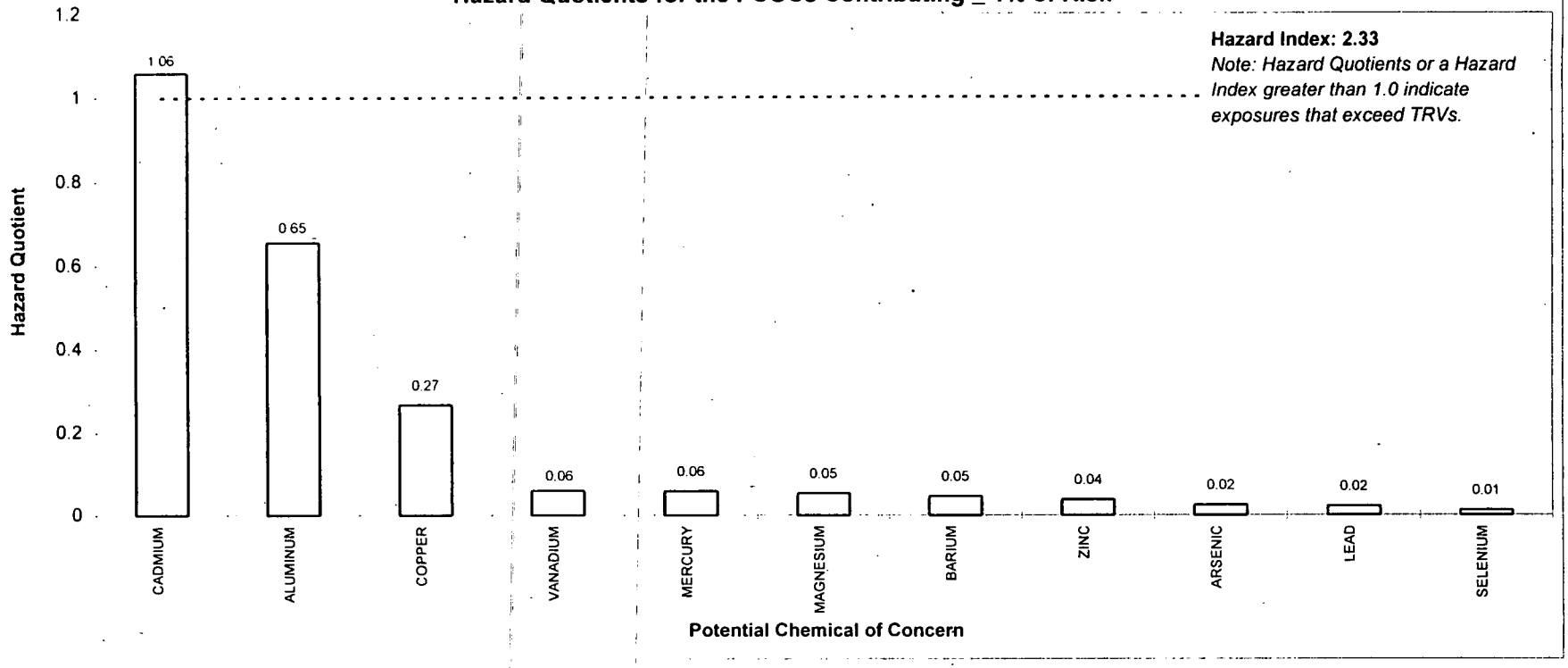
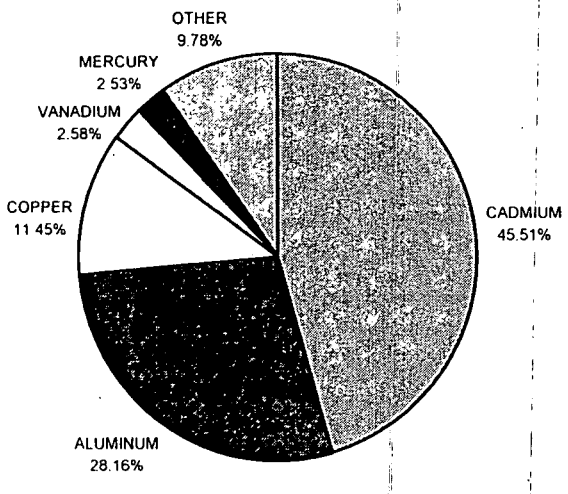
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU5 C-Ponds Source Area at RFETS

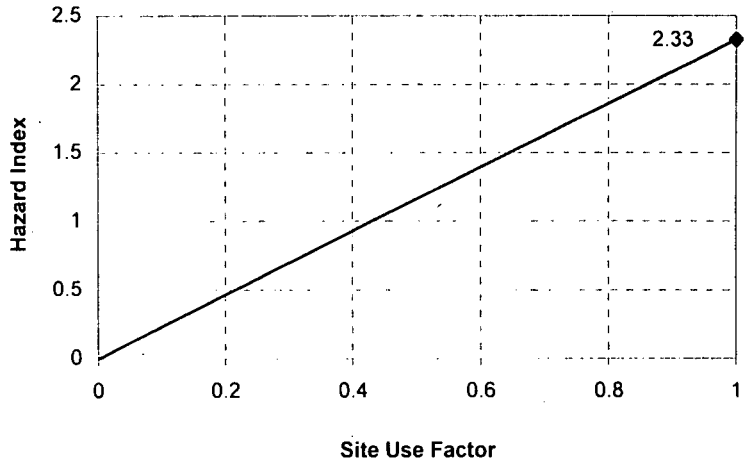
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



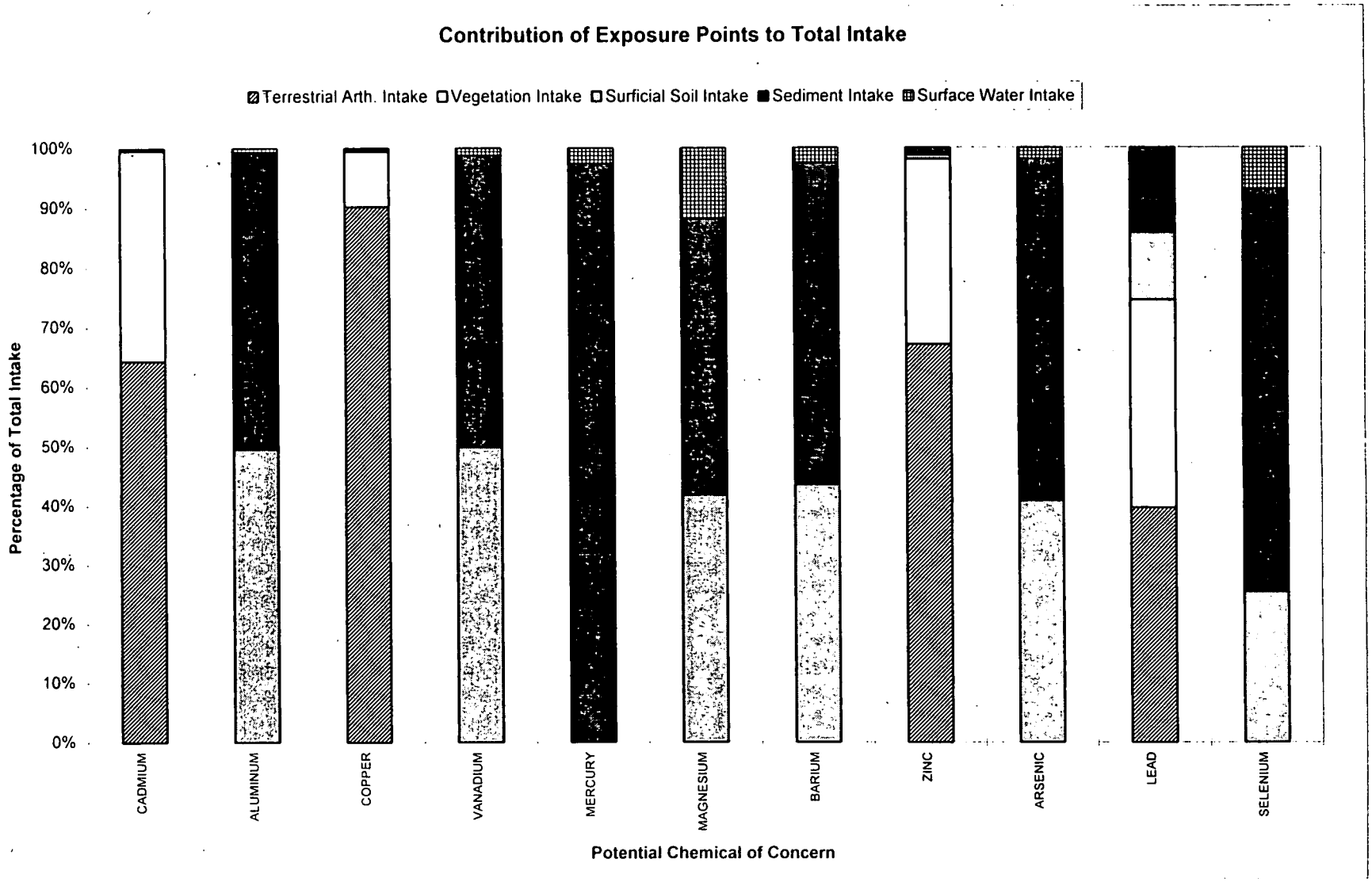
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU5 C-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU5 C-Ponds Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU5 C-PONDS		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU5	IR = 0.051 SUF = 1		IR = 0.119 SUF = 1			IR = 0.002 SUF = 1		IR = 0.002 SUF = 1		IR = 0.150 SUF = 1					
CADMIUM		6.400	0.326	1.500		0.179	ND	—	0.898	0.002	0.003	3.88E-04	0.507	0.479	1.06	45.51%
ALUMINUM		NR	—	NR		—	13000.000	26.000	13018.068	26.036	2.432	0.365	52.401	80.009	0.65	28.16%
COPPER	X	204.000	10.404	8.926		1.062	10.200	0.020	23.083	0.046	0.008	0.001	11.534	43.327	0.27	11.45%
VANADIUM		NR	—	NR		—	34.700	0.069	33.892	0.068	0.012	0.002	0.139	2.313	0.06	2.58%
MERCURY	X	ND	—	ND		—	ND	—	0.393	0.001	1.41E-04	2.12E-05	0.001	0.017	0.06	2.53%
MAGNESIUM		NR	—	NR		—	2860.000	5.720	3157.852	6.316	10.768	1.615	13.651	256.400	0.05	2.29%
BARIUM	X	NR	—	NR		—	144.000	0.288	177.770	0.356	0.109	0.016	0.660	14.217	0.05	2.00%
ZINC	X	210.000	10.710	41.397		4.926	56.700	0.113	94.329	0.189	0.048	0.007	15.946	418.663	0.04	1.64%
ARSENIC		NR	—	NR		—	3.500	0.007	4.893	0.010	0.002	3.34E-04	0.017	0.682	0.02	1.07%
LEAD	X	3.600	0.184	1.355		0.161	26.100	0.052	32.420	0.065	0.006	0.001	0.463	20.933	0.02	0.95%
SELENIUM		ND	—	ND		—	0.510	0.001	1.353	0.003	0.002	2.78E-04	0.004	0.317	0.01	0.54%
MANGANESE		NR	—	NR		—	360.000	0.720	521.405	1.043	0.120	0.018	1.781	230.264	0.01	0.33%
ANTIMONY	X	NR	—	NR		—	ND	—	ND	—	0.015	0.002	0.002	0.346	0.01	0.25%
THALLIUM		NR	—	NR		—	ND	—	0.833	0.002	0.002	3.50E-04	0.002	0.697	<0.01	0.12%
COBALT	X	NR	—	NR		—	7.900	0.016	9.581	0.019	0.008	0.001	0.036	13.192	<0.01	0.12%
NITRATE/NITRITE		NR	—	NR		—	NR	—	3.570	0.007	0.541	0.081	0.088	34.669	<0.01	0.11%
LITHIUM	X	NR	—	NR		—	10.700	0.021	10.543	0.021	0.020	0.003	0.045	24.571	<0.01	0.08%
TIN		NR	—	NR		—	32.700	0.065	12.061	0.024	0.021	0.003	0.093	65.961	<0.01	0.06%
ACETONE		NR	—	NR	0.266	0.032	NR	—	0.124	2.49E-04	0.014	0.002	0.034	26.167	<0.01	0.06%
BERYLLIUM		NR	—	NR		—	ND	—	0.767	0.002	0.001	1.50E-04	0.002	1.727	<0.01	0.05%
MOLYBDENUM		NR	—	NR		—	ND	—	4.832	0.010	0.017	0.002	0.012	12.061	<0.01	0.04%
NICKEL		NR	—	NR		—	13.800	0.028	15.645	0.031	0.009	0.001	0.060	104.666	<0.01	0.02%
STRONTIUM	X	NR	—	NR		—	41.700	0.083	62.795	0.126	0.337	0.051	0.260	688.177	<0.01	0.02%
METHYLENE CHLORIDE	X	NR	—	NR	0.027	0.003	NR	—	0.020	3.97E-05	0.004	0.001	0.004	15.307	<0.01	0.01%
CHROMIUM		ND	—	10.957		1.304	14.800	0.030	14.042	0.028	0.005	0.001	1.362	7161.754	<0.01	0.01%
TOLUENE	X	NR	—	NR	0.020	0.002	NR	—	0.146	2.92E-04	0.001	1.50E-04	0.003	30.220	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	ND	—	ND	—	0.640	0.001	0.002	3.00E-04	0.002	21.321	<0.01	<0.01%
SILVER	X	ND	—	ND		—	ND	—	1.700	0.003	0.004	0.001	0.004	58.626	<0.01	<0.01%
CHLOROFORM		NR	—	NR	ND	—	NR	—	ND	—	0.003	3.86E-04	3.86E-04	39.250	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	ND	—	0.078	1.56E-04	0.140	2.80E-04	ND	—	4.36E-04	145.535	<0.01	<0.01%
PYRENE	X	NR	—	NR	ND	—	0.094	1.88E-04	ND	—	ND	—	1.88E-04	87.321	<0.01	<0.01%
PHENOL	X	NR	—	NR	ND	—	ND	—	0.150	3.00E-04	ND	—	3.00E-04	158.307	<0.01	<0.01%
delta-BHC		NR	—	NR	ND	—	ND	—	0.004	7.00E-06	ND	—	7.00E-06	4.186	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	—	NR	ND	—	ND	—	0.057	1.14E-04	ND	—	1.14E-04	93.349	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	ND	—	ND	—	0.110	2.20E-04	ND	—	2.20E-04	329.807	<0.01	<0.01%
2-BUTANONE		NR	—	NR	ND	—	NR	—	0.027	5.35E-05	0.006	0.001	9.24E-04	4672.704	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	—	NR	ND	—	NR	—	0.001	2.00E-06	ND	—	2.00E-06	1223.894	<0.01	<0.01%

HAZARD INDEX 2.33

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate

SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU11 West Spray Field Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU11 WEST SPRAY FIELD		EXPOSURE POINT												SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water						
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU11	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.004 SUF = 1		IR = I SUF = I		IR = I SUF = I					
ALUMINUM		NR	—	NR		—	12185.807	48.743	NR	—	NR	—	48.743	80.009	0.61	71.23%
VANADIUM		NR	—	NR		—	30.669	0.123	NR	—	NR	—	0.123	2.313	0.05	6.22%
ARSENIC		NR	—	NR		—	8.032	0.032	NR	—	NR	—	0.032	0.682	0.05	5.49%
ANTIMONY		NR	—	NR		—	3.500	0.014	NR	—	NR	—	0.014	0.346	0.04	4.73%
BARIUM		NR	—	NR		—	130.524	0.522	NR	—	NR	—	0.522	14.217	0.04	4.29%
MAGNESIUM		NR	—	NR		—	1746.670	6.987	NR	—	NR	—	6.987	256.400	0.03	3.19%
LEAD		NR	—	NR		—	46.092	0.184	NR	—	NR	—	0.184	20.933	0.01	1.03%
SELENIUM		NR	—	NR		—	0.509	0.002	NR	—	NR	—	0.002	0.317	0.01	0.74%
CADMIUM		NR	—	NR		—	0.737	0.003	NR	—	NR	—	0.003	0.479	0.01	0.73%
MANGANESE		NR	—	NR		—	332.865	1.331	NR	—	NR	—	1.331	230.264	0.01	0.68%
COBALT		NR	—	NR		—	6.719	0.027	NR	—	NR	—	0.027	13.192	<0.01	0.24%
ACETONE		NR	—	NR	0.296	0.050	NR	—	NR	—	NR	—	0.050	26.167	<0.01	0.22%
NITRATE/NITRITE		NR	—	NR		—	15.866	0.063	NR	—	NR	—	0.063	34.669	<0.01	0.21%
BERYLLIUM		NR	—	NR		—	0.682	0.003	NR	—	NR	—	0.003	1.727	<0.01	0.20%
LITHIUM		NR	—	NR		—	10.111	0.040	NR	—	NR	—	0.040	24.571	<0.01	0.19%
THALLIUM		NR	—	NR		—	0.270	0.001	NR	—	NR	—	0.001	0.697	<0.01	0.17%
COPPER		NR	—	NR		—	13.023	0.052	NR	—	NR	—	0.052	43.327	<0.01	0.14%
MOLYBDENUM		NR	—	NR		—	2.600	0.010	NR	—	NR	—	0.010	12.061	<0.01	0.10%
ZINC		NR	—	NR		—	44.730	0.179	NR	—	NR	—	0.179	418.663	<0.01	0.05%
METHYLENE CHLORIDE		NR	—	NR	0.034	0.006	NR	—	NR	—	NR	—	0.006	15.307	<0.01	0.05%
NICKEL		NR	—	NR		—	9.190	0.037	NR	—	NR	—	0.037	104.666	<0.01	0.04%
TIN		NR	—	NR		—	4.900	0.020	NR	—	NR	—	0.020	65.961	<0.01	0.04%
STRONTIUM		NR	—	NR		—	23.573	0.094	NR	—	NR	—	0.094	688.177	<0.01	0.02%
BIS(2-ETHYLHEXYL)PHTHALATE		NR	—	NR	0.011	0.002	NR	—	NR	—	NR	—	0.002	21.321	<0.01	0.01%
CHLOROFORM		NR	—	NR	0.017	0.003	NR	—	NR	—	NR	—	0.003	39.250	<0.01	0.01%
TOLUENE		NR	—	NR	0.004	0.001	NR	—	NR	—	NR	—	0.001	30.220	<0.01	<0.01%
DI-n-BUTYL PHTHALATE		NR	—	NR	0.019	0.003	NR	—	NR	—	NR	—	0.003	329.807	<0.01	<0.01%
CHROMIUM		NR	—	NR		—	13.479	0.054	NR	—	NR	—	0.054	7161.754	<0.01	<0.01%
TRICHLOROETHENE		NR	—	NR	0.004	0.001	NR	—	NR	—	NR	—	0.001	171.044	<0.01	<0.01%
2-BUTANONE		NR	—	NR	0.107	0.018	NR	—	NR	—	NR	—	0.018	4672.704	<0.01	<0.01%

HAZARD INDEX 0.86

Notes:

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NR = Not reported/analyzed in sample information
NC = Not detected in laboratory samples
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NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units = mg/kg

Summary of Ecotoxicological Risk to Preble's Meadow Jumping Mice in the OU2 Mound Area Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU2 MOUND AREA		EXPOSURE POINT											SUMMARY			
		Terrestrial Arth.		Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte[1]	PCOC for OU2	IR = NR SUF = 1		IR = 0.170 SUF = 1			IR = 0.004 SUF = 1		IR = I SUF = I		IR = I SUF = I					
ALUMINUM		NR	—	NR		—	10100.000	40.400	NR	—	NR	—	40.400	80.009	0.50	70.04%
VANADIUM		NR	—	NR		—	31.100	0.124	NR	—	NR	—	0.124	2.313	0.05	7.44%
MAGNESIUM		NR	—	NR		—	2730.000	10.920	NR	—	NR	—	10.920	256.400	0.04	5.91%
ARSENIC		NR	—	NR		—	5.900	0.024	NR	—	NR	—	0.024	0.682	0.04	4.88%
BARIUM		NR	—	NR		—	108.000	0.432	NR	—	NR	—	0.432	14.217	0.03	4.22%
AROCLOR-1254	X	NR	—	NR	ND	—	0.970	0.004	NR	—	NR	—	0.004	0.142	0.03	3.91%
ACETONE		NR	—	NR	0.989	0.168	NR	—	NR	—	NR	—	0.168	26.167	0.01	0.89%
MANGANESE		NR	—	NR		—	240.000	0.960	NR	—	NR	—	0.960	230.264	<0.01	0.58%
LEAD	X	NR	—	NR		—	16.000	0.064	NR	—	NR	—	0.064	20.933	<0.01	0.42%
THALLIUM		NR	—	NR		—	0.500	0.002	NR	—	NR	—	0.002	0.697	<0.01	0.40%
COBALT		NR	—	NR		—	6.200	0.025	NR	—	NR	—	0.025	13.192	<0.01	0.26%
LITHIUM		NR	—	NR		—	8.800	0.035	NR	—	NR	—	0.035	24.571	<0.01	0.20%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.166	0.028	0.052	2.08E-04	NR	—	NR	—	0.029	21.321	<0.01	0.19%
COPPER		NR	—	NR		—	13.100	0.052	NR	—	NR	—	0.052	43.327	<0.01	0.17%
METHYLENE CHLORIDE		NR	—	NR	0.062	0.011	NR	—	NR	—	NR	—	0.011	15.307	<0.01	0.10%
CHROMIUM	X	62.800	3.203	NR		—	10.200	0.041	NR	—	NR	—	3.244	7161.754	<0.01	0.06%
ZINC		NR	—	NR		—	46.300	0.185	NR	—	NR	—	0.185	418.663	<0.01	0.06%
NICKEL		NR	—	NR		—	11.400	0.046	NR	—	NR	—	0.046	104.666	<0.01	0.06%
STRONTIUM		NR	—	NR		—	66.300	0.265	NR	—	NR	—	0.265	688.177	<0.01	0.05%
BENZO(a)PYRENE	X	NR	—	NR	ND	—	0.096	3.84E-04	NR	—	NR	—	3.84E-04	1.163	<0.01	0.05%
TOLUENE		NR	—	NR	0.042	0.007	NR	—	NR	—	NR	—	0.007	30.220	<0.01	0.03%
AROCLOR-1260	X	NR	—	NR	ND	—	0.660	0.003	NR	—	NR	—	0.003	18.205	<0.01	0.02%
TETRACHLOROETHENE		NR	—	NR	0.011	0.002	NR	—	NR	—	NR	—	0.002	16.300	<0.01	0.02%
4-METHYL-2-PENTANONE		NR	—	NR	0.027	0.005	NR	—	NR	—	NR	—	0.005	65.416	<0.01	0.01%
CHLOROFORM		NR	—	NR	0.020	0.003	NR	—	NR	—	NR	—	0.003	39.250	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	ND	—	0.120	4.80E-04	NR	—	NR	—	4.80E-04	11.634	<0.01	0.01%
BENZENE		NR	—	NR	0.007	0.001	NR	—	NR	—	NR	—	0.001	30.662	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	ND	—	0.086	3.44E-04	NR	—	NR	—	3.44E-04	11.634	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	ND	—	0.045	1.80E-04	NR	—	NR	—	1.80E-04	11.634	<0.01	<0.01%
TRICHLOROETHENE		NR	—	NR	0.010	0.002	NR	—	NR	—	NR	—	0.002	171.044	<0.01	<0.01%
PYRENE	X	NR	—	NR	ND	—	0.180	0.001	NR	—	NR	—	0.001	87.321	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	0.015	0.003	ND	—	NR	—	NR	—	0.003	329.807	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	0.004	0.001	0.200	0.001	NR	—	NR	—	0.001	145.535	<0.01	<0.01%
2-BUTANONE		NR	—	NR	0.186	0.032	NR	—	NR	—	NR	—	0.032	4672.704	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	ND	—	0.100	4.00E-04	NR	—	NR	—	4.00E-04	116.343	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	ND	—	0.045	1.80E-04	NR	—	NR	—	1.80E-04	116.343	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	ND	—	0.083	3.32E-04	NR	—	NR	—	3.32E-04	1163.433	<0.01	<0.01%

[1] Chromium concentration in terrestrial arthropods is estimated from tissue:soil ratios in the East Trenches source area.

HAZARD INDEX 0.72

Notes:

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I = Incomplete pathway
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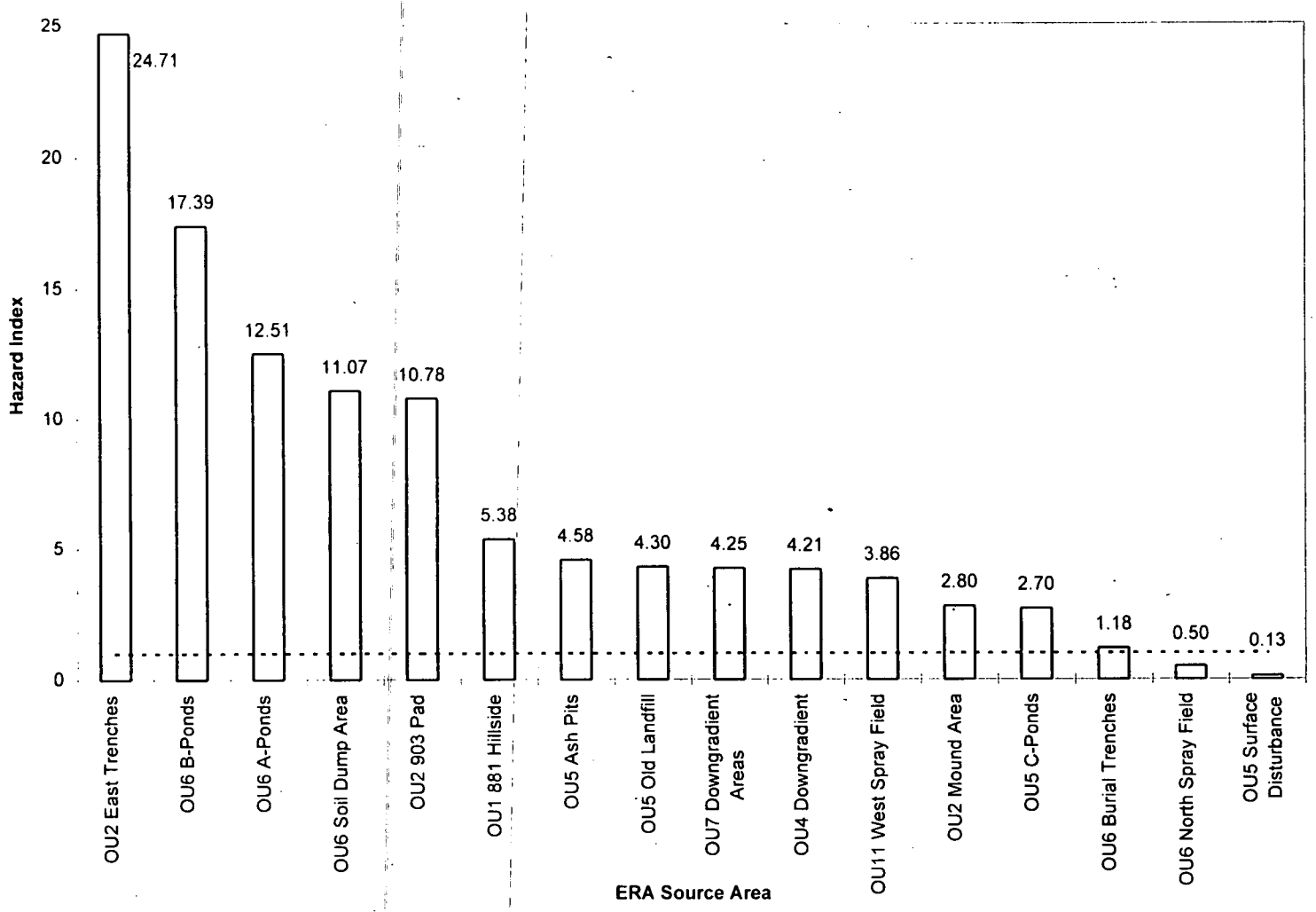
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

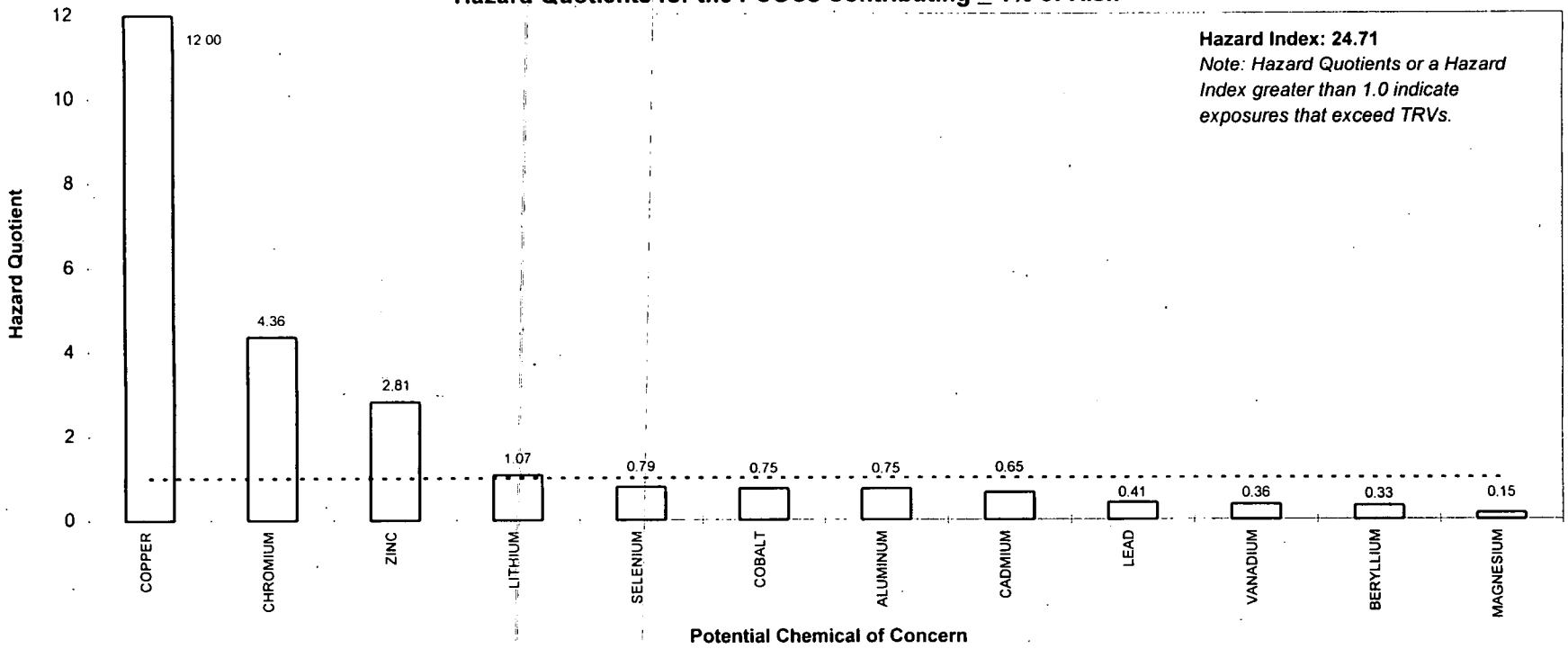
Summary of Ecotoxicological Risk to American Kestrels

Summary of Ecotoxicological Risk to American Kestrels at RFETS

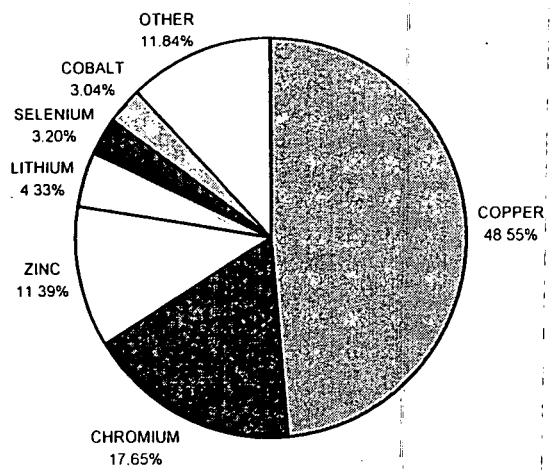


Summary of Ecotoxicological Risk to American Kestrels in the OU2 East Trenches Source Area at RFETS

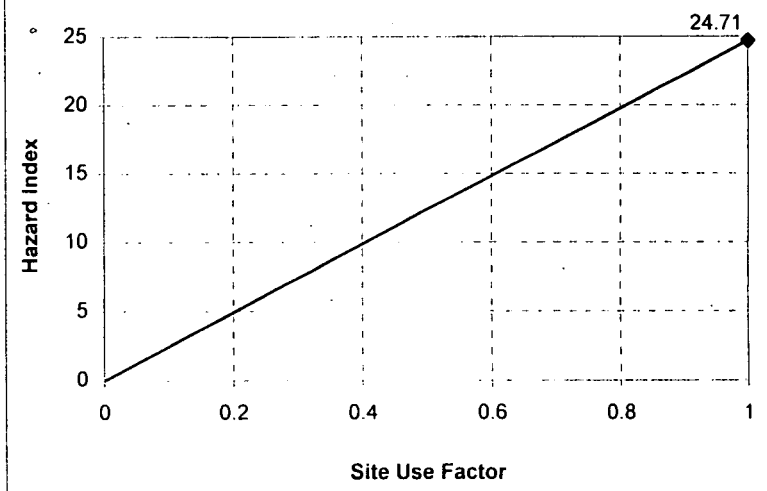
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



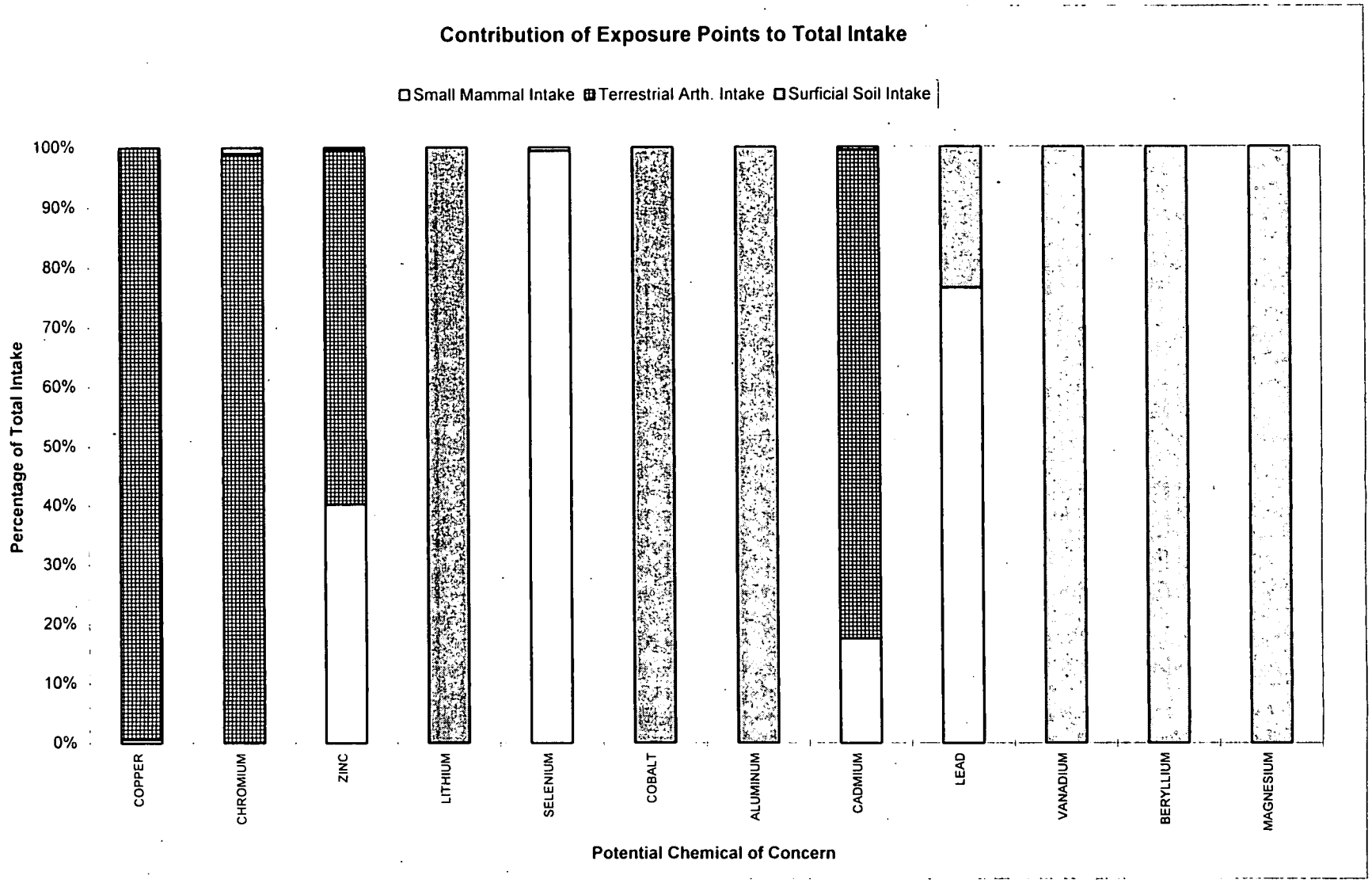
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU2 East Trenches Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU2 East Trenches Source Area at RFETS

AMERICAN KESTRELS OU2 EAST TRENCHES		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU2	IR = 0.140 SUF = 1		IR = 0.150 SUF = 1		IR = 0.008 SUF = 1					
COPPER		17.166	2.403	2676.866	401.530	13.080	0.105	404.038	33.680	12.00	48.55%
CHROMIUM	X	ND	—	63.475	9.521	12.981	0.104	9.625	2.207	4.36	17.65%
ZINC		308.380	43.173	426.000	63.900	54.004	0.432	107.505	38.207	2.81	11.39%
LITHIUM		NR	—	NR	—	13.267	0.106	0.106	0.099	1.07	4.33%
SELENIUM		4.609	0.645	ND	—	0.510	0.004	0.649	0.820	0.79	3.20%
COBALT		NR	—	NR	—	7.136	0.057	0.057	0.076	0.75	3.04%
ALUMINUM		NR	—	NR	—	12216.913	97.735	97.735	130.867	0.75	3.02%
CADMIUM		2.548	0.357	11.134	1.670	1.400	0.011	2.038	3.115	0.65	2.65%
LEAD	X	8.589	1.202	ND	—	45.985	0.368	1.570	3.850	0.41	1.65%
VANADIUM		NR	—	NR	—	27.790	0.222	0.222	0.616	0.36	1.46%
BERYLLIUM		NR	—	NR	—	0.590	0.005	0.005	0.015	0.33	1.35%
MAGNESIUM		NR	—	NR	—	2431.742	19.454	19.454	127.452	0.15	0.62%
MANGANESE		NR	—	NR	—	310.494	2.484	2.484	21.089	0.12	0.48%
BARIUM		NR	—	NR	—	128.840	1.031	1.031	21.155	0.05	0.20%
TIN		NR	—	NR	—	34.188	0.274	0.274	11.455	0.02	0.10%
ARSENIC		NR	—	NR	—	5.496	0.044	0.044	1.846	0.02	0.10%
STRONTIUM		NR	—	NR	—	34.852	0.279	0.279	14.151	0.02	0.08%
BENZO(a)PYRENE	X	NR	—	NR	—	0.120	0.001	0.001	0.078	0.01	0.05%
PHENANTHRENE	X	NR	—	NR	—	0.091	0.001	0.001	0.077	0.01	0.05%
FLUORANTHENE	X	NR	—	NR	—	0.229	0.002	0.002	0.776	<0.01	0.01%
PYRENE	X	NR	—	NR	—	0.218	0.002	0.002	0.776	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	—	0.160	0.001	0.001	0.774	<0.01	0.01%
CHRYSENE	X	NR	—	NR	—	0.110	0.001	0.001	0.776	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	—	0.062	4.96E-04	4.96E-04	0.776	<0.01	<0.01%
NICKEL		NR	—	NR	—	11.629	0.093	0.093	146.122	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	—	0.076	0.001	0.001	1.204	<0.01	<0.01%
SILVER		ND	—	ND	—	1.200	0.010	0.010	2304.896	<0.01	<0.01%

HAZARD INDEX 24.71

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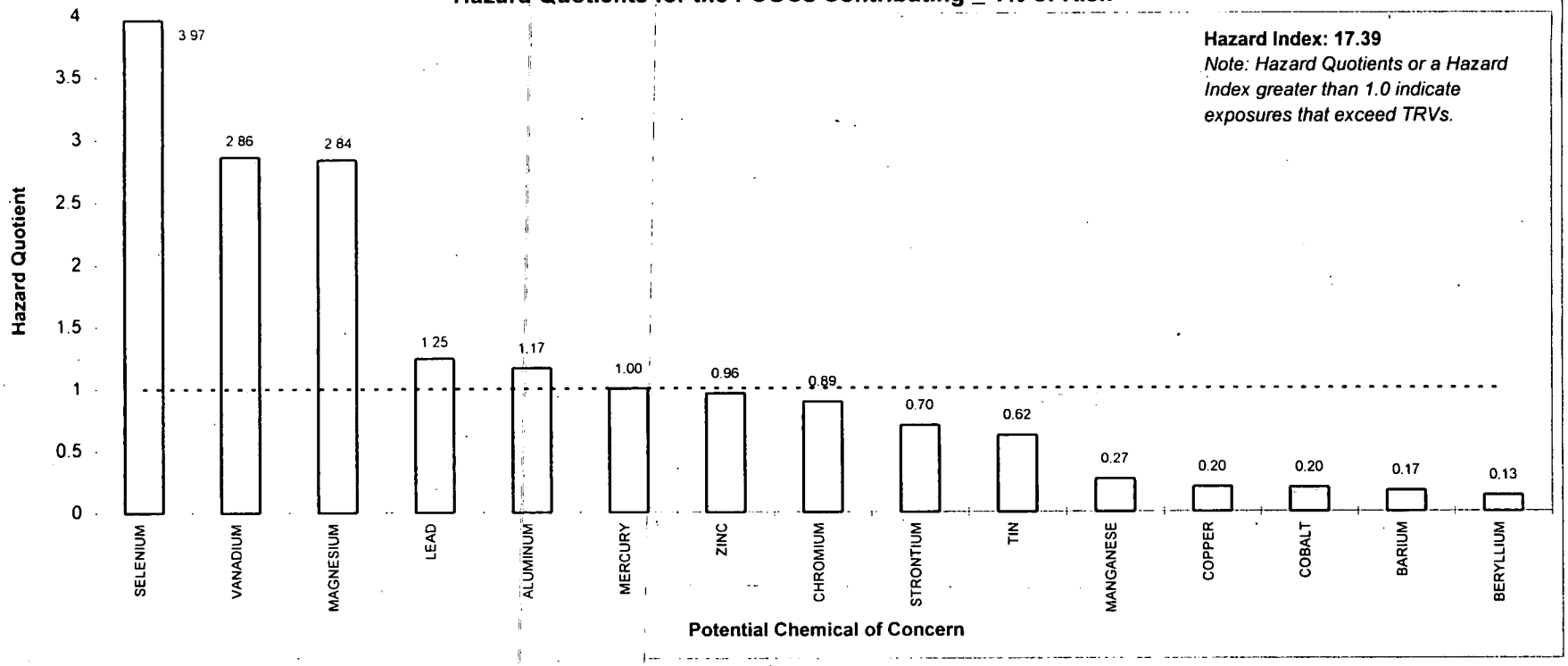
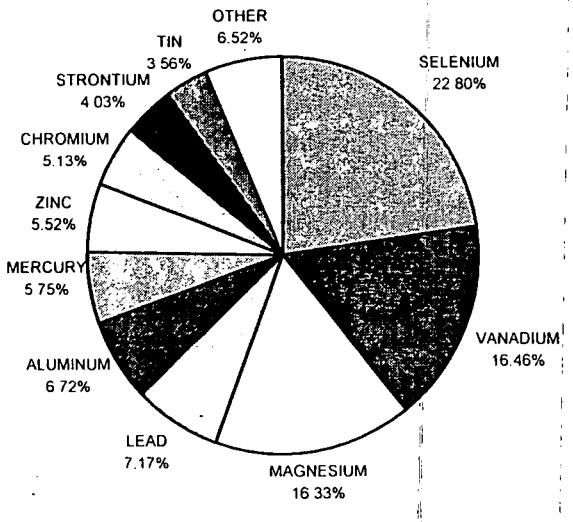
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU6 B-Ponds Source Area at RFETS

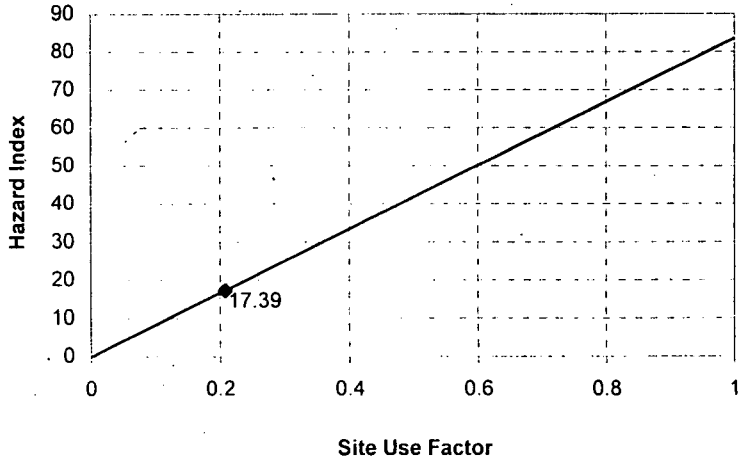
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



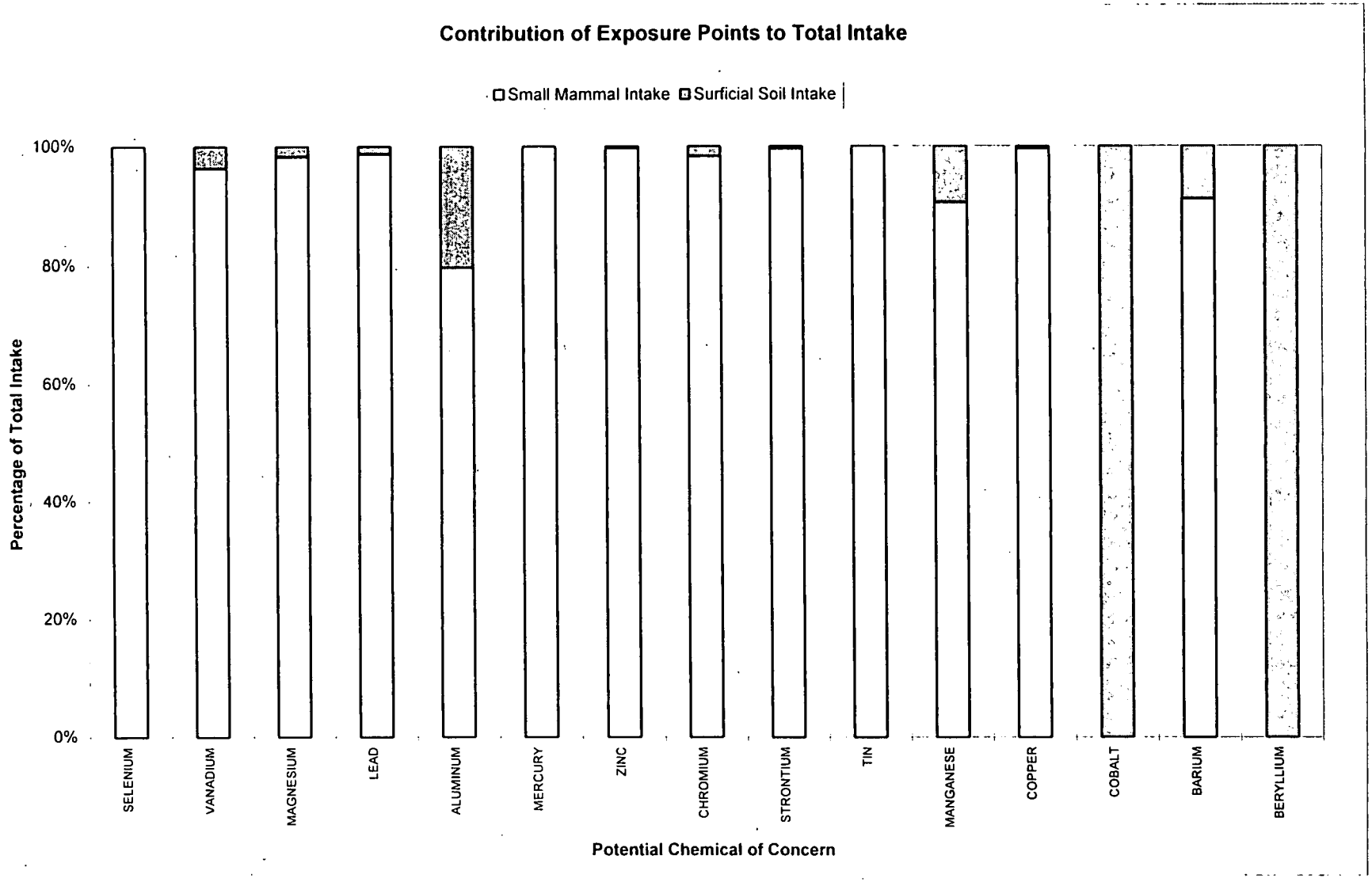
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU6 B-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU6 B-Ponds Source Area at RFETS

AMERICAN KESTRELS OU6 B-PONDS		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = 0.290 SUF = 0.208		IR = I SUF = I		IR = 0.008 SUF = 0.208					
SELENIUM		53.918	3.252	NR	—	ND	—	3.252	0.820	3.97	22.80%
VANADIUM	X	28.178	1.700	NR	—	38.900	0.065	1.764	0.616	2.86	16.46%
MAGNESIUM	X	5898.794	355.815	NR	—	3790.000	6.307	362.122	127.452	2.84	16.33%
LEAD	X	78.532	4.737	NR	—	37.200	0.062	4.799	3.850	1.25	7.17%
ALUMINUM		2019.911	121.841	NR	—	18700.000	31.117	152.958	130.867	1.17	6.72%
MERCURY	X	0.235	0.014	NR	—	ND	—	0.014	0.014	1.00	5.75%
ZINC	X	606.869	36.606	NR	—	64.100	0.107	36.713	38.207	0.96	5.52%
CHROMIUM	X	32.115	1.937	NR	—	19.900	0.033	1.970	2.207	0.89	5.13%
STRONTIUM	X	163.891	9.886	NR	—	25.500	0.042	9.928	14.151	0.70	4.03%
TIN		117.725	7.101	NR	—	ND	—	7.101	11.455	0.62	3.56%
MANGANESE	X	84.595	5.103	NR	—	321.000	0.534	5.637	21.089	0.27	1.54%
COPPER	X	112.560	6.790	NR	—	17.000	0.028	6.818	33.680	0.20	1.16%
COBALT	X	ND	—	NR	—	9.000	0.015	0.015	0.076	0.20	1.13%
BARIUM	X	55.126	3.325	NR	—	194.000	0.323	3.648	21.155	0.17	0.99%
BERYLLIUM		ND	—	NR	—	0.970	0.002	0.002	0.015	0.13	0.77%
LITHIUM		ND	—	NR	—	5.900	0.010	0.010	0.099	0.10	0.58%
THALLIUM		ND	—	NR	—	0.230	3.83E-04	3.83E-04	0.007	0.05	0.31%
ARSENIC	X	ND	—	NR	—	5.100	0.008	0.008	1.846	<0.01	0.02%
SILVER	X	16.472	0.994	NR	—	ND	—	0.994	2304.896	<0.01	<0.01%
NICKEL	X	ND	—	NR	—	14.600	0.024	0.024	146.122	<0.01	<0.01%

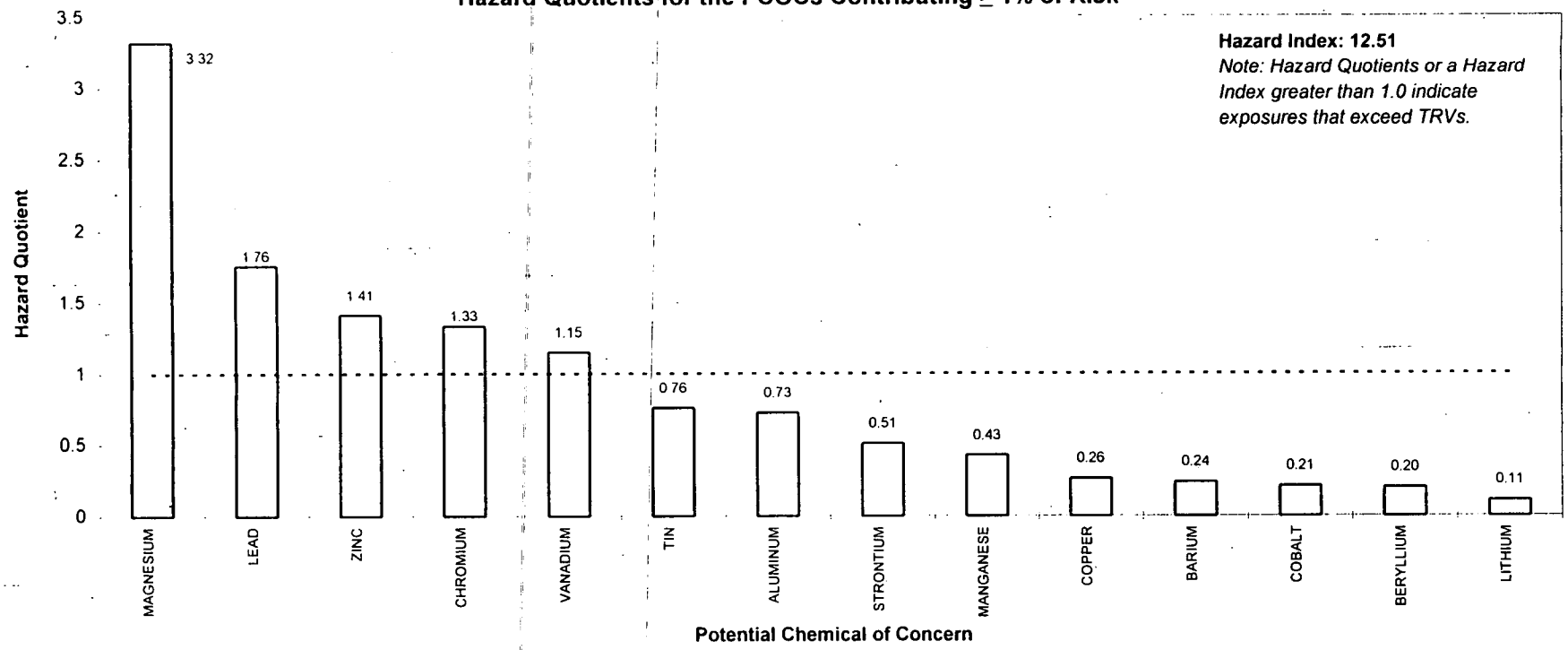
HAZARD INDEX 17.39

Notes:

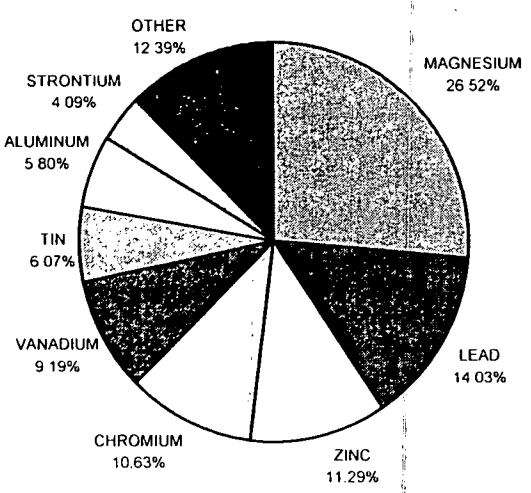
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU6 A-Ponds Source Area at RFETS

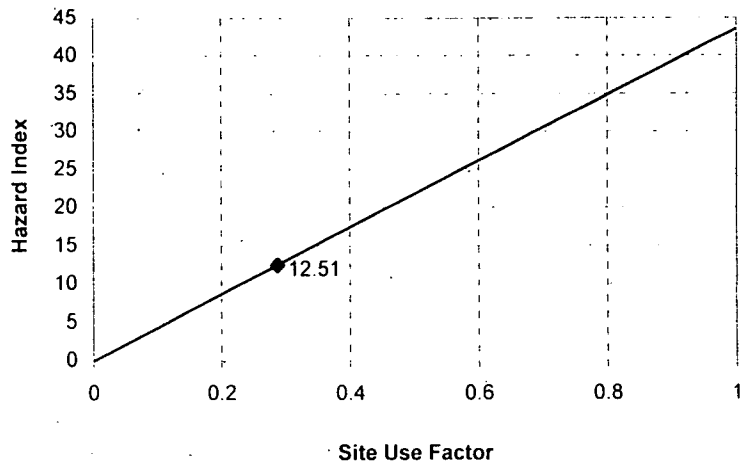
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



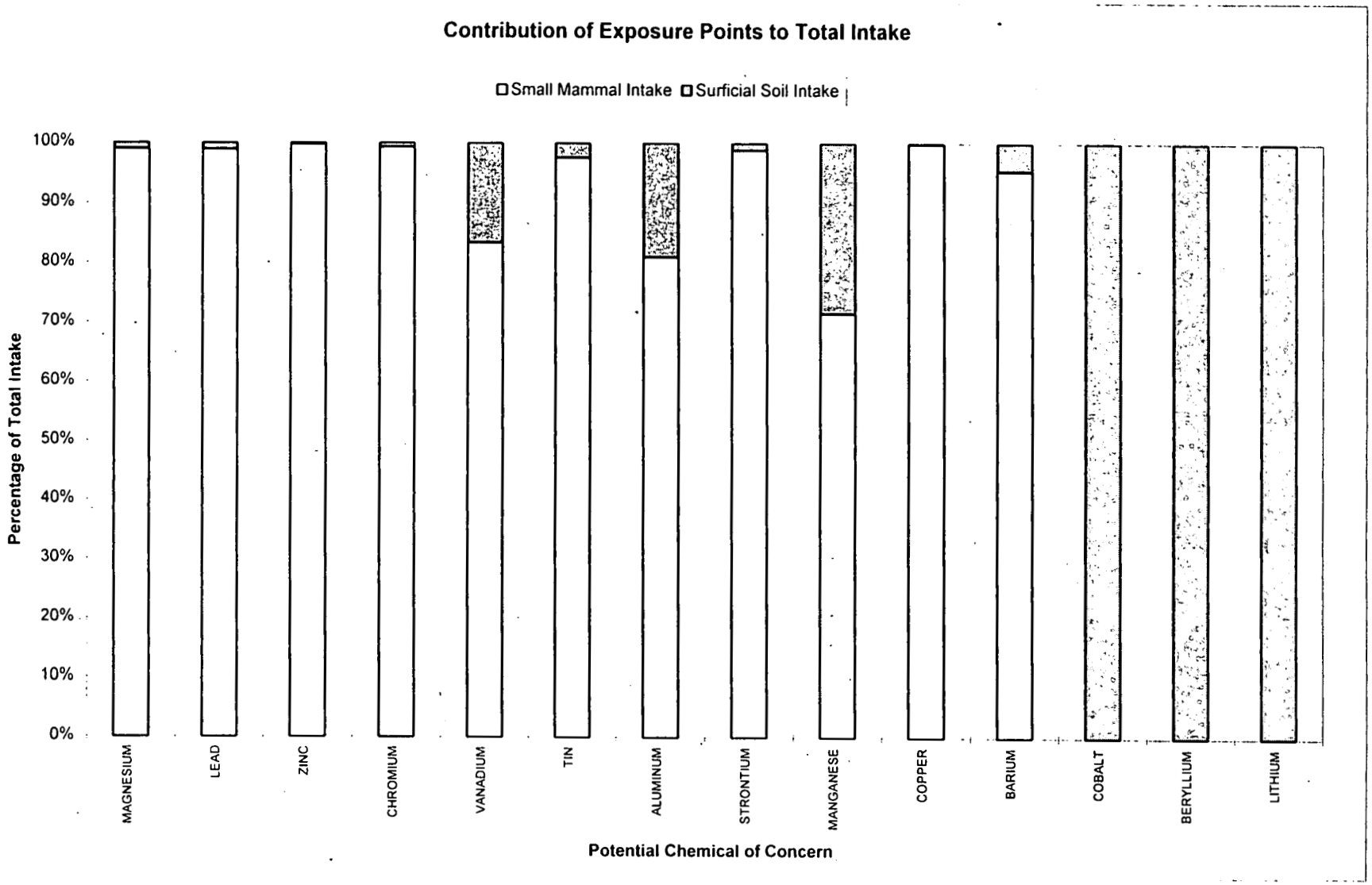
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU6 A-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU6 A-Ponds Source Area at RFETS

AMERICAN KESTRELS OU6 A-PONDS		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = 0.290 SUF = 0.287		IR = I SUF = I		IR = 0.008 SUF = 0.287					
MAGNESIUM	X	5030.433	418.683	NR	—	1880.000	4.316	422.999	127.452	3.32	26.52%
LEAD	X	80.277	6.681	NR	—	33.000	0.076	6.757	3.850	1.76	14.03%
ZINC	X	646.549	53.812	NR	—	65.800	0.151	53.963	38.207	1.41	11.29%
CHROMIUM	X	35.026	2.915	NR	—	9.000	0.021	2.936	2.207	1.33	10.63%
VANADIUM	X	7.100	0.591	NR	—	51.100	0.117	0.708	0.616	1.15	9.19%
TIN		102.000	8.489	NR	—	93.300	0.214	8.704	11.455	0.76	6.07%
ALUMINUM		925.173	77.002	NR	—	7830.000	17.978	94.980	130.867	0.73	5.80%
STRONTIUM	X	85.892	7.149	NR	—	37.100	0.085	7.234	14.151	0.51	4.09%
MANGANESE	X	77.287	6.433	NR	—	1110.000	2.549	8.981	21.089	0.43	3.40%
COPPER	X	106.489	8.863	NR	—	5.000	0.011	8.875	33.680	0.26	2.11%
BARIUM	X	57.799	4.811	NR	—	100.000	0.230	5.040	21.155	0.24	1.90%
COBALT	X	ND	—	NR	—	7.100	0.016	0.016	0.076	0.21	1.68%
BERYLLIUM		ND	—	NR	—	1.300	0.003	0.003	0.015	0.20	1.60%
LITHIUM		ND	—	NR	—	4.800	0.011	0.011	0.099	0.11	0.89%
4,4'-DDT		NR	—	NR	—	0.026	5.97E-05	5.97E-05	0.001	0.06	0.48%
NICKEL	X	54.095	4.502	NR	—	13.100	0.030	4.532	146.122	0.03	0.25%
MOLYBDENUM	X	ND	—	NR	—	5.300	0.012	0.012	2.497	<0.01	0.04%
ARSENIC	X	ND	—	NR	—	2.200	0.005	0.005	1.846	<0.01	0.02%
CADMIUM		ND	—	NR	—	2.200	0.005	0.005	3.115	<0.01	0.01%
SILVER	X	14.724	1.225	NR	—	ND	—	1.225	2304.896	<0.01	<0.01%
delta-BHC		NR	—	NR	—	0.023	5.28E-05	5.28E-05	0.603	<0.01	<0.01%

HAZARD INDEX 12.51

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
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NR = Not reported/analyzed in sample information
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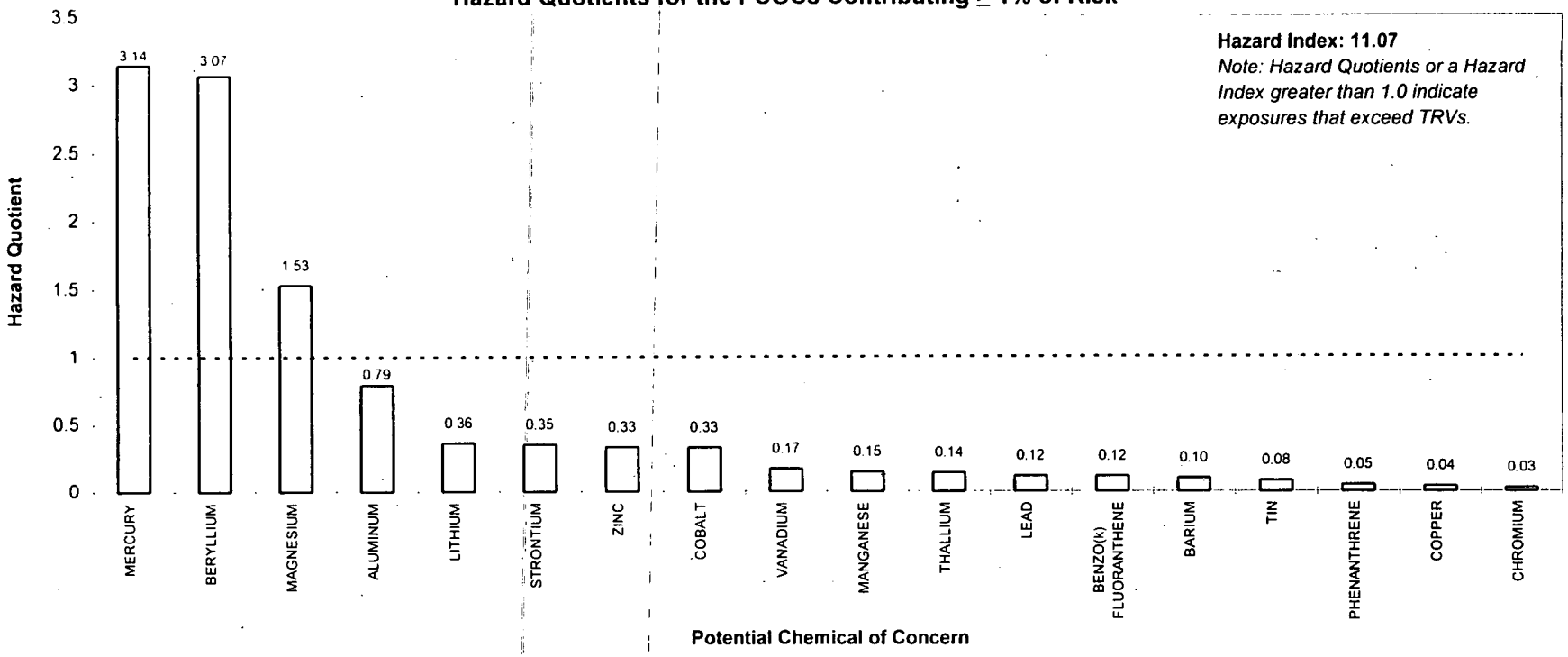
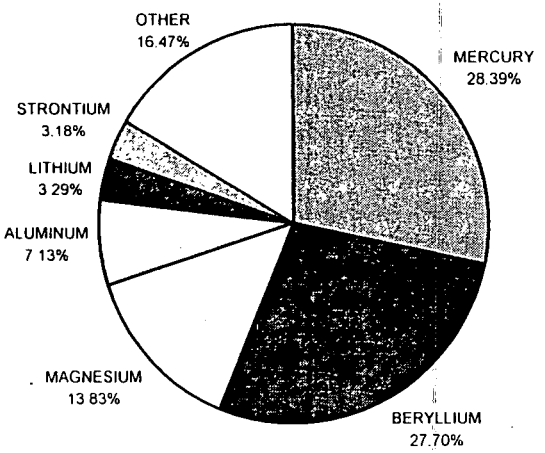
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU6 Soil Dump Areas Source Area at RFETS

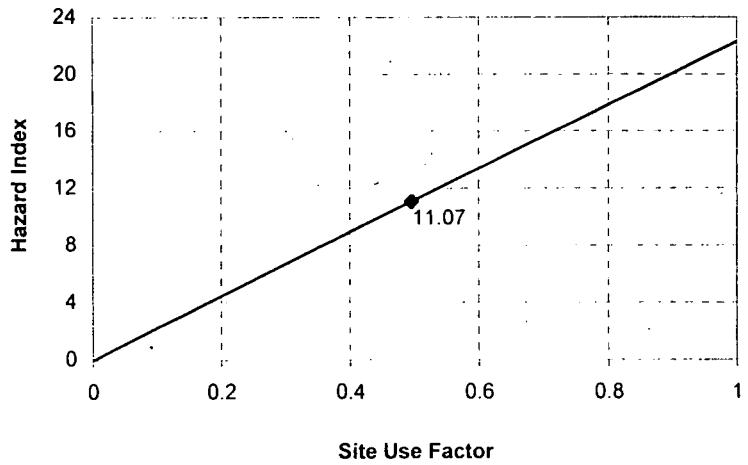
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



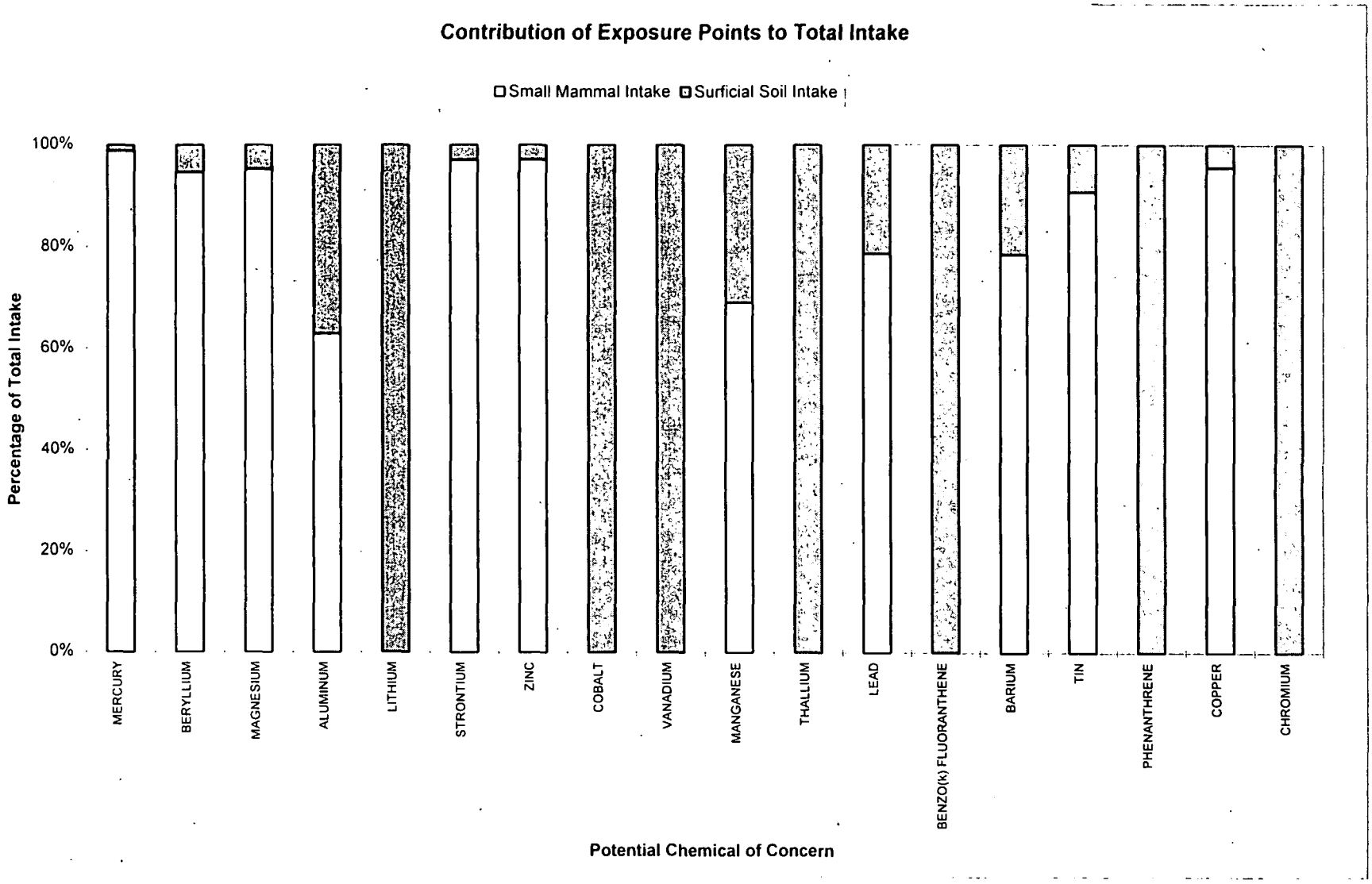
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU6 Soil Dump Areas Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU6 Soil Dump Areas Source Area at RFETS

AMERICAN KESTRELS OU6 SOIL DUMP AREAS		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = 0.290 SUF = 0.496		IR = I SUF = I		IR = 0.008 SUF = 0.496					
MERCURY	X	0.302	0.043	NR	—	0.139	0.001	0.044	0.014	3.14	28.39%
BERYLLIUM		0.300	0.043	NR	—	0.621	0.002	0.046	0.015	3.07	27.70%
MAGNESIUM	X	1291.996	185.841	NR	—	2354.730	9.344	195.184	127.452	1.53	13.83%
ALUMINUM		451.741	64.978	NR	—	9659.033	38.327	103.306	130.867	0.79	7.13%
LITHIUM		ND	—	NR	—	9.142	0.036	0.036	0.099	0.36	3.29%
STRONTIUM	X	33.631	4.837	NR	—	37.401	0.148	4.986	14.151	0.35	3.18%
ZINC	X	85.709	12.328	NR	—	94.049	0.373	12.702	38.207	0.33	3.00%
COBALT	X	ND	—	NR	—	6.279	0.025	0.025	0.076	0.33	2.97%
VANADIUM	X	ND	—	NR	—	26.996	0.107	0.107	0.616	0.17	1.57%
MANGANESE	X	15.079	2.169	NR	—	244.118	0.969	3.138	21.089	0.15	1.34%
THALLIUM		ND	—	NR	—	0.260	0.001	0.001	0.007	0.14	1.29%
LEAD	X	2.505	0.360	NR	—	24.511	0.097	0.458	3.850	0.12	1.07%
BENZO(k) FLUORANTHENE	X	NR	—	NR	—	2.200	0.009	0.009	0.077	0.12	1.06%
BARIUM	X	11.861	1.706	NR	—	117.141	0.465	2.171	21.155	0.10	0.93%
TIN		6.000	0.863	NR	—	22.063	0.088	0.951	11.455	0.08	0.75%
PHENANTHRENE	X	NR	—	NR	—	1.056	0.004	0.004	0.077	0.05	0.47%
COPPER	X	9.200	1.323	NR	—	15.408	0.061	1.384	33.680	0.04	0.37%
CHROMIUM	X	ND	—	NR	—	15.651	0.062	0.062	2.207	0.03	0.25%
BENZO(a)PYRENE	X	NR	—	NR	—	0.495	0.002	0.002	0.078	0.03	0.23%
ANTHRACENE	X	NR	—	NR	—	0.382	0.002	0.002	0.078	0.03	0.23%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	—	0.473	0.002	0.002	0.121	0.02	0.15%
NITRATE/NITRITE		NR	—	NR	—	7.689	0.031	0.031	2.007	0.02	0.14%
ARSENIC	X	ND	—	NR	—	4.989	0.020	0.020	1.846	0.01	0.10%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	—	2.270	0.009	0.009	1.204	0.01	0.07%
FLUORANTHENE	X	NR	—	NR	—	1.376	0.005	0.005	0.776	0.01	0.06%
PYRENE	X	NR	—	NR	—	1.337	0.005	0.005	0.776	0.01	0.06%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	—	0.334	0.001	0.001	0.194	0.01	0.05%
DIBENZO(a,h)ANTHRACENE	X	NR	—	NR	—	0.130	0.001	0.001	0.078	0.01	0.12%
AROCLOR-1254	X	NR	—	NR	—	0.429	0.002	0.002	0.361	0.01	0.05%
BENZO(b)FLUORANTHENE	X	NR	—	NR	—	0.855	0.003	0.003	0.774	<0.01	0.04%
CADMIUM		ND	—	NR	—	3.054	0.012	0.012	3.115	<0.01	0.03%
CHRYSENE	X	NR	—	NR	—	0.577	0.002	0.002	0.776	<0.01	0.02%
BENZO(a)ANTHRACENE	X	NR	—	NR	—	0.526	0.002	0.002	0.776	<0.01	0.02%
BENZO(ghi)PERYLENE	X	NR	—	NR	—	0.292	0.001	0.001	0.776	<0.01	0.01%
FLUORENE	X	NR	—	NR	—	0.232	0.001	0.001	0.774	<0.01	0.01%
NICKEL	X	ND	—	NR	—	11.325	0.045	0.045	146.122	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	—	NR	—	0.658	0.003	0.003	99.060	<0.01	<0.01%

Summary of Ecotoxicological Risk to American Kestrels in the OU6 Soil Dump Areas Source Area at RFETS

AMERICAN KESTRELS OU6 SOIL DUMP AREAS		EXPOSURE POINT						*SUMMARY*			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = 0.290 SUF = 0.496		IR = I SUF = I		IR = 0.008 SUF = 0.496					
ACENAPHTHENE	X	NR	—	NR	—	0.244	0.001	0.001	77.625	<0.01	<0.01%
NAPHTHALENE	X	NR	—	NR	—	0.110	4.36E-04	4.36E-04	77.625	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	—	NR	—	0.072	2.86E-04	2.86E-04	226.426	<0.01	<0.01%

HAZARD INDEX 11.07

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
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SUF = Site Use Factor
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NR = Not reported/analyzed in sample information
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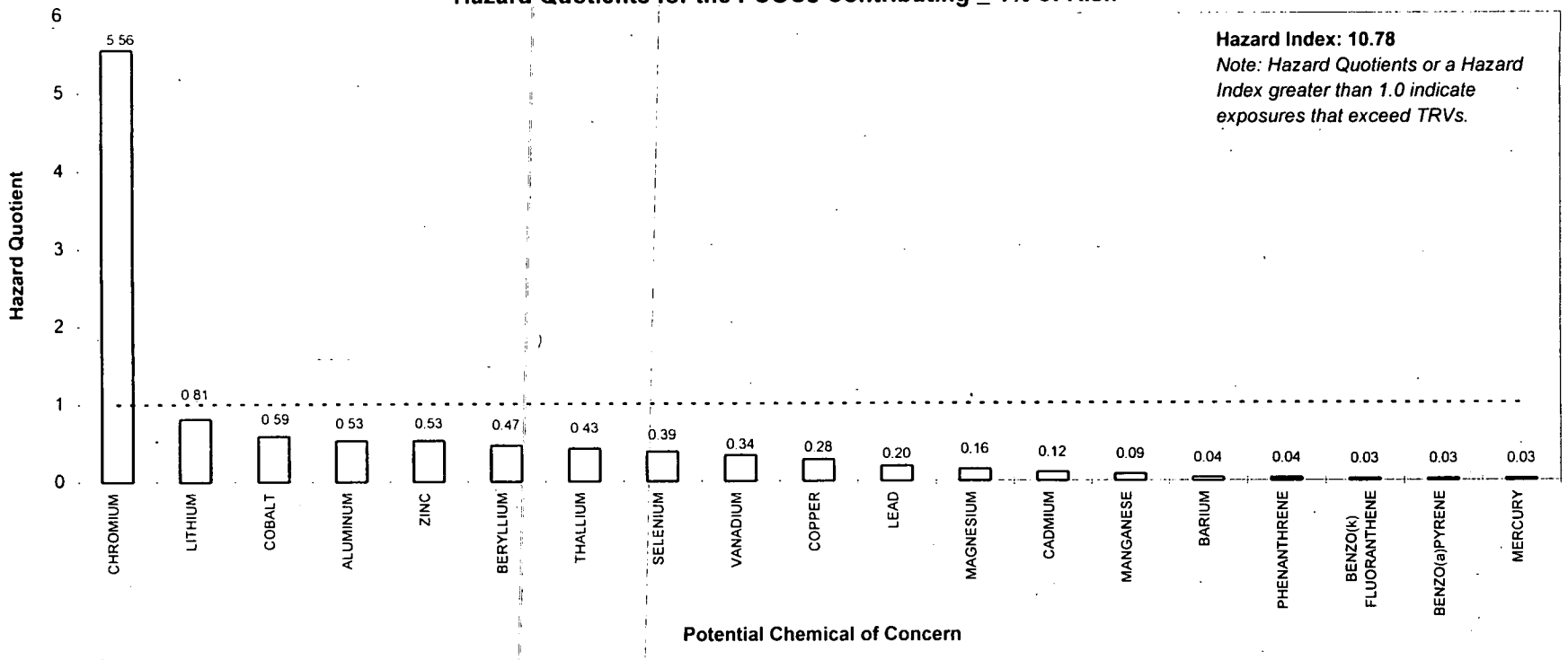
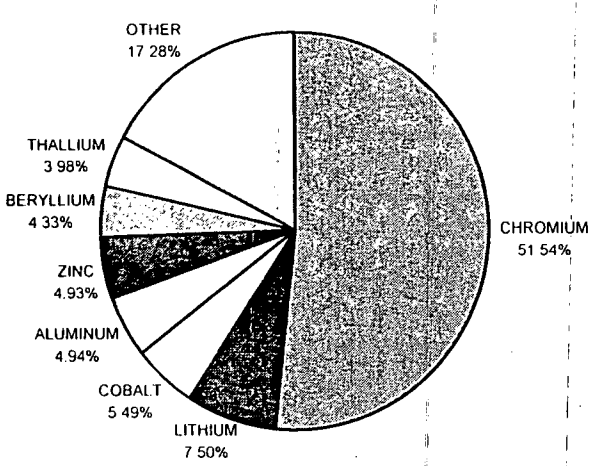
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU2 903 Pad Source Area at RFETS

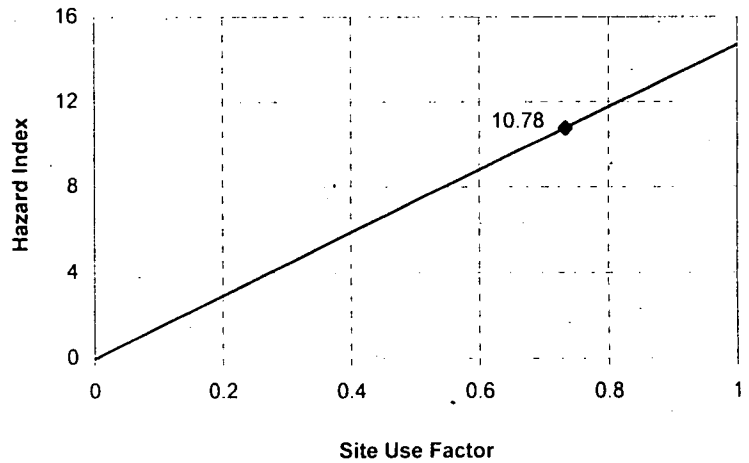
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



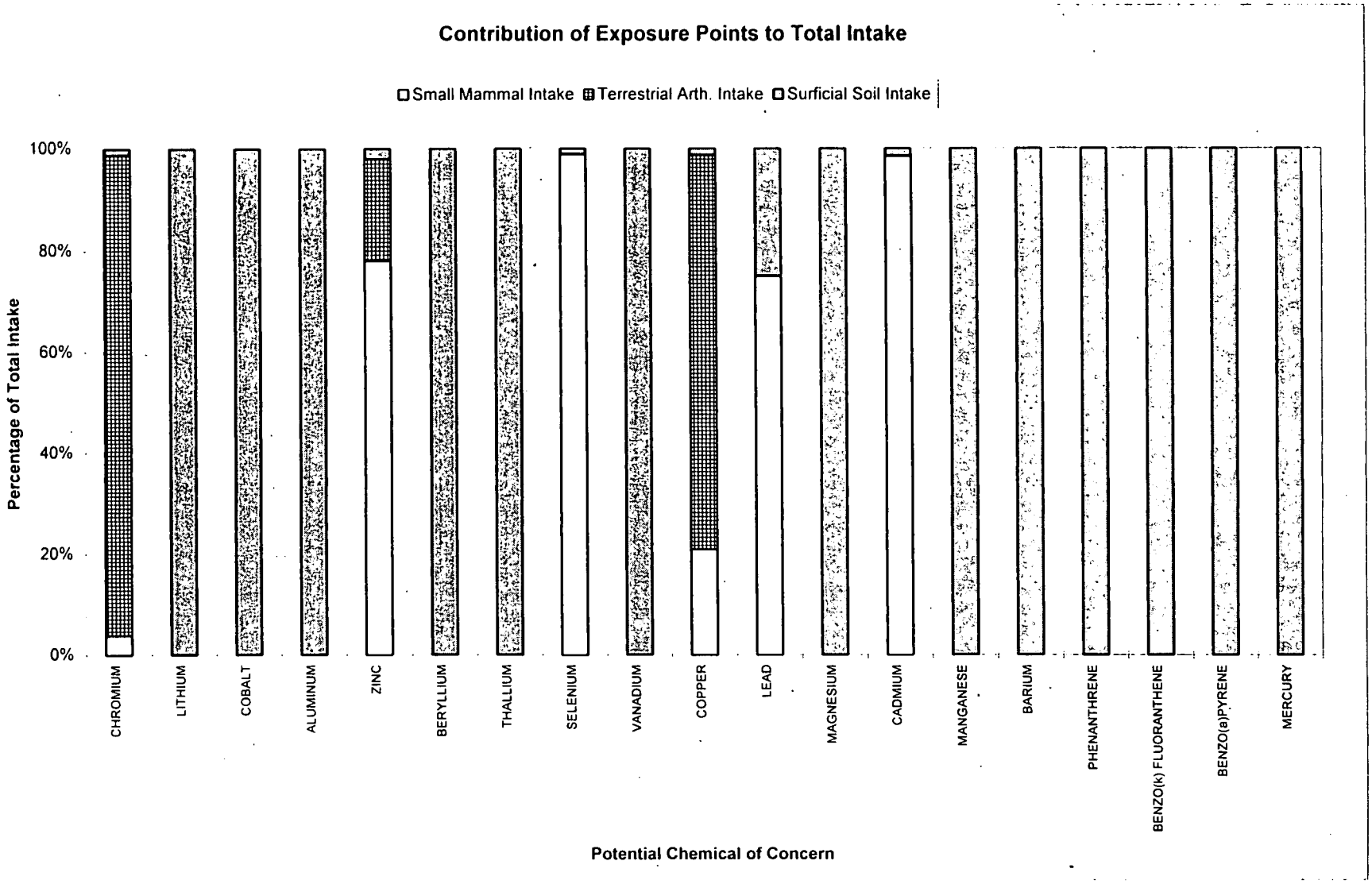
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU2 903 Pad Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU2 903 Pad Source Area at RFETS

AMERICAN KESTRELS OU2 903 PAD		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte[1]	PCOC for OU2	IR = 0.140 SUF = 0.733		IR = 0.150 SUF = 0.733		IR = 0.008 SUF = 0.733					
CHROMIUM	X	4.600	0.472	131.000	11.633	26.789	0.157	12.262	2.207	5.56	51.54%
LITHIUM		NR	—	NR	—	13.592	0.080	0.080	0.099	0.81	7.50%
COBALT		NR	—	NR	—	7.671	0.045	0.045	0.076	0.59	5.49%
ALUMINUM		NR	—	NR	—	11886.180	69.701	69.701	130.867	0.53	4.94%
ZINC		154.647	15.870	36.600	4.024	72.699	0.426	20.320	38.207	0.53	4.93%
BERYLLIUM		NR	—	NR	—	1.200	0.007	0.007	0.015	0.47	4.33%
THALLIUM		NR	—	NR	—	0.430	0.003	0.003	0.007	0.43	3.98%
SELENIUM		3.059	0.314	ND	—	0.620	0.004	0.318	0.820	0.39	3.60%
VANADIUM		NR	—	NR	—	35.681	0.209	0.209	0.616	0.34	3.15%
COPPER		19.385	1.989	67.300	7.400	21.815	0.128	9.517	33.680	0.28	2.62%
LEAD	X	5.567	0.571	ND	—	32.367	0.190	0.761	3.850	0.20	1.83%
MAGNESIUM		NR	—	NR	—	3426.354	20.092	20.092	127.452	0.16	1.46%
CADMIUM		3.448	0.354	ND	—	0.920	0.005	0.359	3.115	0.12	1.07%
MANGANESE		NR	—	NR	—	318.236	1.866	1.866	21.089	0.09	0.82%
BARIUM		NR	—	NR	—	143.681	0.843	0.843	21.155	0.04	0.37%
PHENANTHRENE	X	NR	—	NR	—	0.556	0.003	0.003	0.077	0.04	0.36%
BENZO(k) FLUORANTHENE	X	NR	—	NR	—	0.311	0.002	0.002	0.077	0.03	0.24%
BENZO(a)PYRENE	X	NR	—	NR	—	0.320	0.002	0.002	0.078	0.03	0.24%
MERCURY		ND	—	ND	—	0.060	3.52E-04	3.52E-04	0.014	0.03	0.23%
STRONTIUM		NR	—	NR	—	43.040	0.252	0.252	14.151	0.02	0.17%
TIN		NR	—	NR	—	33.323	0.195	0.195	11.455	0.02	0.16%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	—	0.353	0.002	0.002	0.121	0.02	0.15%
ANTHRACENE		NR	—	NR	—	0.201	0.001	0.001	0.078	0.01	0.12%
DIBENZO(a,h)ANTHRACENE		NR	—	NR	—	0.092	0.001	0.001	0.078	0.01	0.12%
ARSENIC		NR	—	NR	—	3.998	0.023	0.023	1.846	0.01	0.12%
NITRATE/NITRITE		NR	—	NR	—	3.106	0.018	0.018	2.007	0.01	0.08%
MOLYBDENUM		NR	—	NR	—	3.000	0.018	0.018	2.497	0.01	0.07%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	—	0.188	0.001	0.001	0.194	0.01	0.05%
FLUORANTHENE	X	NR	—	NR	—	0.689	0.004	0.004	0.776	0.01	0.05%
PYRENE	X	NR	—	NR	—	0.644	0.004	0.004	0.776	0.01	0.05%
AROCLOR-1248		NR	—	NR	—	0.211	0.001	0.001	0.361	<0.01	0.03%
AROCLOR-1254	X	NR	—	NR	—	0.208	0.001	0.001	0.361	<0.01	0.03%
BENZO(b)FLUORANTHENE	X	NR	—	NR	—	0.337	0.002	0.002	0.774	<0.01	0.02%
CHRYSENE	X	NR	—	NR	—	0.341	0.002	0.002	0.776	<0.01	0.02%
BENZO(a)ANTHRACENE	X	NR	—	NR	—	0.334	0.002	0.002	0.776	<0.01	0.02%
FLUORENE		NR	—	NR	—	0.190	0.001	0.001	0.774	<0.01	0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	—	0.191	0.001	0.001	0.776	<0.01	0.01%

Summary of Ecotoxicological Risk to American Kestrels in the OU2 903 Pad Source Area at RFETS

AMERICAN KESTRELS *OU2 903 PAD*		EXPOSURE POINT						*SUMMARY*			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte[1]	PCOC for OU2	IR = 0.140 SUF = 0.733		IR = 0.150 SUF = 0.733		IR = 0.008 SUF = 0.733					
NICKEL		NR	—	NR	—	26.987	0.158	0.158	146.122	<0.01	0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	—	0.248	0.001	0.001	1.204	<0.01	0.01%
ACENAPHTHENE		NR	—	NR	—	0.186	0.001	0.001	77.625	<0.001	<0.01%

[1] Chromium concentration in terrestrial arthropods is estimated from tissue:soil ratios in the East Trenches source area.

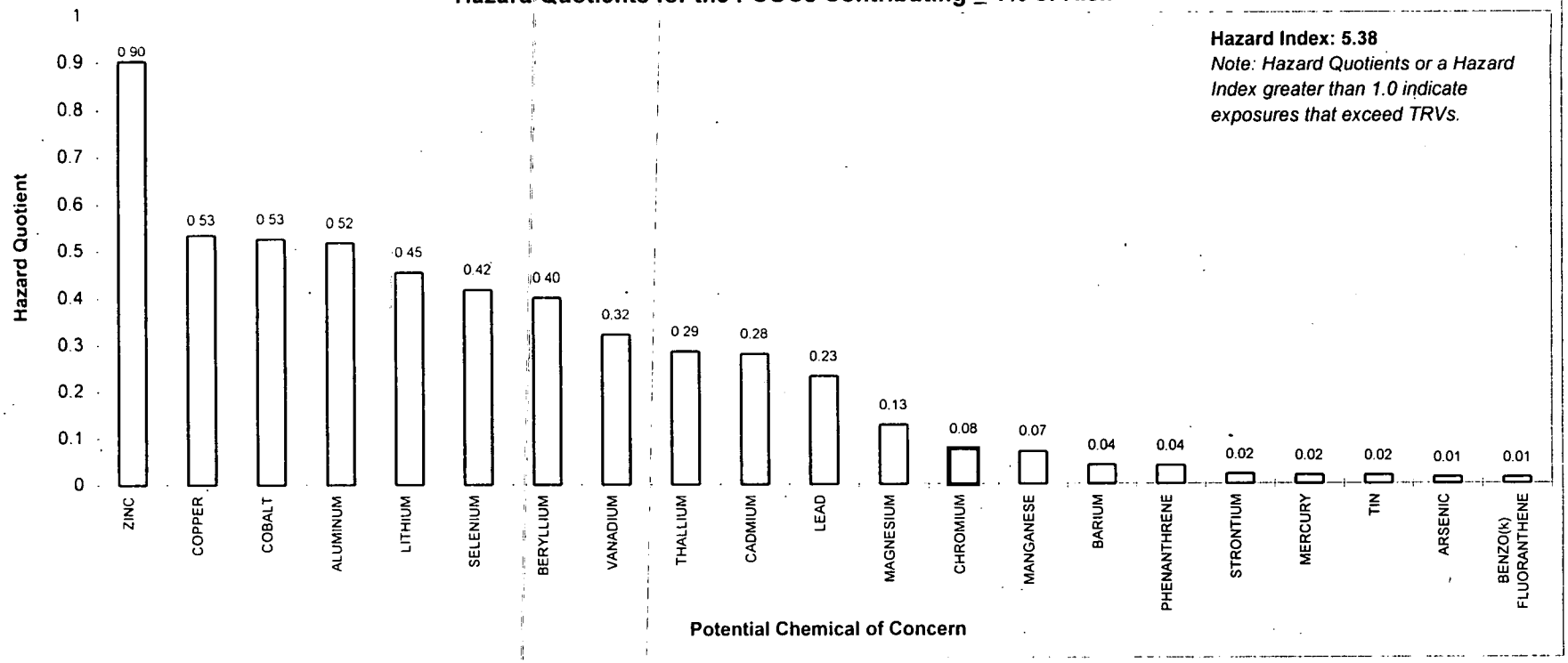
HAZARD INDEX 10.78

Notes:

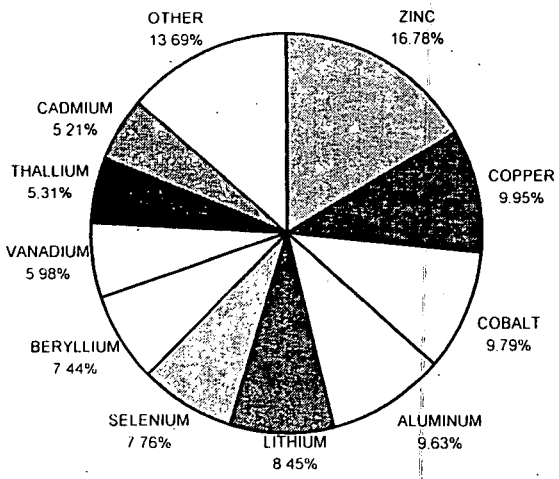
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU1 881 Hillside Source Area at RFETS

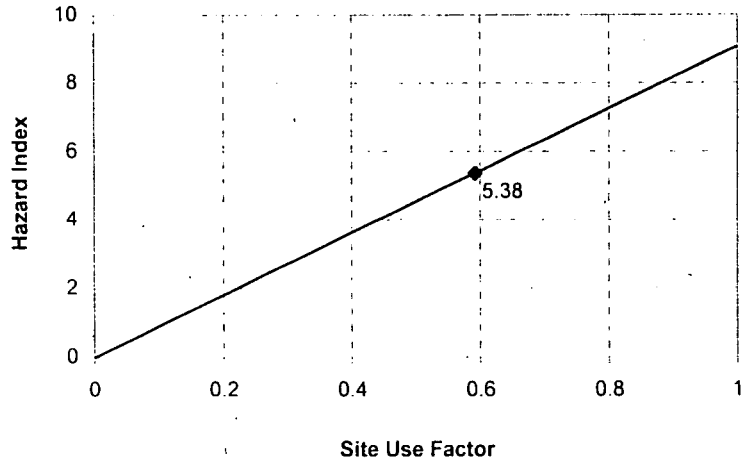
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



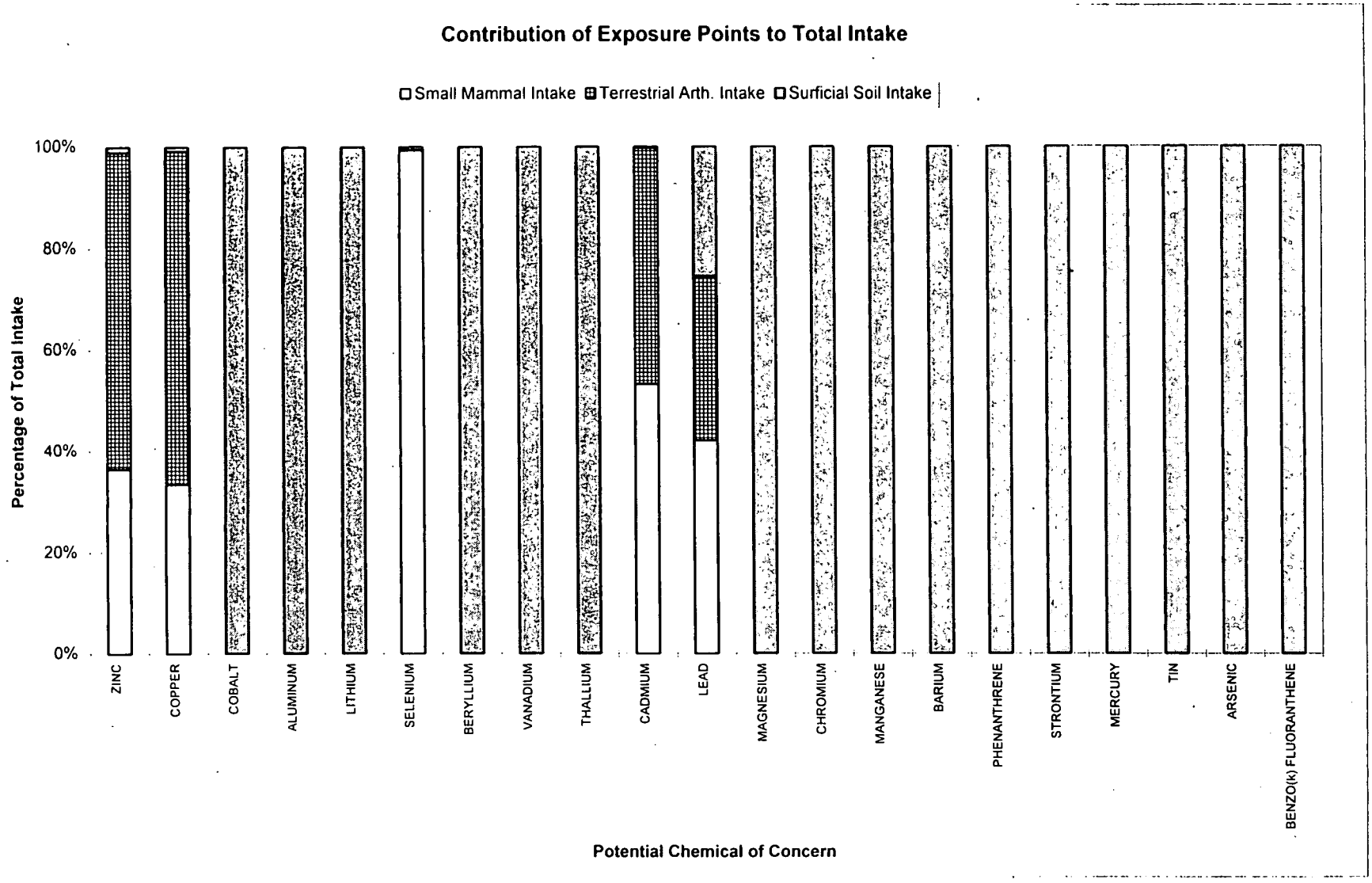
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU1 881 Hillside Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU1 881 Hillside Source Area at RFETS

AMERICAN KESTRELS OU1 881 HILLSIDE		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU1	IR = 0.140 SUF = 0.592		IR = 0.150 SUF = 0.592		IR = 0.008 SUF = 0.592					
ZINC		151.809	12.582	242.000	21.490	85.548	0.405	34.477	38.207	0.90	16.78%
COPPER		72.817	6.035	133.000	11.810	35.484	0.168	18.014	33.680	0.53	9.95%
COBALT		NR	—	NR	—	8.343	0.040	0.040	0.076	0.53	9.79%
ALUMINUM		NR	—	NR	—	14308.320	67.764	67.764	130.867	0.52	9.63%
LITHIUM		NR	—	NR	—	9.473	0.045	0.045	0.099	0.45	8.45%
SELENIUM		4.092	0.339	ND	—	0.511	0.002	0.342	0.820	0.42	7.76%
BERYLLIUM		NR	—	NR	—	1.257	0.006	0.006	0.015	0.40	7.44%
VANADIUM		NR	—	NR	—	41.858	0.198	0.198	0.616	0.32	5.98%
THALLIUM		NR	—	NR	—	0.510	0.002	0.002	0.007	0.29	5.31%
CADMIUM		5.607	0.465	4.567	0.406	0.611	0.003	0.873	3.115	0.28	5.21%
LEAD		4.542	0.376	3.258	0.289	48.003	0.227	0.893	3.850	0.23	4.31%
MAGNESIUM		NR	—	NR	—	3418.568	16.190	16.190	127.452	0.13	2.36%
CHROMIUM		ND	—	ND	—	34.997	0.166	0.166	2.207	0.08	1.40%
MANGANESE		NR	—	NR	—	312.554	1.480	1.480	21.089	0.07	1.31%
BARIUM		NR	—	NR	—	179.137	0.848	0.848	21.155	0.04	0.75%
PHENANTHRENE	X	NR	—	NR	—	0.559	0.003	0.003	0.077	0.04	0.72%
STRONTIUM		NR	—	NR	—	61.651	0.292	0.292	14.151	0.02	0.38%
MERCURY		ND	—	ND	—	0.054	2.55E-04	2.55E-04	0.014	0.02	0.34%
TIN		NR	—	NR	—	43.094	0.204	0.204	11.455	0.02	0.33%
ARSENIC		NR	—	NR	—	5.377	0.025	0.025	1.846	0.01	0.25%
BENZO(k) FLUORANTHENE	X	NR	—	NR	—	0.297	0.001	0.001	0.077	0.01	0.24%
BENZO(a)PYRENE	X	NR	—	NR	—	0.311	0.001	0.001	0.078	0.01	0.24%
ANTHRACENE	X	NR	—	NR	—	0.202	0.001	0.001	0.078	0.01	0.24%
DIBENZO(a,h)ANTHRACENE	X	NR	—	NR	—	0.092	4.36E-04	4.36E-04	0.078	0.01	0.10%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	—	0.204	0.001	0.001	0.194	0.01	0.10%
FLUORANTHENE	X	NR	—	NR	—	0.762	0.004	0.004	0.776	0.01	0.10%
NITRATE/NITRITE		NR	—	NR	—	2.111	0.010	0.010	2.007	<0.01	0.09%
PYRENE	X	NR	—	NR	—	0.693	0.003	0.003	0.776	<0.01	0.07%
MOLYBDENUM		NR	—	NR	—	1.926	0.009	0.009	2.497	<0.01	0.07%
AROCLOR-1254	X	NR	—	NR	—	0.257	0.001	0.001	0.361	<0.01	0.05%
AROCLOR-1248	X	NR	—	NR	—	0.123	0.001	0.001	0.361	<0.01	0.05%
CHRYSENE	X	NR	—	NR	—	0.361	0.002	0.002	0.776	<0.01	0.05%
BENZO(a)ANTHRACENE	X	NR	—	NR	—	0.327	0.002	0.002	0.776	<0.01	0.05%
BENZO(b)FLUORANTHENE	X	NR	—	NR	—	0.314	0.001	0.001	0.774	<0.01	0.02%
FLUORENE	X	NR	—	NR	—	0.193	0.001	0.001	0.774	<0.01	0.02%
BENZO(ghi)PERYLENE	X	NR	—	NR	—	0.205	0.001	0.001	0.776	<0.01	0.02%
NICKEL		NR	—	NR	—	29.863	0.141	0.141	146.122	<0.01	0.02%

Summary of Ecotoxicological Risk to American Kestrels in the OU1 881 Hillside Source Area at RFETS

AMERICAN KESTRELS OU1 881 HILLSIDE		EXPOSURE POINT						*SUMMARY*			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU1	IR = 0.140 SUF = 0.592		IR = 0.150 SUF = 0.592		IR = 0.008 SUF = 0.592					
ACENAPHTHENE	X	NR	—	NR	—	0.195	0.001	0.001	77.625	<0.01	<0.01%
NAPHTHALENE	X	NR	—	NR	—	0.110	0.001	0.001	77.625	<0.01	<0.01%

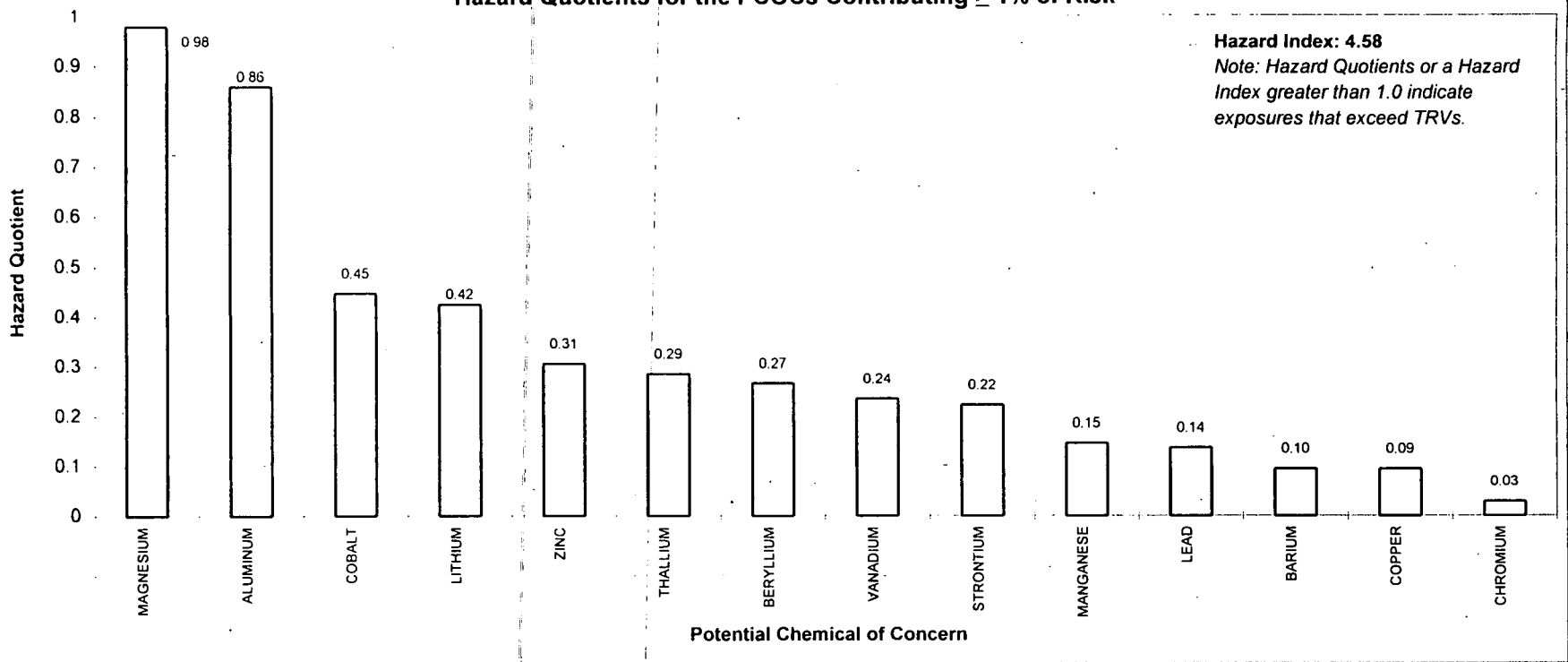
HAZARD INDEX 5.38

Notes:

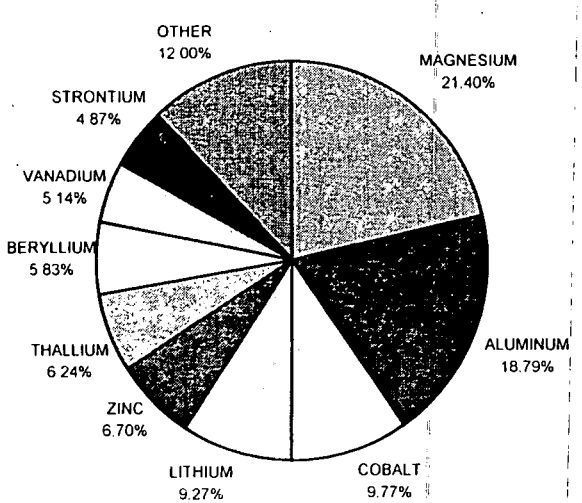
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU5 Ash Pits Source Area at RFETS

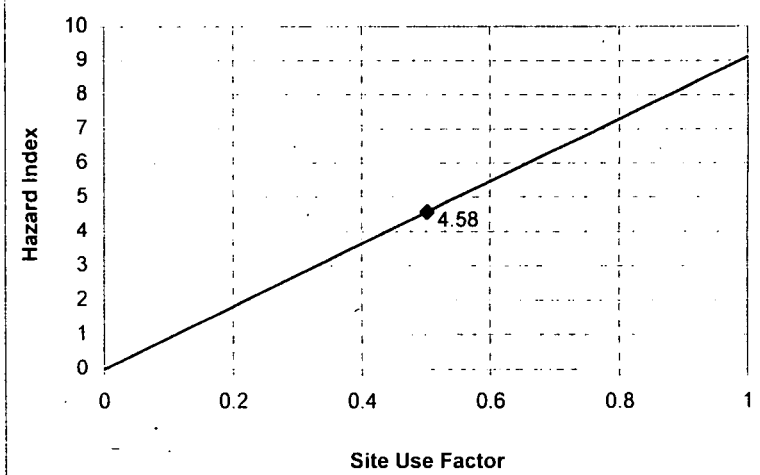
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



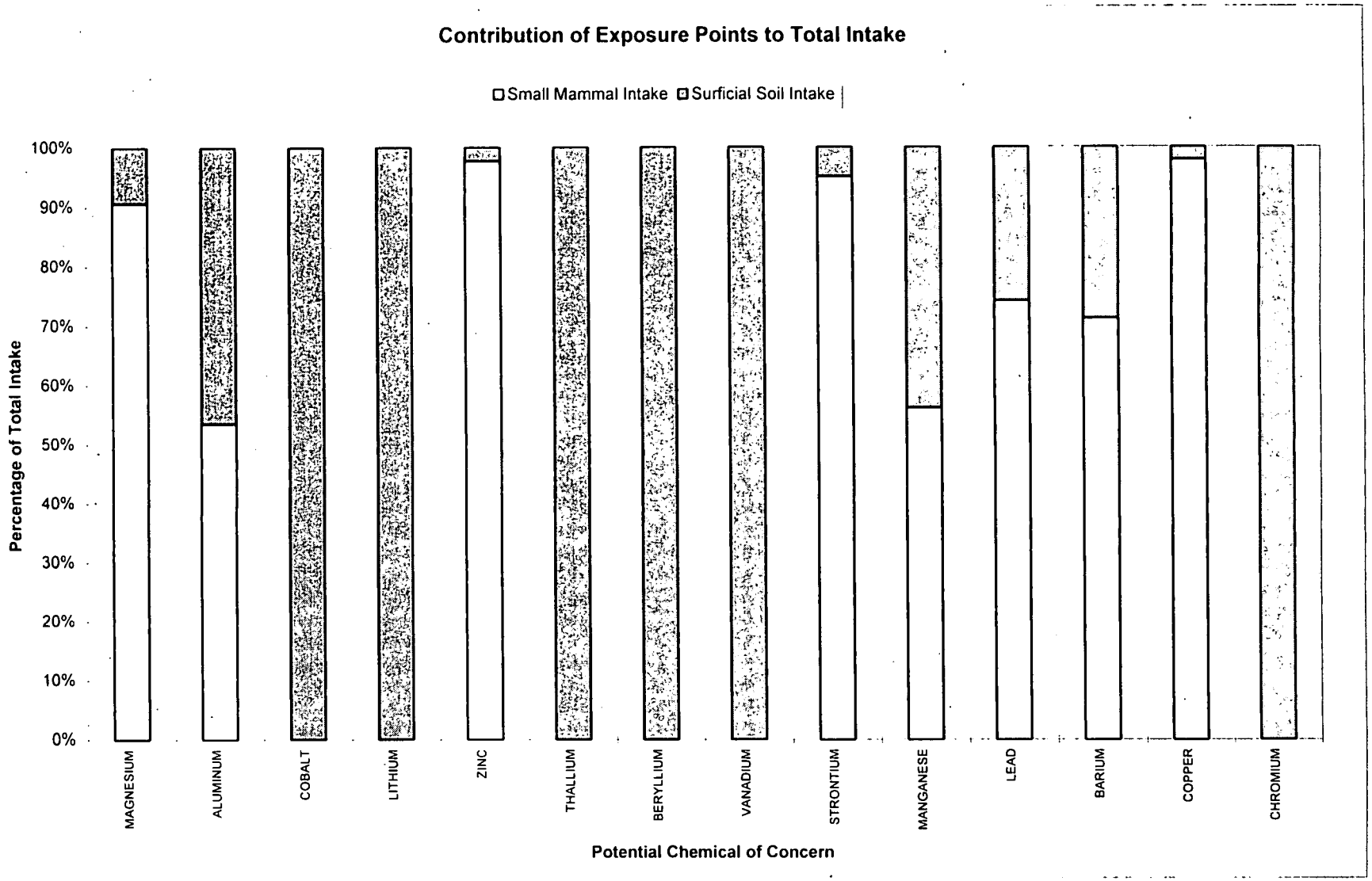
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU5 Ash Pits Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU5 Ash Pits Source Area at RFETS

AMERICAN KESTRELS OU5 ASH PITS		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU5	IR = 0.290 SUF = 0.502		IR = I SUF = I		IR = 0.008 SUF = 0.502					
MAGNESIUM		776.812	113.088	NR	—	2929.961	11.767	124.855	127.452	0.98	21.40%
ALUMINUM		413.418	60.185	NR	—	13038.844	52.364	112.549	130.867	0.86	18.79%
COBALT	X	ND	—	NR	—	8.402	0.034	0.034	0.076	0.45	9.77%
LITHIUM	X	ND	—	NR	—	10.380	0.042	0.042	0.099	0.42	9.27%
ZINC	X	78.515	11.430	NR	—	69.631	0.280	11.710	38.207	0.31	6.70%
THALLIUM		ND	—	NR	—	0.520	0.002	0.002	0.007	0.29	6.24%
BERYLLIUM		ND	—	NR	—	0.940	0.004	0.004	0.015	0.27	5.83%
VANADIUM		ND	—	NR	—	36.213	0.145	0.145	0.616	0.24	5.14%
STRONTIUM	X	20.606	3.000	NR	—	38.768	0.156	3.155	14.151	0.22	4.87%
MANGANESE		11.936	1.738	NR	—	337.520	1.355	3.093	21.089	0.15	3.20%
LEAD	X	2.692	0.392	NR	—	33.783	0.136	0.528	3.850	0.14	3.00%
BARIUM	X	9.863	1.436	NR	—	143.888	0.578	2.014	21.155	0.10	2.08%
COPPER	X	21.419	3.118	NR	—	16.938	0.068	3.186	33.680	0.09	2.07%
CHROMIUM		ND	—	NR	—	15.956	0.064	0.064	2.207	0.03	0.63%
MERCURY	X	ND	—	NR	—	0.078	3.12E-04	3.12E-04	0.014	0.02	0.49%
ARSENIC		ND	—	NR	—	5.715	0.023	0.023	1.846	0.01	0.27%
TIN		ND	—	NR	—	16.661	0.067	0.067	11.455	0.01	0.13%
SELENIUM		ND	—	NR	—	0.410	0.002	0.002	0.820	<0.01	0.05%
CADMIUM		ND	—	NR	—	1.349	0.005	0.005	3.115	<0.01	0.04%
MOLYBDENUM		ND	—	NR	—	0.928	0.004	0.004	2.497	<0.01	0.03%
NICKEL		ND	—	NR	—	13.578	0.055	0.055	146.122	<0.01	0.01%
SILVER	X	ND	—	NR	—	1.807	0.007	0.007	2304.896	<0.01	<0.01%

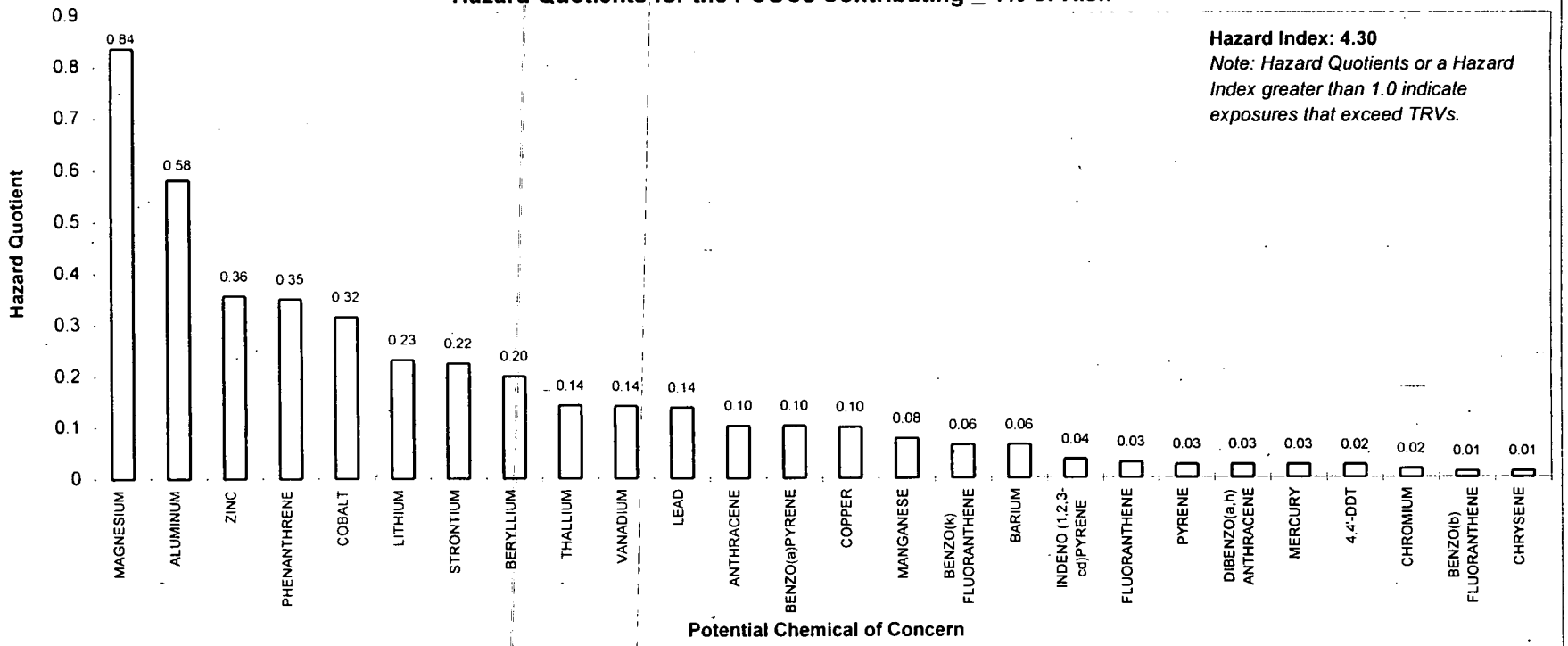
HAZARD INDEX 4.58

Notes:

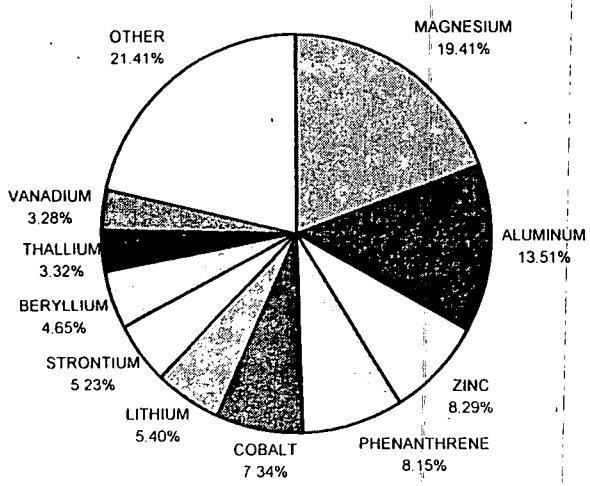
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU5 Old Landfill Source Area at RFETS

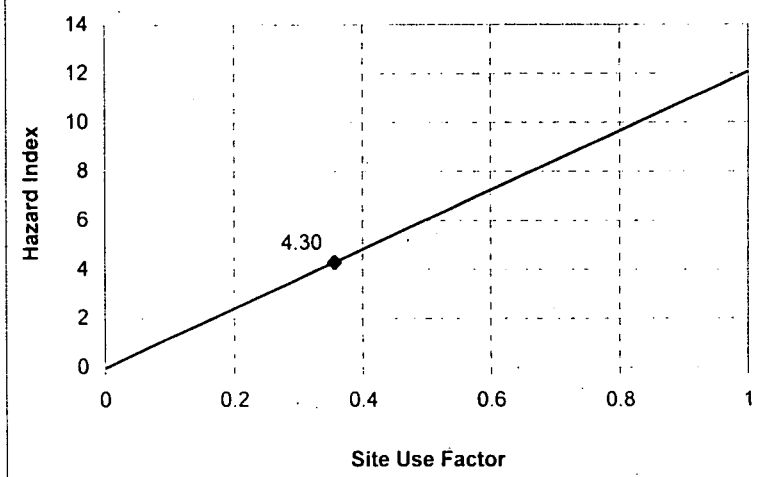
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



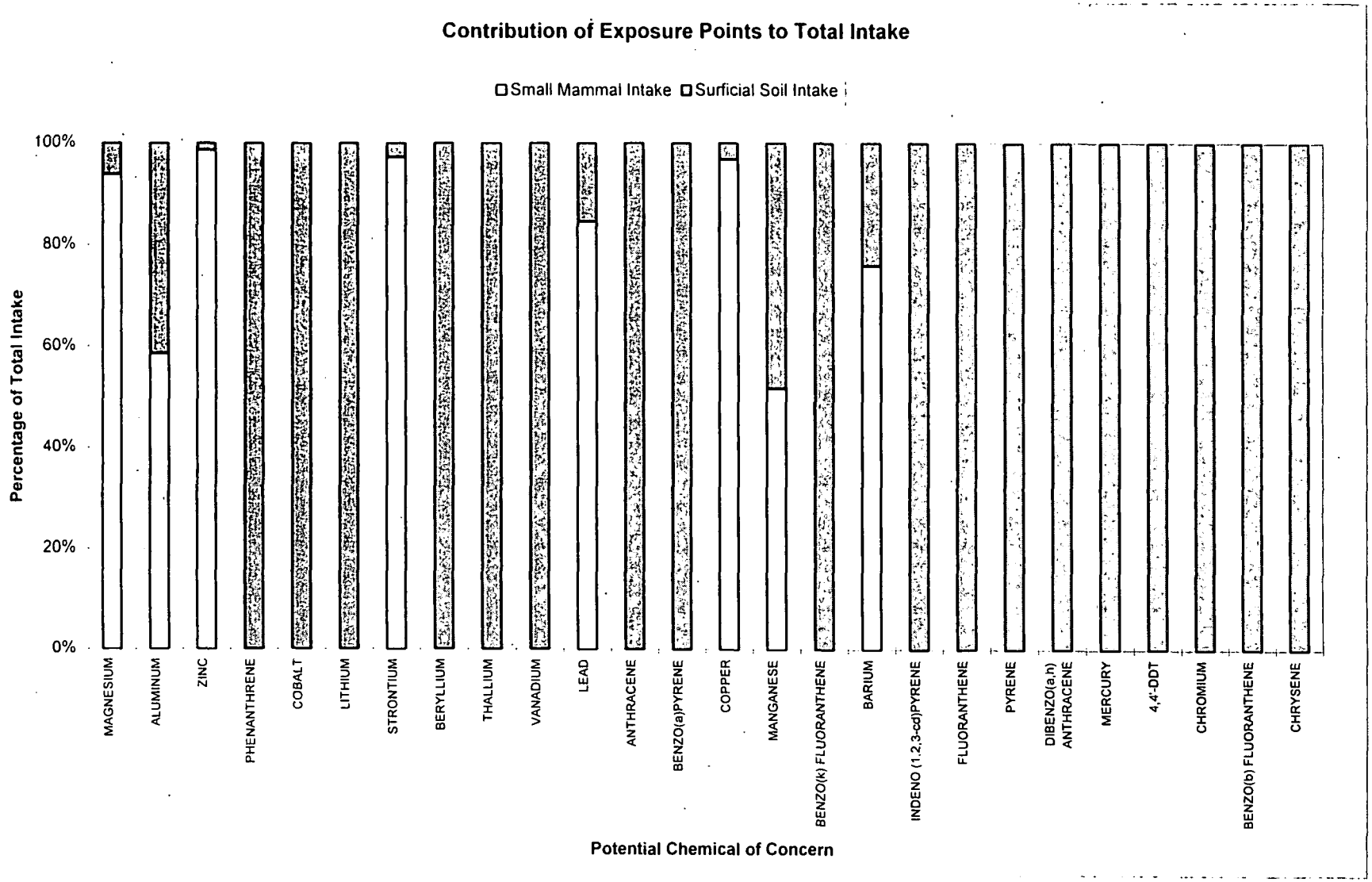
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU5 Old Landfill Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU5 Old Landfill Source Area at RFETS

AMERICAN KESTRELS OU5 OLD LANDFILL		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU5	IR = 0.290 SUF = 0.356		IR = I SUF = I		IR = 0.008 SUF = 0.356					
MAGNESIUM		967.466	99.881	NR	—	2298.534	6.546	106.427	127.452	0.84	19.41%
ALUMINUM		431.427	44.540	NR	—	11074.656	31.541	76.081	130.867	0.58	13.51%
ZINC	X	130.097	13.431	NR	—	66.571	0.190	13.621	38.207	0.36	8.29%
PHENANTHRENE	X	NR	—	NR	—	9.640	0.027	0.027	0.077	0.35	8.15%
COBALT	X	ND	—	NR	—	8.348	0.024	0.024	0.076	0.32	7.34%
LITHIUM	X	ND	—	NR	—	8.005	0.023	0.023	0.099	0.23	5.40%
STRONTIUM	X	29.983	3.095	NR	—	30.813	0.088	3.183	14.151	0.22	5.23%
BERYLLIUM		ND	—	NR	—	0.882	0.003	0.003	0.015	0.20	4.65%
THALLIUM		ND	—	NR	—	0.310	0.001	0.001	0.007	0.14	3.32%
VANADIUM		ND	—	NR	—	30.425	0.087	0.087	0.616	0.14	3.28%
LEAD	X	4.363	0.450	NR	—	28.695	0.082	0.532	3.850	0.14	3.21%
ANTHRACENE	X	NR	—	NR	—	2.816	0.008	0.008	0.078	0.10	2.38%
BENZO(a)PYRENE	X	NR	—	NR	—	2.636	0.008	0.008	0.078	0.10	2.38%
COPPER	X	31.629	3.265	NR	—	37.703	0.107	3.373	33.680	0.10	2.33%
MANGANESE		8.234	0.850	NR	—	277.661	0.791	1.641	21.089	0.08	1.81%
BENZO(k) FLUORANTHENE	X	NR	—	NR	—	1.694	0.005	0.005	0.077	0.06	1.51%
BARIUM	X	10.068	1.039	NR	—	115.593	0.329	1.369	21.155	0.06	1.50%
INDENO (1,2,3-cd)PYRENE	X	NR	—	NR	—	2.572	0.007	0.007	0.194	0.04	0.84%
FLUORANTHENE	X	NR	—	NR	—	8.267	0.024	0.024	0.776	0.03	0.72%
PYRENE	X	NR	—	NR	—	7.090	0.020	0.020	0.776	0.03	0.60%
DIBENZO(a,h) ANTHRACENE	X	NR	—	NR	—	0.758	0.002	0.002	0.078	0.03	0.60%
MERCURY	X	ND	—	NR	—	0.124	3.53E-04	3.53E-04	0.014	0.03	0.59%
4,4'-DDT	X	NR	—	NR	—	0.009	2.45E-05	2.45E-05	0.001	0.02	0.57%
CHROMIUM		ND	—	NR	—	13.088	0.037	0.037	2.207	0.02	0.39%
BENZO(b) FLUORANTHENE	X	NR	—	NR	—	3.179	0.009	0.009	0.774	0.01	0.27%
CHRYSENE	X	NR	—	NR	—	2.987	0.009	0.009	0.776	0.01	0.27%
BENZO(a)ANTHRACENE	X	NR	—	NR	—	2.850	0.008	0.008	0.776	0.01	0.24%
FLUORENE	X	NR	—	NR	—	2.363	0.007	0.007	0.774	0.01	0.21%
ARSENIC		ND	—	NR	—	5.702	0.016	0.016	1.846	0.01	0.20%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	—	0.200	0.001	0.001	0.121	0.01	0.19%
AROCLOR-1254	X	NR	—	NR	—	0.572	0.002	0.002	0.361	0.01	0.13%
MOLYBDENUM		ND	—	NR	—	4.400	0.013	0.013	2.497	0.01	0.12%
BENZO(ghi)PERYLENE	X	NR	—	NR	—	0.922	0.003	0.003	0.776	<0.01	0.09%
NICKEL		4.800	0.496	NR	—	14.939	0.043	0.538	146.122	<0.01	0.09%
TIN		ND	—	NR	—	9.714	0.028	0.028	11.455	<0.01	0.06%
HEPTACHLOR EPOXIDE	X	NR	—	NR	—	0.004	1.23E-05	1.23E-05	0.008	<0.01	0.04%
SELENIUM		ND	—	NR	—	0.459	0.001	0.001	0.820	<0.01	0.03%

Summary of Ecotoxicological Risk to American Kestrels in the OU5 Old Landfill Source Area at RFETS

AMERICAN KESTRELS OU5 OLD LANDFILL		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU5	IR = 0.290 SUF = 0.356		IR = I SUF = I		IR = 0.008 SUF = 0.356					
CADMIUM		ND	—	NR	—	0.880	0.003	0.003	3.115	<0.01	0.02%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	—	0.210	0.001	0.001	1.204	<0.01	0.02%
DIELDRIN	X	NR	—	NR	—	0.009	2.63E-05	2.63E-05	0.122	<0.01	0.01%
ALDRIN	X	NR	—	NR	—	0.005	1.33E-05	1.33E-05	0.122	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	NR	—	2.636	0.008	0.008	77.625	<0.01	<0.01%
NAPHTHALENE	X	NR	—	NR	—	2.498	0.007	0.007	77.625	<0.01	<0.01%
2-METHYLNAPHTHALENE	X	NR	—	NR	—	0.944	0.003	0.003	77.625	<0.01	<0.01%
SILVER	X	ND	—	NR	—	7.180	0.020	0.020	2304.896	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	—	NR	—	0.220	0.001	0.001	226.426	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	—	NR	—	0.083	2.36E-04	2.36E-04	99.060	<0.01	<0.01%

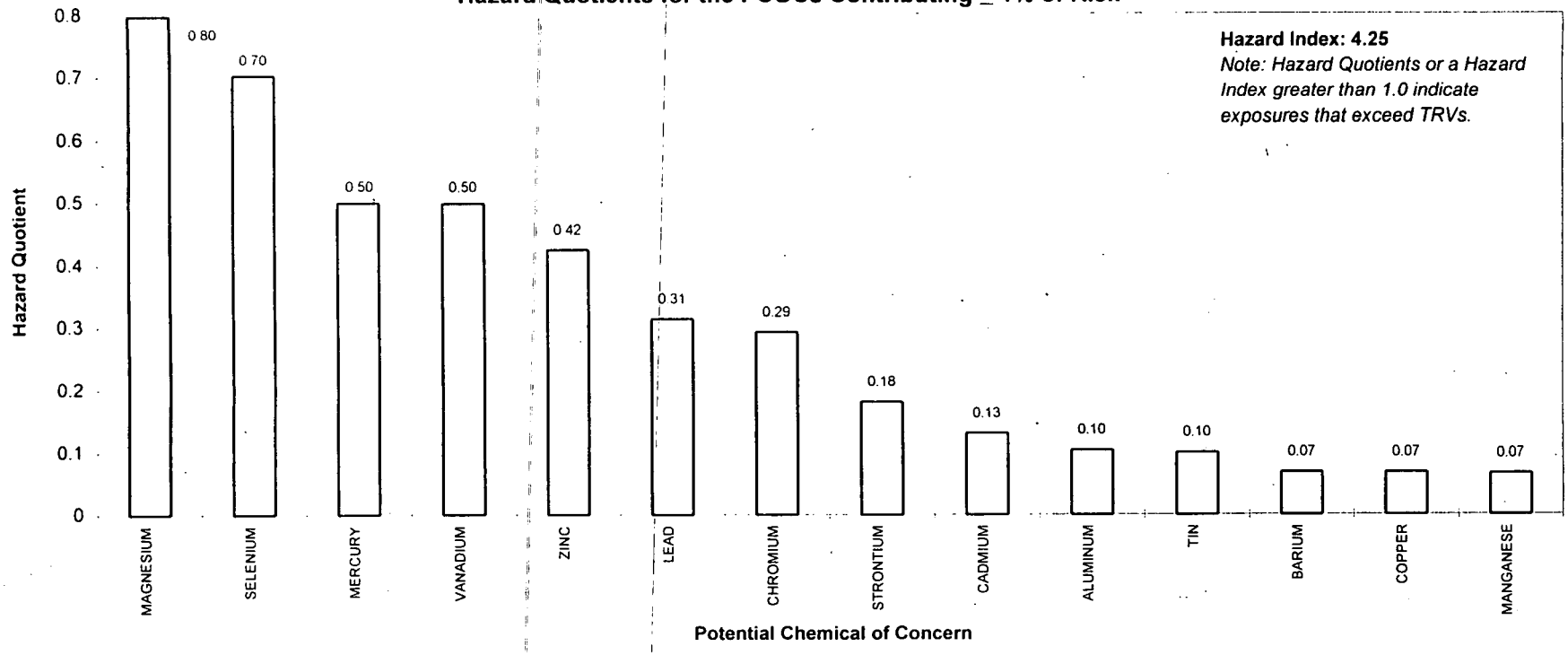
HAZARD INDEX 4.30

Notes:

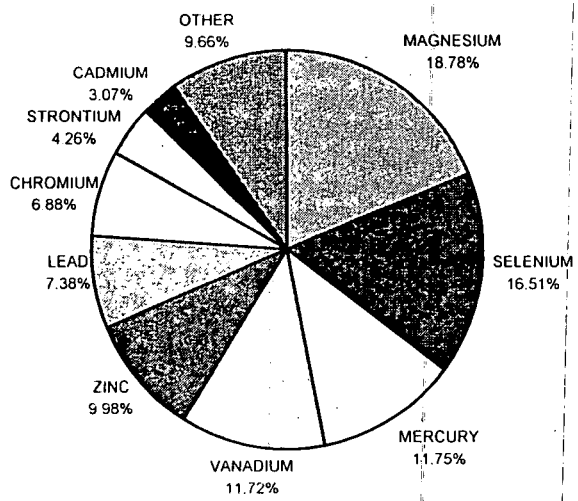
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU7 Downgradient Areas Source Area at RFETS

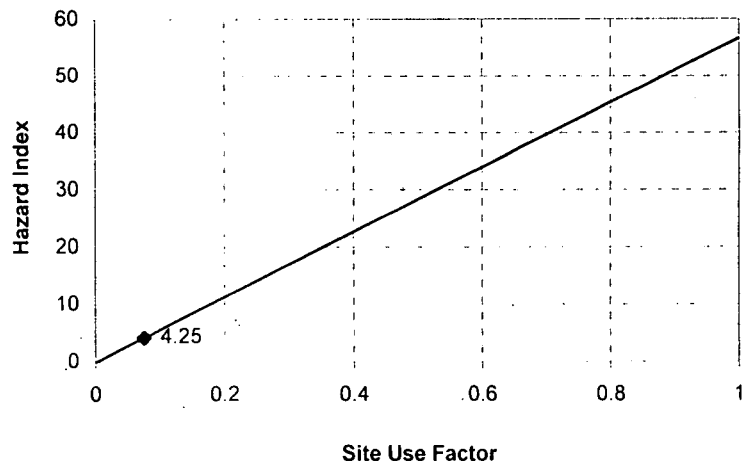
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



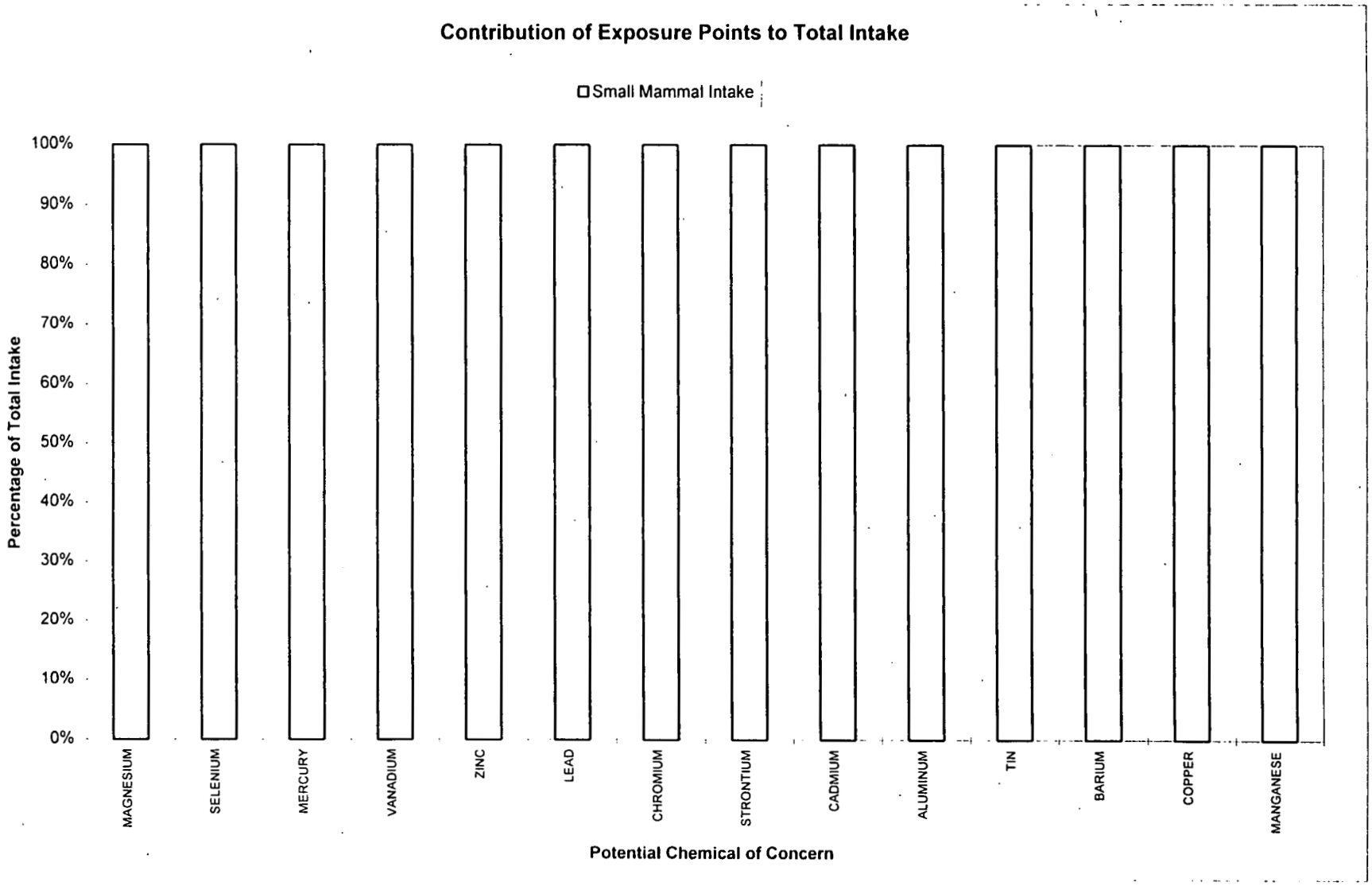
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU7 Downgradient Areas Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU7 Downgradient Areas Source Area at RFETS

AMERICAN KESTRELS OU7 DOWNGRADIENT AREAS		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU7	IR = 0.290 SUF = 0.075		IR = I SUF = I		IR = 0.008 SUF = 0.075					
MAGNESIUM	X	4680.000	101.790	NR	—	NR	—	101.790	127.452	0.80	18.78%
SELENIUM	X	26.500	0.576	NR	—	NR	—	0.576	0.820	0.70	16.51%
MERCURY		0.300	0.007	NR	—	NR	—	0.007	0.014	0.50	11.75%
VANADIUM	X	14.100	0.307	NR	—	NR	—	0.307	0.616	0.50	11.72%
ZINC	X	746.000	16.226	NR	—	NR	—	16.226	38.207	0.42	9.98%
LEAD	X	55.600	1.209	NR	—	NR	—	1.209	3.850	0.31	7.38%
CHROMIUM	X	29.700	0.646	NR	—	NR	—	0.646	2.207	0.29	6.88%
STRONTIUM	X	118.000	2.567	NR	—	NR	—	2.567	14.151	0.18	4.26%
CADMIUM		18.700	0.407	NR	—	NR	—	0.407	3.115	0.13	3.07%
ALUMINUM	X	624.000	13.572	NR	—	NR	—	13.572	130.867	0.10	2.44%
TIN	X	52.700	1.146	NR	—	NR	—	1.146	11.455	0.10	2.35%
BARIUM	X	67.100	1.459	NR	—	NR	—	1.459	21.155	0.07	1.62%
COPPER	X	106.000	2.306	NR	—	NR	—	2.306	33.680	0.07	1.61%
MANGANESE	X	64.400	1.401	NR	—	NR	—	1.401	21.089	0.07	1.56%
NITRATE/NITRITE	X	NR	—	NR	—	10.779	0.006	0.006	2.007	<0.01	0.07%
SILVER		24.400	0.531	NR	—	NR	—	0.531	2304.896	<0.01	0.01%

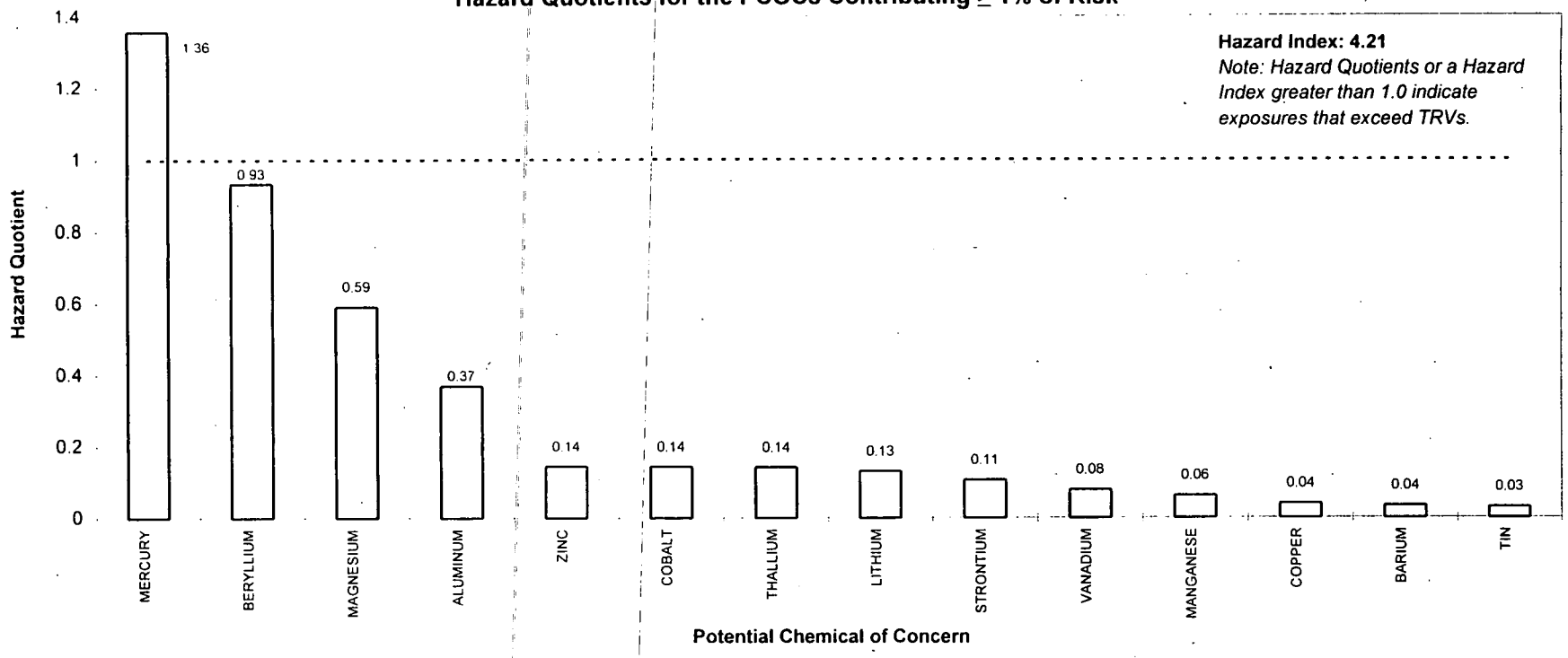
HAZARD INDEX 4.25

Notes:

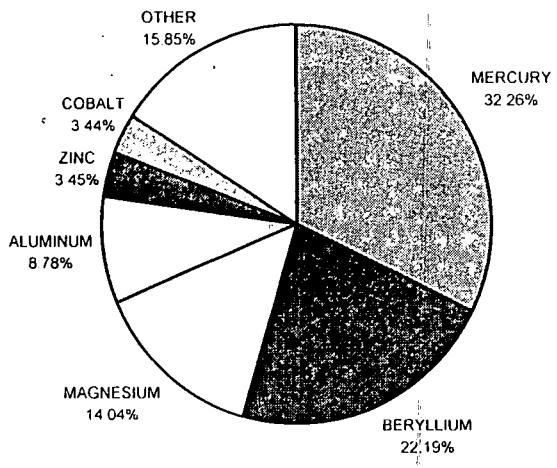
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU4 Downgradient Source Area at RFETS

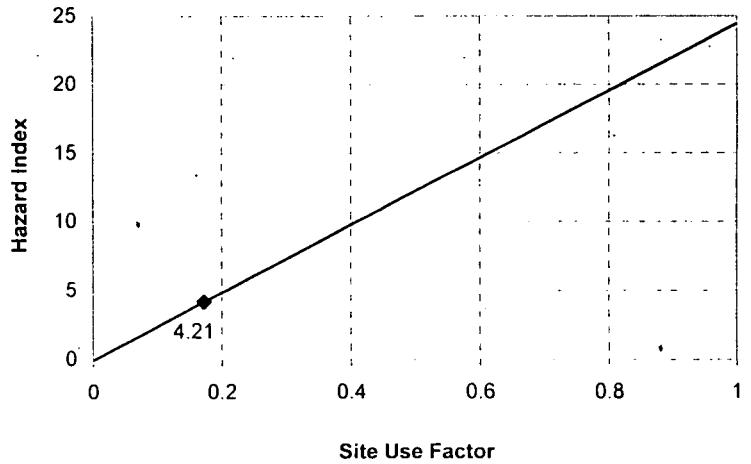
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



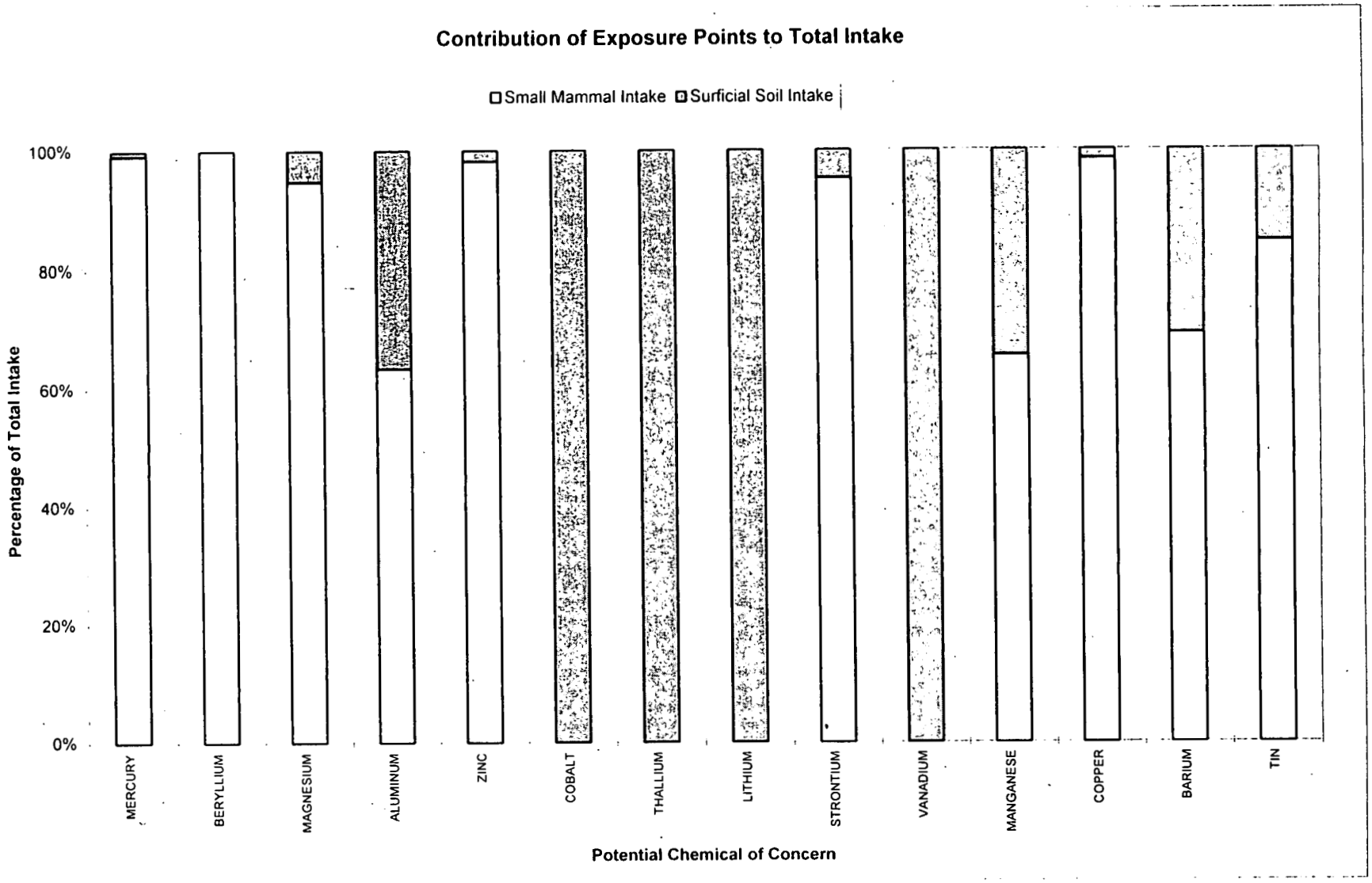
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU4 Downgradient Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU4 Downgradient Source Area at RFETS

AMERICAN KESTRELS OU4 DOWNGRADIENT		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU4	IR = 0.290 SUF = 0.172		IR = NR SUF = 0.172		IR = 0.008 SUF = 0.172					
MERCURY	X	0.380	0.019	NR	—	0.107	1.47E-04	0.019	0.014	1.36	32.26%
BERYLLIUM	X	0.290	0.014	NR	—	ND	—	0.014	0.015	0.93	22.19%
MAGNESIUM		1430.000	71.328	NR	—	2871.518	3.951	75.280	127.452	0.59	14.04%
ALUMINUM		614.000	30.626	NR	—	12856.399	17.690	48.317	130.867	0.37	8.78%
ZINC		109.000	5.437	NR	—	74.594	0.103	5.540	38.207	0.14	3.45%
COBALT		ND	—	NR	—	8.238	0.011	0.011	0.076	0.14	3.44%
THALLIUM		ND	—	NR	—	0.630	0.001	0.001	0.007	0.14	3.40%
LITHIUM		ND	—	NR	—	9.207	0.013	0.013	0.099	0.13	3.12%
STRONTIUM		29.000	1.447	NR	—	52.509	0.072	1.519	14.151	0.11	2.55%
VANADIUM		ND	—	NR	—	35.665	0.049	0.049	0.616	0.08	1.89%
MANGANESE		17.700	0.883	NR	—	337.070	0.464	1.347	21.089	0.06	1.52%
COPPER		27.500	1.372	NR	—	16.143	0.022	1.394	33.680	0.04	0.98%
BARIUM		10.300	0.514	NR	—	165.692	0.228	0.742	21.155	0.04	0.83%
TIN		5.900	0.294	NR	—	38.477	0.053	0.347	11.455	0.03	0.72%
CHROMIUM		ND	—	NR	—	14.049	0.019	0.019	2.207	0.01	0.20%
LEAD		ND	—	NR	—	20.053	0.028	0.028	3.850	0.01	0.17%
BENZO(a)PYRENE	X	NR	—	NR	—	0.200	2.75E-04	2.75E-04	0.078	<0.01	0.08%
ARSENIC		ND	—	NR	—	4.565	0.006	0.006	1.846	<0.01	0.08%
NITRATE/NITRITE	X	NR	—	NR	—	3.975	0.005	0.005	2.007	<0.01	0.06%
BENZO(k)FLUORANTHENE	X	NR	—	NR	—	0.130	1.79E-04	1.79E-04	0.077	<0.01	0.06%
PHENANTHRENE	X	NR	—	NR	—	0.074	1.02E-04	1.02E-04	0.077	<0.01	0.03%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	—	0.150	2.06E-04	2.06E-04	0.194	<0.01	0.03%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	—	0.079	1.09E-04	1.09E-04	0.121	<0.01	0.02%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	—	0.978	0.001	0.001	1.204	<0.01	0.02%
DIBENZO(a,h)ANTHRACENE		NR	—	NR	—	0.047	6.47E-05	6.47E-05	0.078	<0.01	0.02%
CADMIUM	X	ND	—	NR	—	1.109	0.002	0.002	3.115	<0.01	0.02%
CHRYSENE	X	NR	—	NR	—	0.220	3.03E-04	3.03E-04	0.776	<0.01	0.01%
PYRENE	X	NR	—	NR	—	0.191	2.63E-04	2.63E-04	0.776	<0.01	0.01%
FLUORANTHENE	X	NR	—	NR	—	0.183	2.52E-04	2.52E-04	0.776	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	—	0.182	2.50E-04	2.50E-04	0.774	<0.01	0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	—	0.170	2.34E-04	2.34E-04	0.776	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	—	0.160	2.20E-04	2.20E-04	0.776	<0.01	0.01%
NICKEL		ND	—	NR	—	14.767	0.020	0.020	146.122	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	—	NR	—	0.295	4.06E-04	4.06E-04	99.060	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	—	NR	—	0.170	2.34E-04	2.34E-04	226.426	<0.01	<0.01%

HAZARD INDEX 4.21

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway

NR = Not reported/analyzed in sample information
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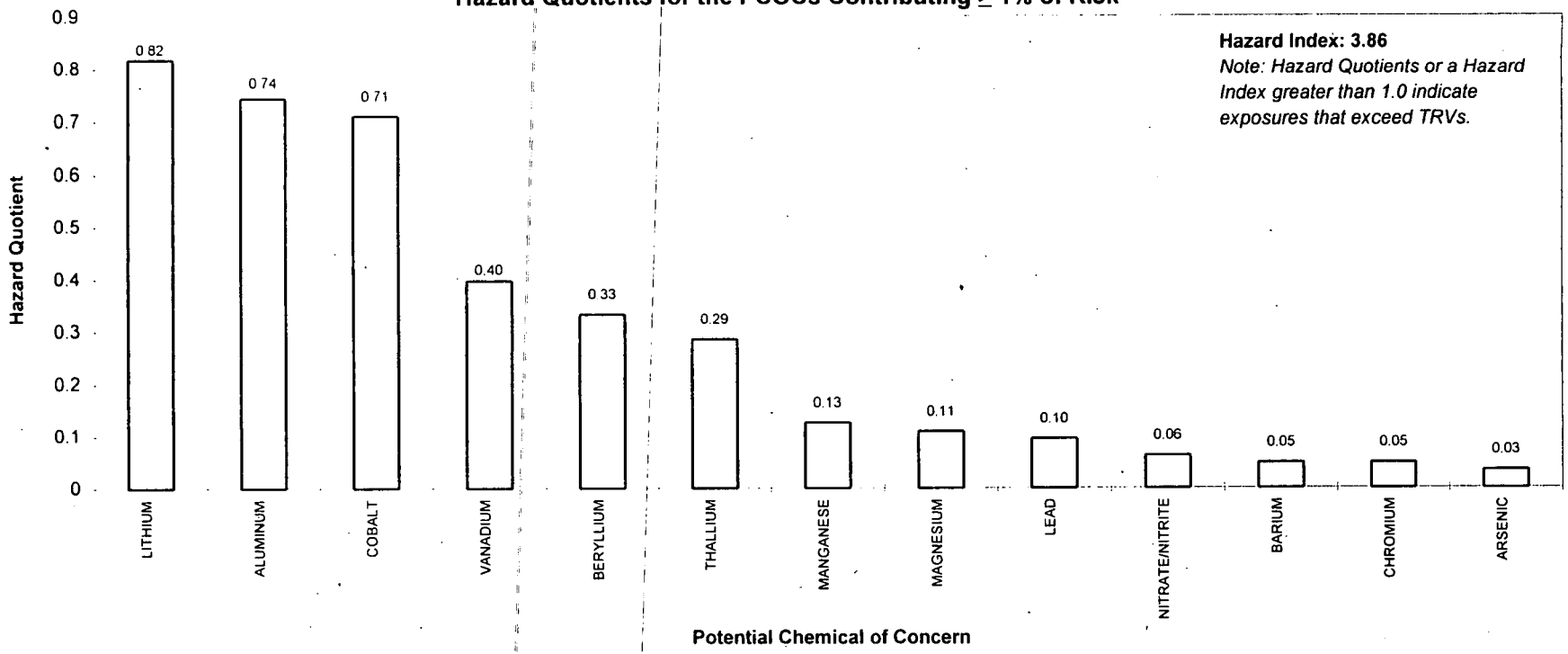
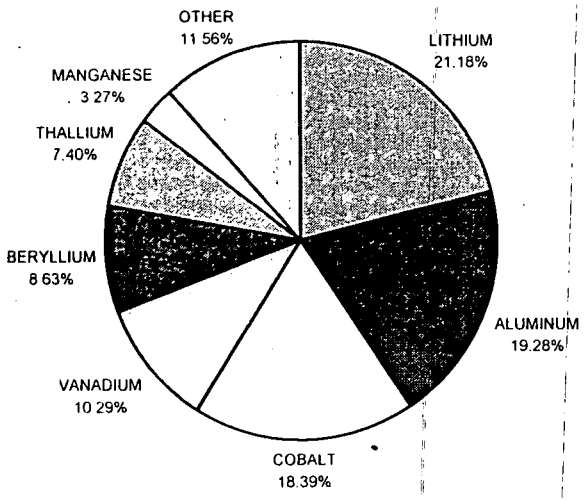
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU11 West Spray Field Source Area at RFETS

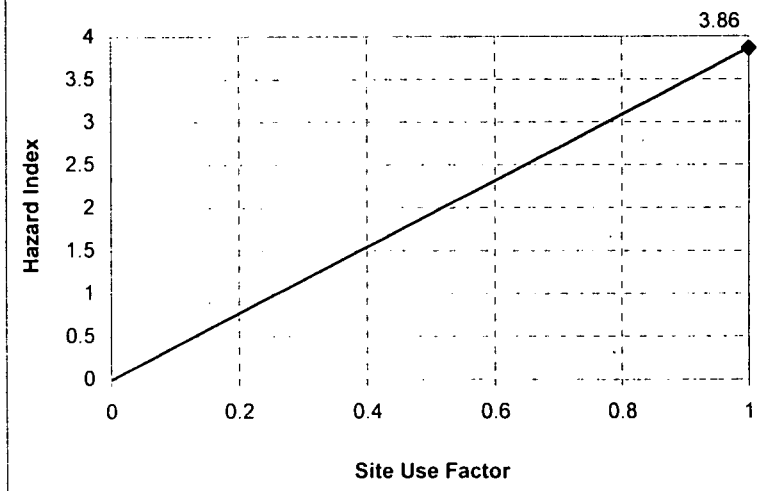
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



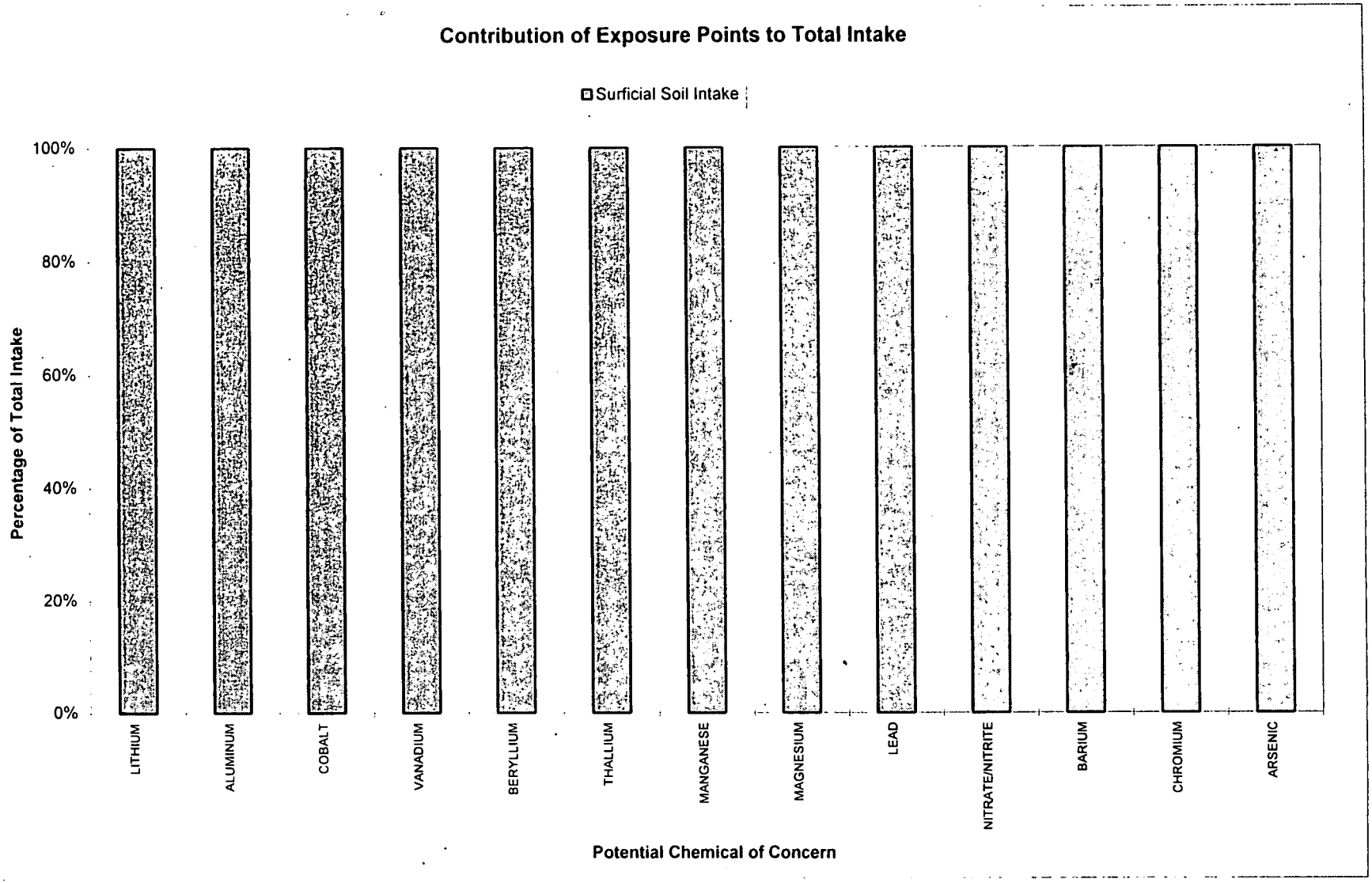
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU11 West Spray Field Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU11 West Spray Field Source Area at RFETS

AMERICAN KESTRELS OU11 WEST SPRAY FIELD		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU11	IR = NR SUF = 1		IR = I SUF = I		IR = 0.008 SUF = 1					
LITHIUM		NR	—	NR	—	10.111	0.081	0.081	0.099	0.82	21.18%
ALUMINUM		NR	—	NR	—	12185.807	97.486	97.486	130.867	0.74	19.28%
COBALT		NR	—	NR	—	6.719	0.054	0.054	0.076	0.71	18.39%
VANADIUM		NR	—	NR	—	30.669	0.245	0.245	0.616	0.40	10.29%
BERYLLIUM		NR	—	NR	—	0.682	0.005	0.005	0.015	0.33	8.63%
THALLIUM		NR	—	NR	—	0.270	0.002	0.002	0.007	0.29	7.40%
MANGANESE		NR	—	NR	—	332.865	2.663	2.663	21.089	0.13	3.27%
MAGNESIUM		NR	—	NR	—	1746.670	13.973	13.973	127.452	0.11	2.84%
LEAD		NR	—	NR	—	46.092	0.369	0.369	3.850	0.10	2.48%
NITRATE/NITRITE		NR	—	NR	—	15.866	0.127	0.127	2.007	0.06	1.64%
BARIUM		NR	—	NR	—	130.524	1.044	1.044	21.155	0.05	1.28%
CHROMIUM		NR	—	NR	—	13.479	0.108	0.108	2.207	0.05	1.27%
ARSENIC		NR	—	NR	—	8.032	0.064	0.064	1.846	0.03	0.90%
STRONTIUM		NR	—	NR	—	23.573	0.189	0.189	14.151	0.01	0.35%
ZINC		NR	—	NR	—	44.730	0.358	0.358	38.207	0.01	0.24%
MOLYBDENUM		NR	—	NR	—	2.600	0.021	0.021	2.497	0.01	0.22%
SELENIUM		NR	—	NR	—	0.509	0.004	0.004	0.820	<0.01	0.13%
TIN		NR	—	NR	—	4.900	0.039	0.039	11.455	<0.01	0.09%
COPPER		NR	—	NR	—	13.023	0.104	0.104	33.680	<0.01	0.08%
CADMIUM		NR	—	NR	—	0.737	0.006	0.006	3.115	<0.01	0.05%
NICKEL		NR	—	NR	—	9.190	0.074	0.074	146.122	<0.01	0.01%

HAZARD INDEX 3.86

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
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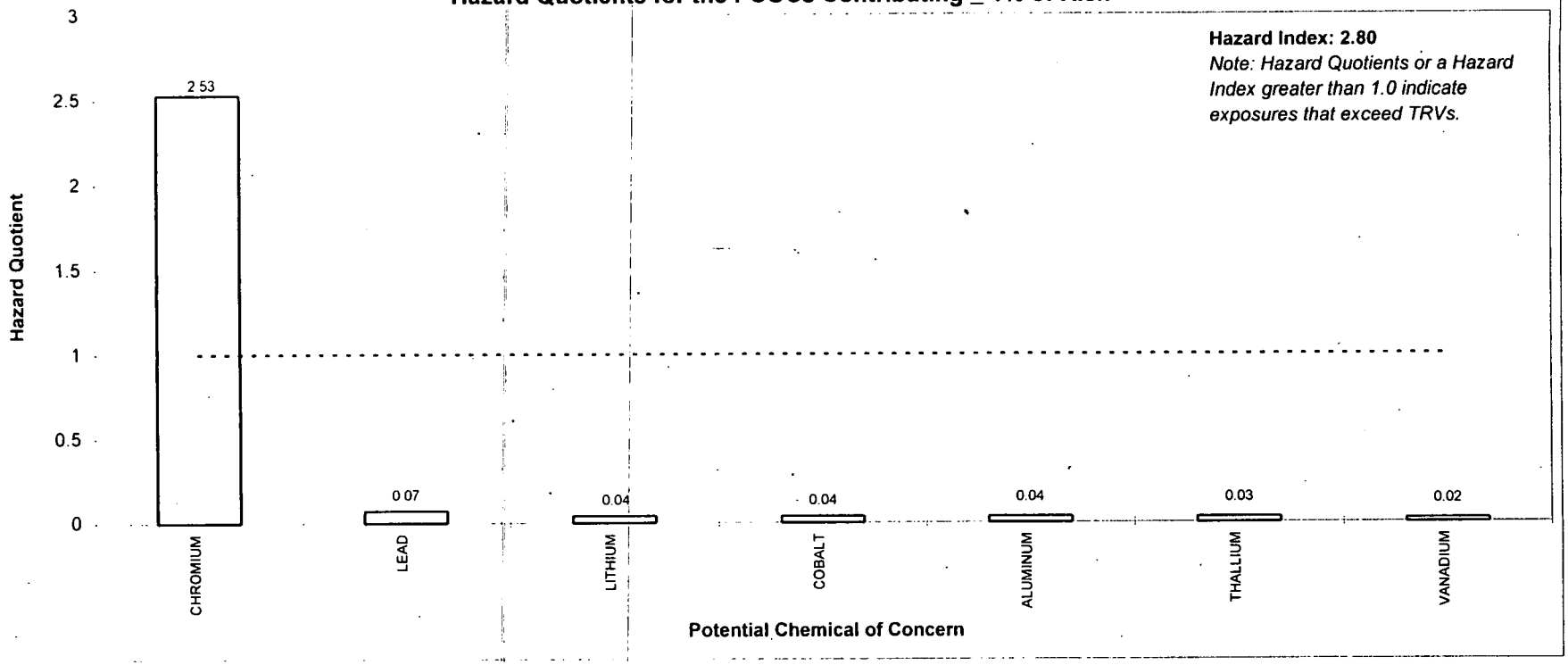
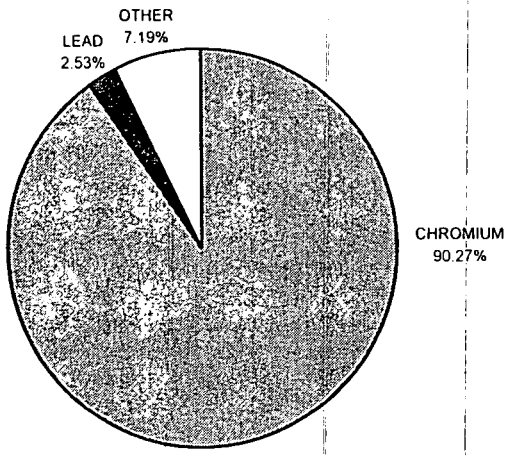
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU2 Mound Area Source Area at RFETS

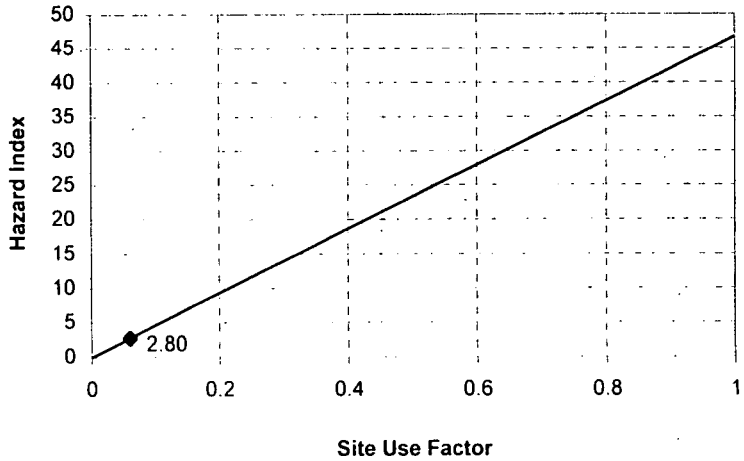
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



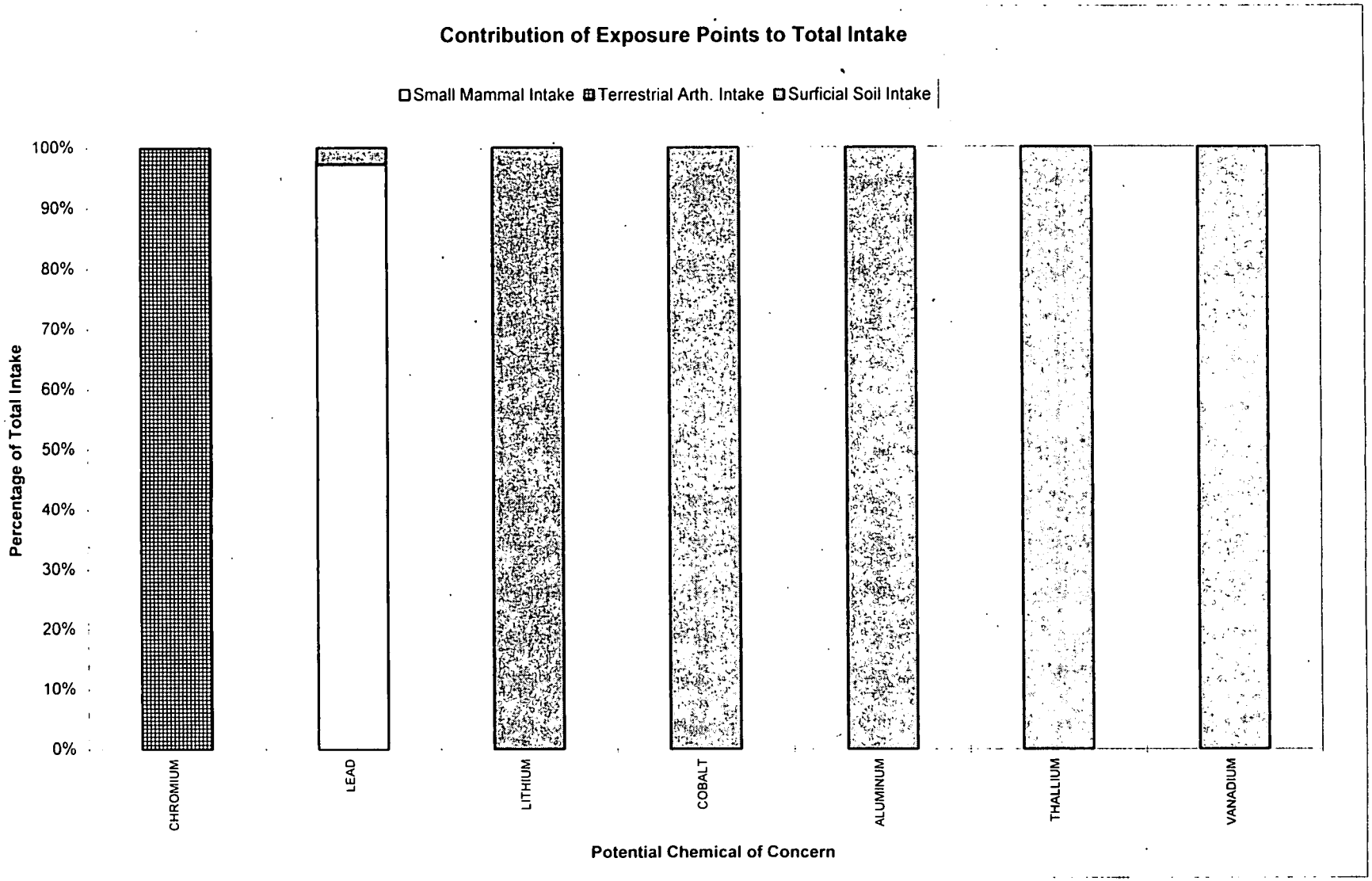
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU2 Mound Area Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU2 Mound Area Source Area at RFETS

AMERICAN KESTRELS OU2 MOUND AREA		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte[1]	PCOC for OU2	IR = NR SUF = 0.060		IR = I SUF = I		IR = 0.008 SUF = 0.060					
CHROMIUM	X	NR	—	62.800	5.577	10.200	0.005	5.582	2.207	2.53	90.27%
LEAD	X	3.200	0.265	NR	—	16.000	0.008	0.273	3.850	0.07	2.53%
LITHIUM		NR	—	NR	—	8.800	0.004	0.004	0.099	0.04	1.44%
COBALT		NR	—	NR	—	6.200	0.003	0.003	0.076	0.04	1.41%
ALUMINUM		NR	—	NR	—	10100.000	4.848	4.848	130.867	0.04	1.32%
THALLIUM		NR	—	NR	—	0.500	2.40E-04	2.40E-04	0.007	0.03	1.22%
VANADIUM		NR	—	NR	—	31.100	0.015	0.015	0.616	0.02	0.87%
MAGNESIUM		NR	—	NR	—	2730.000	1.310	1.310	127.452	0.01	0.37%
MANGANESE		NR	—	NR	—	240.000	0.115	0.115	21.089	0.01	0.19%
BARIUM		NR	—	NR	—	108.000	0.052	0.052	21.155	<0.01	0.09%
STRONTIUM		NR	—	NR	—	66.300	0.032	0.032	14.151	<0.01	0.08%
ARSENIC		NR	—	NR	—	5.900	0.003	0.003	1.846	<0.01	0.06%
AROCLOR-1254	X	NR	—	NR	—	0.970	4.66E-04	4.66E-04	0.361	<0.01	0.05%
BENZO(a)PYRENE	X	NR	—	NR	—	0.096	4.61E-05	4.61E-05	0.078	<0.01	0.02%
ZINC		NR	—	NR	—	46.300	0.022	0.022	38.207	<0.01	0.02%
PHENANTHRENE	X	NR	—	NR	—	0.083	3.98E-05	3.98E-05	0.077	<0.01	0.02%
COPPER		NR	—	NR	—	13.100	0.006	0.006	33.680	<0.01	0.01%
AROCLOR-1260	X	NR	—	NR	—	0.660	3.17E-04	3.17E-04	1.838	<0.01	0.01%
FLUORANTHENE	X	NR	—	NR	—	0.200	9.60E-05	9.60E-05	0.776	<0.01	<0.01%
PYRENE	X	NR	—	NR	—	0.180	8.64E-05	8.64E-05	0.776	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	—	0.045	2.16E-05	2.16E-05	0.194	<0.01	<0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	—	0.120	5.76E-05	5.76E-05	0.774	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	—	0.100	4.80E-05	4.80E-05	0.776	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	—	0.086	4.13E-05	4.13E-05	0.776	<0.01	<0.01%
NICKEL		NR	—	NR	—	11.400	0.005	0.005	146.122	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	—	0.045	2.16E-05	2.16E-05	0.776	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	—	0.052	2.50E-05	2.50E-05	1.204	<0.01	<0.01%

[1] Chromium concentration in terrestrial arthropods is estimated from tissue:soil ratios in the East Trenches source area; Lead concentration in small mammals is estimated from small mammal:soil ratios in the East Trenches source area.

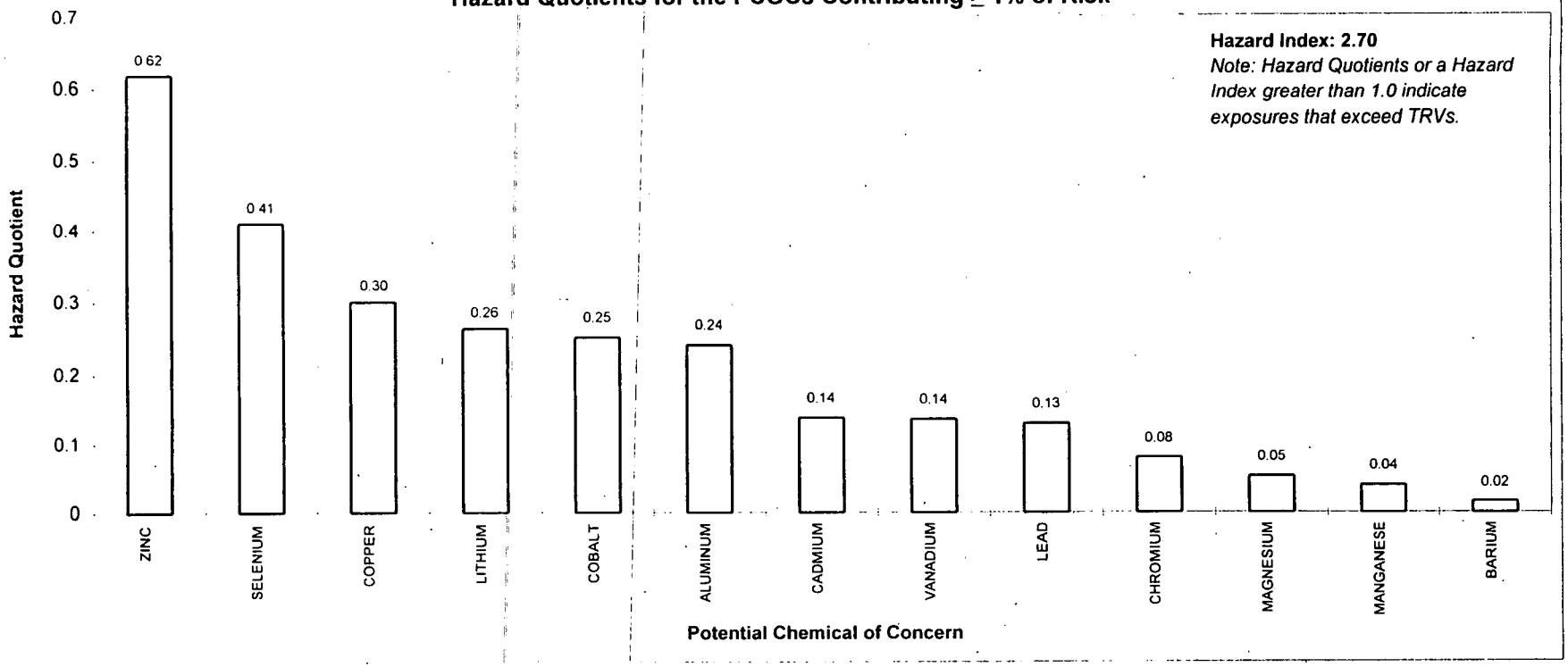
HAZARD INDEX 2.80

Notes:

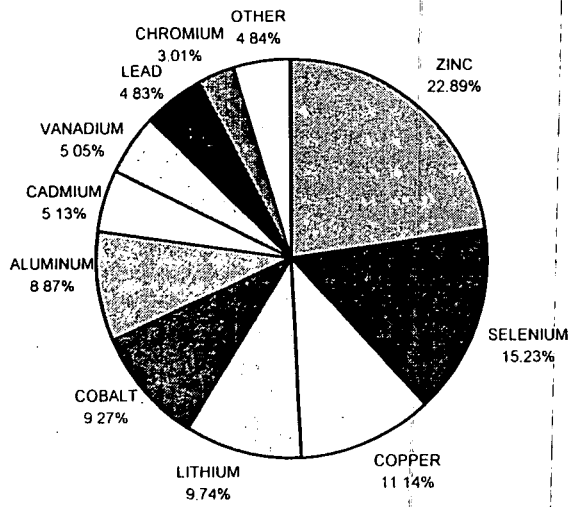
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU5 C-Ponds Source Area at RFETS

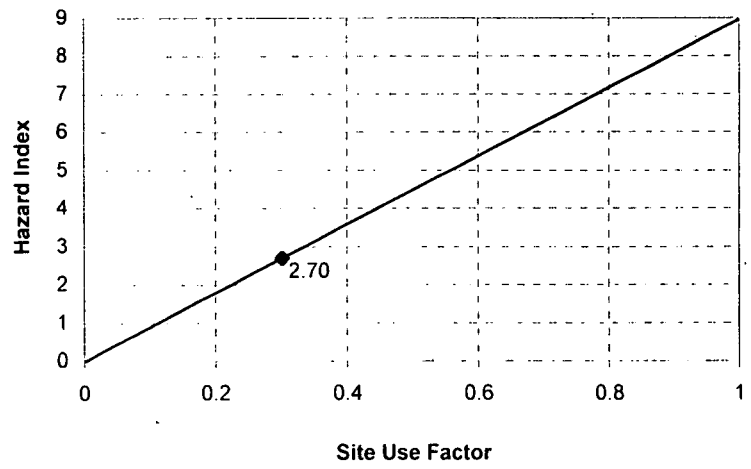
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



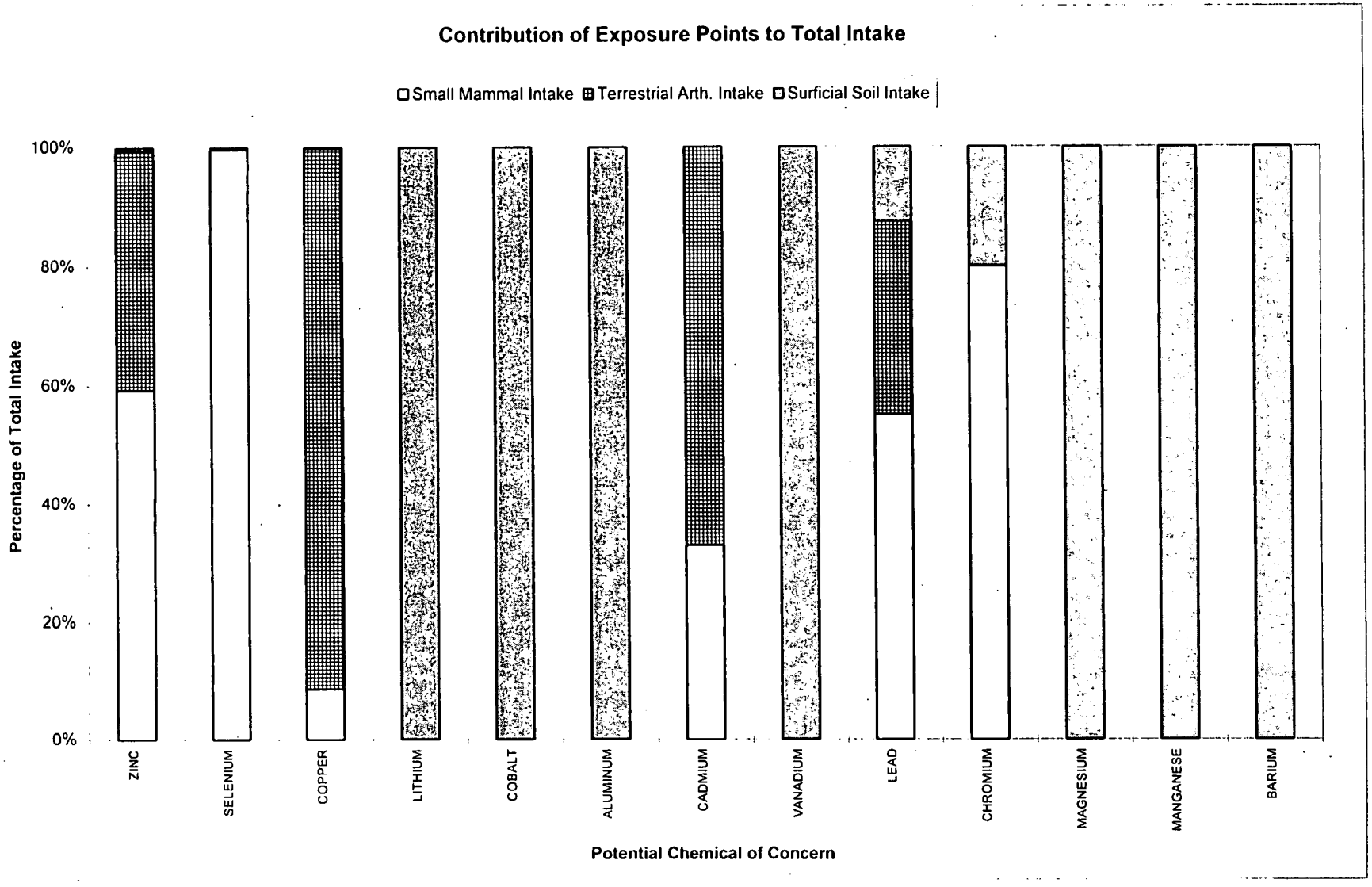
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU5 C-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the OU5 C-Ponds Source Area at RFETS

AMERICAN KESTRELS OU5 C-PONDS		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU5	IR = 0.140 SUF = 0.301		IR = 0.150 SUF = 0.301		IR = 0.008 SUF = 0.301					
ZINC	X	331.676	13.977	210.000	9.482	56.700	0.137	23.595	38.207	0.62	22.89%
SELENIUM		7.964	0.336	ND	—	0.510	0.001	0.337	0.820	0.41	15.23%
COPPER	X	21.044	0.887	204.000	9.211	10.200	0.025	10.122	33.680	0.30	11.14%
LITHIUM	X	NR	—	NR	—	10.700	0.026	0.026	0.099	0.26	9.74%
COBALT	X	NR	—	NR	—	7.900	0.019	0.019	0.076	0.25	9.27%
ALUMINUM		NR	—	NR	—	13000.000	31.304	31.304	130.867	0.24	8.87%
CADMIUM		3.375	0.142	6.400	0.289	ND	—	0.431	3.115	0.14	5.13%
VANADIUM		NR	—	NR	—	34.700	0.084	0.084	0.616	0.14	5.05%
LEAD	X	6.573	0.277	3.600	0.163	26.100	0.063	0.502	3.850	0.13	4.83%
CHROMIUM		3.400	0.143	ND	—	14.800	0.036	0.179	2.207	0.08	3.01%
MAGNESIUM		NR	—	NR	—	2860.000	6.887	6.887	127.452	0.05	2.00%
MANGANESE		NR	—	NR	—	360.000	0.867	0.867	21.089	0.04	1.52%
BARIUM	X	NR	—	NR	—	144.000	0.347	0.347	21.155	0.02	0.61%
STRONTIUM	X	NR	—	NR	—	41.700	0.100	0.100	14.151	0.01	0.26%
TIN		NR	—	NR	—	32.700	0.079	0.079	11.455	0.01	0.26%
ARSENIC		NR	—	NR	—	3.500	0.008	0.008	1.846	<0.01	0.16%
PYRENE	X	NR	—	NR	—	0.094	2.26E-04	2.26E-04	0.776	<0.01	0.01%
FLUORANTHENE	X	NR	—	NR	—	0.078	1.88E-04	1.88E-04	0.776	<0.01	0.01%
NICKEL		NR	—	NR	—	13.800	0.033	0.033	146.122	<0.01	0.01%

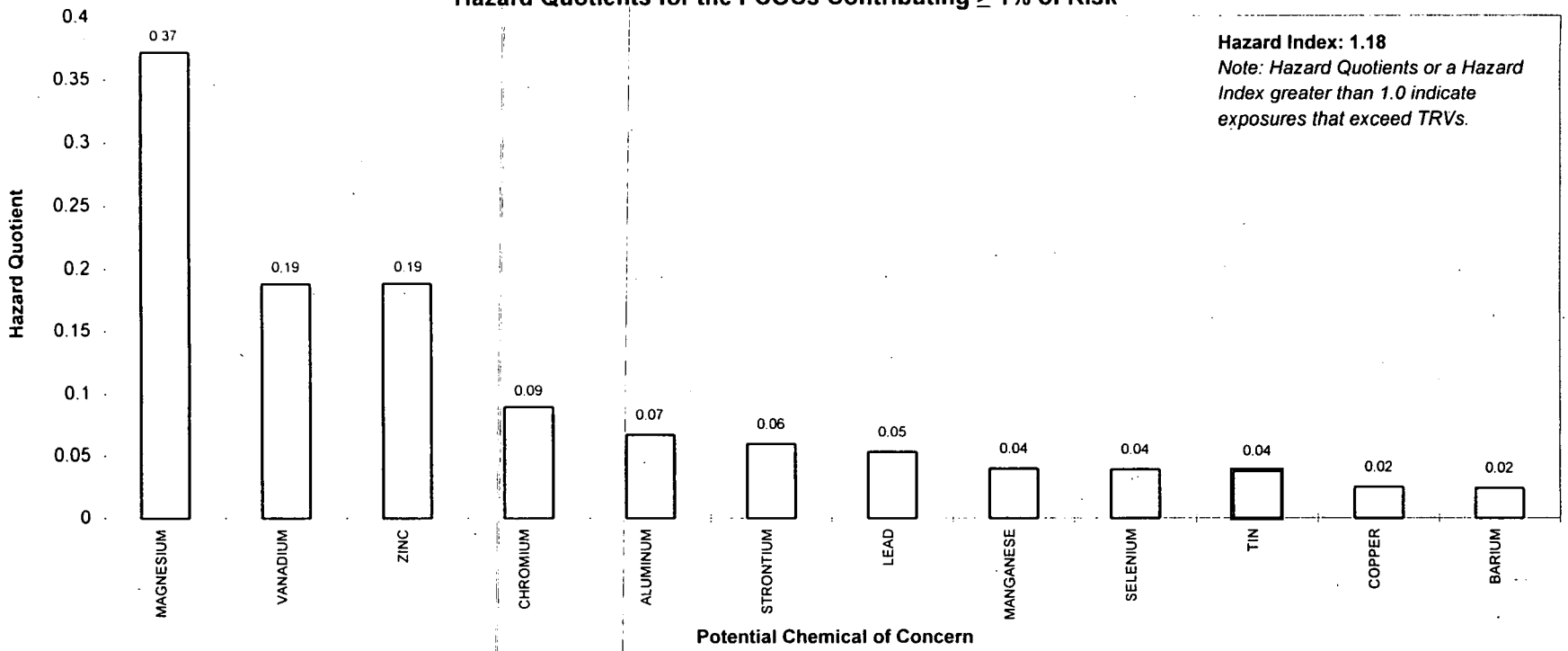
HAZARD INDEX 2.70

Notes:

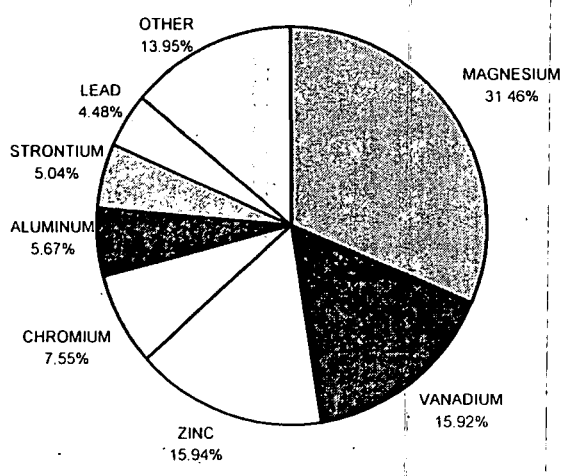
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU6 Burial Trenches Source Area at RFETS

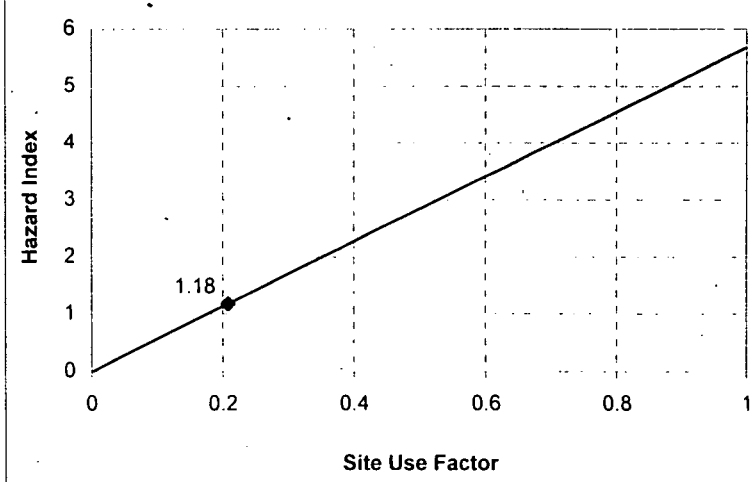
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



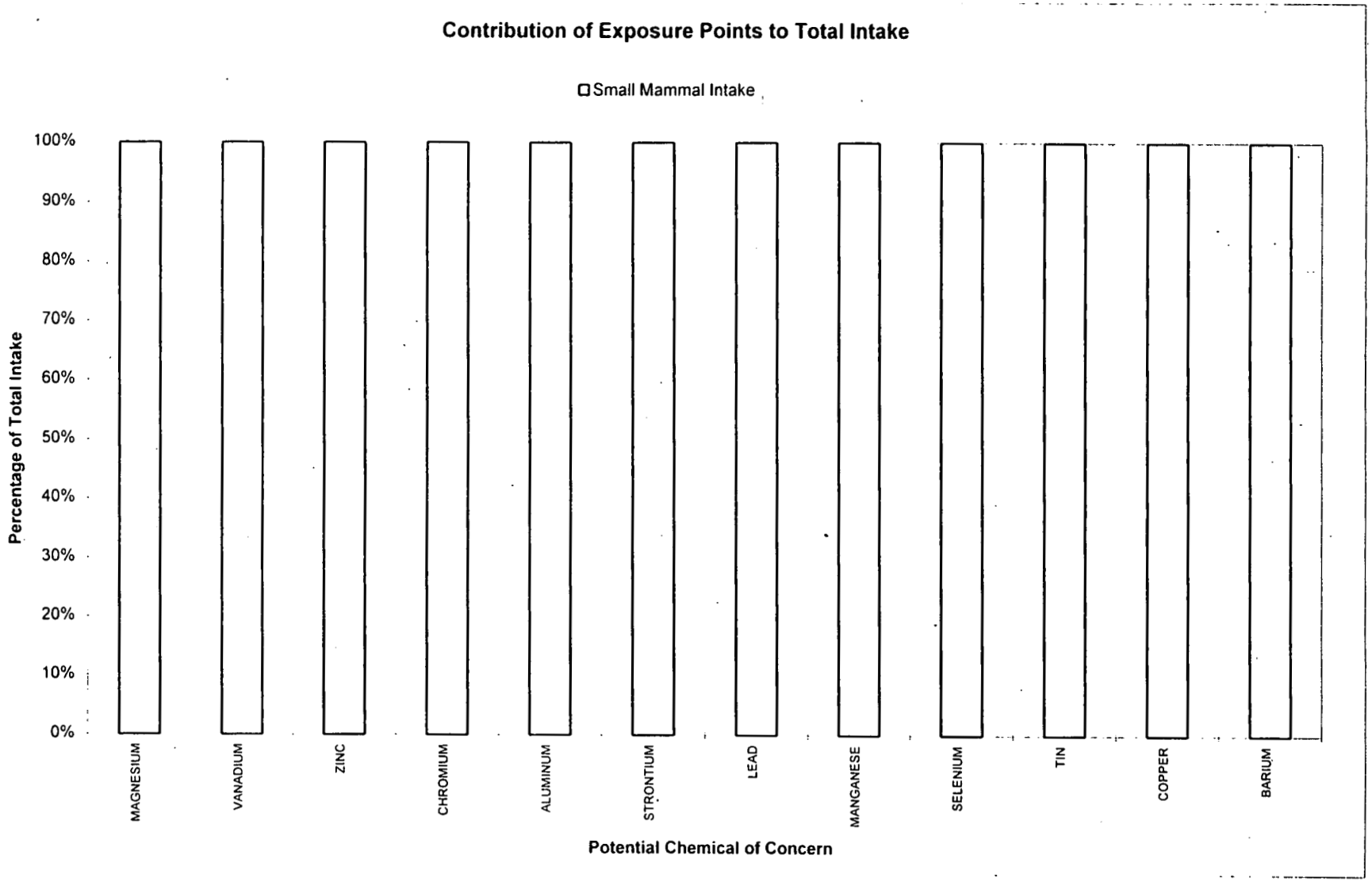
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to American Kestrels in the OU6 Burial Trenches Source Area at RFETS



Summary of Ecotoxicological Risk to American Kestrels in the Burial Trenches Source Area at RFETS

AMERICAN KESTRELS OU6 BURIAL TRENCHES		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = 0.290 SUF = 0.028		IR = I SUF = I		IR = NR SUF = 0.208					
MAGNESIUM	X	5840.000	47.421	NR	—	NR	—	47.421	127.452	0.37	31.46%
VANADIUM	X	14.300	0.116	NR	—	NR	—	0.116	0.616	0.19	15.92%
ZINC	X	887.000	7.202	NR	—	NR	—	7.202	38.207	0.19	15.94%
CHROMIUM	X	24.300	0.197	NR	—	NR	—	0.197	2.207	0.09	7.55%
ALUMINUM		1080.000	8.770	NR	—	NR	—	8.770	130.867	0.07	5.67%
STRONTIUM	X	104.000	0.844	NR	—	NR	—	0.844	14.151	0.06	5.04%
LEAD	X	25.100	0.204	NR	—	NR	—	0.204	3.850	0.05	4.48%
MANGANESE	X	103.000	0.836	NR	—	NR	—	0.836	21.089	0.04	3.35%
SELENIUM		3.900	0.032	NR	—	NR	—	0.032	0.820	0.04	3.30%
TIN		52.900	0.430	NR	—	NR	—	0.430	11.455	0.04	3.17%
COPPER	X	103.000	0.836	NR	—	NR	—	0.836	33.680	0.02	2.10%
BARIUM	X	62.500	0.508	NR	—	NR	—	0.508	21.155	0.02	2.03%
SILVER	X	3.000	0.024	NR	—	NR	—	0.024	2304.896	<0.01	<0.01%

HAZARD INDEX 1.18

Notes:

RFETS = Rocky Flats Environmental Technology Site
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SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU6 North Spray Field Source Area at RFETS

AMERICAN KESTRELS OU6 NORTH SPRAY FIELD		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU6	IR = 0.14 SUF = 0.592		IR = 0.15 SUF = 0.592		IR = 0.008 SUF = 0.592					
COBALT	X	NR	—	NR	—	9.750	0.009	0.009	0.076	0.12	23.73%
ALUMINUM		NR	—	NR	—	11820.163	11.253	11.253	130.867	0.09	17.23%
BERYLLIUM		NR	—	NR	—	0.686	0.001	0.001	0.015	0.07	13.36%
LITHIUM		NR	—	NR	—	6.643	0.006	0.006	0.099	0.06	12.14%
VANADIUM	X	NR	—	NR	—	33.599	0.032	0.032	0.616	0.05	10.41%
THALLIUM		NR	—	NR	—	0.340	3.24E-04	3.24E-04	0.007	0.05	9.26%
MAGNESIUM	X	NR	—	NR	—	2397.398	2.282	2.282	127.452	0.02	3.59%
MANGANESE	X	NR	—	NR	—	315.526	0.300	0.300	21.089	0.01	2.85%
LEAD	X	NR	—	NR	—	40.050	0.038	0.038	3.850	0.01	1.98%
BARIUM	X	NR	—	NR	—	170.910	0.163	0.163	21.155	0.01	1.54%
CHROMIUM	X	NR	—	NR	—	13.137	0.013	0.013	2.207	0.01	1.18%
MERCURY	X	NR	—	NR	—	0.066	6.31E-05	6.31E-05	0.014	<0.01	0.90%
ARSENIC	X	NR	—	NR	—	6.579	0.006	0.006	1.846	<0.01	0.65%
STRONTIUM	X	NR	—	NR	—	31.283	0.030	0.030	14.151	<0.01	0.42%
ZINC	X	NR	—	NR	—	48.942	0.047	0.047	38.207	<0.01	0.25%
SELENIUM		NR	—	NR	—	0.574	0.001	0.001	0.820	<0.01	0.24%
NITRATE/NITRITE		NR	—	NR	—	1.000	0.001	0.001	2.007	<0.01	0.10%
COPPER	X	NR	—	NR	—	13.985	0.013	0.013	33.680	<0.01	0.08%
CADMIUM		NR	—	NR	—	0.990	0.001	0.001	3.115	<0.01	0.06%
NICKEL	X	NR	—	NR	—	15.387	0.015	0.015	146.122	<0.01	0.02%

HAZARD INDEX 0.50

Notes:

RFETS = Rocky Flats Environmental Technology Site
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Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to American Kestrels in the OU5 Surface Disturbance Source Area at RFETS

AMERICAN KESTRELS OU5 SURFACE DISTURBANCE		EXPOSURE POINT						SUMMARY			
		Small Mammal		Terrestrial Arth.		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Risk
Analyte	PCOC for OU5	IR = NR SUF = 0.044		IR = I SUF = I		IR = 0.008 SUF = 0.044					
COBALT	X	NR	—	NR	—	5.700	0.002	0.002	0.076	0.03	20.96%
ALUMINUM		NR	—	NR	—	7680.000	2.703	2.703	130.867	0.02	16.45%
LITHIUM	X	NR	—	NR	—	6.500	0.002	0.002	0.099	0.02	16.09%
MERCURY	X	NR	—	NR	—	0.660	2.32E-04	2.32E-04	0.014	0.02	13.22%
BERYLLIUM		NR	—	NR	—	0.600	2.11E-04	2.11E-04	0.015	0.01	11.22%
VANADIUM		NR	—	NR	—	22.200	0.008	0.008	0.616	0.01	10.35%
MAGNESIUM		NR	—	NR	—	1810.000	0.637	0.637	127.452	<0.01	3.98%
MANGANESE		NR	—	NR	—	218.000	0.077	0.077	21.089	<0.01	2.91%
CHROMIUM		NR	—	NR	—	7.800	0.003	0.003	2.207	<0.01	1.08%
BARIUM	X	NR	—	NR	—	80.800	0.028	0.028	21.155	<0.01	1.05%
LEAD	X	NR		NR	—	14.100	0.005	0.005	3.850	<0.01	1.03%
STRONTIUM	X	NR	—	NR	—	38.600	0.014	0.014	14.151	<0.01	0.79%
ARSENIC		NR	—	NR	—	3.900	0.001	0.001	1.846	<0.01	0.43%
ZINC	X	NR	—	NR	—	40.000	0.014	0.014	38.207	<0.01	0.29%
COPPER	X	NR	—	NR	—	14.200	0.005	0.005	33.680	<0.01	0.12%
NICKEL		NR	—	NR	—	10.100	0.004	0.004	146.122	<0.01	0.02%

HAZARD INDEX 0.13

Notes:

RFETS = Rocky Flats Environmental Technology Site
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Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
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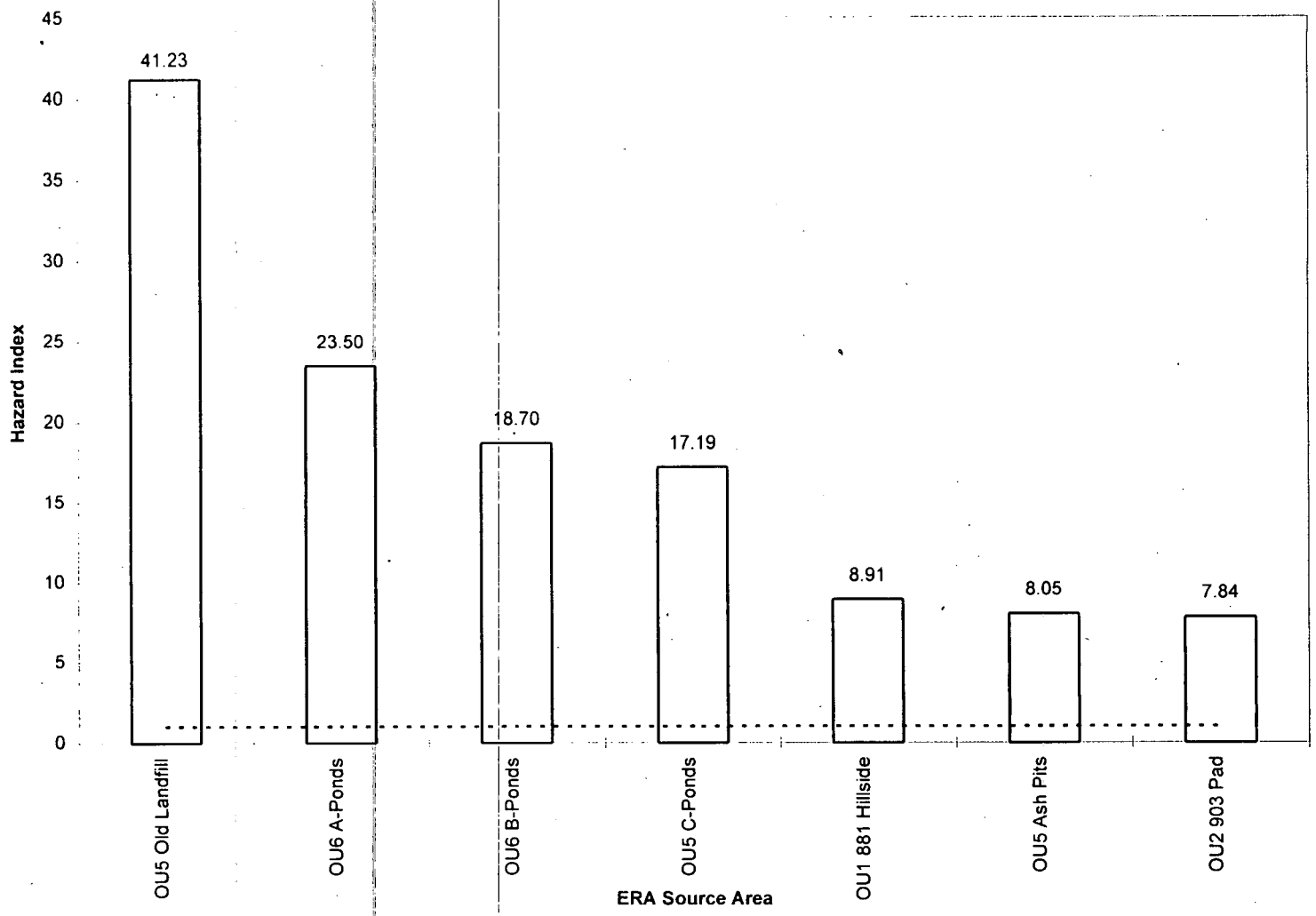
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

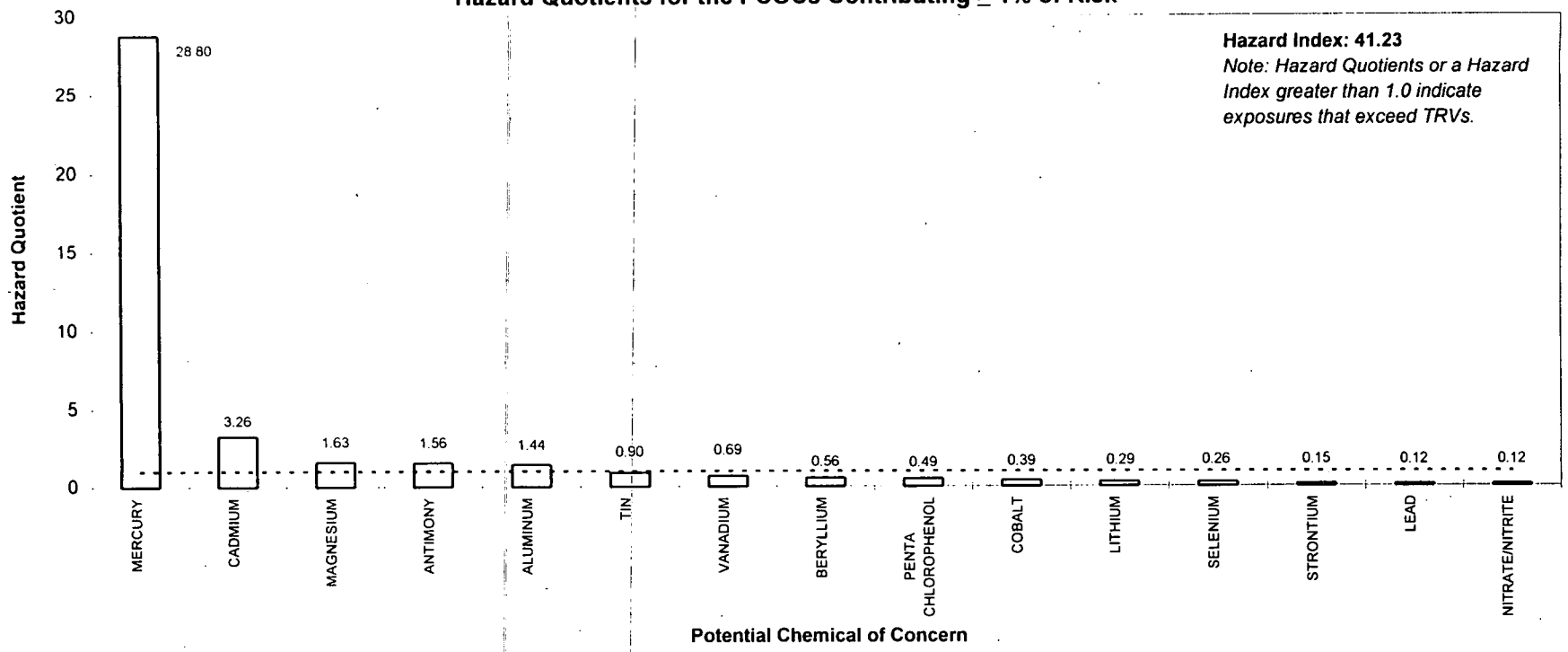
Summary of Ecotoxicological Risk to Great Blue Herons

Summary of Ecotoxicological Risk to Great Blue Herons at RFETS

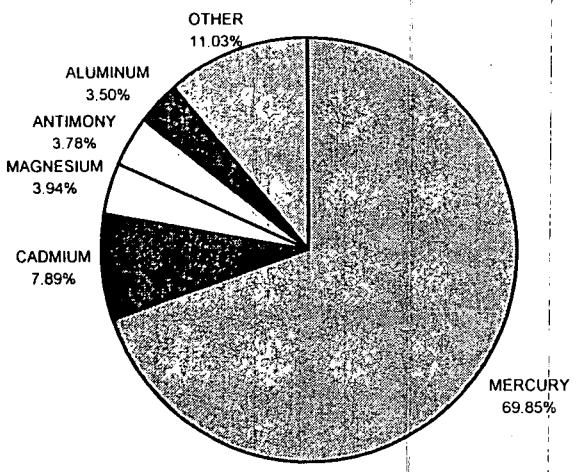


Summary of Ecotoxicological Risk to Great Blue Herons in the OU5 Old Landfill Source Area at RFETS

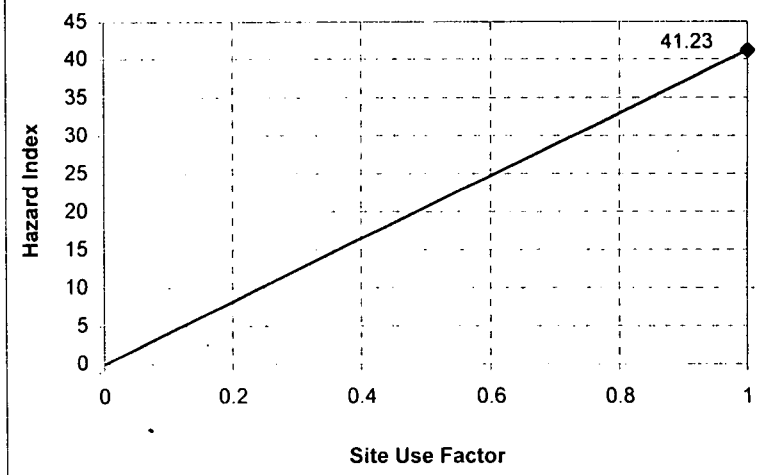
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



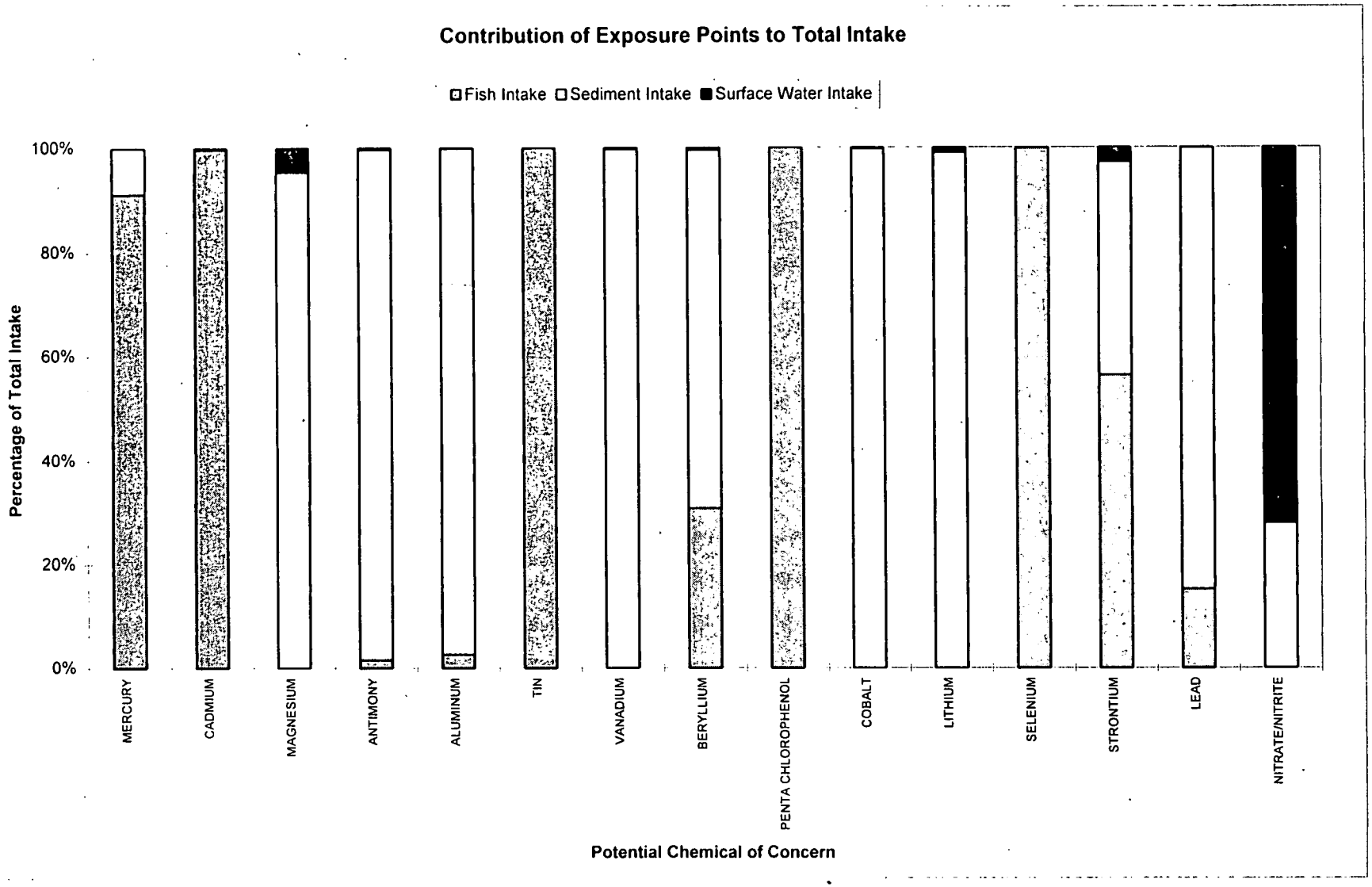
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Great Blue Herons in the OU5 Old Landfill Source Area at RFETS



Summary of Ecotoxicological Risk to Great Blue Herons at the OU5 Old Landfill Source at RFETS

GREAT BLUE HERONS OU5 OLD LANDFILL		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.180 SUF = 1			IR = 0.004 SUF = 1		IR = 0.045 SUF = 1					
MERCURY	X	NR	0.731	0.132	3.194	0.013	1.11E-04	5.00E-06	0.144	0.005	28.80	69.85%
CADMIUM		NR	20.993	3.779	2.486	0.010	0.002	7.20E-05	3.789	1.164	3.26	7.89%
MAGNESIUM		NR	NO BCF	—	4628.783	18.515	19.837	0.893	19.408	11.932	1.63	3.94%
ANTIMONY	X	NR	0.018	0.003	51.300	0.205	0.015	0.001	0.209	0.134	1.56	3.78%
ALUMINUM		NR	9.830	1.769	16076.395	64.306	1.471	0.066	66.141	45.851	1.44	3.50%
TIN		NR	77.147	13.886	ND	ND	0.021	0.001	13.887	15.433	0.90	2.18%
VANADIUM		NR	NO BCF	—	39.300	0.157	0.008	3.68E-04	0.158	0.230	0.69	1.67%
BERYLLIUM		NR	0.017	0.003	1.700	0.007	0.001	4.27E-05	0.010	0.018	0.56	1.35%
PENTA CHLOROPHENOL	X	NR	18.905	3.403	ND	—	0.005	2.25E-04	3.403	6.888	0.49	1.20%
COBALT	X	NR	NO BCF	—	10.900	0.044	0.002	9.00E-05	0.044	0.112	0.39	0.95%
LITHIUM	X	NR	NO BCF	—	15.400	0.062	0.013	0.001	0.062	0.213	0.29	0.71%
SELENIUM		NR	0.449	0.081	ND	—	0.003	1.14E-04	0.081	0.306	0.26	0.64%
STRONTIUM	X	NR	2.431	0.438	79.000	0.316	0.484	0.022	0.775	5.288	0.15	0.36%
LEAD	X	NR	0.151	0.027	37.926	0.152	0.004	1.81E-04	0.179	1.439	0.12	0.30%
NITRATE/NITRITE		NR	NO BCF	—	6.526	0.026	1.490	0.067	0.093	0.750	0.12	0.30%
MANGANESE		NR	NO BCF	—	556.331	2.225	0.061	0.003	2.228	23.173	0.10	0.23%
BARIUM	X	NR	NO BCF	—	186.000	0.744	0.162	0.007	0.751	7.906	0.09	0.23%
BIS(2-ETHYLHEXYL) PHTHALATE	X	NR	0.156	0.028	0.068	2.72E-04	0.002	9.00E-05	0.028	0.450	0.06	0.15%
CHROMIUM		NR	0.011	0.002	22.917	0.092	0.004	1.92E-04	0.094	1.551	0.06	0.15%
COPPER	X	NR	1.717	0.309	108.217	0.433	0.006	2.55E-04	0.742	12.587	0.06	0.14%
THALLIUM		NR	ND	—	0.600	0.002	0.002	8.92E-05	0.002	0.046	0.04	0.11%
ARSENIC		NR	0.039	0.007	6.100	0.024	0.002	9.63E-05	0.031	0.690	0.04	0.11%
ZINC	X	NR	13.717	2.469	634.180	2.537	0.022	0.001	5.007	138.711	0.04	0.09%
TRICHLOROETHENE		NR	0.117	0.021	ND	—	0.003	1.29E-04	0.021	0.993	0.02	0.05%
MOLYBDENUM		NR	NO BCF	—	3.900	0.016	0.004	1.98E-04	0.016	0.933	0.02	0.04%
PHENANTHRENE	X	NR	ND	—	0.082	3.28E-04	ND	—	3.28E-04	0.029	0.01	0.03%
AROCLOR-1254	X	NR	ND	—	0.250	0.001	ND	—	0.001	0.135	0.01	0.02%
METHYLENE CHLORIDE	X	NR	0.016	0.003	ND	—	0.003	1.38E-04	0.003	0.642	<0.01	0.01%
NICKEL		NR	0.904	0.163	21.300	0.085	0.009	4.24E-04	0.248	54.608	<0.01	0.01%
FLUORANTHENE	X	NR	ND	—	0.097	3.88E-04	ND	—	3.88E-04	0.290	<0.01	<0.01%
PYRENE	X	NR	ND	—	0.097	3.88E-04	ND	—	3.88E-04	0.290	<0.01	<0.01%
CHRYSENE	X	NR	ND	—	0.041	1.64E-04	ND	—	1.64E-04	0.290	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	ND	—	0.038	1.52E-04	ND	—	1.52E-04	0.290	<0.01	<0.01%
ACETONE		NR	0.009	0.002	0.046	1.84E-04	0.022	0.001	0.003	68.362	<0.01	<0.01%
SILVER	X	NR	0.003	0.001	6.597	0.026	0.003	1.57E-04	0.027	861.381	<0.01	<0.01%
TETRACHLOROETHENE		NR	ND	—	0.001	4.00E-06	ND	—	4.00E-06	1.253	<0.01	<0.01%

HAZARD INDEX 41.23

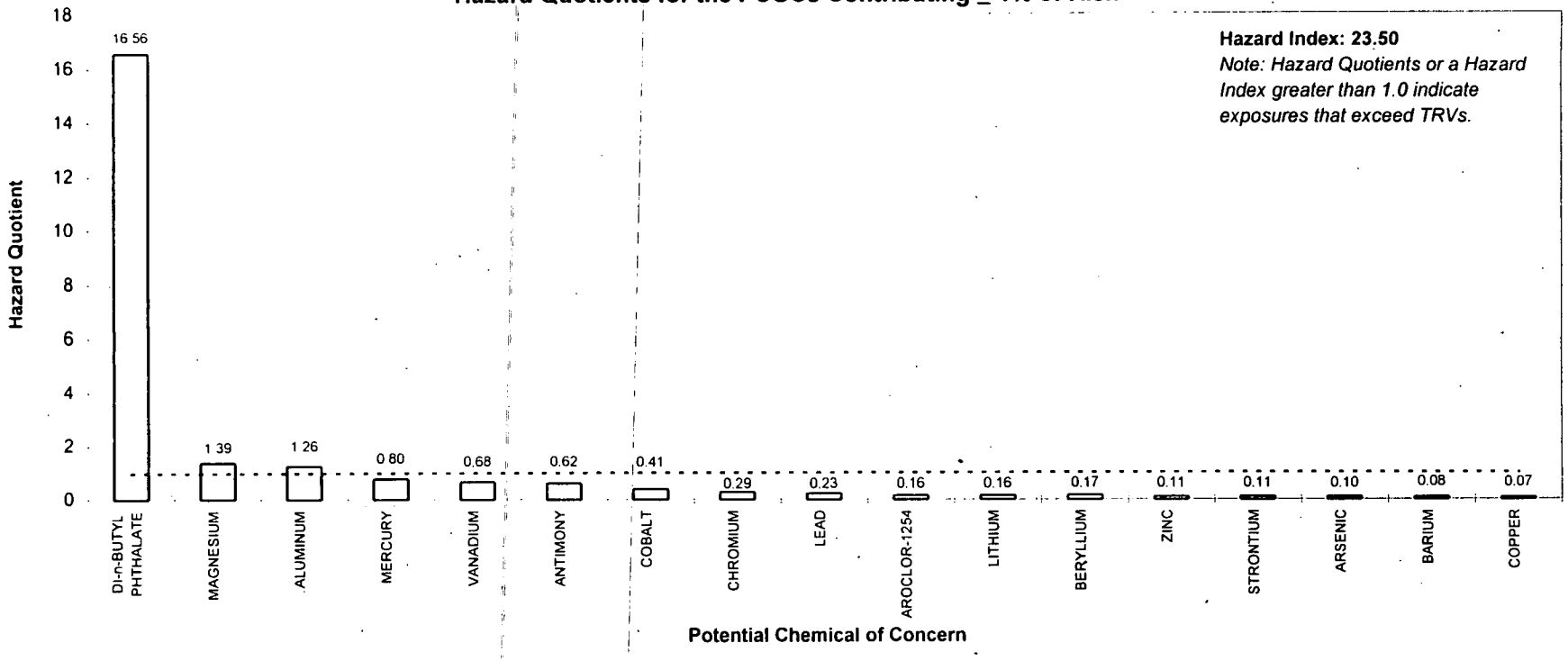
Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor

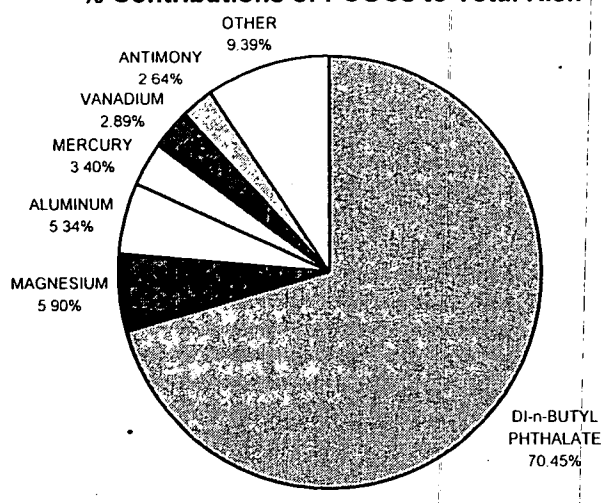
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Great Blue Herons in the OU6 A-Ponds Source Area at RFETS

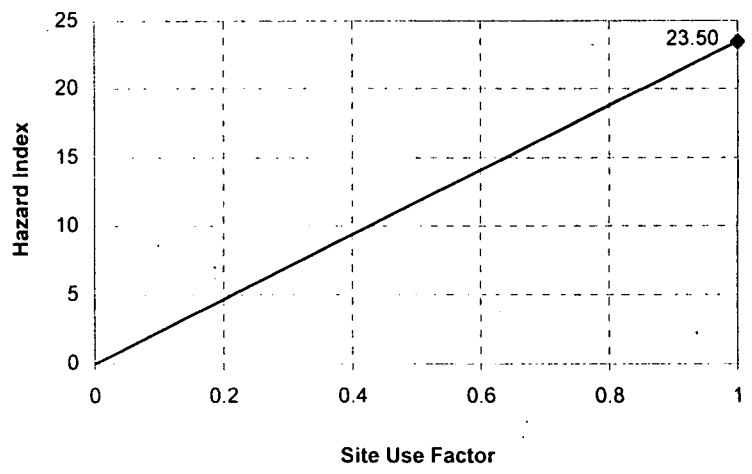
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



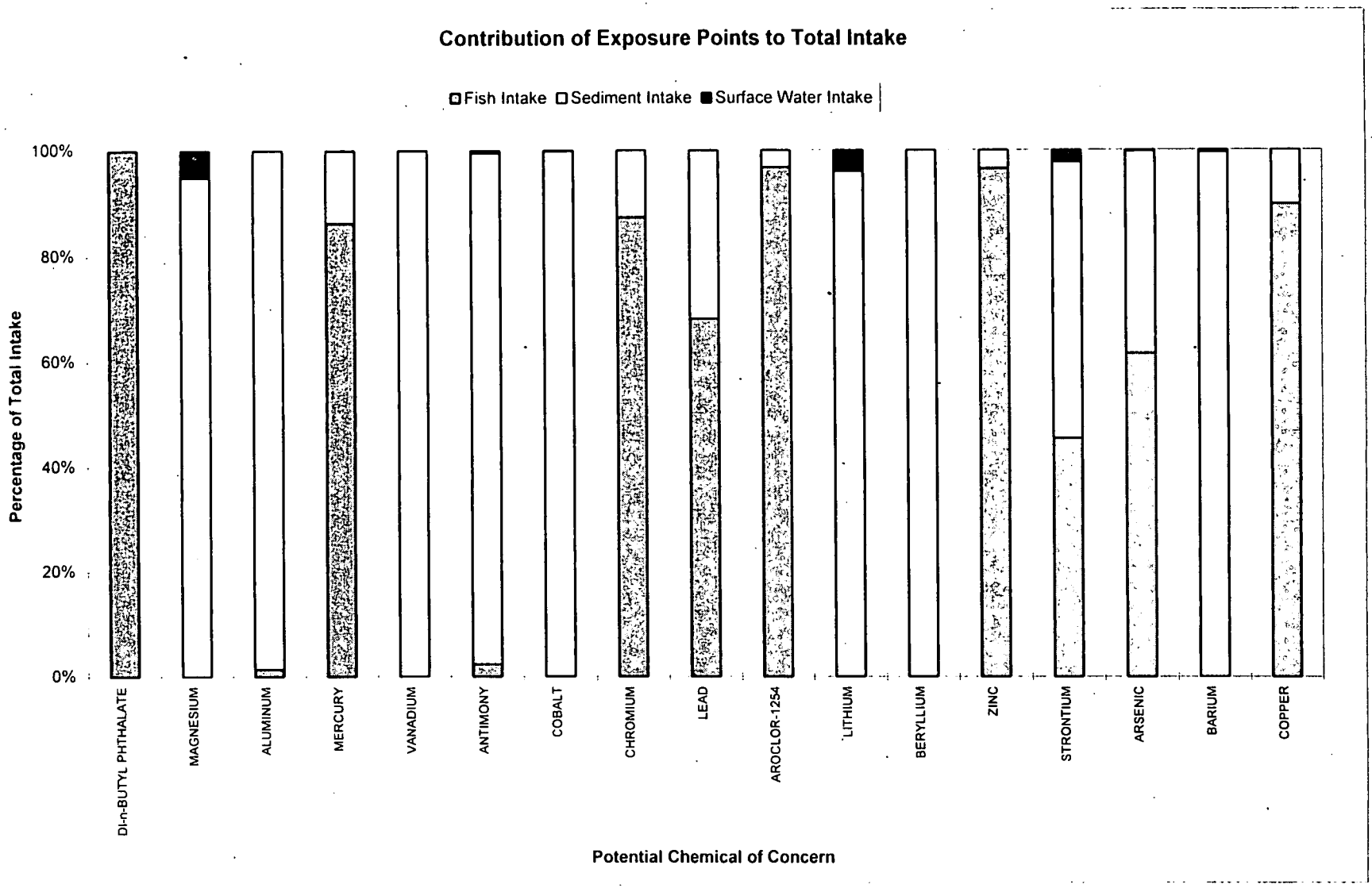
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Great Blue Herons in the OU6 A-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to Great Blue Herons in the OU6 A-Ponds Source Area at RFETS

GREAT BLUE HERONS OU6 A-PONDS		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.180 SUF = 1			IR = 0.004 SUF = 1		IR = 0.045 SUF = 1					
DI-n-BUTYL PHTHALATE	X	NR	4.136	0.744	ND	—	0.002	9.00E-05	0.745	0.045	16.56	70.45%
MAGNESIUM	X	NR	NO BCF	—	3921.004	15.684	18.851	0.848	16.532	11.932	1.39	5.90%
ALUMINUM		NR	4.700	0.846	14176.386	56.706	0.405	0.018	57.570	45.851	1.26	5.34%
MERCURY	X	0.020		0.004	0.142	0.001	1.49E-04	6.71E-06	0.004	0.005	0.80	3.40%
VANADIUM	X	NR	NO BCF	—	38.875	0.155	0.002	1.03E-04	0.156	0.230	0.68	2.89%
ANTIMONY	X	NR	0.011	0.002	20.227	0.081	0.009	3.98E-04	0.083	0.134	0.62	2.64%
COBALT	X	NR	NO BCF	—	11.590	0.046	0.001	6.57E-05	0.046	0.112	0.41	1.75%
CHROMIUM	X	2.161		0.389	13.994	0.056	0.002	7.34E-05	0.445	1.551	0.29	1.22%
LEAD	X	1.270		0.229	26.601	0.106	0.003	1.49E-04	0.335	1.439	0.23	0.99%
AROCLOR-1254	X	0.120		0.022	0.182	0.001	NR	—	0.022	0.135	0.16	0.69%
LITHIUM		NR	NO BCF	—	8.270	0.033	0.031	0.001	0.034	0.213	0.16	0.68%
BERYLLIUM		ND		—	0.710	0.003	ND	—	0.003	0.018	0.17	0.71%
ZINC	X	80.045		14.408	130.564	0.522	0.008	3.70E-04	14.931	138.711	0.11	0.46%
STRONTIUM	X	NR	1.414	0.254	73.117	0.292	0.278	0.013	0.559	5.288	0.11	0.45%
ARSENIC	X	0.229		0.041	6.354	0.025	0.004	1.60E-04	0.067	0.690	0.10	0.41%
BARIUM	X	NR	NO BCF	—	163.378	0.654	0.062	0.003	0.656	7.906	0.08	0.35%
COPPER	X	4.357		0.784	22.165	0.089	0.002	9.44E-05	0.873	12.587	0.07	0.30%
MANGANESE	X	NR	NO BCF	—	362.368	1.449	0.179	0.008	1.458	23.173	0.06	0.27%
THALLIUM		NR	ND	—	0.690	0.003	ND	—	0.003	0.046	0.07	0.28%
PHENANTHRENE	X	NR	ND	—	0.311	0.001	ND	—	0.001	0.029	0.03	0.15%
BENZO(a)PYRENE	X	NR	ND	—	0.282	0.001	ND	—	0.001	0.029	0.03	0.15%
BENZO(k)FLUORANTHENE	X	NR	ND	—	0.200	0.001	ND	—	0.001	0.029	0.03	0.15%
ANTHRACENE	X	NR	ND	—	0.088	3.52E-04	ND	—	3.52E-04	0.023	0.02	0.07%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	ND	—	1.241	0.005	ND	—	0.005	0.450	0.01	0.05%
INDENO(1,2,3-cd)PYRENE	X	NR	ND	—	0.200	0.001	ND	—	0.001	0.073	0.01	0.06%
NICKEL	X	2.529		0.455	17.820	0.071	0.003	1.25E-04	0.527	54.608	0.01	0.04%
SELENIUM		ND		—	0.640	0.003	0.003	1.48E-04	0.003	0.306	0.01	0.04%
FLUORANTHENE	X	NR	ND	—	0.405	0.002	ND	—	0.002	0.290	0.01	0.03%
PYRENE	X	NR	ND	—	0.343	0.001	ND	—	0.001	0.290	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	ND	—	0.312	0.001	ND	—	0.001	0.289	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	ND	—	0.270	0.001	ND	—	0.001	0.290	<0.01	0.01%
CHRYSENE	X	NR	ND	—	0.268	0.001	ND	—	0.001	0.290	<0.01	0.01%
CADMIUM		ND		—	0.945	0.004	0.001	4.33E-05	0.004	1.164	<0.01	0.01%
METHYLENE CHLORIDE	X	NR	0.011	0.002	ND	—	0.002	9.00E-05	0.002	0.642	<0.01	0.01%
BENZO(ghi)PERYLENE	X	NR	ND	—	0.210	0.001	ND	—	0.001	0.290	<0.01	0.01%
ALDRIN	X	ND		—	0.009	3.68E-05	NR	—	3.68E-05	0.046	<0.01	<0.01%
TOLUENE	X	NR	ND	—	0.178	0.001	ND	—	0.001	3.476	<0.01	<0.01%
SILVER	X	0.790		0.142	ND	—	0.002	8.38E-05	0.142	861.381	<0.01	<0.01%
MOLYBDENUM	X	NR	NO BCF	—	ND	—	0.003	1.38E-04	1.38E-04	0.933	<0.01	<0.01%

Summary of Ecotoxicological Risk to Great Blue Herons in the OU6 A-Ponds Source Area at RFETS

GREAT BLUE HERONS OU6 A-PONDS		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.180 SUF = 1			IR = 0.004 SUF = 1		IR = 0.045 SUF = 1					
PHENOL	X	NR	ND	—	0.110	4.40E-04	ND	—	4.40E-04	15.501	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	ND	—	0.130	0.001	ND	—	0.001	37.020	<0.01	<0.01%
ACETONE	X	NR	ND	—	0.230	0.001	ND	—	0.001	68.362	<0.01	<0.01%
ACENAPHTHENE	X	NR	ND	—	0.089	3.56E-04	ND	—	3.56E-04	29.010	<0.01	<0.01%
BENZENE	X	NR	ND	—	0.003	1.20E-05	ND	—	1.20E-05	6.649	<0.01	<0.01%

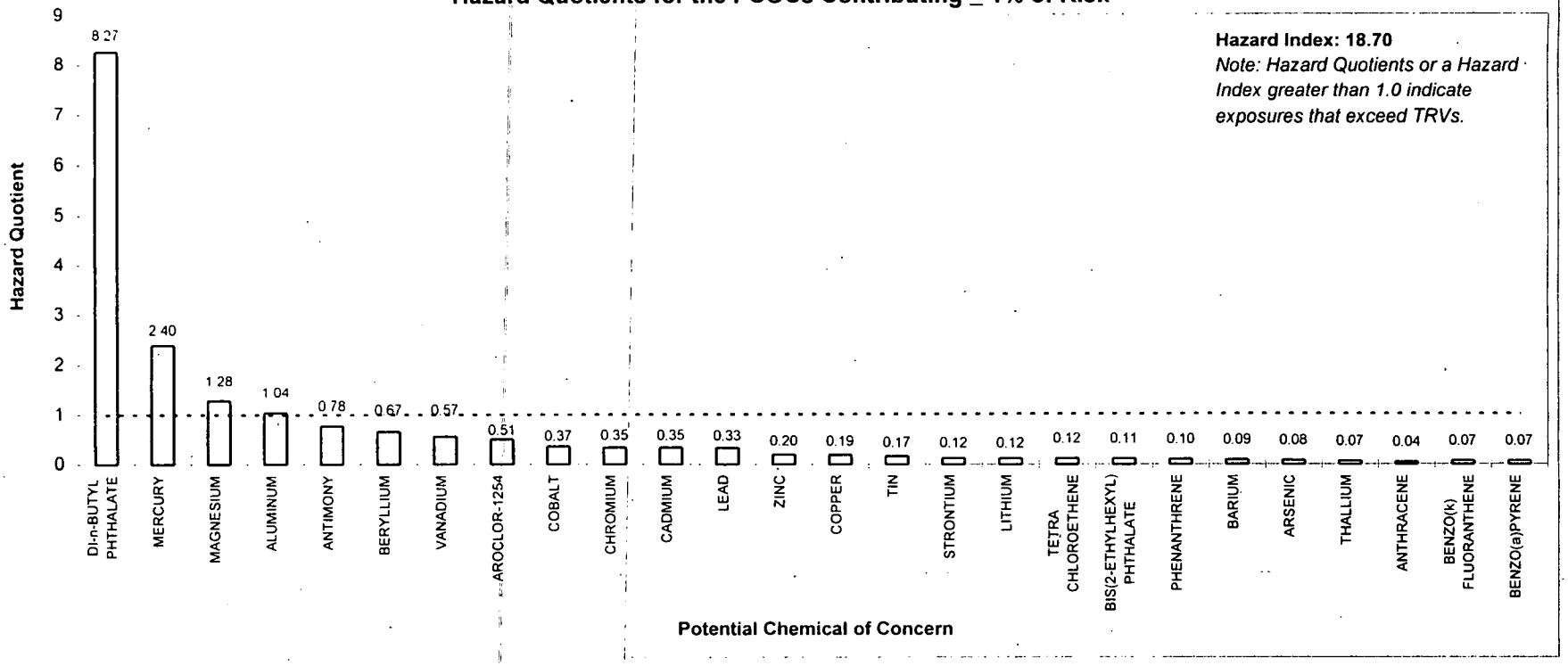
HAZARD INDEX 23.50

Notes:

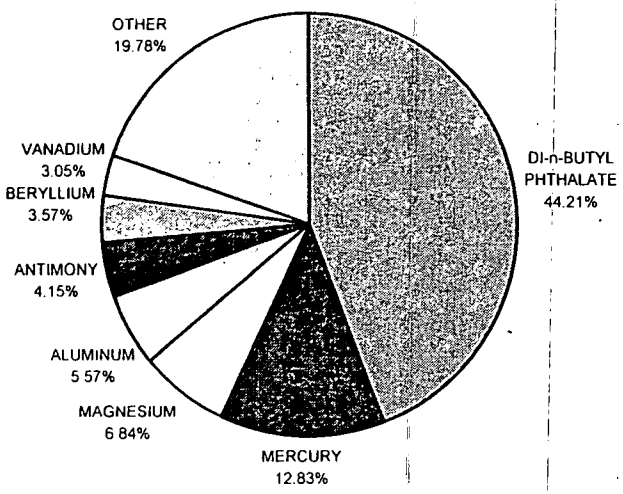
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Great Blue Herons in the OU6 B-Ponds Source Area at RFETS

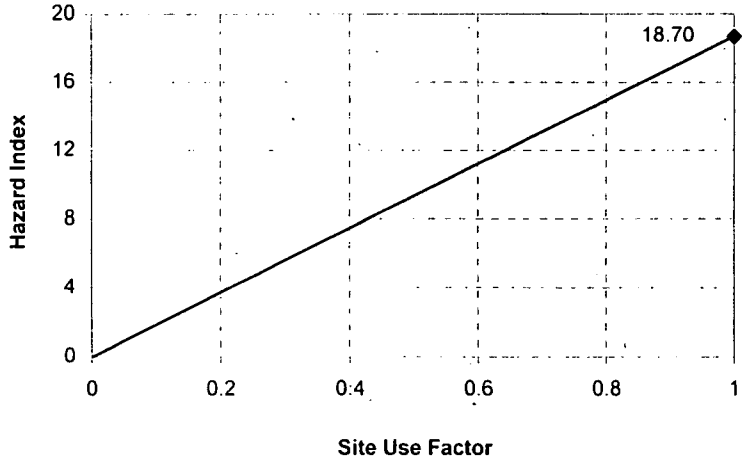
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



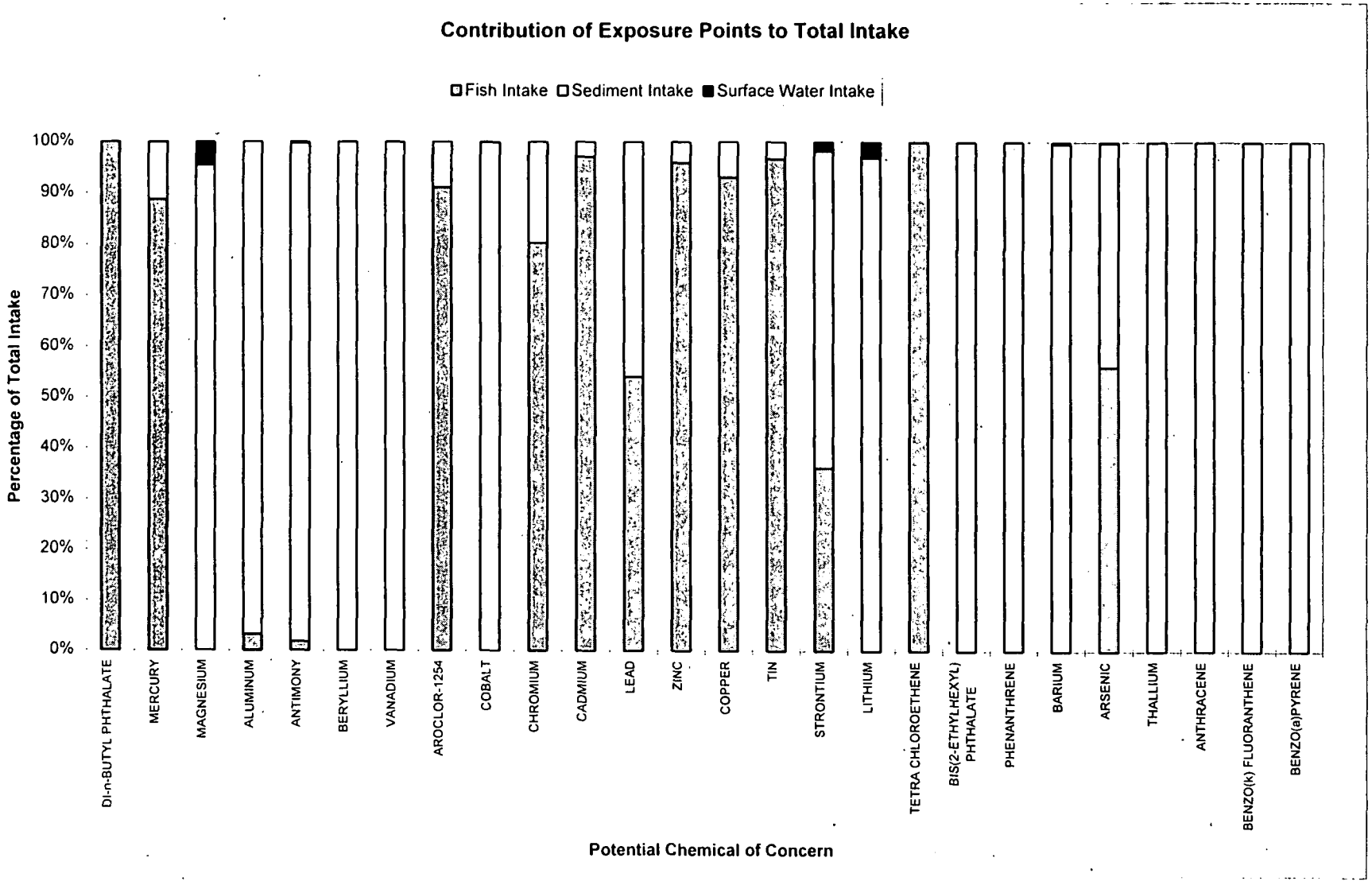
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Great Blue Herons in the OU6 B-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to Great Blue Herons in the OU6 B-Ponds Source Area at RFETS

GREAT BLUE HERONS OU6 B-PONDS		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.180 SUF = 1			IR = 0.004 SUF = 1		IR = 0.045 SUF = 1					
DI-n-BUTYL PHTHALATE	X	NR	2.068	0.372	ND	—	0.001	4.50E-05	0.372	0.045	8.27	44.21%
MERCURY	X	0.060		0.011	0.340	0.001	2.75E-04	1.24E-05	0.012	0.005	2.40	12.83%
MAGNESIUM	X	NR	NO BCF	—	3643.654	14.575	15.504	0.698	15.272	11.932	1.28	6.84%
ALUMINUM		NR	8.604	1.549	11556.246	46.225	0.264	0.012	47.786	45.851	1.04	5.57%
ANTIMONY	X	NR	0.010	0.002	25.419	0.102	0.009	3.83E-04	0.104	0.134	0.78	4.15%
BERYLLIUM		ND		—	2.933	0.012	1.79E-04	8.06E-06	0.012	0.018	0.67	3.57%
VANADIUM	X	NR	NO BCF	—	32.781	0.131	0.003	1.28E-04	0.131	0.230	0.57	3.05%
AROCLOR-1254	X	0.351		0.063	1.543	0.006	NR	—	0.069	0.135	0.51	2.73%
COBALT	X	NR	NO BCF	—	10.133	0.041	0.002	7.12E-05	0.041	0.112	0.37	1.96%
CHROMIUM	X	2.400		0.432	26.369	0.105	0.002	9.95E-05	0.538	1.551	0.35	1.85%
CADMIUM		2.176		0.392	2.888	0.012	0.001	4.44E-05	0.403	1.164	0.35	1.85%
LEAD	X	1.426		0.257	54.428	0.218	0.005	2.31E-04	0.475	1.439	0.33	1.77%
ZINC	X	148.423		26.716	279.259	1.117	0.026	0.001	27.834	138.711	0.20	1.07%
COPPER	X	12.594		2.267	42.045	0.168	ND	—	2.435	12.587	0.19	1.03%
TIN		NR	13.941	2.509	21.229	0.085	0.006	2.85E-04	2.595	15.433	0.17	0.90%
STRONTIUM	X	NR	1.315	0.237	101.256	0.405	0.255	0.011	0.653	5.288	0.12	0.66%
LITHIUM		NR	NO BCF	—	6.200	0.025	0.017	0.001	0.026	0.213	0.12	0.65%
TETRA CHLOROETHENE	X	NR	0.826	0.149	ND	—	0.004	1.65E-04	0.149	1.253	0.12	0.64%
BIS(2-ETHYLHEXYL) PHTHALATE	X	NR	ND	—	12.825	0.051	ND	—	0.051	0.450	0.11	0.61%
PHENANTHRENE	X	NR	ND	—	0.744	0.003	ND	—	0.003	0.029	0.10	0.55%
BARIUM	X	NR	NO BCF	—	178.739	0.715	0.051	0.002	0.717	7.906	0.09	0.48%
ARSENIC	X	0.179		0.032	6.286	0.025	0.002	1.01E-04	0.057	0.690	0.08	0.44%
THALLIUM		NR	ND	—	0.790	0.003	ND	—	0.003	0.046	0.07	0.35%
ANTHRACENE	X	NR	ND	—	0.326	0.001	ND	—	0.001	0.023	0.04	0.23%
BENZO(k) FLUORANTHENE	X	NR	ND	—	0.411	0.002	ND	—	0.002	0.029	0.07	0.37%
BENZO(a)PYRENE	X	NR	ND	—	0.398	0.002	ND	—	0.002	0.029	0.07	0.37%
MANGANESE	X	NR	NO BCF	—	272.520	1.090	0.098	0.004	1.094	23.173	0.05	0.25%
AROCLOR-1260	X	0.142		0.026	0.166	0.001	NR	—	0.026	0.687	0.04	0.20%
TRICHLOROETHENE	X	NR	0.117	0.021	ND	—	0.003	1.29E-04	0.021	0.993	0.02	0.11%
DIBENZO(a,h)ANTHRACENE	X	NR	ND	—	0.150	0.001	ND	—	0.001	0.029	0.03	0.18%
INDENO(1,2,3-cd)PYRENE	X	NR	ND	—	0.350	0.001	ND	—	0.001	0.073	0.01	0.07%
FLUORANTHENE	X	NR	ND	—	1.128	0.005	ND	—	0.005	0.290	0.02	0.09%
PYRENE	X	NR	ND	—	0.951	0.004	ND	—	0.004	0.290	0.01	0.07%
BENZO(b)FLUORANTHENE	X	NR	ND	—	0.854	0.003	ND	—	0.003	0.289	0.01	0.06%
CHRYSENE	X	NR	ND	—	0.614	0.002	ND	—	0.002	0.290	0.01	0.04%
SELENIUM		ND		—	0.591	0.002	0.002	9.10E-05	0.002	0.306	0.01	0.03%
BENZO(a)ANTHRACENE	X	NR	ND	—	0.429	0.002	ND	—	0.002	0.290	0.01	0.04%
AROCLOR-1248		ND		—	0.165	0.001	NR	—	0.001	0.135	0.01	0.04%
FLUORENE	X	NR	ND	—	0.351	0.001	ND	—	0.001	0.289	<0.01	0.02%

Summary of Ecotoxicological Risk to Great Blue Herons in the OU6 B-Ponds Source Area at RFETS

GREAT BLUE HERONS OU6 B-PONDS		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.180 SUF = 1			IR = 0.004 SUF = 1		IR = 0.045 SUF = 1					
BENZO(ghi)PERYLENE	X	NR	ND	—	0.270	0.001	ND	—	0.001	0.290	<0.01	0.02%
NICKEL	X	ND		—	19.763	0.079	0.004	1.60E-04	0.079	54.608	<0.01	0.01%
HEPTACHLOR	X	ND		—	0.007	2.71E-05	NR	—	2.71E-05	0.025	<0.01	0.01%
SILVER	X	0.480		0.086	92.067	0.368	ND	—	0.455	861.381	<0.01	<0.01%
MOLYBDENUM	X	NR	NO BCF	—	ND	—	0.007	3.31E-04	3.31E-04	0.933	<0.01	<0.01%
TOLUENE	X	NR	ND	—	0.278	0.001	ND	—	0.001	3.476	<0.01	<0.01%
1,2-DICHLOROETHANE	X	NR	0.008	0.001	ND	—	0.001	4.50E-05	0.001	15.067	<0.01	<0.01%
PHENOL	X	NR	ND	—	0.290	0.001	ND	—	0.001	15.501	<0.01	<0.01%
METHYLENE CHLORIDE	X	NR	ND	—	0.009	3.60E-05	ND	—	3.60E-05	0.642	<0.01	<0.01%
NAPHTHALENE	X	NR	ND	—	0.351	0.001	ND	—	0.001	29.010	<0.01	<0.01%
ACENAPHTHENE	X	NR	ND	—	0.341	0.001	ND	—	0.001	29.010	<0.01	<0.01%
ACETONE	X	NR	0.004	0.001	0.190	0.001	0.011	4.76E-04	0.002	68.362	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	ND	—	0.250	0.001	ND	—	0.001	37.020	<0.01	<0.01%
2-METHYLNAPHTHALENE	X	NR	ND	—	0.170	0.001	ND	—	0.001	29.010	<0.01	<0.01%
gamma-BHC (LINDANE)	X	ND		—	0.006	2.31E-05	NR	—	2.31E-05	1.500	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	ND	—	0.110	4.40E-04	ND	—	4.40E-04	84.619	<0.01	<0.01%

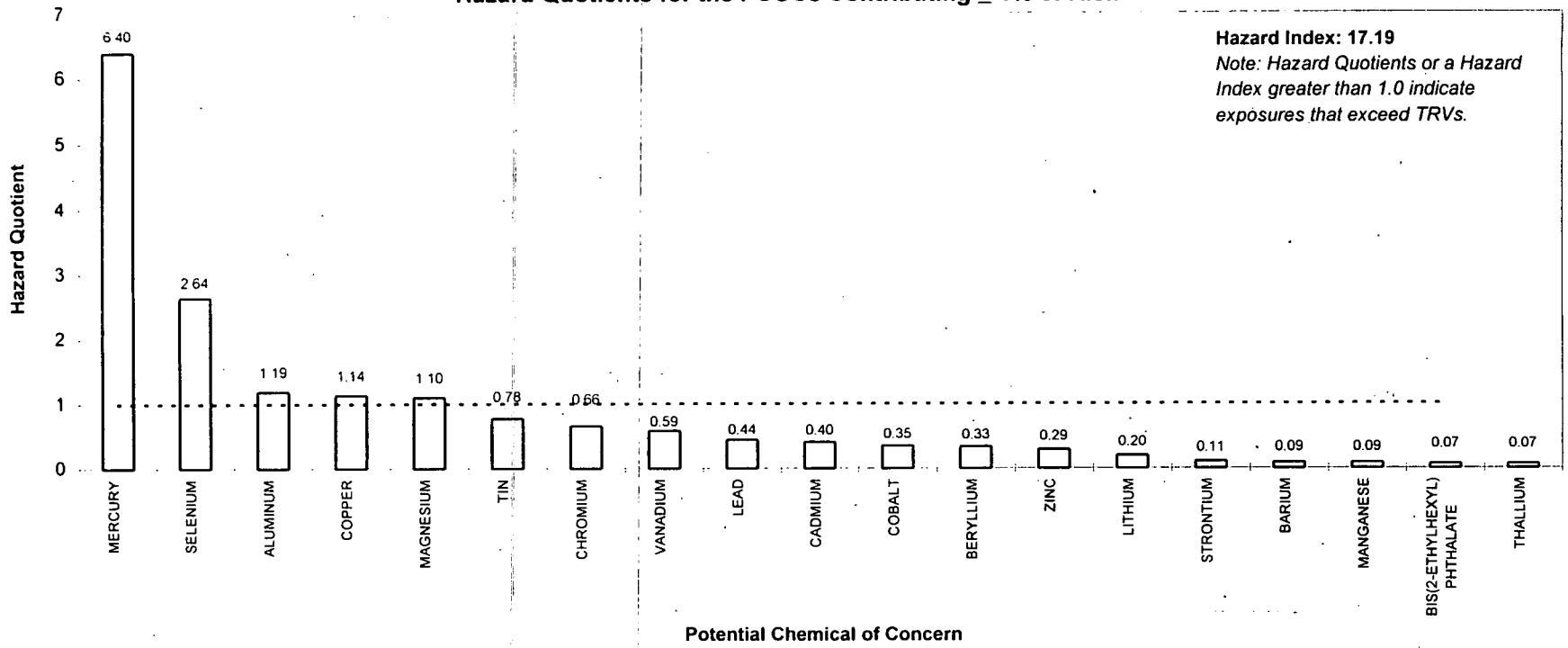
HAZARD INDEX 18.70

Notes:

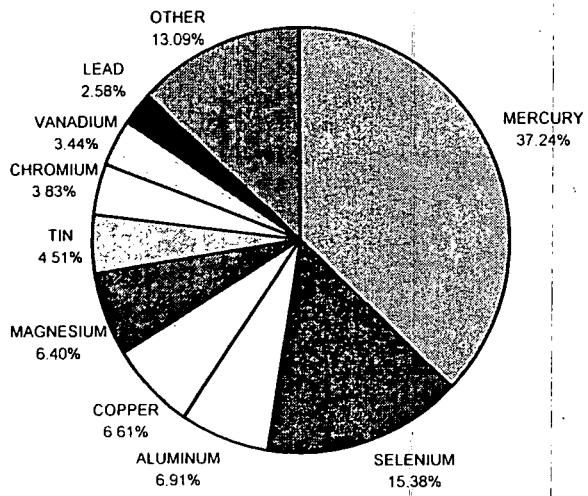
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Great Blue Herons in the OU5 C-Ponds Source Area at RFETS

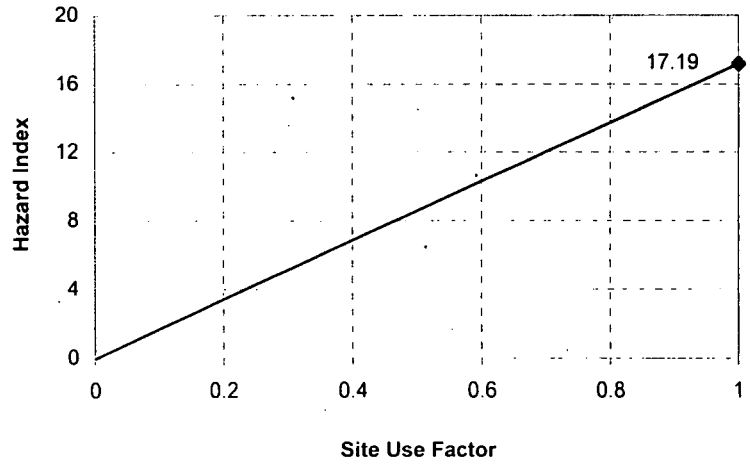
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



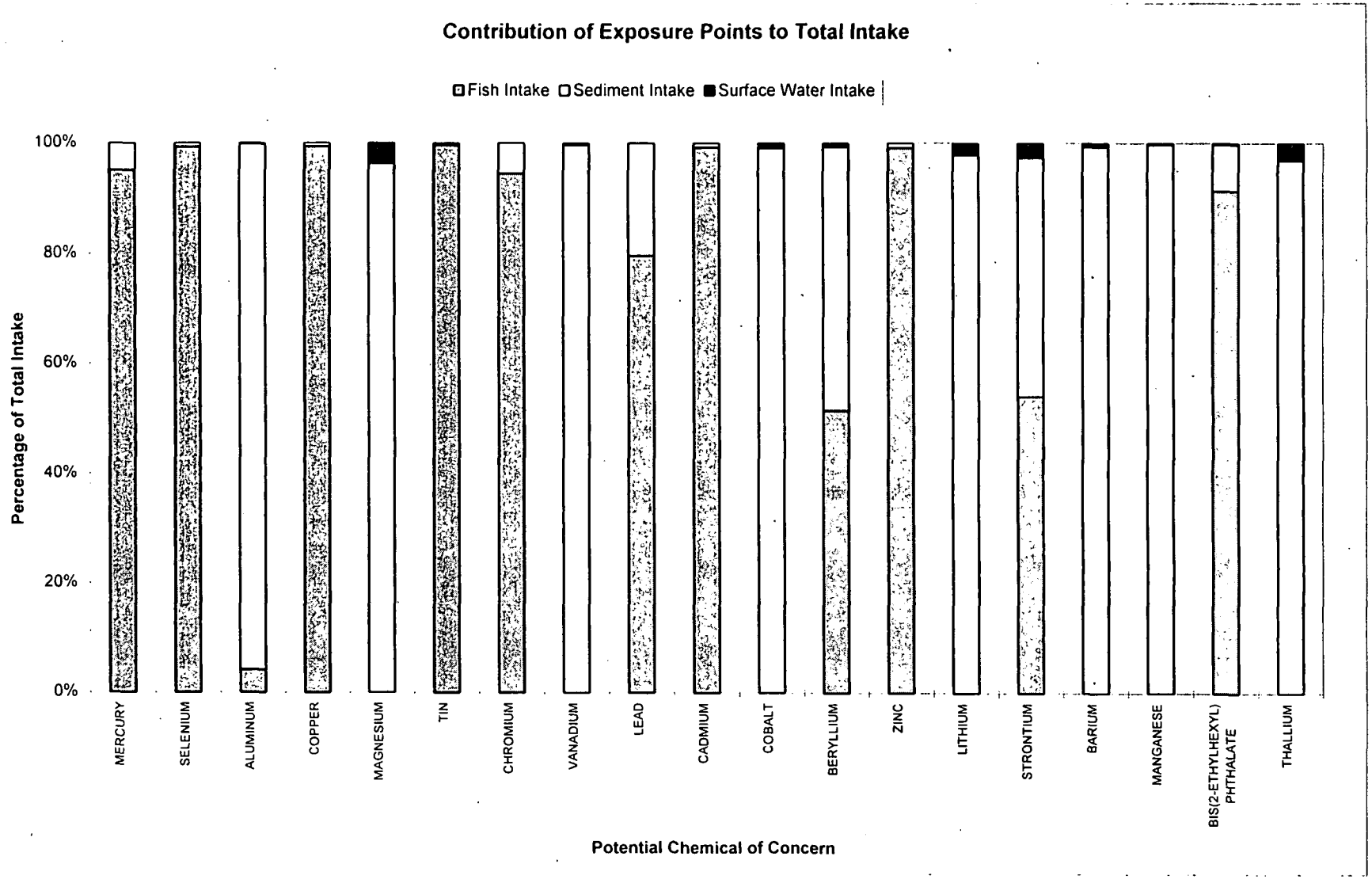
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Great Blue Herons in the OU5 C-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to Great Blue Herons in the OU5 C-Ponds Source Area at RFETS

GREAT BLUE HERONS OU5 C-PONDS		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.180 SUF = 1			IR = 0.004 SUF = 1		IR = 0.045 SUF = 1					
MERCURY	X	0.171		0.031	0.393	0.002	1.41E-04	6.35E-06	0.032	0.005	6.40	37.24%
SELENIUM		4.461		0.803	1.353	0.005	0.002	8.34E-05	0.809	0.306	2.64	15.38%
ALUMINUM		NR	12.739	2.293	13018.068	52.072	2.432	0.109	54.475	45.851	1.19	6.91%
COPPER	X	78.919		14.205	23.083	0.092	0.008	3.59E-04	14.298	12.587	1.14	6.61%
MAGNESIUM		NR	NO BCF	—	3157.852	12.631	10.768	0.485	13.116	11.932	1.10	6.40%
TIN		NR	66.240	11.923	12.061	0.048	0.021	0.001	11.972	15.433	0.78	4.51%
CHROMIUM		5.367		0.966	14.042	0.056	0.005	2.14E-04	1.022	1.551	0.66	3.83%
VANADIUM		NR	NO BCF	—	33.892	0.136	0.012	0.001	0.136	0.230	0.59	3.44%
LEAD	X	2.825		0.508	32.420	0.130	0.006	2.84E-04	0.638	1.439	0.44	2.58%
CADMIUM		2.597		0.468	0.898	0.004	0.003	1.16E-04	0.471	1.164	0.40	2.35%
COBALT	X	NR	NO BCF	—	9.581	0.038	0.008	3.58E-04	0.039	0.112	0.35	2.03%
BERYLLIUM		NR	0.018	0.003	0.767	0.003	0.001	4.50E-05	0.006	0.018	0.33	1.94%
ZINC	X	219.885		39.579	94.329	0.377	0.048	0.002	39.959	138.711	0.29	1.68%
LITHIUM	X	NR	NO BCF	—	10.543	0.042	0.020	0.001	0.043	0.213	0.20	1.17%
STRONTIUM	X	NR	1.744	0.314	62.795	0.251	0.337	0.015	0.580	5.288	0.11	0.64%
BARIUM	X	NR	NO BCF	—	177.770	0.711	0.109	0.005	0.716	7.906	0.09	0.53%
MANGANESE		NR	NO BCF	—	521.405	2.086	0.120	0.005	2.091	23.173	0.09	0.53%
BIS(2-ETHYLHEXYL) PHTHALATE	X	NR	0.156	0.028	0.640	0.003	0.002	9.00E-05	0.031	0.450	0.07	0.40%
THALLIUM		NR	ND	—	0.833	0.003	0.002	1.05E-04	0.003	0.046	0.07	0.38%
NITRATE/NITRITE		NR	NO BCF	—	3.570	0.014	0.541	0.024	0.039	0.750	0.05	0.30%
AROCLOR-1254	X	0.035		0.006	ND	—	ND	—	0.006	0.135	0.04	0.26%
ARSENIC		NR	0.034	0.006	4.893	0.020	0.002	1.00E-04	0.026	0.690	0.04	0.22%
AROCLOR-1248		0.030		0.005	ND	—	ND	—	0.005	0.135	0.04	0.22%
ANTIMONY	X	NR	0.020	0.004	ND	—	0.015	0.001	0.004	0.134	0.03	0.17%
MOLYBDENUM		NR	NO BCF	—	4.832	0.019	0.017	0.001	0.020	0.933	0.02	0.12%
DI-n-BUTYL PHTHALATE	X	NR	ND	—	0.110	4.40E-04	ND	—	4.40E-04	0.045	0.01	0.06%
METHYLENE CHLORIDE	X	NR	0.019	0.003	0.020	7.95E-05	0.004	1.65E-04	0.004	0.642	0.01	0.04%
NICKEL		NR	0.890	0.160	15.645	0.063	0.009	3.91E-04	0.223	54.608	<0.01	0.02%
TOLUENE	X	NR	0.070	0.013	0.146	0.001	0.001	4.50E-05	0.013	3.476	<0.01	0.02%
FLUORANTHENE	X	NR	ND	—	0.140	0.001	ND	—	0.001	0.290	<0.01	0.02%
PHENOL	X	NR	ND	—	0.150	0.001	ND	—	0.001	15.501	<0.01	<0.01%
delta-BHC		NR	ND	—	0.004	1.40E-05	ND	—	1.40E-05	0.226	<0.01	<0.01%
ACETONE		NR	0.006	0.001	0.124	4.97E-04	0.014	0.001	0.002	68.362	<0.01	<0.01%
SILVER	X	ND		—	1.700	0.007	0.004	1.62E-04	0.007	861.381	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	ND	—	0.001	4.00E-06	ND	—	4.00E-06	1.008	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	ND	—	0.057	2.28E-04	ND	—	2.28E-04	84.619	<0.01	<0.01%

HAZARD INDEX 17.19

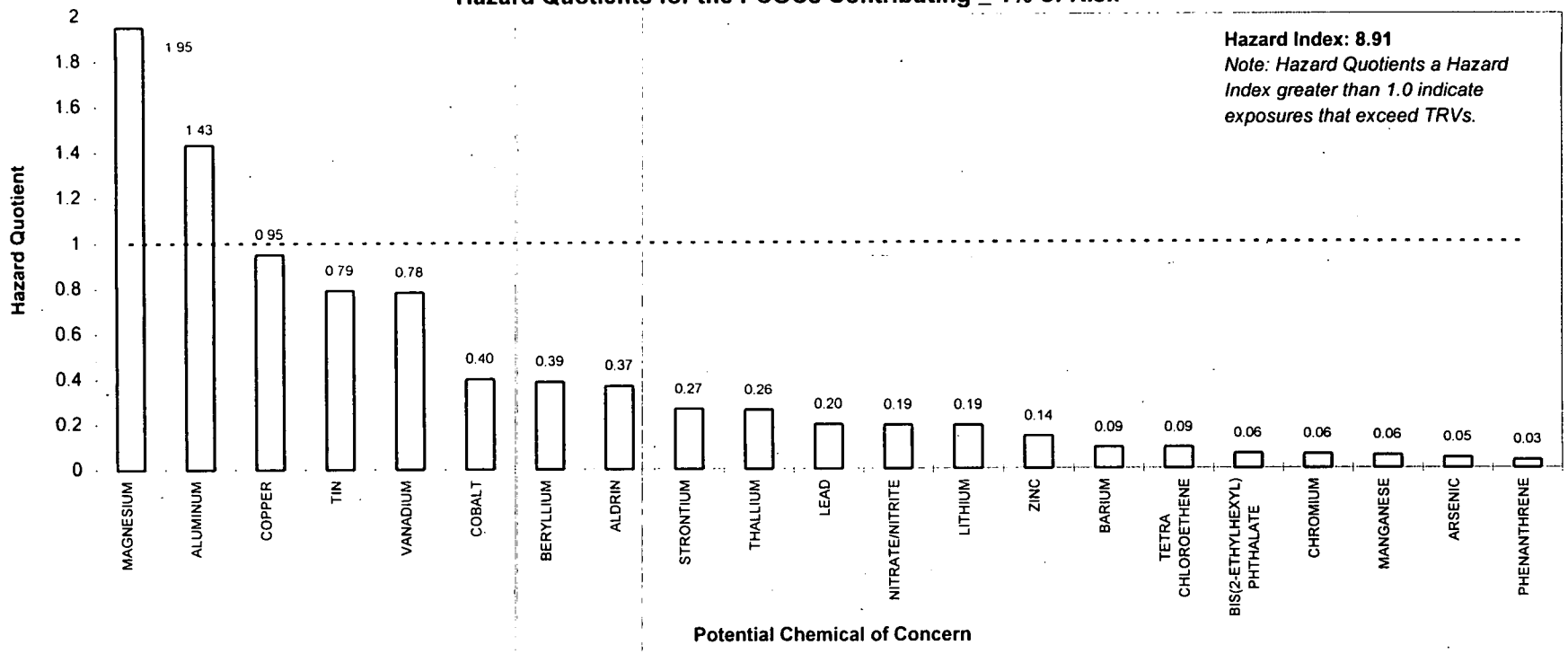
Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor

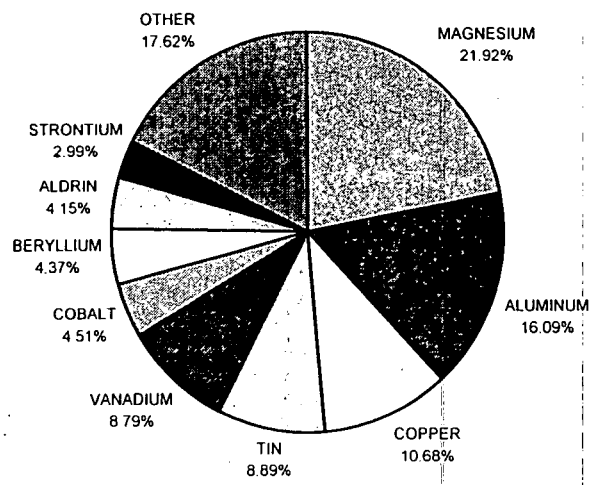
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Great Blue Herons in the OU1 881 Hillside Source Area at RFETS

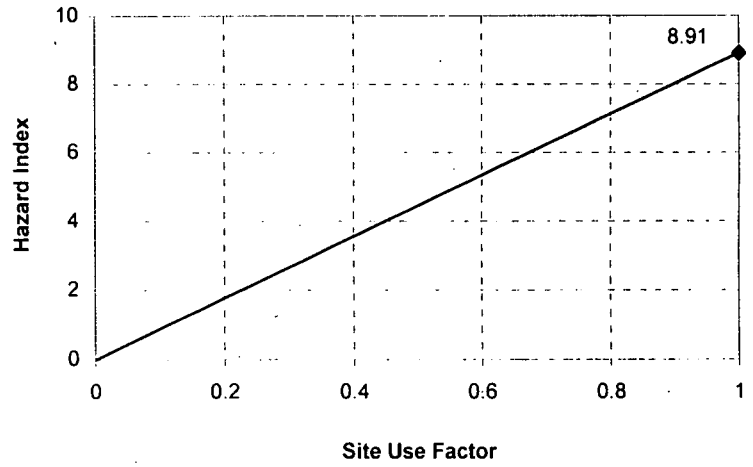
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



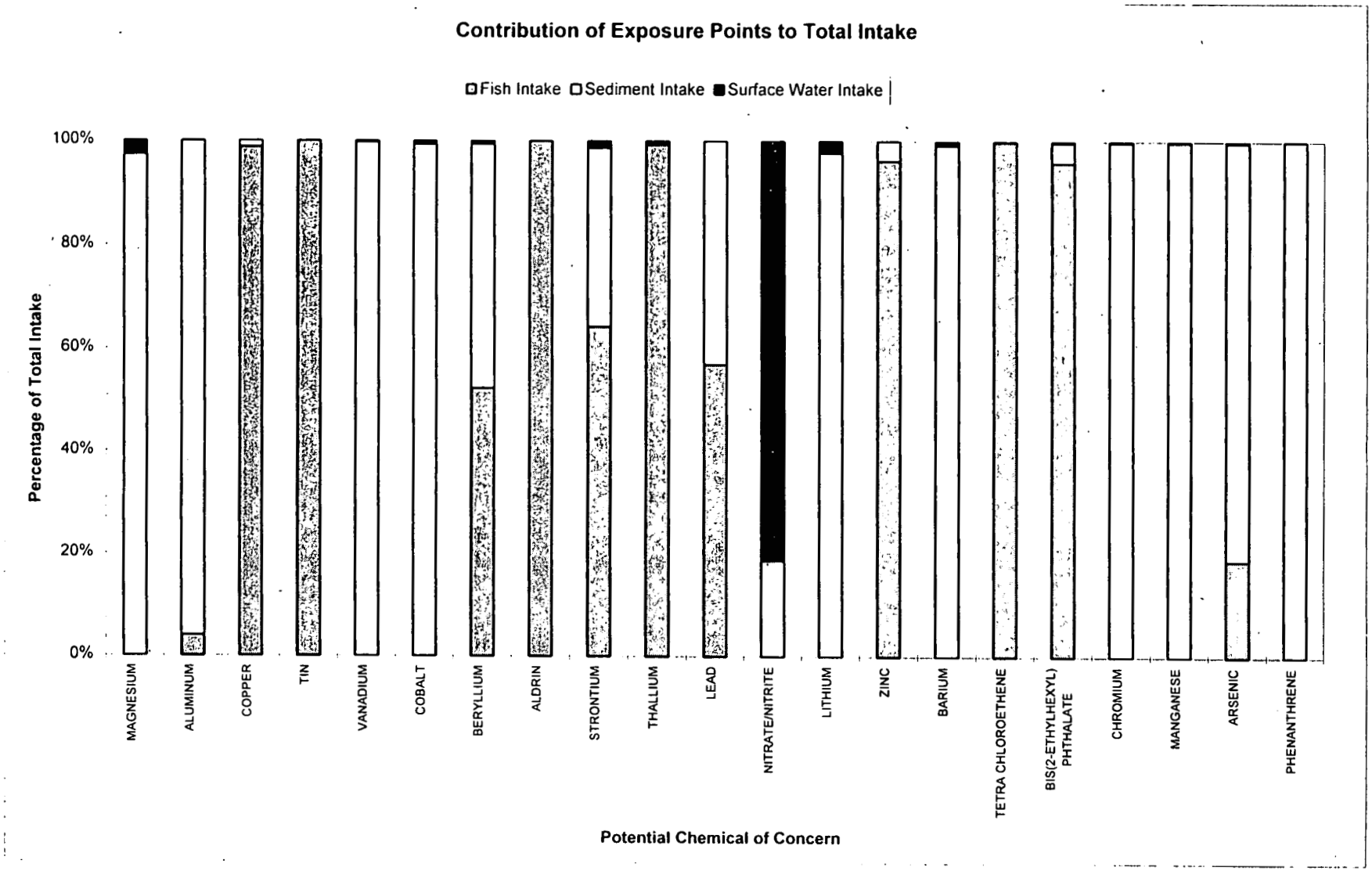
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Great Blue Herons in the OU1 881 Hillside Source Area at RFETS



Summary of Ecotoxicological Risk to Great Blue Herons in the OU1 881 Hillside Source Area at RFETS

GREAT BLUE HERONS OU1 881 HILLSIDE		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU1	IR = 0.180 SUF = 1			IR = 0.004 SUF = 1		IR = 0.045 SUF = 1					
MAGNESIUM		NR	NO BCF	—	5670.202	22.681	13.583	0.611	23.292	11.932	1.95	21.92%
ALUMINUM		NR	14.717	2.649	15760.019	63.040	0.926	0.042	65.731	45.851	1.43	16.09%
COPPER		65.700		11.826	36.368	0.145	0.009	4.22E-04	11.972	12.587	0.95	10.68%
TIN		NR	67.886	12.219	ND	—	0.024	0.001	12.221	15.433	0.79	8.89%
VANADIUM		NR	NO BCF	—	44.881	0.180	0.009	3.97E-04	0.180	0.230	0.78	8.79%
COBALT		NR	NO BCF	—	11.094	0.044	0.007	2.93E-04	0.045	0.112	0.40	4.51%
BERYLLIUM		NR	0.020	0.004	0.809	0.003	0.001	4.08E-05	0.007	0.018	0.39	4.37%
ALDRIN		NR	0.092	0.017	ND	—	1.00E-05	4.50E-07	0.017	0.046	0.37	4.15%
STRONTIUM		NR	5.033	0.906	121.257	0.485	0.413	0.019	1.410	5.288	0.27	2.99%
THALLIUM		NR	0.068	0.012	ND	—	0.002	8.84E-05	0.012	0.046	0.26	2.93%
LEAD		0.900		0.162	30.594	0.122	0.003	1.56E-04	0.285	1.439	0.20	2.22%
NITRATE/NITRITE		NR	NO BCF	—	6.793	0.027	2.624	0.118	0.145	0.750	0.19	2.17%
LITHIUM		NR	NO BCF	—	10.000	0.040	0.021	0.001	0.041	0.213	0.19	2.16%
ZINC		106.000		19.080	186.114	0.744	0.051	0.002	19.827	138.711	0.14	1.60%
BARIUM		NR	NO BCF	—	180.333	0.721	0.123	0.006	0.727	7.906	0.09	1.03%
TETRA CHLOROETHENE	X	NR	0.637	0.115	ND	—	0.003	1.27E-04	0.115	1.253	0.09	1.03%
BIS(2-ETHYLHEXYL) PHTHALATE		NR	0.156	0.028	0.280	0.001	0.002	9.00E-05	0.029	0.450	0.06	0.72%
CHROMIUM		ND		—	23.900	0.096	0.004	1.78E-04	0.096	1.551	0.06	0.69%
MANGANESE		NR	NO BCF	—	335.402	1.342	0.063	0.003	1.344	23.173	0.06	0.65%
ARSENIC		NR	0.033	0.006	6.464	0.026	0.002	9.19E-05	0.032	0.690	0.05	0.52%
PHENANTHRENE	X	NR	ND	—	0.190	0.001	ND	—	0.001	0.029	0.03	0.39%
ANTIMONY		NR	0.015	0.003	ND	—	0.015	0.001	0.003	0.134	0.02	0.25%
1,1,1-TRICHLOROETHANE	X	NR	0.116	0.021	ND	—	0.003	1.13E-04	0.021	1.008	0.02	0.23%
TRICHLOROETHENE	X	NR	0.105	0.019	ND	—	0.003	1.16E-04	0.019	0.993	0.02	0.21%
BENZO(k)FLUORANTHENE	X	NR	ND	—	0.110	4.40E-04	ND	—	4.40E-04	0.029	0.02	0.17%
SELENIUM		ND		—	0.919	0.004	0.002	8.79E-05	0.004	0.306	0.01	0.15%
TOLUENE	X	NR	0.184	0.033	0.005	2.00E-05	0.003	1.19E-04	0.033	3.476	0.01	0.11%
METHYLENE CHLORIDE		NR	0.020	0.004	ND	—	0.004	1.70E-04	0.004	0.642	0.01	0.07%
FLUORANTHENE	X	NR	ND	—	0.380	0.002	ND	—	0.002	0.290	0.01	0.08%
PYRENE	X	NR	ND	—	0.310	0.001	ND	—	0.001	0.290	<0.01	0.04%
NICKEL		NR	0.767	0.138	14.200	0.057	0.008	3.42E-04	0.195	54.608	<0.01	0.04%
CADMIUM		ND		—	0.827	0.003	0.002	7.24E-05	0.003	1.164	<0.01	0.03%
BENZO(b)FLUORANTHENE	X	NR	ND	—	0.190	0.001	ND	—	0.001	0.289	<0.01	0.04%
CHRYSENE	X	NR	ND	—	0.190	0.001	ND	—	0.001	0.290	<0.01	0.04%
MERCURY		ND		—	ND	—	1.18E-04	5.31E-06	5.31E-06	0.005	<0.01	0.01%
MOLYBDENUM		NR	NO BCF	—	ND	—	0.018	0.001	0.001	0.933	<0.01	0.01%
TOTAL XYLENES	X	NR	0.159	0.029	ND	—	0.001	4.50E-05	0.029	91.697	<0.01	<0.01%
1,2-DICHLOROETHANE	X	NR	0.021	0.004	ND	—	0.003	1.20E-04	0.004	15.067	<0.01	<0.01%

Summary of Ecotoxicological Risk to Great Blue Herons in the OU1 881 Hillside Source Area at RFETS

GREAT BLUE HERONS OU1 881 HILLSIDE		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU1	IR = 0.180 SUF = 1			IR = 0.004 SUF = 1		IR = 0.045 SUF = 1					
ACETONE		NR	0.003	4.92E-04	0.036	1.44E-04	0.007	3.15E-04	0.001	68.362	<0.01	<0.01%
SILVER		ND		—	ND	—	0.003	1.53E-04	1.53E-04	861.381	<0.01	<0.01%

HAZARD INDEX 8.91

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
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IR = Ingestion Rate
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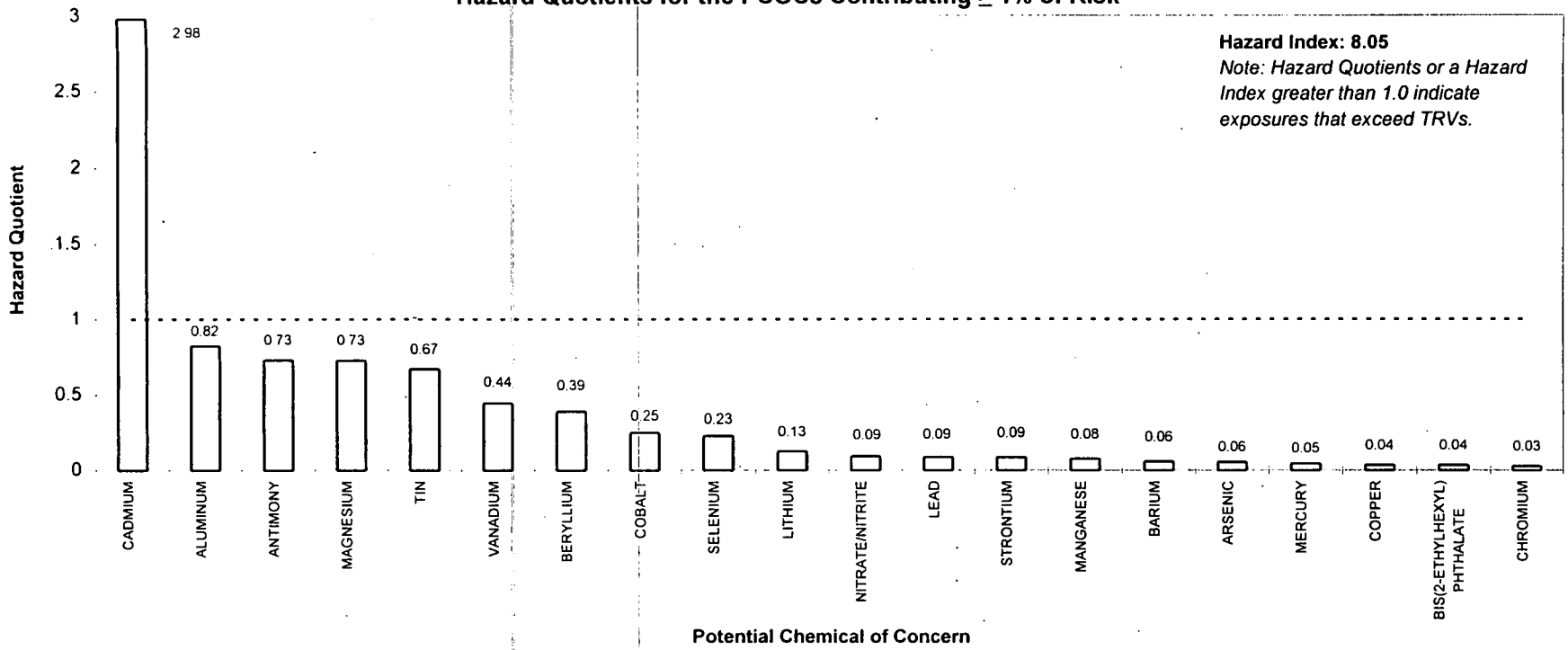
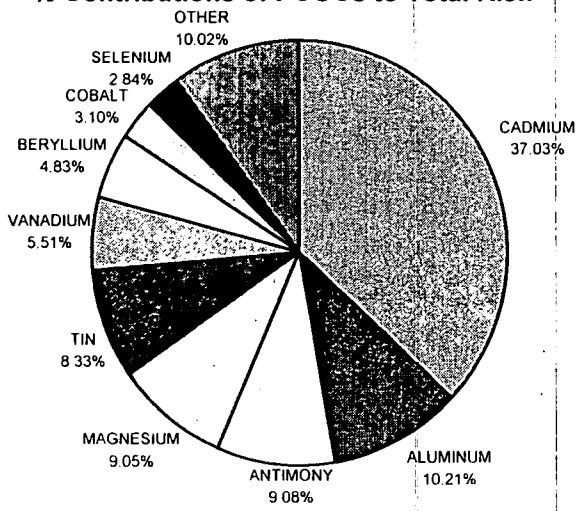
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Great Blue Herons in the OU5 Ash Pits Source Area at RFETS

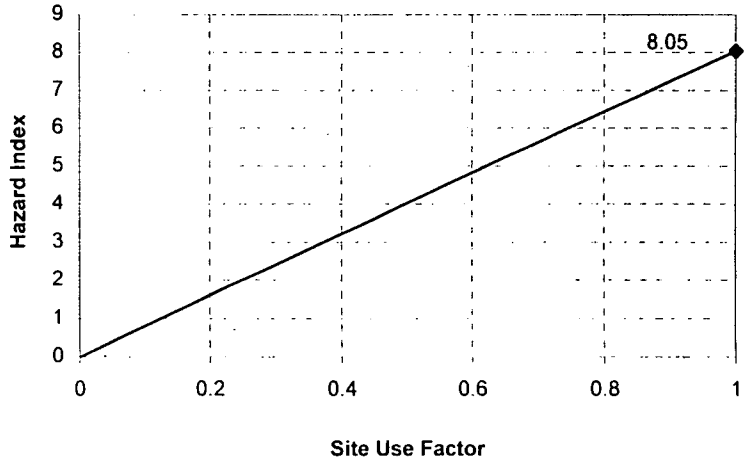
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



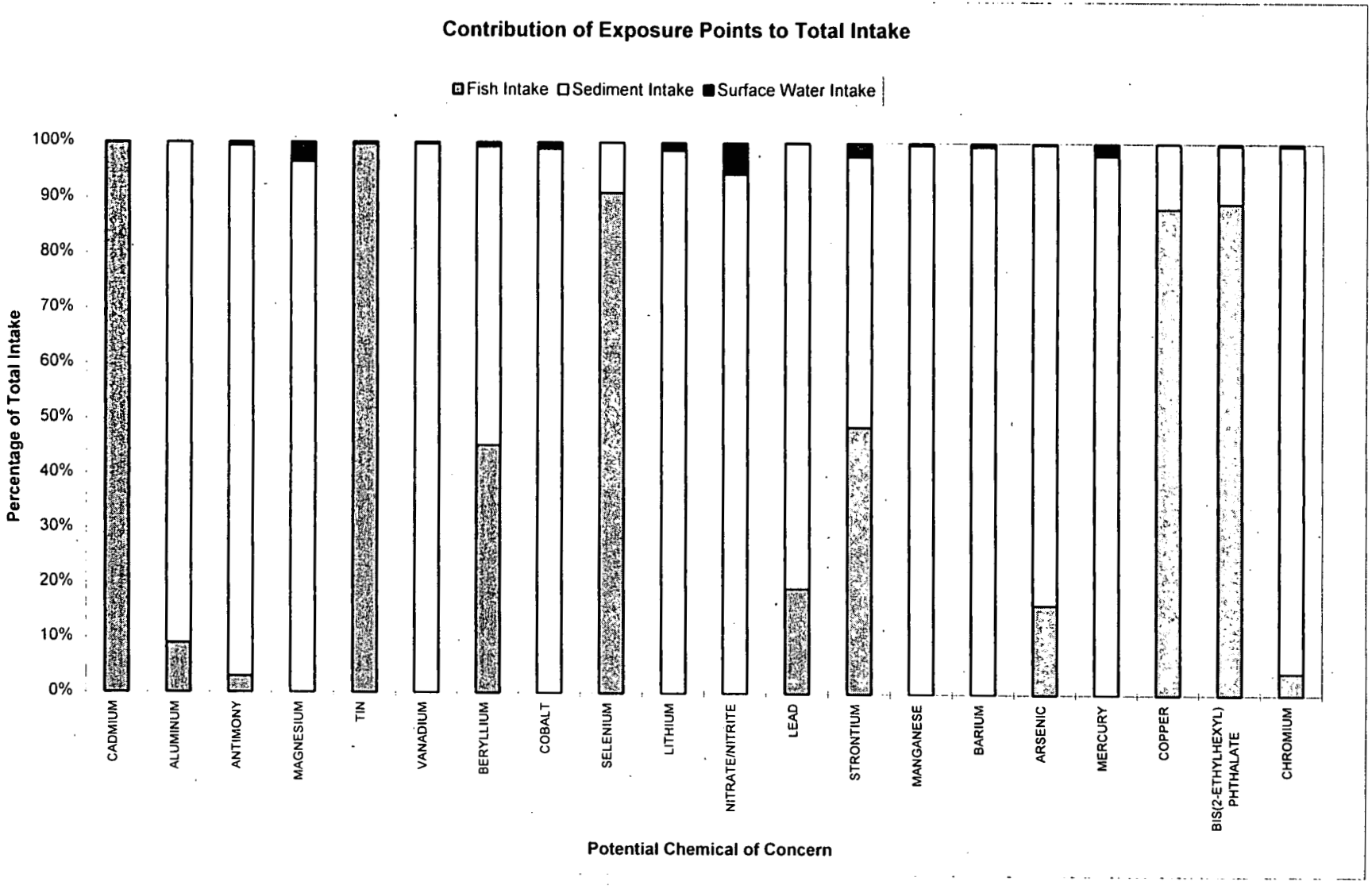
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Great Blue Herons in the OU5 Ash Pits Source Area at RFETS



Summary of Ecotoxicological Risk to Great Blue Herons in the OU5 Ash Pits Source Area at RFETS

GREAT BLUE HERONS OU5 ASH PITS		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.180 SUF = 1			IR = 0.004 SUF = 1		IR = 0.045 SUF = 1					
CADMIUM		NR	19.257	3.466	1.197	0.005	0.001	4.50E-05	3.471	1.164	2.98	37.03%
ALUMINUM		NR	18.747	3.375	8571.142	34.285	0.855	0.038	37.698	45.851	0.82	10.21%
ANTIMONY	X	NR	0.016	0.003	23.639	0.095	0.015	0.001	0.098	0.134	0.73	9.08%
MAGNESIUM		NR	NO BCF	—	2095.530	8.382	6.862	0.309	8.691	11.932	0.73	9.05%
TIN		NR	57.281	10.311	9.207	0.037	0.019	0.001	10.348	15.433	0.67	8.33%
VANADIUM		NR	NO BCF	—	25.339	0.101	0.009	3.87E-04	0.102	0.230	0.44	5.51%
BERYLLIUM		NR	0.018	0.003	0.969	0.004	0.001	6.16E-05	0.007	0.018	0.39	4.83%
COBALT	X	NR	NO BCF	—	6.823	0.027	0.007	3.30E-04	0.028	0.112	0.25	3.10%
SELENIUM		NR	0.354	0.064	1.572	0.006	0.001	4.95E-05	0.070	0.306	0.23	2.84%
LITHIUM	X	NR	NO BCF	—	6.612	0.026	0.009	3.92E-04	0.027	0.213	0.13	1.57%
NITRATE/NITRITE		NR	NO BCF	—	16.528	0.066	0.088	0.004	0.070	0.750	0.09	1.16%
LEAD	X	NR	0.135	0.024	25.470	0.102	0.004	1.70E-04	0.126	1.439	0.09	1.09%
STRONTIUM	X	NR	1.243	0.224	56.300	0.225	0.247	0.011	0.460	5.288	0.09	1.08%
MANGANESE		NR	NO BCF	—	445.908	1.784	0.148	0.007	1.790	23.173	0.08	0.96%
BARIUM	X	NR	NO BCF	—	117.818	0.471	0.071	0.003	0.474	7.906	0.06	0.74%
ARSENIC		NR	0.034	0.006	7.845	0.031	0.002	9.39E-05	0.038	0.690	0.06	0.68%
MERCURY	X	NR	ND	—	0.056	2.23E-04	1.10E-04	4.95E-06	2.28E-04	0.005	0.05	0.57%
COPPER	X	NR	2.222	0.400	13.145	0.053	0.006	2.54E-04	0.453	12.587	0.04	0.45%
BIS(2-ETHYLHEXYL) PHTHALATE	X	NR	0.078	0.014	0.410	0.002	0.001	4.50E-05	0.016	0.450	0.04	0.44%
CHROMIUM		NR	0.010	0.002	10.564	0.042	0.004	1.75E-04	0.044	1.551	0.03	0.35%
ZINC	X	NR	12.447	2.240	383.943	1.536	0.018	0.001	3.777	138.711	0.03	0.34%
THALLIUM		NR	ND	—	0.280	0.001	ND	—	0.001	0.046	0.02	0.27%
MOLYBDENUM		NR	NO BCF	—	3.529	0.014	0.020	0.001	0.015	0.933	0.02	0.20%
METHYLENE CHLORIDE	X	NR	0.025	0.004	0.012	4.85E-05	0.005	2.13E-04	0.005	0.642	0.01	0.10%
NICKEL		NR	ND	—	14.020	0.056	0.009	3.92E-04	0.056	54.608	<0.01	0.01%
1,2-DICHLOROETHANE		NR	0.024	0.004	ND	—	0.003	1.38E-04	0.004	15.067	<0.01	<0.01%
ACETONE		NR	0.003	0.001	1.165	0.005	0.009	4.03E-04	0.006	68.362	<0.01	<0.01%
SILVER	X	NR	0.004	0.001	2.400	0.010	0.003	1.45E-04	0.010	861.381	<0.01	<0.01%

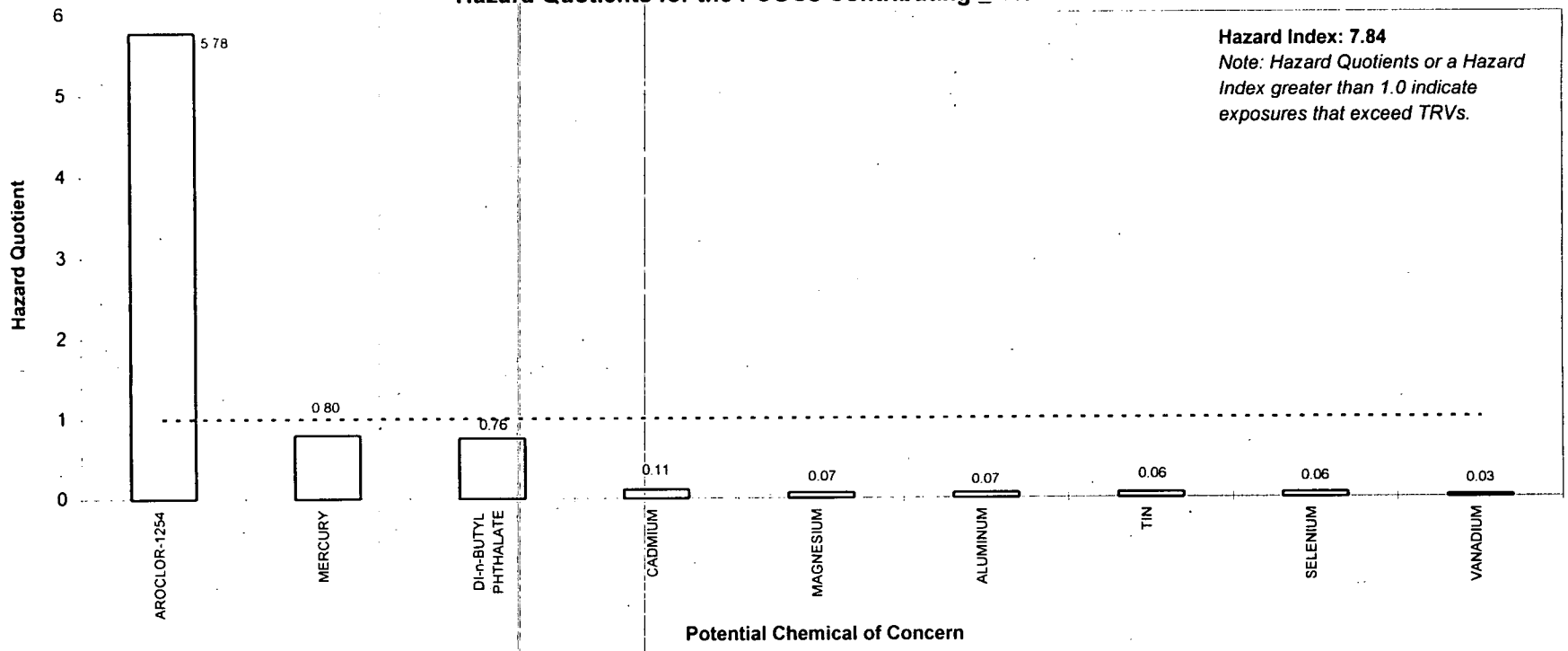
HAZARD INDEX 8.05

Notes:

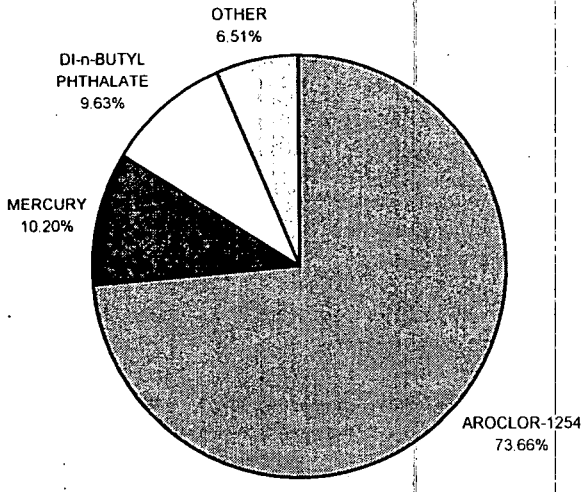
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Great Blue Herons in the OU2 903 Pad Source Area at RFETS

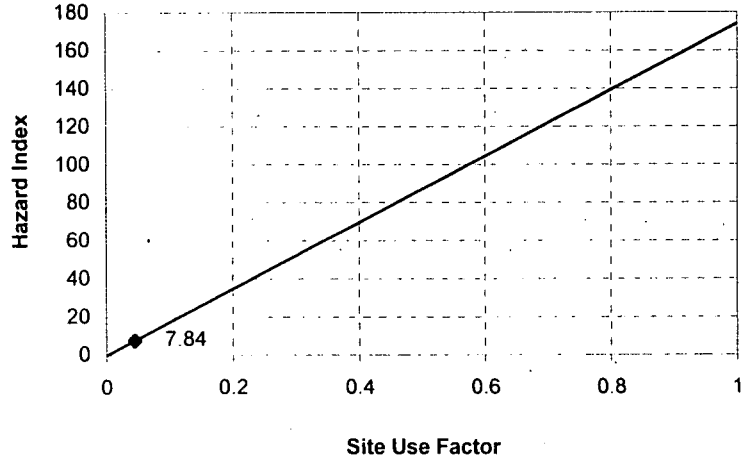
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



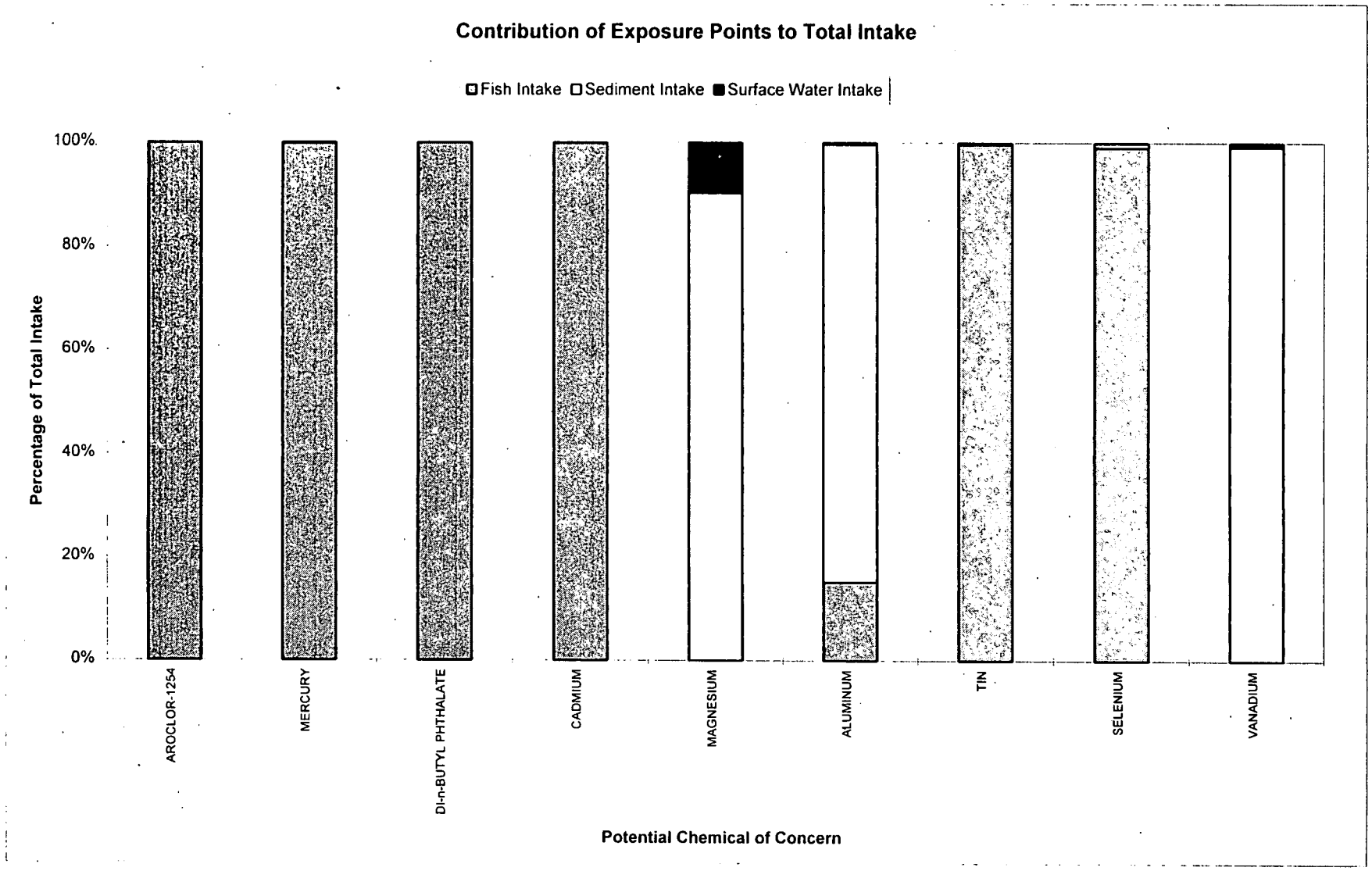
% Contributions of PCOCs to Total Risk



Hazard Index versus Site Use Factor



Summary of Ecotoxicological Risk to Great Blue Herons in the OU2 903 Pad Source Area at RFETS



Summary of Ecotoxicological Risk to Great Blue Herons in the OU2 903 Pad Source Area at RFETS

GREAT BLUE HERONS OU2 903 PAD		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU2	IR = 0.180 SUF = 0.045			IR = 0.004 SUF = 0.045		IR = 0.045 SUF = 0.045					
AROCLOR-1254	X	NR	96.315	0.780	0.260	0.000	0.002	0.000	0.780	0.135	5.78	73.66%
MERCURY		NR	0.477	0.004	0.040	0.000	0.000	0.000	0.004	0.005	0.80	10.20%
DI-n-BUTYL PHTHALATE	X	NR	4.136	0.034	0.065	0.000	0.002	0.000	0.034	0.045	0.76	9.63%
CADMIUM		NR	16.120	0.131	0.950	0.000	0.002	0.000	0.131	1.164	0.11	1.43%
MAGNESIUM		NR	NO BCF	—	4179.821	0.752	39.934	0.081	0.833	11.932	0.07	0.89%
ALUMINUM		NR	56.849	0.460	14104.468	2.539	5.480	0.011	3.010	45.851	0.07	0.84%
TIN		NR	119.444	0.967	18.800	0.003	0.053	0.000	0.971	15.433	0.06	0.80%
SELENIUM		NR	2.306	0.019	0.880	0.000	0.008	0.000	0.019	0.306	0.06	0.79%
VANADIUM		NR	NO BCF	—	37.422	0.007	0.026	0.000	0.007	0.230	0.03	0.39%
COBALT		NR	NO BCF	—	9.088	0.002	0.011	0.000	0.002	0.112	0.02	0.23%
BERYLLIUM		NR	0.013	0.000	0.903	0.000	0.001	0.000	0.000	0.018	0.02	0.19%
STRONTIUM		NR	4.801	0.039	97.592	0.018	1.028	0.002	0.059	5.288	0.01	0.14%
TETRACHLOROETHENE		NR	1.420	0.012	ND	—	0.006	0.000	0.012	1.253	0.01	0.12%
LITHIUM		NR	NO BCF	—	12.183	0.002	0.071	0.000	0.002	0.213	0.01	0.12%
ANTIMONY		NR	0.022	0.000	4.900	0.001	0.020	0.000	0.001	0.134	0.01	0.10%
LEAD	X	NR	0.277	0.002	32.749	0.006	0.007	0.000	0.008	1.439	0.01	0.07%
TRICHLOROETHENE		NR	0.498	0.004	ND	—	0.012	0.000	0.004	0.993	0.00	0.05%
THALLIUM		NR	ND	—	1.000	0.000	ND	—	0.000	0.046	0.00	0.05%
BARIUM		NR	NO BCF	—	164.776	0.030	0.261	0.001	0.030	7.906	0.00	0.05%
4,4'-DDT	X	NR	ND	—	0.006	0.000	ND	—	0.000	0.000	0.00	0.04%
NITRATE/NITRITE		NR	NO BCF	—	4.124	0.001	0.793	0.002	0.002	0.750	0.00	0.03%
CHROMIUM	X	NR	0.020	0.000	14.581	0.003	0.011	0.000	0.003	1.551	0.00	0.02%
MANGANESE		NR	NO BCF	—	236.041	0.042	0.312	0.001	0.043	23.173	0.00	0.02%
COPPER		NR	2.264	0.018	23.031	0.004	0.024	0.000	0.023	12.587	0.00	0.02%
ZINC		NR	26.227	0.212	109.953	0.020	0.227	0.000	0.233	138.711	0.00	0.02%
ARSENIC		NR	0.050	0.000	5.742	0.001	0.006	0.000	0.001	0.690	0.00	0.02%
PHENANTHRENE	X	NR	ND	—	0.190	0.000	ND	—	0.000	0.029	0.00	0.02%
MOLYBDENUM		NR	NO BCF	—	6.700	0.001	0.016	0.000	0.001	0.933	0.00	0.01%
BENZO(k)FLUORANTHENE	X	NR	ND	—	0.110	0.000	ND	—	0.000	0.029	0.00	0.01%
BENZO(a)PYRENE	X	NR	ND	—	0.110	0.000	ND	—	0.000	0.029	0.00	0.01%
METHYLENE CHLORIDE		NR	0.019	0.000	0.009	0.000	0.004	0.000	0.000	0.642	0.00	0.00%
NICKEL		NR	1.202	0.010	17.615	0.003	0.014	0.000	0.013	54.608	0.00	0.00%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	ND	—	0.540	0.000	ND	—	0.000	0.450	0.00	0.00%
PYRENE	X	NR	ND	—	0.260	0.000	ND	—	0.000	0.290	0.00	0.00%
FLUORANTHENE	X	NR	ND	—	0.230	0.000	ND	—	0.000	0.290	0.00	0.00%
CHRYSENE	X	NR	ND	—	0.140	0.000	ND	—	0.000	0.290	0.00	0.00%
BENZO(b)FLUORANTHENE	X	NR	ND	—	0.120	0.000	ND	—	0.000	0.289	0.00	0.00%

Summary of Ecotoxicological Risk to Great Blue Herons in the OU2 903 Pad Source Area at RFETS

GREAT BLUE HERONS OU2 903 PAD		EXPOSURE POINT							SUMMARY			
		Fish			Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU2	IR = 0.180 SUF = 0.045			IR = 0.004 SUF = 0.045		IR = 0.045 SUF = 0.045					
BENZO(a)ANTHRACENE	X	NR	ND	—	0.110	0.000	ND	—	0.000	0.290	0.00	0.00%
ACETONE		NR	0.005	0.000	0.066	0.000	0.013	0.000	0.000	68.362	0.00	0.00%
DI-n-OCTYL PHTHALATE		NR	ND	—	0.210	0.000	ND	—	0.000	37.020	0.00	0.00%
gamma-BHC (LINDANE)		NR	ND	—	0.004	0.000	ND	—	0.000	1.500	0.00	0.00%
SILVER		NR	0.003	0.000	1.700	0.000	0.005	0.000	0.000	861.381	0.00	0.00%
TOLUENE		NR	ND	—	0.002	0.000	ND	—	0.000	3.476	0.00	0.00%

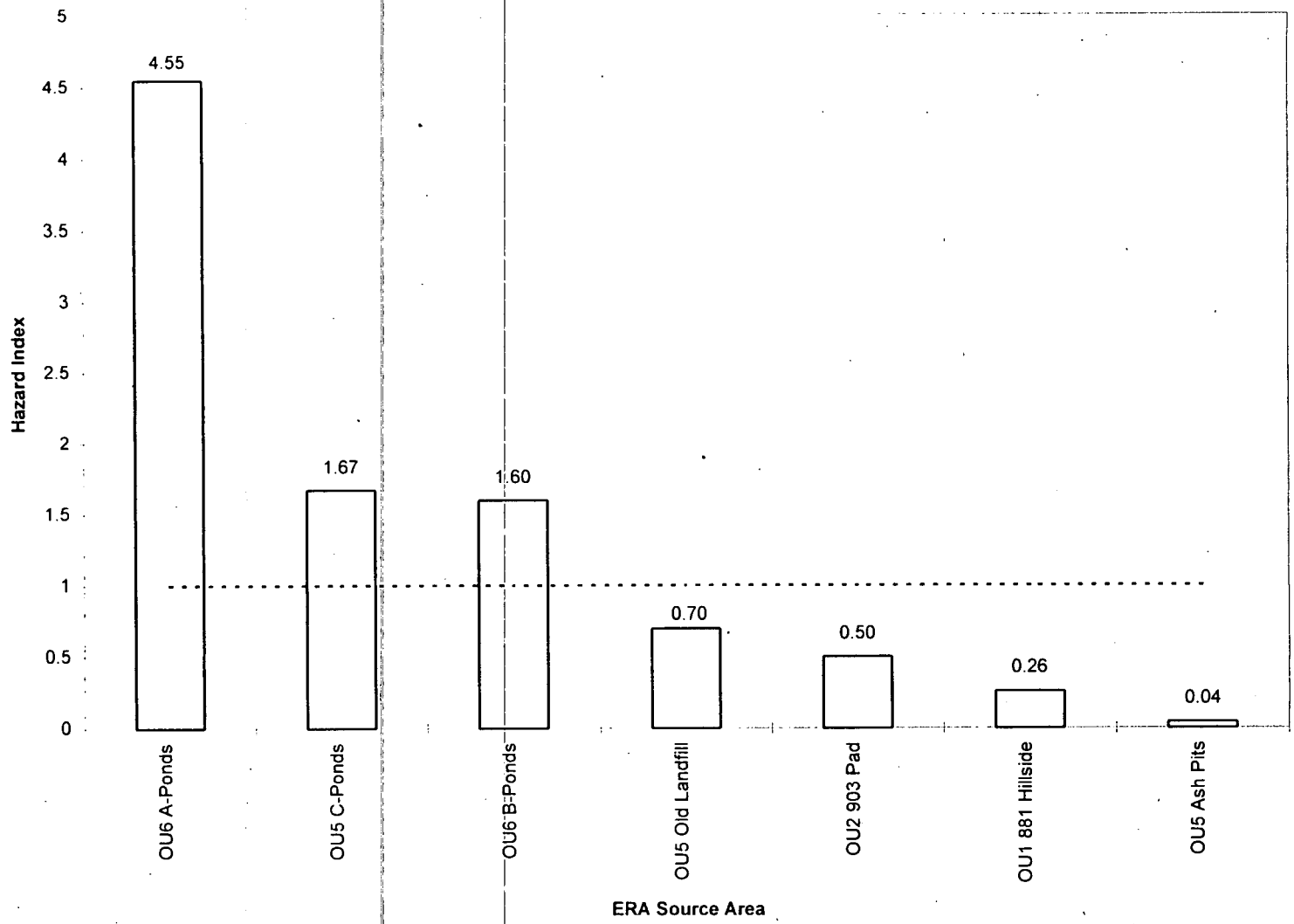
HAZARD INDEX 7.84

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

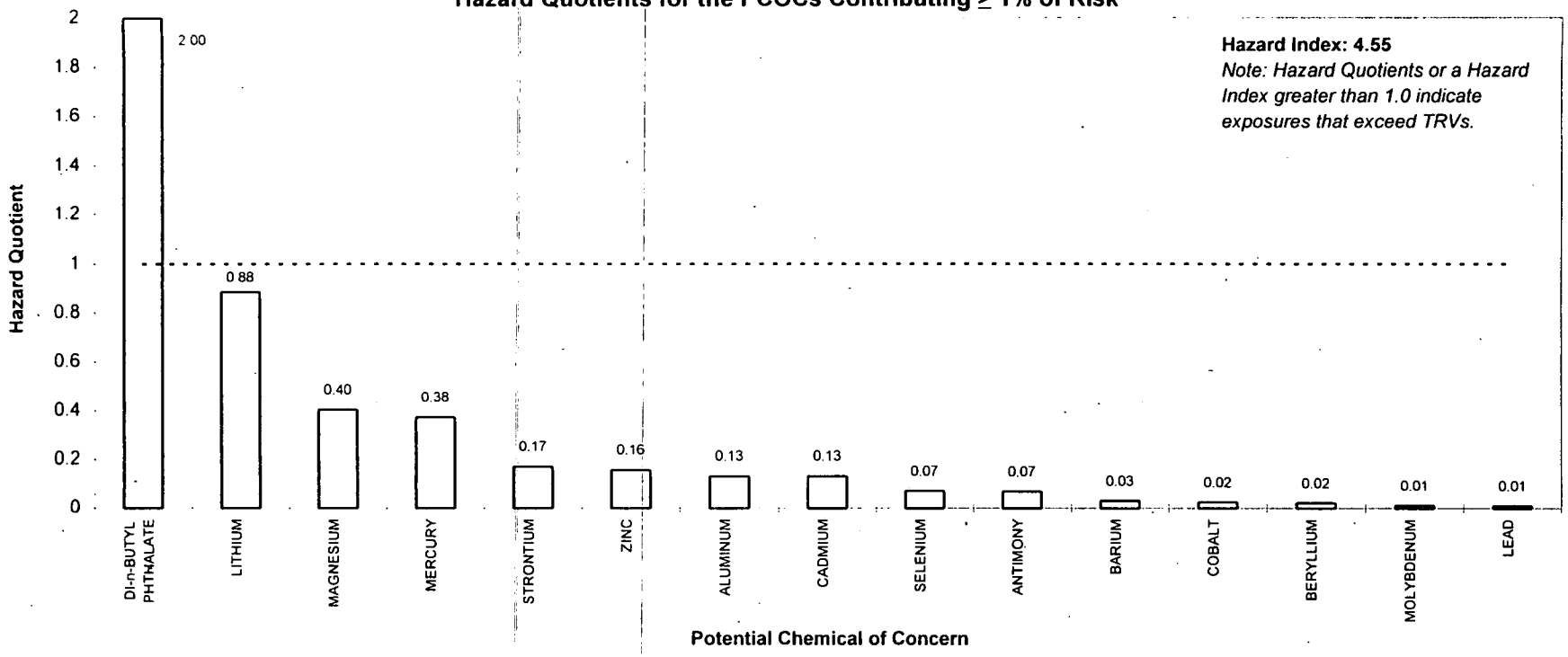
Summary of Ecotoxicological Risk to Mallards

Summary of Ecotoxicological Risk to Mallards at RFETS

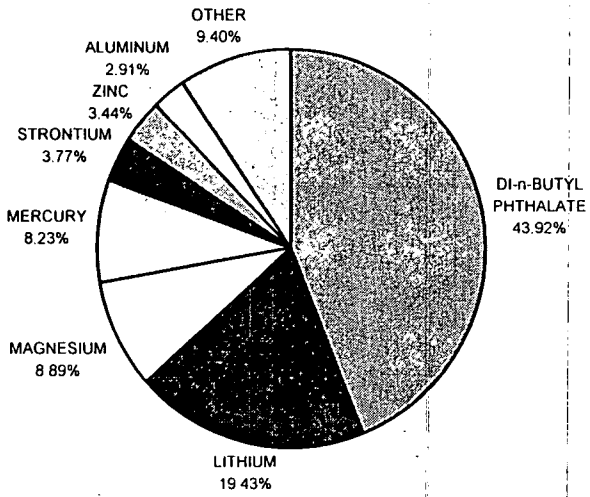


Summary of Ecotoxicological Risk to Mallards in the OU6 A-Ponds Source Area at RFETS

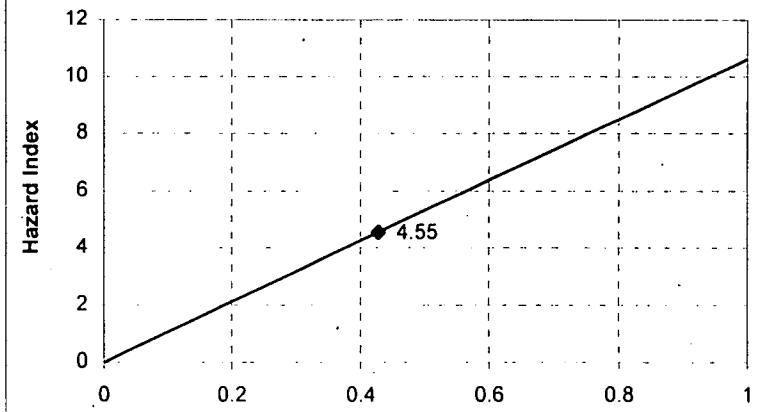
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



% Contributions of PCOCs to Total Risk

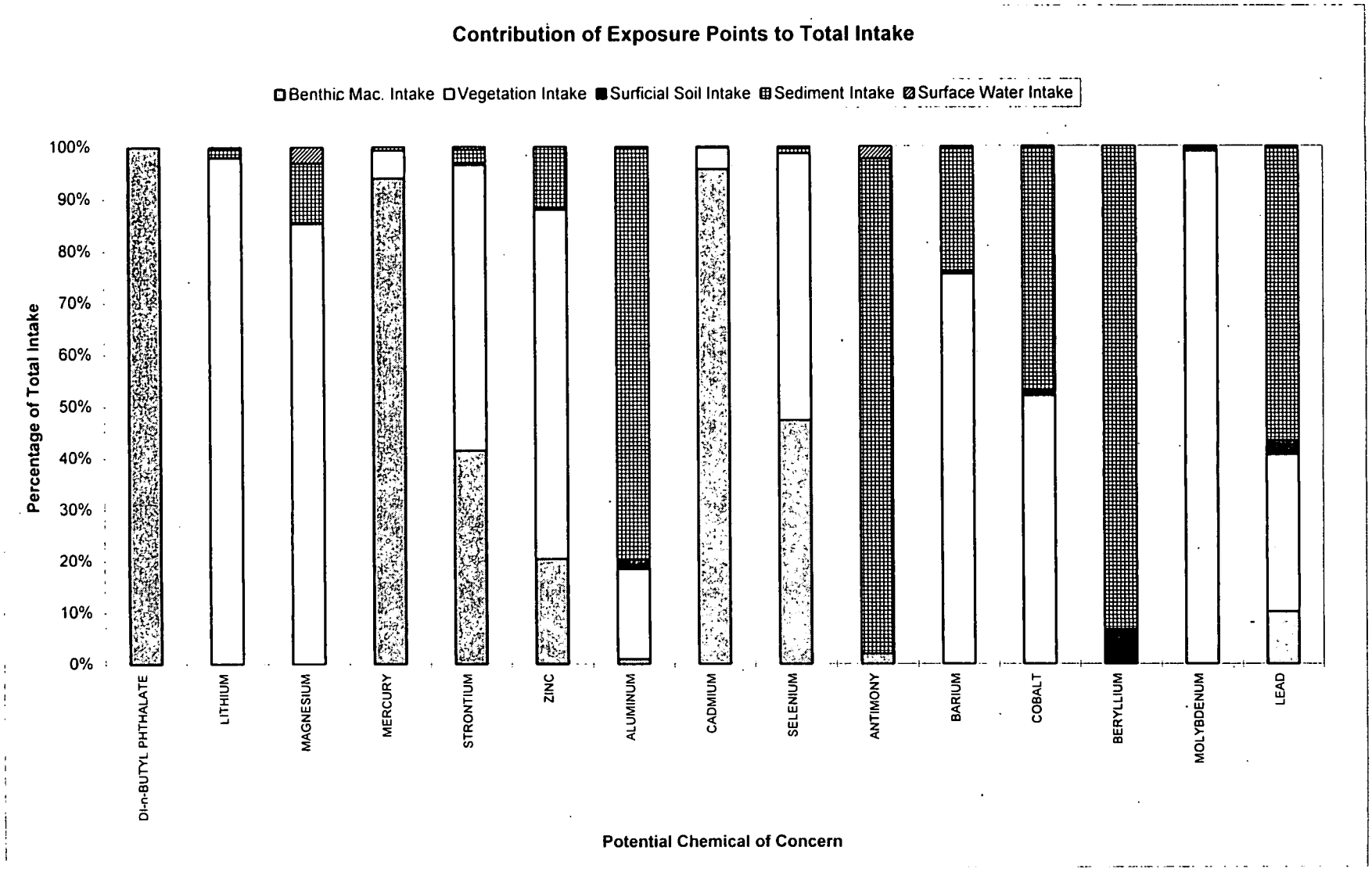


Hazard Index versus Site Use Factor



Site Use Factor for land-based media = 0.017

Summary of Ecotoxicological Risk to Mallards in the OU6 A-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to Mallards in the OU6 A-Ponds Source Area at RFETS

MALLARDS OU6 A-PONDS		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.039 SUF = 0.428			IR = 0.013 SUF = 0.428			IR = 0.001 SUF = 0.017		IR = 0.001 SUF = 0.428		IR = 0.056 SUF = 0.428					
DI-n-BUTYL PHTHALATE	X	NR	6.832	0.114	NR	NR	—	ND	—	ND	—	0.002	4.79E-05	0.114	0.057	2.00	43.92%
LITHIUM		NR	NO BCF	—	37.901		0.211	4.800	8.16E-05	8.270	0.004	0.031	0.001	0.215	0.243	0.88	19.43%
MAGNESIUM	X	NR	NO BCF	—	2252.596		12.533	1880.000	0.032	3921.004	1.678	18.851	0.452	14.695	36.287	0.40	8.89%
MERCURY	X	NR	0.529	0.009	0.090		0.001	ND	—	0.142	6.06E-05	1.49E-04	3.57E-06	0.009	0.024	0.38	8.23%
STRONTIUM	X	NR	28.275	0.472	112.501		0.626	37.100	0.001	73.117	0.031	0.278	0.007	1.137	6.623	0.17	3.77%
ZINC	X	NR	5.798	0.097	57.285		0.319	65.800	0.001	130.564	0.056	0.008	1.97E-04	0.473	3.017	0.16	3.44%
ALUMINUM		NR	4.700	0.078	238.686		1.328	7830.000	0.133	14176.386	6.067	0.405	0.010	7.617	57.422	0.13	2.91%
CADMIUM		NR	11.073	0.185	1.400		0.008	2.200	3.74E-05	0.945	4.04E-04	0.001	2.31E-05	0.193	1.458	0.13	2.91%
SELENIUM		NR	0.773	0.013	2.516		0.014	ND	—	0.640	2.74E-04	0.003	7.87E-05	0.027	0.384	0.07	1.54%
ANTIMONY	X	NR	0.011	1.87E-04	ND		—	ND	—	20.227	0.009	0.009	2.12E-04	0.009	0.132	0.07	1.50%
BARIUM	X	NR	NO BCF	—	40.567		0.226	100.000	0.002	163.378	0.070	0.062	0.001	0.299	9.901	0.03	0.66%
COBALT	X	NR	NO BCF	—	1.000		0.006	7.100	1.21E-04	11.590	0.005	0.001	3.50E-05	0.011	0.445	0.02	0.54%
BERYLLIUM		NR	ND	—	ND		—	1.300	2.21E-05	0.710	3.04E-04	ND	—	3.26E-04	0.015	0.02	0.48%
MOLYBDENUM	X	NR	NO BCF	—	3.100		0.017	5.300	9.01E-05	ND	—	0.003	7.38E-05	0.017	1.478	0.01	0.25%
LEAD	X	NR	0.124	0.002	1.107		0.006	33.000	0.001	26.601	0.011	0.003	7.95E-05	0.020	1.802	0.01	0.24%
COPPER	X	NR	0.424	0.007	24.122		0.134	5.000	8.50E-05	22.165	0.009	0.002	5.03E-05	0.151	15.763	0.01	0.21%
MANGANESE	X	NR	NO BCF	—	42.435		0.236	1110.000	0.019	362.368	0.155	0.179	0.004	0.414	49.511	0.01	0.18%
TIN		NR	ND	—	5.798		0.032	93.300	0.002	ND	—	ND	—	0.034	4.519	0.01	0.17%
CHROMIUM	X	NR	0.005	8.21E-05	ND		—	9.000	1.53E-04	13.994	0.006	0.002	3.91E-05	0.006	1.033	0.01	0.13%
PHENANTHRENE	X	NR	ND	—	NR	NR	—	ND	—	0.311	1.33E-04	ND	—	1.33E-04	0.036	<0.01	0.08%
BENZO(a)PYRENE	X	NR	ND	—	NR	NR	—	ND	—	0.282	1.21E-04	ND	—	1.21E-04	0.036	<0.01	0.07%
THALLIUM		NR	ND	—	ND		—	ND	—	0.690	2.95E-04	ND	—	2.95E-04	0.105	<0.01	0.06%
BENZO(k)FLUORANTHENE	X	NR	ND	—	NR	NR	—	ND	—	0.200	8.56E-05	ND	—	8.56E-05	0.036	<0.01	0.05%
VANADIUM	X	NR	NO BCF	—	1.700		0.009	51.100	0.001	38.875	0.017	0.002	5.50E-05	0.027	11.499	<0.01	0.05%
ARSENIC	X	NR	0.065	0.001	0.920		0.005	2.200	3.74E-05	6.354	0.003	0.004	8.52E-05	0.009	5.128	<0.01	0.04%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	ND	—	NR	NR	—	ND	—	1.241	0.001	ND	—	5.31E-04	0.573	<0.01	0.04%
NICKEL	X	NR	0.358	0.006	14.200		0.079	13.100	2.23E-04	17.820	0.008	0.003	6.66E-05	0.093	68.390	<0.01	0.03%
ANTHRACENE	X	NR	ND	—	NR	NR	—	ND	—	0.088	3.77E-05	ND	—	3.77E-05	0.029	<0.01	0.03%
AROCLOR-1254	X	0.008		1.35E-04	ND		—	ND	—	0.182	7.79E-05	NR	—	2.13E-04	0.172	<0.01	0.03%
4,4'-DDT		NR	NR	—	NR	NR	—	0.026	4.40E-07	ND	—	NR	—	4.40E-07	4.03E-04	<0.01	0.02%
INDENO(1,2,3-cd)PYRENE	X	NR	ND	—	NR	NR	—	ND	—	0.200	8.56E-05	ND	—	8.56E-05	0.091	<0.01	0.02%
FLUORANTHENE	X	NR	ND	—	NR	NR	—	ND	—	0.405	1.74E-04	ND	—	1.74E-04	0.363	<0.01	0.01%
PYRENE	X	NR	ND	—	NR	NR	—	ND	—	0.343	1.47E-04	ND	—	1.47E-04	0.363	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	ND	—	NR	NR	—	ND	—	0.312	1.34E-04	ND	—	1.34E-04	0.362	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	ND	—	NR	NR	—	ND	—	0.270	1.16E-04	ND	—	1.16E-04	0.363	<0.01	0.01%
CHRYSENE	X	NR	ND	—	NR	NR	—	ND	—	0.268	1.15E-04	ND	—	1.15E-04	0.363	<0.01	0.01%
METHYLENE CHLORIDE	X	NR	0.011	1.75E-04	NR	ND	—	NR	—	ND	—	0.002	4.79E-05	2.23E-04	0.804	<0.01	0.01%
BENZO(ghi)PERYLENE	X	NR	ND	—	NR	NR	—	ND	—	0.210	8.99E-05	ND	—	8.99E-05	0.363	<0.01	0.01%
AROCLOR-1260	X	0.004		6.44E-05	ND		—	ND	—	ND	—	NR	—	6.44E-05	0.860	<0.01	<0.01%
ALDRIN	X	NR	NR	—	NR	NR	—	ND	—	0.009	3.94E-06	NR	—	3.94E-06	0.057	<0.01	<0.01%
ACETONE	X	NR	ND	—	NR	0.693	0.004	NR	—	0.230	9.84E-05	ND	—	3.95E-03	85.614	<0.01	<0.01%
TOLUENE	X	NR	ND	—	NR	0.016	8.87E-05	NR	—	0.178	7.61E-05	ND	—	1.65E-04	4.353	<0.01	<0.01%
PHENOL	X	NR	ND	—	NR	NR	—	ND	—	0.110	4.71E-05	ND	—	4.71E-05	19.413	<0.01	<0.01%

Summary of Ecotoxicological Risk to Mallards in the OU6 A-Ponds Source Area at RFETS

MALLARDS OU6 A-PONDS		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.039 SUF = 0.428			IR = 0.013 SUF = 0.428			IR = 0.001 SUF = 0.017		IR = 0.001 SUF = 0.428		IR = 0.056 SUF = 0.428					
delta-BHC		NR	NR	—	NR	NR	—	0.023	3.90E-07	ND	—	NR	—	3.90E-07	0.287	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	ND	—	NR	NR	—	ND	—	0.130	5.56E-05	ND	—	5.56E-05	46.363	<0.01	<0.01%
ACENAPHTHENE	X	NR	ND	—	NR	NR	—	ND	—	0.089	3.81E-05	ND	—	3.81E-05	36.331	<0.01	<0.01%
BENZENE	X	NR	ND	—	NR	ND	—	NR	—	0.003	1.28E-06	ND	—	1.28E-06	8.327	<0.01	<0.01%
SILVER	X	NR	ND	—	ND		—	ND	—	ND	—	0.002	4.47E-05	4.47E-05	1078.772	<0.01	<0.01%

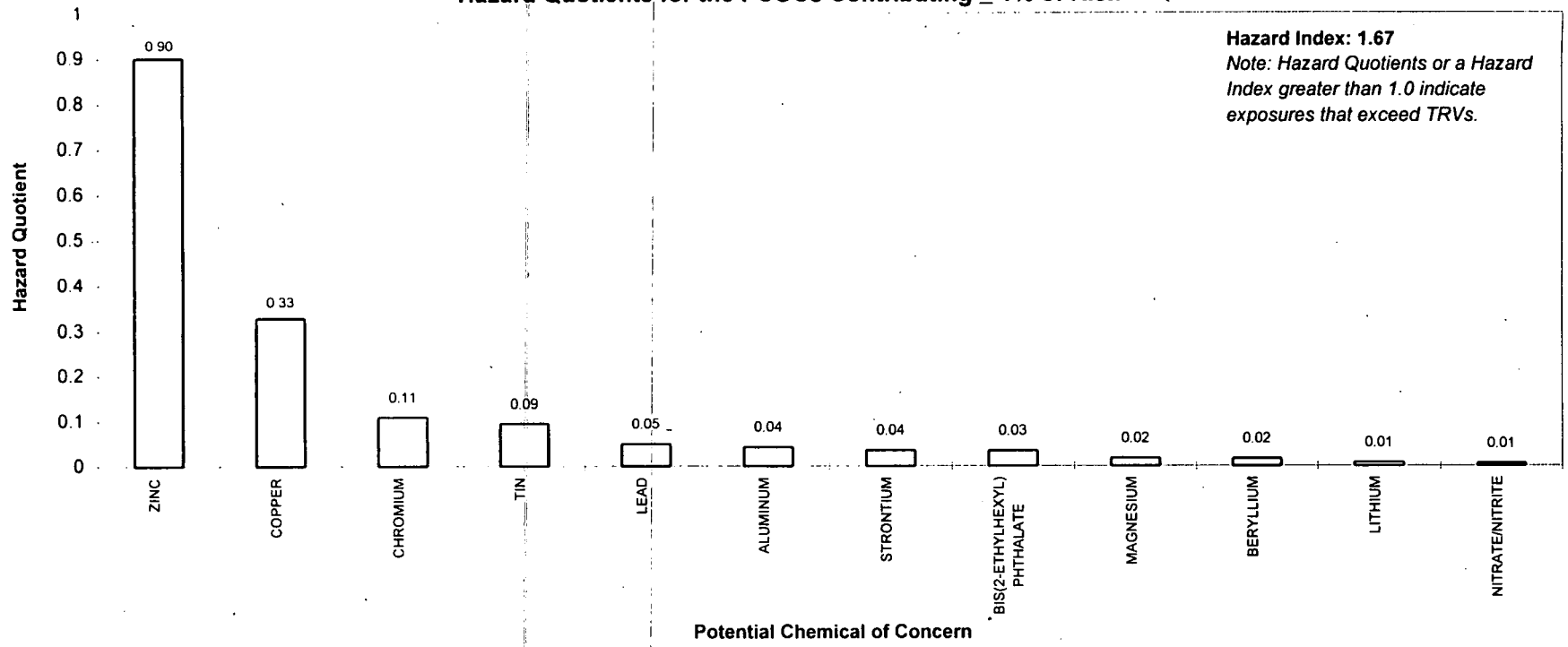
HAZARD INDEX 4.55

Notes:

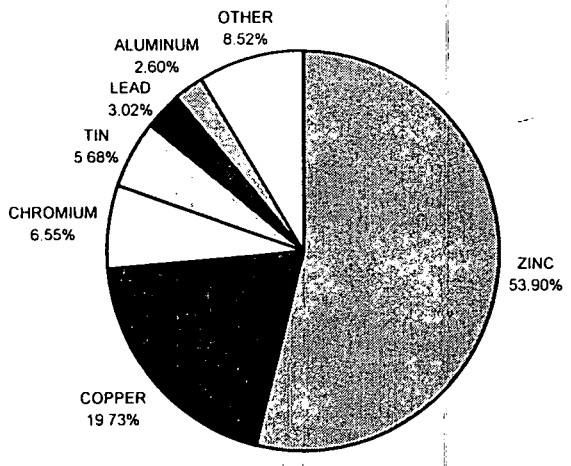
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{ow} = No octonol-water partition coefficient available; LOG K_{ow}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mallards in the OU5 C-Ponds Source Area at RFETS

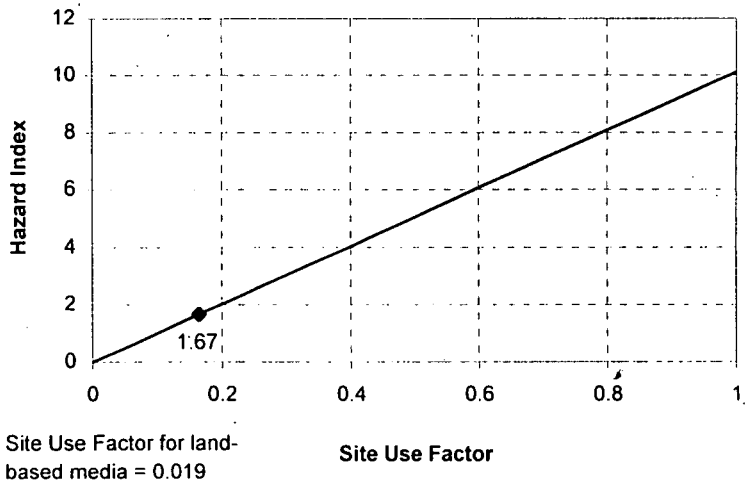
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



% Contributions of PCOCs to Total Risk

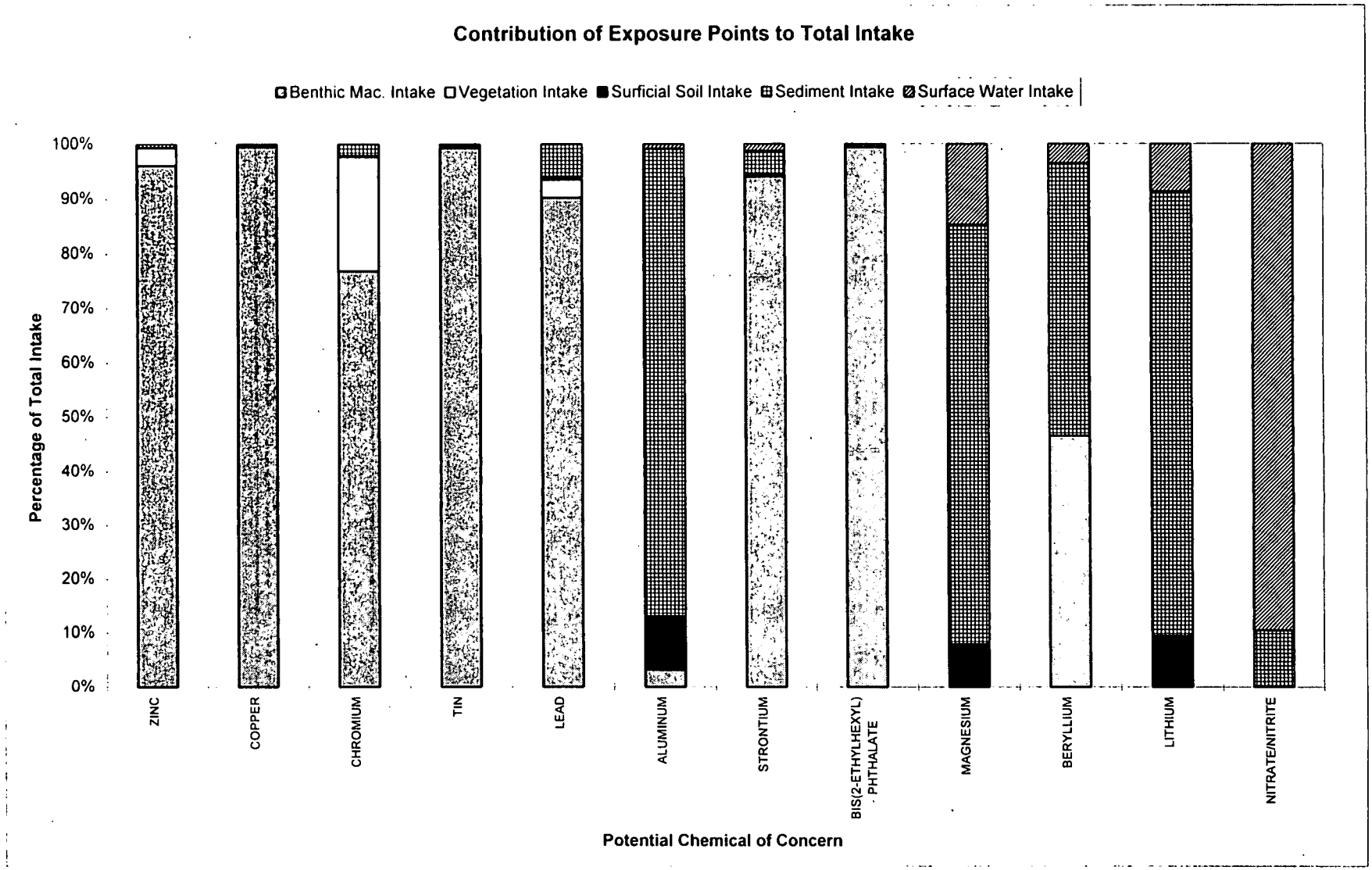


Hazard Index versus Site Use Factor



Site Use Factor for land-based media = 0.019

Summary of Ecotoxicological Risk to Mallards in the OU5 C-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to Mallards in the OU5 C-Ponds Source Area at RFETS

MALLARDS OU5 C-PONDS		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.039 SUF = 0.165			IR = 0.013 SUF = 0.165			IR = 0.001 SUF = 0.019		IR = 0.001 SUF = 0.165		IR = 0.056 SUF = 0.165					
ZINC	X	406.000		2.613	41.397		0.089	56.700	0.001	94.329	0.016	0.048	4.48E-04	2.718	3.017	0.90	53.90%
COPPER	X	804.000		5.174	8.926		0.019	10.200	1.94E-04	23.083	0.004	0.008	7.37E-05	5.197	15.763	0.33	19.73%
CHROMIUM		13.452		0.087	10.957		0.024	14.800	2.81E-04	14.042	0.002	0.005	4.40E-05	0.113	1.033	0.11	6.55%
TIN		NR	66.240	0.426	NR		—	32.700	0.001	12.061	0.002	0.021	1.98E-04	0.429	4.519	0.09	5.68%
LEAD	X	12.700		0.082	1.355		0.003	26.100	4.96E-04	32.420	0.005	0.006	5.83E-05	0.091	1.802	0.05	3.02%
ALUMINUM		NR	12.739	0.082	NR		—	13000.000	0.247	13018.068	2.148	2.432	0.022	2.499	57.422	0.04	2.60%
STRONTIUM	X	NR	34.882	0.224	NR		—	41.700	0.001	62.795	0.010	0.337	0.003	0.239	6.623	0.04	2.16%
BIS(2-ETHYLHEXYL) PHTHALATE	X	NR	3.100	0.020	NR	ND	—	ND	—	0.640	1.06E-04	0.002	1.85E-05	0.020	0.573	0.03	2.09%
MAGNESIUM		NR	NO BCF	—	NR		—	2860.000	0.054	3157.852	0.521	10.768	0.099	0.675	36.287	0.02	1.11%
BERYLLIUM		NR	0.018	1.19E-04	NR		—	ND	—	0.767	1.27E-04	0.001	9.23E-06	2.54E-04	0.015	0.02	1.01%
LITHIUM	X	NR	NO BCF	—	NR		—	10.700	2.03E-04	10.543	0.002	0.020	1.85E-04	0.002	0.243	0.01	0.49%
NITRATE/NITRITE		NR	NO BCF	—	NR		—	NR	—	3.570	0.001	0.541	0.005	0.006	0.939	0.01	0.38%
COBALT	X	NR	NO BCF	—	NR		—	7.900	1.50E-04	9.581	0.002	0.008	7.34E-05	0.002	0.445	<0.01	0.27%
BARIUM	X	NR	NO BCF	—	NR		—	144.000	0.003	177.770	0.029	0.109	0.001	0.033	9.901	<0.01	0.20%
MERCURY	X	ND		—	ND		—	ND	—	0.393	6.48E-05	1.41E-04	1.30E-06	6.61E-05	0.024	<0.01	0.16%
CADMIUM		ND		—	1.500		0.003	ND	—	0.898	1.48E-04	0.003	2.39E-05	0.003	1.458	<0.01	0.12%
ANTIMONY	X	NR	0.020	1.29E-04	NR		—	ND	—	ND	—	0.015	1.42E-04	2.71E-04	0.132	<0.01	0.12%
MANGANESE		NR	NO BCF	—	NR		—	360.000	0.007	521.405	0.086	0.120	0.001	0.094	49.511	<0.01	0.11%
THALLIUM		NR	ND	—	NR		—	ND	—	0.833	1.38E-04	0.002	2.16E-05	1.59E-04	0.105	<0.01	0.09%
MOLYBDENUM		NR	NO BCF	—	NR		—	ND	—	4.832	0.001	0.017	1.53E-04	0.001	1.478	<0.01	0.04%
SELENIUM		ND		—	ND		—	0.510	9.69E-06	1.353	2.23E-04	0.002	1.71E-05	2.50E-04	0.384	<0.01	0.04%
VANADIUM		NR	NO BCF	—	NR		—	34.700	0.001	33.892	0.006	0.012	1.07E-04	0.006	11.499	<0.01	0.03%
DI-n-BUTYL PHTHALATE	X	NR	ND	—	NR	ND	—	ND	—	0.110	1.82E-05	ND	—	1.82E-05	0.057	<0.01	0.02%
METHYLENE CHLORIDE	X	NR	0.019	1.24E-04	NR	0.027	5.89E-05	NR	—	0.020	3.28E-06	0.004	3.39E-05	2.20E-04	0.804	<0.01	0.02%
TOLUENE	X	NR	0.070	4.50E-04	NR	0.020	4.39E-05	NR	—	0.146	2.41E-05	0.001	9.24E-06	0.001	4.353	<0.01	0.01%
ARSENIC		NR	0.034	2.19E-04	NR		—	3.500	6.65E-05	4.893	0.001	0.002	2.06E-05	0.001	5.128	<0.01	0.01%
NICKEL		NR	0.890	0.006	NR		—	13.800	2.62E-04	15.645	0.003	0.009	8.02E-05	0.009	68.390	<0.01	0.01%
FLUORANTHENE	X	NR	ND	—	NR	ND	—	0.078	1.48E-06	0.140	2.31E-05	ND	—	2.46E-05	0.363	<0.01	<0.01%
ACETONE		NR	0.006	3.63E-05	NR	0.266	0.001	NR	—	0.124	2.05E-05	0.014	1.34E-04	0.001	85.614	<0.01	<0.01%
PYRENE	X	NR	ND	—	NR	ND	—	0.094	1.79E-06	ND	—	ND	—	1.79E-06	0.363	<0.01	<0.01%
delta-BHC		NR	ND	—	NR	ND	—	ND	—	0.004	5.80E-07	ND	—	5.80E-07	0.287	<0.01	<0.01%
PHENOL	X	NR	ND	—	NR	ND	—	ND	—	0.150	2.48E-05	ND	—	2.48E-05	19.413	<0.01	<0.01%
SILVER	X	ND		—	ND		—	ND	—	1.700	2.81E-04	0.004	3.33E-05	3.14E-04	1078.772	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	ND	—	NR	ND	—	NR	—	0.001	1.70E-07	ND	—	1.70E-07	1.262	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	ND	—	NR	ND	—	ND	—	0.057	9.41E-06	ND	—	9.41E-06	105.975	<0.01	<0.01%

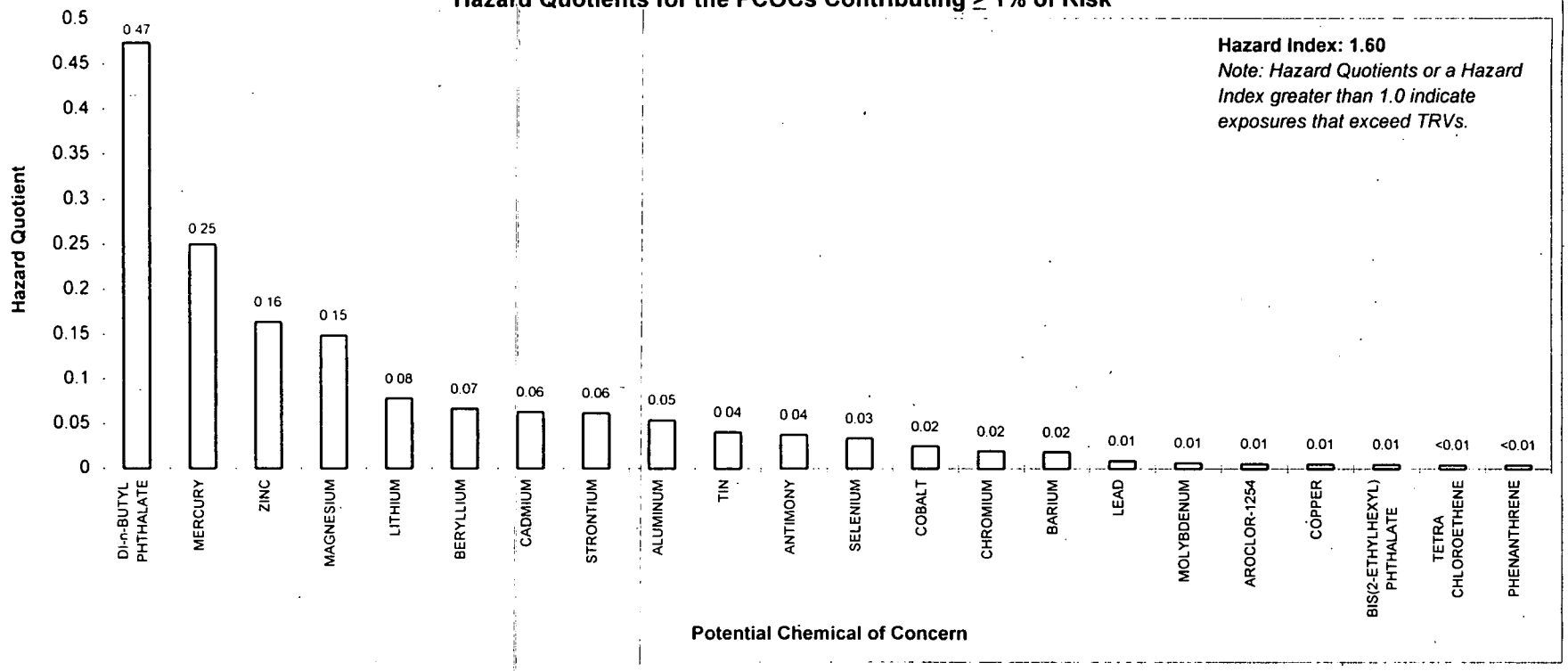
HAZARD INDEX 1.67

Notes:

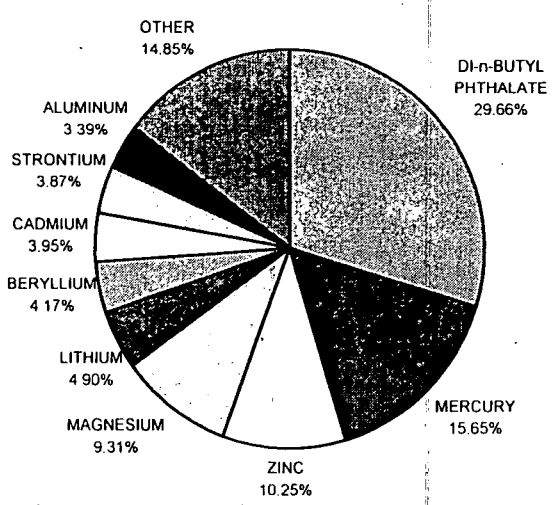
RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mallards in the OU6 B-Ponds Source Area at RFETS

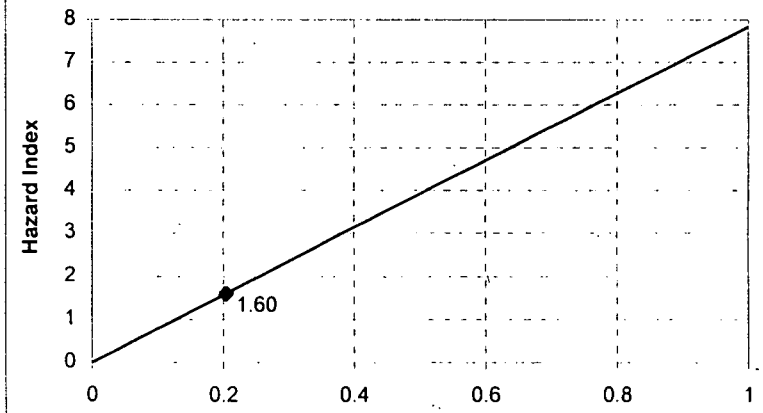
Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



% Contributions of PCOCs to Total Risk

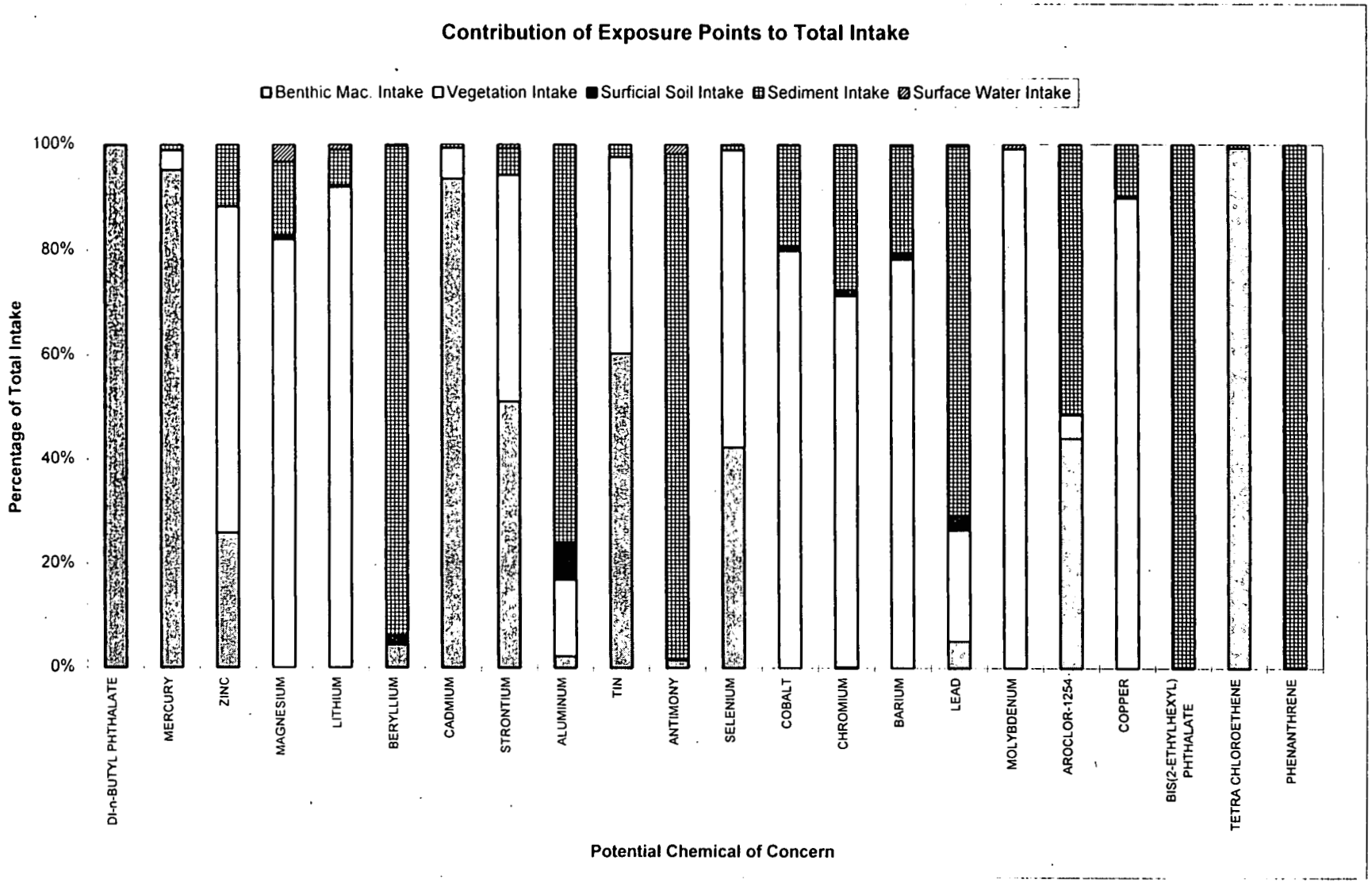


Hazard Index versus Site Use Factor



Site Use Factor for land-based media = 0.012

Summary of Ecotoxicological Risk to Mallards in the OU6 B-Ponds Source Area at RFETS



Summary of Ecotoxicological Risk to Mallards in the OU6 B-Ponds Source Area at RFETS

MALLARDS OU6 B-PONDS		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.039 SUF = 0.204			IR = 0.013 SUF = 0.204			IR = 0.001 SUF = 0.012		IR = 0.001 SUF = 0.204		IR = 0.056 SUF = 0.204					
DI-n-BUTYL PHTHALATE	X	NR	3.416	0.027	NR	NR	—	ND	—	ND	—	0.001	1.14E-05	0.027	0.057	0.47	29.66%
MERCURY	X	NR	0.757	0.006	0.086		2.28E-04	ND	—	0.340	6.93E-05	2.75E-04	3.14E-06	0.006	0.024	0.25	15.65%
ZINC	X	NR	16.116	0.128	116.031		0.308	64.100	0.001	279.259	0.057	0.026	2.98E-04	0.494	3.017	0.16	10.25%
MAGNESIUM	X	NR	NO BCF	—	1669.753		4.428	3790.000	0.045	3643.654	0.743	15.504	0.177	5.394	36.287	0.15	9.31%
LITHIUM		NR	NO BCF	—	6.600		0.018	5.900	7.08E-05	6.200	0.001	0.017	1.98E-04	0.019	0.243	0.08	4.90%
BERYLLIUM		NR	0.004	2.83E-05	ND		—	0.970	1.16E-05	2.933	0.001	1.79E-04	2.04E-06	0.001	0.015	0.07	4.17%
CADMIUM		NR	10.862	0.086	2.034		0.005	ND	—	2.888	0.001	0.001	1.13E-05	0.092	1.458	0.06	3.95%
STRONTIUM	X	NR	26.305	0.209	66.453		0.176	25.500	3.06E-04	101.256	0.021	0.255	0.003	0.409	6.623	0.06	3.87%
ALUMINUM		NR	8.604	0.068	172.535		0.458	18700.000	0.224	11556.246	2.357	0.264	0.003	3.111	57.422	0.05	3.39%
TIN		NR	13.941	0.111	25.800		0.068	ND	—	21.229	0.004	0.006	7.25E-05	0.184	4.519	0.04	2.55%
ANTIMONY	X	NR	0.010	8.17E-05	ND		—	ND	—	25.419	0.005	0.009	9.72E-05	0.005	0.132	0.04	2.37%
SELENIUM		NR	0.703	0.006	2.818		0.007	ND	—	0.591	1.21E-04	0.002	2.31E-05	0.013	0.384	0.03	2.12%
COBALT	X	NR	NO BCF	—	3.300		0.009	9.000	1.08E-04	10.133	0.002	0.002	1.81E-05	0.011	0.445	0.02	1.55%
CHROMIUM	X	NR	0.005	4.13E-05	5.293		0.014	19.900	2.39E-04	26.369	0.005	0.002	2.53E-05	0.020	1.033	0.02	1.21%
BARIUM	X	NR	NO BCF	—	53.768		0.143	194.000	0.002	178.739	0.036	0.051	0.001	0.182	9.901	0.02	1.15%
LEAD	X	NR	0.102	0.001	1.274		0.003	37.200	4.46E-04	54.428	0.011	0.005	5.85E-05	0.016	1.802	0.01	0.56%
MOLYBDENUM	X	NR	NO BCF	—	3.800		0.010	ND	—	ND	—	0.007	8.40E-05	0.010	1.478	0.01	0.42%
AROCLOR-1254	X	0.034		2.71E-04	0.010		2.71E-05	ND	—	1.543	3.15E-04	NR	—	0.001	0.172	0.01	0.36%
COPPER	X	NR	ND	—	29.452		0.078	17.000	2.04E-04	42.045	0.009	ND	—	0.087	15.763	0.01	0.35%
BIS(2-ETHYLHEXYL) PHTHALATE	X	NR	ND	—	NR	NR	—	ND	—	12.825	0.003	ND	—	0.003	0.573	0.01	0.33%
TETRA CHLOROETHENE	X	NR	0.826	0.007	NR	ND	—	NR	—	ND	—	0.004	4.18E-05	0.007	1.570	<0.01	0.28%
PHENANTHRENE	X	NR	ND	—	NR	NR	—	ND	—	0.744	1.52E-04	ND	—	1.52E-04	0.036	<0.01	0.26%
MANGANESE	X	NR	NO BCF	—	53.948		0.143	321.000	0.004	272.520	0.056	0.098	0.001	0.204	49.511	<0.01	0.26%
BENZO(k)FLUORANTHENE	X	NR	ND	—	NR	NR	—	ND	—	0.411	8.38E-05	ND	—	8.38E-05	0.036	<0.01	0.15%
ANTHRACENE	X	NR	ND	—	NR	NR	—	ND	—	0.326	6.65E-05	ND	—	6.65E-05	0.029	<0.01	0.14%
BENZO(a)PYRENE	X	NR	ND	—	NR	NR	—	ND	—	0.398	8.13E-05	ND	—	8.13E-05	0.036	<0.01	0.14%
ARSENIC	X	NR	0.038	3.01E-04	2.700		0.007	5.100	6.12E-05	6.286	0.001	0.002	2.57E-05	0.009	5.128	<0.01	0.11%
THALLIUM		NR	ND	—	ND		—	0.230	2.76E-06	0.790	1.61E-04	ND	—	1.64E-04	0.105	<0.01	0.10%
VANADIUM	X	NR	NO BCF	—	1.200		0.003	38.900	4.67E-04	32.781	0.007	0.003	3.26E-05	0.010	11.499	<0.01	0.05%
DIBENZO(a,h)ANTHRACENE	X	NR	ND	—	NR	NR	—	ND	—	0.150	3.06E-05	ND	—	3.06E-05	0.036	<0.01	0.05%
TRICHLOROETHENE	X	NR	0.117	0.001	NR	ND	—	NR	—	ND	—	0.003	3.29E-05	0.001	1.244	<0.01	0.05%
INDENO(1,2,3-cd)PYRENE	X	NR	ND	—	NR	NR	—	ND	—	0.350	7.13E-05	ND	—	7.13E-05	0.091	<0.01	0.05%
NICKEL	X	NR	0.640	0.005	13.890		0.037	14.600	1.75E-04	19.763	0.004	0.004	4.06E-05	0.046	68.390	<0.01	0.04%
FLUORANTHENE	X	NR	ND	—	NR	NR	—	ND	—	1.128	2.30E-04	ND	—	2.30E-04	0.363	<0.01	0.04%
PYRENE	X	NR	ND	—	NR	NR	—	ND	—	0.951	1.94E-04	ND	—	1.94E-04	0.363	<0.01	0.03%
BENZO(b)FLUORANTHENE	X	NR	ND	—	NR	NR	—	ND	—	0.854	1.74E-04	ND	—	1.74E-04	0.362	<0.01	0.03%
CHRYSENE	X	NR	ND	—	NR	NR	—	ND	—	0.614	1.25E-04	ND	—	1.25E-04	0.363	<0.01	0.02%
BENZO(a)ANTHRACENE	X	NR	ND	—	NR	NR	—	ND	—	0.429	8.75E-05	ND	—	8.75E-05	0.363	<0.01	0.02%
FLUORENE	X	NR	ND	—	NR	NR	—	ND	—	0.351	7.16E-05	ND	—	7.16E-05	0.362	<0.01	0.01%
AROCLOR-1248		ND		—	ND		—	ND	—	0.165	3.37E-05	NR	—	3.37E-05	0.172	<0.01	0.01%
BENZO(ghi)PERYLENE	X	NR	ND	—	NR	NR	—	ND	—	0.270	5.51E-05	ND	—	5.51E-05	0.363	<0.01	0.01%
AROCLOR-1260	X	0.006		5.06E-05	ND		—	ND	—	0.166	3.38E-05	NR	—	8.44E-05	0.860	<0.01	0.01%
HEPTACHLOR	X	NR	NR	—	NR	NR	—	ND	—	0.007	1.38E-06	NR	—	1.38E-06	0.032	<0.01	<0.01%
SILVER	X	NR	ND	—	4.700		0.012	ND	—	92.067	0.019	ND	—	0.031	1078.772	<0.01	<0.01%
TOLUENE	X	NR	ND	—	NR	0.020	5.43E-05	NR	—	0.278	5.68E-05	ND	—	1.11E-04	4.353	<0.01	<0.01%
1,2-DICHLOROETHANE	X	NR	0.008	6.25E-05	NR	ND	—	NR	—	ND	—	0.001	1.14E-05	7.39E-05	19.169	<0.01	<0.01%

Summary of Ecotoxicological Risk to Mallards in the OU6 B-Ponds Source Area at RFETS

MALLARDS OU6 B-PONDS		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.039 SUF = 0.204			IR = 0.013 SUF = 0.204			IR = 0.001 SUF = 0.012		IR = 0.001 SUF = 0.204		IR = 0.056 SUF = 0.204					
PHENOL	X	NR	ND	—	NR	NR	—	ND	—	0.290	5.92E-05	ND	—	5.92E-05	19.413	<0.01	<0.01%
METHYLENE CHLORIDE	X	NR	ND	—	NR	ND	—	NR	—	0.009	1.84E-06	ND	—	1.84E-06	0.804	<0.01	<0.01%
ACETONE	X	NR	0.004	3.28E-05	NR	ND	—	NR	—	0.190	3.87E-05	0.011	1.21E-04	1.92E-04	85.614	<0.01	<0.01%
NAPHTHALENE	X	NR	ND	—	NR	NR	—	ND	—	0.351	7.16E-05	ND	—	7.16E-05	36.331	<0.01	<0.01%
ACENAPHTHENE	X	NR	ND	—	NR	NR	—	ND	—	0.341	6.96E-05	ND	—	6.96E-05	36.331	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	ND	—	NR	NR	—	ND	—	0.250	5.10E-05	ND	—	5.10E-05	46.363	<0.01	<0.01%
2-METHYLNAPHTHALENE	X	NR	ND	—	NR	NR	—	ND	—	0.170	3.47E-05	ND	—	3.47E-05	36.331	<0.01	<0.01%
gamma-BHC (LINDANE)	X	NR	NR	—	NR	NR	—	ND	—	0.006	1.18E-06	NR	—	1.18E-06	2.000	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	ND	—	NR	NR	—	ND	—	0.110	2.24E-05	ND	—	2.24E-05	105.975	<0.01	<0.01%

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Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mallards in the OU5 Old Landfill Source Area at RFETS

MALLARDS OU5 OLD LANDFILL		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.039 SUF = 0.081			IR = 0.013 SUF = 0.081			IR = 0.001 SUF = 0.023		IR = 0.001 SUF = 0.081		IR = 0.056 SUF = 0.081					
ZINC	X	219.000		0.692	44.205		0.047	66.571	0.002	634.180	0.051	0.022	1.01E-04	0.791	3.017	0.26	37.27%
MAGNESIUM		NR	NO BCF	—	2448.896		2.579	2298.534	0.053	4628.783	0.375	19.837	0.090	3.096	36.287	0.09	12.13%
TIN		NR	77.147	0.244	2.100		0.002	9.714	2.23E-04	ND	—	0.021	9.53E-05	0.246	4.519	0.05	7.74%
STRONTIUM	X	NR	48.619	0.154	79.000		0.083	30.813	0.001	79.000	0.006	0.484	0.002	0.246	6.623	0.04	5.28%
ANTIMONY	X	NR	0.018	5.73E-05	ND		—	8.677	2.00E-04	51.300	0.004	0.015	6.88E-05	0.004	0.132	0.03	4.31%
ALUMINUM		NR	9.830	0.031	199.127		0.210	11074.656	0.255	16076.395	1.302	1.471	0.007	1.804	57.422	0.03	4.47%
COPPER	X	122.000		0.385	7.863		0.008	37.703	0.001	108.217	0.009	0.006	2.57E-05	0.403	15.763	0.03	3.63%
PHENANTHRENE	X	NR	ND	—	NR	0.610	0.001	9.640	2.22E-04	0.082	6.64E-06	ND	—	0.001	0.036	0.03	3.95%
CHROMIUM		5.600		0.018	3.600		0.004	13.088	3.01E-04	22.917	0.002	0.004	1.94E-05	0.024	1.033	0.02	3.30%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	3.100	0.010	NR	0.023	2.43E-05	0.210	4.83E-06	0.068	5.51E-06	0.002	9.07E-06	0.010	0.573	0.02	2.48%
BERYLLIUM		NR	0.017	5.36E-05	ND		—	0.882	2.03E-05	1.700	1.38E-04	0.001	4.30E-06	2.16E-04	0.015	0.01	2.05%
LEAD	X	5.200		0.016	1.683		0.002	28.695	0.001	37.926	0.003	0.004	1.82E-05	0.022	1.802	0.01	1.74%
ANTHRACENE	X	NR	ND	—	NR	0.243	2.56E-04	2.816	6.48E-05	ND	—	ND	—	3.21E-04	0.029	0.01	1.57%
LITHIUM	X	NR	NO BCF	—	1.100		0.001	8.005	1.84E-04	15.400	0.001	0.013	5.84E-05	0.003	0.243	0.01	1.75%
MERCURY	X	ND		—	ND		—	0.124	2.85E-06	3.194	2.59E-04	0.000	5.00E-07	2.62E-04	0.024	0.01	1.55%
BARIUM	X	NR	NO BCF	—	66.461		0.070	115.593	0.003	186.000	0.015	0.162	0.001	0.088	9.901	0.01	1.26%
NITRATE/NITRITE		NR	NO BCF	—	NR		—	NR	—	6.526	0.001	1.490	0.007	0.007	0.939	0.01	1.06%
MOLYBDENUM		NR	NO BCF	—	8.700		0.009	4.400	1.01E-04	3.900	3.16E-04	0.004	2.00E-05	0.010	1.478	0.01	0.96%
SELENIUM		ND		—	1.400		0.001	0.459	1.06E-05	ND	—	0.003	1.14E-05	0.001	0.384	<0.01	0.37%
PENTACHLOROPHENOL	X	NR	18.905	0.060	NR	0.008	8.29E-06	ND	—	ND	—	0.005	2.27E-05	0.060	16.920	<0.01	0.50%
BENZO(a)PYRENE	X	NR	ND	—	NR	0.030	3.18E-05	2.636	6.06E-05	ND	—	ND	—	9.24E-05	0.036	<0.01	0.36%
COBALT	X	NR	NO BCF	—	ND		—	8.348	1.92E-04	10.900	0.001	0.002	9.07E-06	0.001	0.445	<0.01	0.32%
MANGANESE		NR	NO BCF	—	47.237		0.050	277.661	0.006	556.331	0.045	0.061	2.79E-04	0.101	49.511	<0.01	0.29%
CADMIUM		ND		—	1.900		0.002	0.880	2.03E-05	2.486	2.01E-04	0.002	7.26E-06	0.002	1.458	<0.01	0.19%
BENZO(k)FLUORANTHENE	X	NR	ND	—	NR	0.005	5.00E-06	1.694	3.90E-05	ND	—	ND	—	4.40E-05	0.036	<0.01	0.17%
FLUORANTHENE	X	NR	ND	—	NR	0.208	2.19E-04	8.267	1.90E-04	0.097	7.86E-06	ND	—	4.17E-04	0.363	<0.01	0.16%
PYRENE	X	NR	ND	—	NR	0.201	2.12E-04	7.090	1.63E-04	0.097	7.86E-06	ND	—	3.83E-04	0.363	<0.01	0.15%
FLUORENE	X	NR	ND	—	NR	0.268	2.82E-04	2.363	5.44E-05	ND	—	ND	—	3.37E-04	0.362	<0.01	0.13%
INDENO(1,2,3-cd)PYRENE	X	NR	ND	—	NR	0.001	1.26E-06	2.572	5.92E-05	ND	—	ND	—	6.04E-05	0.091	<0.01	0.09%
THALLIUM		NR	ND	—	ND		—	0.310	7.13E-06	0.600	4.86E-05	0.002	8.99E-06	6.47E-05	0.105	<0.01	0.09%
DIBENZO(a,h)ANTHRACENE	X	NR	ND	—	NR	0.003	3.28E-06	0.758	1.74E-05	ND	—	ND	—	2.07E-05	0.036	<0.01	0.08%
DI-n-BUTYL PHTHALATE	X	NR	ND	—	NR	0.027	2.79E-05	0.200	4.60E-06	ND	—	ND	—	3.25E-05	0.057	<0.01	0.08%
4,4'-DDT	X	NR	ND	—	NR	ND	—	0.009	2.00E-07	ND	—	ND	—	2.00E-07	4.03E-04	<0.01	0.07%
VANADIUM		NR	NO BCF	—	1.400		0.001	30.425	0.001	39.300	0.003	0.008	3.71E-05	0.005	11.499	<0.01	0.06%
HEPTACHLOR EPOXIDE	X	NR	ND	—	NR	0.001	1.36E-06	0.004	1.00E-07	ND	—	ND	—	1.46E-06	0.004	<0.01	0.05%
CHRYSENE	X	NR	ND	—	NR	0.061	6.39E-05	2.987	6.87E-05	0.041	3.32E-06	ND	—	1.36E-04	0.363	<0.01	0.05%
TRICHLOROETHENE		NR	0.117	3.69E-04	NR	0.019	1.97E-05	ND	—	ND	—	0.003	1.30E-05	4.01E-04	1.244	<0.01	0.05%
BENZO(a)ANTHRACENE	X	NR	ND	—	NR	0.038	3.99E-05	2.850	6.56E-05	0.038	3.08E-06	ND	—	1.09E-04	0.363	<0.01	0.04%
ARSENIC		NR	0.039	1.22E-04	0.590		0.001	5.702	1.31E-04	6.100	4.94E-04	0.002	9.71E-06	0.001	5.128	<0.01	0.03%
BENZO(b)FLUORANTHENE	X	NR	ND	—	NR	0.016	1.66E-05	3.179	7.31E-05	ND	—	ND	—	8.97E-05	0.362	<0.01	0.04%
AROCLOR-1254	X	NR	ND	—	NR	0.001	1.53E-06	0.572	1.32E-05	0.250	2.03E-05	ND	—	3.49E-05	0.172	<0.01	0.03%
NICKEL		NR	0.904	0.003	8.000		0.008	14.939	3.44E-04	21.300	0.002	0.009	4.28E-05	0.013	68.390	<0.01	0.03%
METHYLENE CHLORIDE	X	NR	0.016	5.08E-05	NR	0.042	4.37E-05	ND	—	ND	—	0.003	1.39E-05	1.08E-04	0.804	<0.01	0.02%
BENZO(ghi)PERYLENE	X	NR	ND	—	NR	0.002	2.44E-06	0.922	2.12E-05	ND	—	ND	—	2.37E-05	0.363	<0.01	0.01%
PHENOL	X	NR	ND	—	NR	0.777	0.001	ND	—	ND	—	ND	—	0.001	19.413	<0.01	0.01%
NAPHTHALENE	X	NR	ND	—	NR	1.297	0.001	2.498	5.75E-05	ND	—	ND	—	0.001	36.331	<0.01	<0.01%
ACETONE		NR	0.009	2.74E-05	NR	1.397	0.001	ND	—	0.046	3.73E-06	0.022	1.01E-04	0.002	85.614	<0.01	<0.01%
ACENAPHTHENE	X	NR	ND	—	NR	0.258	2.72E-04	2.636	6.06E-05	ND	—	ND	—	3.32E-04	36.331	<0.01	<0.01%

Summary of Ecotoxicological Risk to Mallards in the OU5 Old Landfill Source Area at RFETS

MALLARDS OU5 OLD LANDFILL		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.039 SUF = 0.081			IR = 0.013 SUF = 0.081			IR = 0.001 SUF = 0.023		IR = 0.001 SUF = 0.081		IR = 0.056 SUF = 0.081					
TETRACHLOROETHENE		NR	ND	—	NR	0.013	1.36E-05	ND	—	0.001	8.00E-08	ND	—	1.37E-05	1.570	<0.01	<0.01%
TOLUENE	X	NR	ND	—	NR	0.027	2.80E-05	ND	—	ND	—	ND	—	2.80E-05	4.353	<0.01	<0.01%
2-METHYLNAPHTHALENE	X	NR	ND	—	NR	0.141	1.49E-04	0.944	2.17E-05	ND	—	ND	—	1.70E-04	36.331	<0.01	<0.01%
DIELDRIN	X	NR	ND	—	NR	ND	—	0.009	2.10E-07	ND	—	ND	—	2.10E-07	0.057	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	ND	—	NR	0.003	3.05E-06	ND	—	ND	—	ND	—	3.05E-06	1.262	<0.01	<0.01%
ALDRIN	X	NR	ND	—	NR	ND	—	0.005	1.10E-07	ND	—	ND	—	1.10E-07	0.057	<0.01	<0.01%
SILVER	X	ND		—	1.000		0.001	7.180	1.65E-04	6.597	0.001	0.003	1.58E-05	0.002	1078.772	<0.01	<0.01%
AROCLOR-1260		NR	ND	—	NR	0.001	6.60E-07	ND	—	ND	—	ND	—	6.60E-07	0.860	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	ND	—	NR	0.024	2.53E-05	0.220	5.06E-06	ND	—	ND	—	3.04E-05	105.975	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	ND	—	NR	ND	—	0.083	1.91E-06	ND	—	ND	—	1.91E-06	46.363	<0.01	<0.01%
TOTAL XYLENES		NR	ND	—	NR	0.003	3.43E-06	ND	—	ND	—	ND	—	3.43E-06	114.839	<0.01	<0.01%

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Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{ow} = No octonol-water partition coefficient available; LOG K_{ow}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mallards in the OU2 903 Pad Source Area at RFETS

MALLARDS OU2 903 PAD		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU2	IR = 0.039 SUF = 0.014			IR = 0.013 SUF = 0.014			IR = 0.001 SUF = 0.048		IR = 0.001 SUF = 0.014		IR = 0.056 SUF = 0.014					
AROCLOR-1254	X	NR	96.315	0.053	NR	0.033	6.05E-06	0.208	1.00E-05	0.260	3.64E-06	0.002	1.47E-06	0.053	0.172	0.31	61.27%
DI-n-BUTYL PHTHALATE	X	NR	6.832	0.004	NR	0.061	1.11E-05	0.353	1.70E-05	0.065	9.10E-07	0.002	1.57E-06	0.004	0.057	0.07	13.95%
TIN		NR	119.444	0.065	3.500		0.001	33.323	0.002	18.800	2.63E-04	0.053	4.14E-05	0.068	4.519	0.02	2.99%
ALUMINUM		NR	56.849	0.031	297.170		0.054	11886.180	0.571	14104.468	0.197	5.480	0.004	0.857	57.422	0.01	2.97%
MAGNESIUM		NR	NO BCF	—	1426.036		0.260	3426.354	0.164	4179.821	0.059	39.934	0.031	0.514	36.287	0.01	2.82%
MERCURY		NR	0.477	2.61E-04	0.098		1.78E-05	0.060	2.88E-06	0.040	5.60E-07	0.000	9.00E-08	2.82E-04	0.024	0.01	2.34%
STRONTIUM		NR	96.028	0.052	46.852		0.009	43.040	0.002	97.592	0.001	1.028	0.001	0.065	6.623	0.01	1.95%
ZINC		NR	26.227	0.014	29.152		0.005	72.699	0.003	109.953	0.002	0.227	1.78E-04	0.025	3.017	0.01	1.65%
CADMIUM		NR	16.120	0.009	2.100		3.82E-04	0.920	4.42E-05	0.950	1.33E-05	0.002	1.80E-06	0.009	1.458	0.01	1.23%
BERYLLIUM		NR	0.013	7.26E-06	ND		—	1.200	5.76E-05	0.903	1.26E-05	0.001	9.90E-07	7.85E-05	0.015	0.01	1.04%
SELENIUM		NR	2.306	0.001	2.288		4.16E-04	0.620	2.98E-05	0.880	1.23E-05	0.008	6.38E-06	0.002	0.384	0.01	1.04%
LITHIUM		NR	NO BCF	—	1.100		2.00E-04	13.592	0.001	12.183	1.71E-04	0.071	5.54E-05	0.001	0.243	0.00	0.82%
PHENANTHRENE	X	NR	ND	—	NR	0.716	1.30E-04	0.556	2.67E-05	0.190	2.66E-06	ND	—	1.60E-04	0.036	0.00	0.88%
ANTIMONY		NR	0.022	1.17E-05	ND		—	9.800	4.70E-04	4.900	6.86E-05	0.020	1.55E-05	0.001	0.132	0.01	1.51%
CHROMIUM	X	NR	0.020	1.10E-05	5.509		0.001	26.789	0.001	14.581	2.04E-04	0.011	8.91E-06	0.003	1.033	<0.01	0.58%
BARIUM		NR	NO BCF	—	59.791		0.011	143.681	0.007	164.776	0.002	0.261	2.05E-04	0.020	9.901	<0.01	0.40%
COBALT		NR	NO BCF	—	0.830		1.51E-04	7.671	3.68E-04	9.088	1.27E-04	0.011	8.23E-06	0.001	0.445	<0.01	0.45%
LEAD	X	NR	0.277	1.51E-04	1.789		3.26E-04	32.367	0.002	32.749	4.58E-04	0.007	5.21E-06	0.002	1.802	<0.01	0.22%
METHYLENE CHLORIDE		NR	0.019	1.07E-05	NR	5.553	0.001	NR	—	0.009	1.30E-07	0.004	2.91E-06	0.001	0.804	<0.01	0.25%
MANGANESE		NR	NO BCF	—	169.997		0.031	318.236	0.015	236.041	0.003	0.312	2.44E-04	0.050	49.511	<0.01	0.20%
NITRATE/NITRITE		NR	NO BCF	—	NR		—	3.106	1.49E-04	4.124	5.77E-05	0.793	0.001	0.001	0.939	<0.01	0.21%
MOLYBDENUM		NR	NO BCF	—	5.700		0.001	3.000	1.44E-04	6.700	9.38E-05	0.016	1.22E-05	0.001	1.478	<0.01	0.13%
TOLUENE		NR	ND	—	NR	18.926	0.003	NR	—	0.002	3.00E-08	ND	—	0.003	4.353	<0.01	0.14%
TETRACHLOROETHENE		NR	1.420	0.001	NR	0.035	6.44E-06	NR	—	ND	—	0.006	4.93E-06	0.001	1.570	<0.01	0.13%
BENZO(a)PYRENE	X	NR	ND	—	NR	0.005	8.40E-07	0.320	1.54E-05	0.110	1.54E-06	ND	—	1.78E-05	0.036	<0.01	0.10%
BENZO(k)FLUORANTHENE	X	NR	ND	—	NR	ND	—	0.311	1.49E-05	0.110	1.54E-06	ND	—	1.65E-05	0.036	<0.01	0.09%
ANTHRACENE		NR	ND	—	NR	0.009	1.72E-06	0.201	9.63E-06	ND	—	ND	—	1.14E-05	0.029	<0.01	0.08%
TRICHLOROETHENE		NR	0.498	2.72E-04	NR	0.937	1.71E-04	NR	—	ND	—	0.012	9.59E-06	4.52E-04	1.244	<0.01	0.07%
THALLIUM		NR	ND	—	ND		—	0.430	2.06E-05	1.000	1.40E-05	ND	—	3.46E-05	0.105	<0.01	0.07%
COPPER		NR	2.264	0.001	10.420		0.002	21.815	0.001	23.031	3.22E-04	0.024	1.89E-05	0.005	15.763	<0.01	0.06%
PYRENE	X	NR	ND	—	NR	0.339	6.18E-05	0.644	3.09E-05	0.260	3.64E-06	ND	—	9.63E-05	0.363	<0.01	0.05%
FLUORANTHENE	X	NR	ND	—	NR	0.284	5.17E-05	0.689	3.31E-05	0.230	3.22E-06	ND	—	8.80E-05	0.363	<0.01	0.05%
VANADIUM		NR	NO BCF	—	2.400		4.37E-04	35.681	0.002	37.422	0.001	0.026	2.07E-05	0.003	11.499	<0.01	0.05%
4,4'-DDT	X	NR	ND	—	NR	ND	—	ND	—	0.006	8.00E-08	ND	—	8.00E-08	0.000	<0.01	0.04%
ACETONE		NR	0.005	2.80E-06	NR	73.447	0.013	NR	—	0.066	9.20E-07	0.013	1.03E-05	0.013	85.614	<0.01	0.03%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	ND	—	NR	0.358	6.51E-05	0.248	1.19E-05	0.540	7.56E-06	ND	—	8.46E-05	0.573	<0.01	0.03%
DIBENZO(a,h)ANTHRACENE		NR	ND	—	NR	ND	—	0.092	4.42E-06	ND	—	ND	—	4.42E-06	0.036	<0.01	0.02%
INDENO(1,2,3-cd)PYRENE	X	NR	ND	—	NR	ND	—	0.188	9.02E-06	ND	—	ND	—	9.02E-06	0.091	<0.01	0.02%
AROCLOR-1248		NR	ND	—	NR	0.027	4.94E-06	0.211	1.01E-05	ND	—	ND	—	1.51E-05	0.172	<0.01	0.02%
ARSENIC		NR	0.050	2.71E-05	ND		—	3.998	1.92E-04	5.742	8.04E-05	0.006	4.34E-06	3.04E-04	5.128	<0.01	0.01%
CHRYSENE	X	NR	ND	—	NR	0.007	1.21E-06	0.341	1.64E-05	0.140	1.96E-06	ND	—	1.95E-05	0.363	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	ND	—	NR	0.004	6.90E-07	0.334	1.60E-05	0.110	1.54E-06	ND	—	1.83E-05	0.363	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	ND	—	NR	0.001	2.60E-07	0.337	1.62E-05	0.120	1.68E-06	ND	—	1.81E-05	0.362	<0.01	0.01%
NICKEL		NR	1.202	0.001	4.400		0.001	26.987	0.001	17.615	2.47E-04	0.014	1.11E-05	0.003	68.390	<0.01	0.01%
BENZO(ghi)PERYLENE	X	NR	ND	—	NR	ND	—	0.191	9.17E-06	ND	—	ND	—	9.17E-06	0.363	<0.01	0.01%
FLUORENE		NR	ND	—	NR	ND	—	0.190	9.11E-06	ND	—	ND	—	9.11E-06	0.362	<0.01	0.01%
1,1,1-TRICHLOROETHANE		NR	ND	—	NR	0.014	2.63E-06	NR	—	ND	—	ND	—	2.63E-06	1.262	<0.01	<0.01%
SILVER		NR	0.815	4.45E-04	1.300		2.37E-04	ND	—	1.700	2.38E-05	0.005	3.53E-06	0.001	1078.772	<0.01	<0.01%

Summary of Ecotoxicological Risk to Mallards in the OU2 903 Pad Source Area at RFETS

MALLARDS OU2 903 PAD		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU2	IR = 0.039 SUF = 0.014			IR = 0.013 SUF = 0.014			IR = 0.001 SUF = 0.048		IR = 0.001 SUF = 0.014		IR = 0.056 SUF = 0.014					
ACENAPHTHENE		NR	ND	—	NR	0.010	1.82E-06	0.186	8.94E-06	ND	—	ND	—	1.08E-05	36.331	<0.01	<0.01%
TOTAL XYLENES		NR	ND	—	NR	0.049	8.87E-06	NR	—	ND	—	ND	—	8.87E-06	114.839	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	ND	—	NR	0.035	6.33E-06	ND	—	ND	—	ND	—	6.33E-06	105.975	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	ND	—	NR	1.40E-05	—	ND	—	0.210	2.94E-06	ND	—	2.94E-06	46.363	<0.01	<0.01%
gamma-BHC (LINDANE)		NR	ND	—	NR	ND	—	ND	—	0.004	6.00E-08	ND	—	6.00E-08	2.000	<0.01	<0.01%

HAZARD INDEX 0.50

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available, BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{ow} = No octonol-water partition coefficient available; LOG K_{ow}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mallards in the OU1 881 Hillside Source Area at RFETS

MALLARD OU1 881 HILLSIDE		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU1	IR = 0.039 SUF = 0.032			IR = 0.013 SUF = 0.032			IR = 0.001 SUF = 0.039		IR = 0.001 SUF = 0.032		IR = 0.056 SUF = 0.032					
PHENANTHRENE	X	NR	ND	—	NR	4.472	0.002	0.559	2.18E-05	0.190	6.08E-06	ND	—	0.002	0.036	0.06	21.33%
MERCURY		NR	0.469	0.001	ND		—	0.054	2.10E-06	ND	—	1.18E-04	2.10E-07	0.001	0.024	0.04	16.00%
STRONTIUM		NR	100.662	0.126	NR		—	61.651	0.002	121.257	0.004	0.413	0.001	0.133	6.623	0.02	7.71%
TIN		NR	67.886	0.085	NR		—	43.094	0.002	ND	—	0.024	4.26E-05	0.086	4.519	0.02	7.31%
ALUMINUM		NR	14.717	0.018	NR		—	14308.320	0.558	15760.019	0.504	0.926	0.002	1.082	57.422	0.02	7.23%
CADMIUM		NR	19.096	0.024	1.409		0.001	0.611	2.38E-05	0.827	2.65E-05	0.002	2.88E-06	0.024	1.458	0.02	6.32%
ZINC		NR	14.991	0.019	28.068		0.012	85.548	0.003	186.114	0.006	0.051	9.07E-05	0.040	3.017	0.01	5.09%
MAGNESIUM		NR	NO BCF	—	NR		—	3418.568	0.133	5670.202	0.181	13.583	0.024	0.339	36.287	0.01	3.59%
BIS(2-ETHYLHEXYL)PHTHALATE		NR	3.100	0.004	NR	3.395	0.001	ND	—	0.280	8.96E-06	0.002	3.58E-06	0.005	0.573	0.01	3.35%
METHYLENE CHLORIDE		NR	0.020	2.48E-05	NR	14.721	0.006	NR	—	ND	—	0.004	6.78E-06	0.006	0.804	0.01	2.87%
BERYLLIUM		NR	0.020	2.49E-05	NR		—	1.257	4.90E-05	0.809	2.59E-05	0.001	1.63E-06	1.01E-04	0.015	0.01	2.60%
NITRATE/NITRITE		NR	NO BCF	—	NR		—	2.111	8.23E-05	6.793	2.17E-04	2.624	0.005	0.005	0.939	0.01	2.04%
SELENIUM		NR	0.660	0.001	1.500		0.001	0.511	1.99E-05	0.919	2.94E-05	0.002	3.50E-06	0.002	0.384	0.01	2.00%
TOLUENE	X	NR	0.184	2.30E-04	NR	43.577	0.018	NR	—	0.005	1.60E-07	0.003	4.72E-06	0.018	4.353	<0.01	1.59%
LITHIUM		NR	NO BCF	—	NR		—	9.473	3.69E-04	10.000	3.20E-04	0.021	3.67E-05	0.001	0.243	<0.01	1.58%
CHROMIUM		NR	0.013	1.67E-05	5.535		0.002	34.997	0.001	23.900	0.001	0.004	7.08E-06	0.004	1.033	<0.01	1.49%
PYRENE	X	NR	ND	—	NR	2.156	0.001	0.693	2.70E-05	0.310	9.92E-06	ND	—	0.001	0.363	<0.01	1.06%
FLUORANTHENE	X	NR	ND	—	NR	1.763	0.001	0.762	2.97E-05	0.380	1.22E-05	ND	—	0.001	0.363	<0.01	1.06%
COBALT		NR	NO BCF	—	NR		—	8.343	3.25E-04	11.094	3.55E-04	0.007	1.17E-05	0.001	0.445	<0.01	0.86%
ALDRIN		NR	0.092	1.15E-04	NR	ND	—	ND	—	ND	—	1.00E-05	2.00E-08	1.15E-04	0.057	<0.01	0.78%
LEAD		NR	0.101	1.26E-04	1.100		4.58E-04	48.003	0.002	30.594	0.001	0.003	6.21E-06	0.003	1.802	<0.01	0.64%
ACETONE		NR	0.003	3.41E-06	NR	271.965	0.113	NR	—	0.036	1.15E-06	0.007	1.26E-05	0.113	85.614	<0.01	0.51%
BARIUM		NR	NO BCF	—	NR		—	179.137	0.007	180.333	0.006	0.123	2.21E-04	0.013	9.901	<0.01	0.50%
THALLIUM		NR	0.068	8.49E-05	NR		—	0.510	1.99E-05	ND	—	0.002	3.52E-06	1.08E-04	0.105	<0.01	0.40%
ANTHRACENE	X	NR	ND	—	NR	0.027	1.12E-05	0.202	7.89E-06	ND	—	ND	—	1.91E-05	0.029	<0.01	0.25%
TETRACHLOROETHENE	X	NR	0.637	0.001	NR	0.015	6.29E-06	NR	—	ND	—	0.003	5.05E-06	0.001	1.570	<0.01	0.24%
COPPER		NR	1.801	0.002	9.256		0.004	35.484	0.001	36.368	0.001	0.009	1.68E-05	0.009	15.763	<0.01	0.22%
MANGANESE		NR	NO BCF	—	NR		—	312.554	0.012	335.402	0.011	0.063	1.12E-04	0.023	49.511	<0.01	0.18%
BENZO(k)FLUORANTHENE	X	NR	ND	—	NR	0.002	8.10E-07	0.297	1.16E-05	0.110	3.52E-06	ND	—	1.59E-05	0.036	<0.01	0.17%
BENZO(a)PYRENE	X	NR	ND	—	NR	0.006	2.63E-06	0.311	1.21E-05	ND	—	ND	—	1.48E-05	0.036	<0.01	0.16%
DI-n-BUTYL PHTHALATE		NR	ND	—	NR	0.056	2.32E-05	ND	—	ND	—	ND	—	2.32E-05	0.057	<0.01	0.16%
ANTIMONY		NR	0.015	1.93E-05	NR		—	ND	—	ND	—	0.015	2.74E-05	4.68E-05	0.132	<0.01	0.14%
VANADIUM		NR	NO BCF	—	NR		—	41.858	0.002	44.881	0.001	0.009	1.58E-05	0.003	11.499	<0.01	0.10%
AROCLOR-1248	X	NR	ND	—	NR	0.082	3.41E-05	0.123	4.81E-06	ND	—	ND	—	3.89E-05	0.172	<0.01	0.09%
TRICHLOROETHENE	X	NR	0.105	1.31E-04	NR	0.187	7.78E-05	NR	—	ND	—	0.003	4.63E-06	2.14E-04	1.244	<0.01	0.07%
AROCLOR-1254	X	NR	ND	—	NR	0.037	1.53E-05	0.257	1.00E-05	ND	—	ND	—	2.53E-05	0.172	<0.01	0.06%
1,1,1-TRICHLOROETHANE	X	NR	0.116	1.44E-04	NR	0.007	3.01E-06	NR	—	ND	—	0.003	4.51E-06	1.52E-04	1.262	<0.01	0.05%
DIBENZO(a,h)ANTHRACENE	X	NR	ND	—	NR	ND	—	0.092	3.59E-06	ND	—	ND	—	3.59E-06	0.036	<0.01	0.04%
ARSENIC		NR	0.033	4.14E-05	NR		—	5.377	2.10E-04	6.464	2.07E-04	0.002	3.66E-06	4.62E-04	5.128	<0.01	0.03%
INDENO(1,2,3-cd)PYRENE	X	NR	ND	—	NR	ND	—	0.204	7.94E-06	ND	—	ND	—	7.94E-06	0.091	<0.01	0.03%
MOLYBDENUM		NR	NO BCF	—	NR		—	1.926	7.51E-05	ND	—	0.018	3.14E-05	1.06E-04	1.478	<0.01	0.03%
CHRYSENE	X	NR	ND	—	NR	0.012	5.16E-06	0.361	1.41E-05	0.190	6.08E-06	ND	—	2.53E-05	0.363	<0.01	0.03%
BENZO(b)FLUORANTHENE	X	NR	ND	—	NR	0.002	1.00E-06	0.314	1.22E-05	0.190	6.08E-06	ND	—	1.93E-05	0.362	<0.01	0.02%
FLUORENE	X	NR	ND	—	NR	0.028	1.17E-05	0.193	7.52E-06	ND	—	ND	—	1.93E-05	0.362	<0.01	0.02%
BENZO(a)ANTHRACENE	X	NR	ND	—	NR	0.008	3.32E-06	0.327	1.28E-05	ND	—	ND	—	1.61E-05	0.363	<0.01	0.02%
NICKEL		NR	0.767	0.001	NR		—	29.863	0.001	14.200	4.54E-04	0.008	1.36E-05	0.003	68.390	<0.01	0.02%
BENZO(ghi)PERYLENE	X	NR	ND	—	NR	ND	—	0.205	8.00E-06	ND	—	ND	—	8.00E-06	0.363	<0.01	0.01%

Summary of Ecotoxicological Risk to Mallards in the OU1 881 Hillside Source Area at RFETS

MALLARD OU1 881 HILLSIDE		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU1	IR = 0.039 SUF = 0.032			IR = 0.013 SUF = 0.032			IR = 0.001 SUF = 0.039		IR = 0.001 SUF = 0.032		IR = 0.056 SUF = 0.032					
1,2-DICHLOROETHANE	X	NR	0.021	2.60E-05	NR	0.027	1.12E-05	NR	—	ND	—	0.003	4.76E-06	4.20E-05	19.169	<0.01	<0.01%
TOTAL XYLENES	X	NR	0.159	1.99E-04	NR	0.002	6.80E-07	NR	—	ND	—	0.001	1.79E-06	2.01E-04	114.839	<0.01	<0.01%
SILVER		NR	0.784	0.001	0.540		2.25E-04	ND	—	ND	—	0.003	6.11E-06	0.001	1078.772	<0.01	<0.01%
ACENAPHTHENE	X	NR	ND	—	NR	0.040	1.65E-05	0.195	7.60E-06	ND	—	ND	—	2.41E-05	36.331	<0.01	<0.01%
NAPHTHALENE	X	NR	ND	—	NR	0.040	1.68E-05	0.110	4.29E-06	ND	—	ND	—	2.10E-05	36.331	<0.01	<0.01%
PENTACHLOROPHENOL		NR	ND	—	NR	0.019	7.99E-06	ND	—	ND	—	ND	—	7.99E-06	16.920	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	ND	—	NR	0.009	3.80E-06	ND	—	ND	—	ND	—	3.80E-06	46.363	<0.01	<0.01%

HAZARD INDEX 0.26

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mallards in the OU5 Ash Pits Source Area at RFETS

MALLARDS OU5 ASH PITS		EXPOSURE POINT												SUMMARY			
		Benthic Macroinvertebrates			Vegetation			Surficial Soil		Sediment		Surface Water					
		Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	TRV	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.039 SUF = 0.007			IR = 0.013 SUF = 0.007			IR = 0.001 SUF = 0.034		IR = 0.001 SUF = 0.007		IR = 0.056 SUF = 0.007					
ALUMINUM		NR	18.747	0.005	264.435		0.024	13038.844	0.443	8571.142	0.060	0.855	3.35E-04	0.533	57.422	0.01	21.67%
MAGNESIUM		NR	NO BCF	—	1466.885		0.133	2929.961	0.100	2095.530	0.015	6.862	0.003	0.250	36.287	0.01	16.09%
CADMIUM		NR	19.257	0.005	2.179		1.98E-04	1.349	4.59E-05	1.197	8.38E-06	0.001	3.90E-07	0.006	1.458	<0.01	9.61%
TIN		NR	57.281	0.016	3.200		2.91E-04	16.661	0.001	9.207	6.45E-05	0.019	7.41E-06	0.017	4.519	<0.01	8.78%
ZINC	X	NR	12.447	0.003	29.216		0.003	69.631	0.002	383.943	0.003	0.018	7.02E-06	0.011	3.017	<0.01	8.51%
BERYLLIUM		NR	0.018	5.05E-06	0.084		7.64E-06	0.940	3.20E-05	0.969	6.78E-06	0.001	5.40E-07	5.20E-05	0.015	<0.01	8.09%
STRONTIUM	X	NR	24.865	0.007	45.069		0.004	38.768	0.001	56.300	3.94E-04	0.247	9.67E-05	0.013	6.623	<0.01	4.58%
LITHIUM	X	NR	NO BCF	—	ND		—	10.380	3.53E-04	6.612	4.63E-05	0.009	3.41E-06	4.03E-04	0.243	<0.01	3.87%
ANTIMONY	X	NR	0.016	4.49E-06	ND		—	ND	—	23.639	1.65E-04	0.015	6.02E-06	1.76E-04	0.132	<0.01	3.11%
BARIUM	X	NR	NO BCF	—	66.746		0.006	143.888	0.005	117.818	0.001	0.071	2.76E-05	0.012	9.901	<0.01	2.83%
LEAD	X	NR	0.135	3.77E-05	1.581		1.44E-04	33.783	0.001	25.470	1.78E-04	0.004	1.48E-06	0.002	1.802	<0.01	2.59%
CHROMIUM		NR	0.010	2.82E-06	1.900		1.73E-04	15.956	0.001	10.564	7.40E-05	0.004	1.53E-06	0.001	1.033	<0.01	2.26%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	1.550	4.34E-04	NR	NR	—	NR	—	0.410	2.87E-06	0.001	3.90E-07	4.37E-04	0.573	<0.01	1.78%
COBALT	X	NR	NO BCF	—	ND		—	8.402	2.86E-04	6.823	4.78E-05	0.007	2.88E-06	3.36E-04	0.445	<0.01	1.76%
MERCURY	X	NR	ND	—	0.073		6.64E-06	0.078	2.64E-06	0.056	3.90E-07	1.10E-04	4.00E-08	9.71E-06	0.024	<0.01	0.94%
MANGANESE		NR	NO BCF	—	42.730		0.004	337.520	0.011	445.908	0.003	0.148	5.79E-05	0.019	49.511	<0.01	0.90%
SELENIUM		NR	0.354	9.92E-05	ND		—	0.410	1.40E-05	1.572	1.10E-05	0.001	4.30E-07	1.25E-04	0.384	<0.01	0.76%
THALLIUM		NR	ND	—	ND		—	0.520	1.77E-05	0.280	1.96E-06	ND	—	1.96E-05	0.105	<0.01	0.44%
NITRATE/NITRITE		NR	NO BCF	—	NR		—	NR	—	16.528	1.16E-04	0.088	3.47E-05	1.50E-04	0.939	<0.01	0.37%
VANADIUM		NR	NO BCF	—	2.300		2.09E-04	36.213	0.001	25.339	1.77E-04	0.009	3.37E-06	0.002	11.499	<0.01	0.41%
COPPER	X	NR	2.222	0.001	7.604		0.001	16.938	0.001	13.145	9.20E-05	0.006	2.21E-06	0.002	15.763	<0.01	0.30%
ARSENIC		NR	0.034	9.52E-06	0.840		7.64E-05	5.715	1.94E-04	7.845	5.49E-05	0.002	8.20E-07	3.36E-04	5.128	<0.01	0.15%
MOLYBDENUM		NR	NO BCF	—	ND		—	0.928	3.15E-05	3.529	2.47E-05	0.020	7.73E-06	6.40E-05	1.478	<0.01	0.10%
NICKEL		NR	ND	—	14.803		0.001	13.578	4.62E-04	14.020	9.81E-05	0.009	3.42E-06	0.002	68.390	<0.01	0.07%
METHYLENE CHLORIDE	X	NR	0.025	6.97E-06	NR	NR	—	NR	—	0.012	8.00E-08	0.005	1.86E-06	8.91E-06	0.804	<0.01	0.03%
1,2-DICHLOROETHANE		NR	0.024	6.75E-06	NR	NR	—	NR	—	ND	—	0.003	1.20E-06	7.95E-06	19.169	<0.01	<0.01%
SILVER	X	NR	0.840	2.35E-04	0.970		8.83E-05	1.807	6.14E-05	2.400	1.68E-05	0.003	1.26E-06	4.03E-04	1078.772	<0.01	<0.01%
ACETONE		NR	0.003	9.80E-07	NR	NR	—	NR	—	1.165	8.15E-06	0.009	3.51E-06	1.26E-05	85.614	<0.01	<0.01%

HAZARD INDEX 0.04

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NR = Not reported/analyzed in sample information
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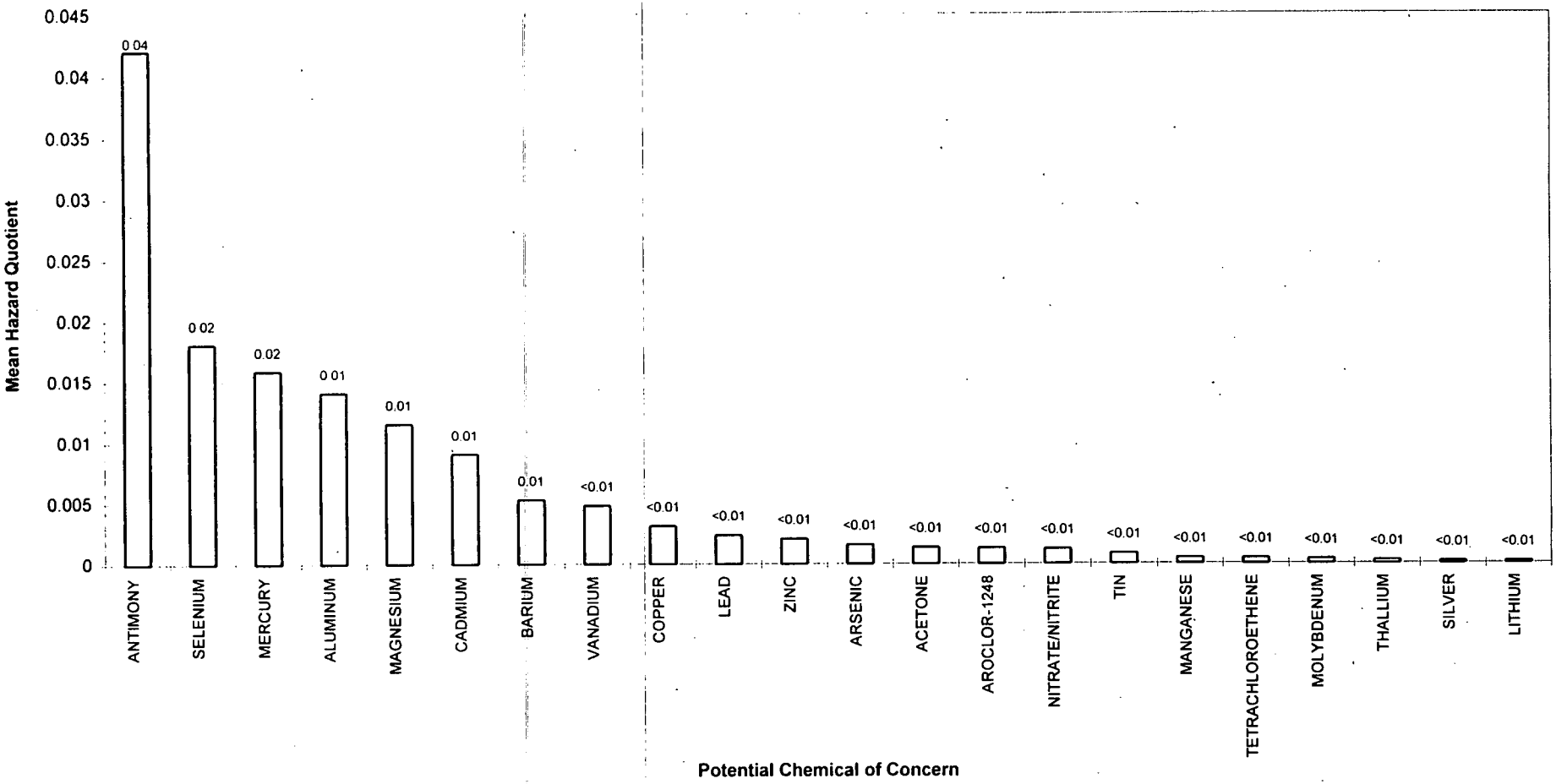
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes

Summary of Sitewide Ecotoxicological Risk to Coyotes at RFETS

Mean Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



Note: Variation in similar values is due to rounding

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Summary of Sitewide Ecotoxicological Risk to Coyotes at RFETS

COYOTE																			
Analyte	OU1 881 Hillside	OU5 Ash Pits	OU5 C Ponds	OU5 Old Landfill	OU2 903 Pad	OU5 Surface Disturbance	OU2 East Trenches	OU4 Downgradient	OU6 A Ponds	OU6 B Ponds	OU2 Mound Area	OU6 North Spray Field	OU6 Burial Trenches	OU7 Downgradient Areas	OU6 Soil Dump Areas	OU11 West Spray Field	Mean Hazard Quotient	Hazard Quotient Range	Percent of Total Risk
ANTIMONY	8.76E-04	4.26E-04	1.34E-03	1.26E-03	2.02E-03	—	—	—	0.19	0.18	—	3.96E-04	—	—	—	8.47E-04	0.04	<0.001 - 0.191	30.43%
SELENIUM	0.03	8.89E-05	0.02	7.88E-04	0.03	—	0.05	8.00E-04	1.23E-03	0.10	—	1.68E-05	1.29E-03	0.02	3.88E-03	1.53E-04	0.02	<0.001 - 0.1	13.09%
MERCURY	1.05E-03	3.80E-03	9.81E-04	1.08E-03	0.01	3.11E-04	—	0.05	3.15E-03	0.03	—	1.27E-04	1.37E-04	0.01	0.10	—	0.02	<0.001 - 0.1	11.48%
ALUMINUM	0.01	0.03	0.01	0.02	0.02	3.72E-04	0.02	0.01	0.02	0.03	9.79E-04	0.01	2.27E-03	2.64E-03	0.02	0.02	0.01	<0.001 - 0.031	10.19%
MAGNESIUM	3.91E-03	0.01	3.67E-03	0.02	0.01	3.54E-05	1.71E-03	0.01	0.04	0.03	1.07E-04	0.02	4.95E-03	0.01	0.02	1.40E-03	0.01	<0.001 - 0.043	8.36%
CADMIUM	0.04	1.57E-03	0.01	1.01E-03	0.03	—	0.03	3.60E-04	6.92E-04	5.43E-04	—	1.98E-03	4.81E-05	0.01	7.40E-04	2.23E-04	0.01	<0.001 - 0.036	6.56%
BARIUM	2.89E-03	0.01	1.85E-03	0.01	0.01	4.88E-05	2.80E-03	3.19E-03	0.01	0.01	1.31E-04	0.01	1.73E-03	3.73E-03	0.01	3.24E-03	0.01	<0.001 - 0.014	3.83%
VANADIUM	3.61E-03	3.33E-03	2.03E-03	1.99E-03	0.01	8.69E-05	3.92E-03	1.20E-03	0.01	0.03	2.44E-04	1.48E-03	2.38E-03	4.69E-03	1.91E-03	4.92E-03	<0.01	<0.001 - 0.029	3.49%
COPPER	0.01	3.22E-03	1.89E-03	3.35E-03	4.43E-03	2.82E-06	0.01	1.54E-03	0.01	0.01	5.20E-06	2.55E-04	8.78E-04	1.85E-03	1.40E-03	1.06E-04	<0.01	<0.001 - 0.012	2.27%
LEAD	2.02E-03	1.09E-03	1.31E-03	1.10E-03	2.84E-03	5.79E-06	0.01	7.09E-05	0.01	0.01	1.31E-05	2.02E-04	4.35E-04	1.92E-03	8.93E-04	7.76E-04	<0.01	<0.001 - 0.011	1.73%
ZINC	2.72E-03	1.23E-03	2.93E-03	1.42E-03	3.47E-03	8.20E-07	0.01	6.00E-04	4.52E-03	3.23E-03	1.90E-06	8.60E-05	7.68E-04	1.29E-03	1.27E-03	3.77E-05	<0.01	<0.001 - 0.01	1.50%
ARSENIC	2.04E-03	2.85E-03	1.09E-03	1.91E-03	2.04E-03	6.24E-05	3.17E-03	9.66E-04	2.05E-03	2.24E-03	1.89E-04	4.21E-04	5.04E-05	1.12E-04	1.28E-03	0.01	<0.01	<0.001 - 0.005	1.16%
ACETONE	0.01	1.38E-05	7.47E-05	7.99E-05	3.04E-03	—	0.01	1.07E-05	9.11E-06	4.39E-05	3.05E-05	—	1.75E-06	—	3.05E-04	1.88E-04	<0.01	<0.001 - 0.009	0.99%
AROCLOR-1248	1.46E-03	—	—	—	1.18E-03	—	—	—	—	—	—	—	—	—	—	—	<0.01	0.001 - 0.001	0.95%
NITRATE/NITRITE	0.01	1.05E-04	2.01E-03	2.69E-03	1.00E-03	—	—	6.01E-06	—	—	—	1.01E-06	—	5.43E-06	3.10E-05	1.64E-04	<0.01	<0.001 - 0.006	0.90%
TIN	1.45E-04	8.53E-05	8.53E-05	5.20E-05	2.03E-04	—	1.63E-04	2.61E-04	4.67E-03	4.04E-03	—	—	2.96E-04	5.91E-04	6.27E-04	2.66E-05	<0.01	<0.001 - 0.005	0.63%
MANGANESE	2.56E-04	6.94E-04	2.01E-04	4.02E-04	1.15E-03	8.14E-06	4.17E-04	3.00E-04	1.50E-03	9.75E-04	1.79E-05	2.95E-04	1.66E-04	2.09E-04	6.69E-04	5.10E-04	<0.01	<0.001 - 0.002	0.35%
TETRACHLOROETHENE	1.55E-05	—	—	4.20E-07	1.90E-05	—	3.60E-03	3.00E-08	—	2.47E-05	5.40E-07	—	—	—	1.80E-07	—	<0.01	<0.001 - 0.004	0.33%
MOLYBDENUM	2.71E-04	1.41E-04	3.19E-04	7.89E-04	1.12E-03	—	—	2.81E-04	3.00E-04	2.69E-04	—	—	1.37E-05	4.56E-05	8.75E-04	1.39E-04	<0.01	<0.001 - 0.001	0.28%
THALLIUM	3.95E-04	1.19E-04	4.66E-04	2.42E-04	1.45E-04	—	—	5.11E-05	—	1.87E-05	1.35E-05	1.16E-03	—	—	5.62E-05	1.50E-04	<0.01	<0.001 - 0.001	0.19%
SILVER	1.30E-05	1.91E-05	7.93E-06	2.55E-05	2.75E-05	—	2.04E-05	—	7.43E-04	6.40E-04	—	—	1.88E-05	3.05E-04	—	—	<0.01	<0.001 - 0.001	0.13%
LITHIUM	1.36E-04	7.61E-05	1.41E-04	8.90E-05	2.89E-04	2.28E-06	1.67E-04	3.72E-04	7.66E-04	1.58E-04	6.16E-06	9.30E-06	4.38E-06	3.82E-05	5.02E-04	1.45E-04	<0.01	<0.001 - 0.001	0.13%
STRONTIUM	6.54E-05	2.54E-04	6.75E-05	2.96E-04	1.50E-04	4.80E-07	1.57E-05	1.24E-04	4.92E-04	5.83E-04	1.66E-06	1.81E-04	5.77E-05	1.35E-04	3.70E-04	1.21E-05	<0.01	<0.001 - 0.001	0.13%
BERYLLIUM	1.69E-04	1.47E-04	7.36E-05	8.65E-05	1.80E-04	2.99E-06	1.06E-04	4.39E-04	5.18E-05	4.02E-05	—	1.37E-05	3.24E-06	5.48E-05	1.05E-03	1.39E-04	<0.01	<0.001 - 0.001	0.12%
METHYLENE CHLORIDE	8.48E-04	1.25E-05	3.12E-05	1.37E-05	4.00E-04	—	6.44E-04	1.31E-06	2.33E-05	—	3.30E-06	—	1.04E-06	—	9.30E-07	3.65E-05	<0.01	<0.001 - 0.001	0.12%
NICKEL	5.51E-05	1.26E-04	2.19E-05	2.58E-04	1.06E-04	8.30E-07	3.44E-05	2.40E-05	1.55E-03	4.51E-05	1.87E-06	3.13E-05	4.31E-06	1.18E-05	9.83E-05	3.10E-05	<0.01	<0.001 - 0.002	0.11%
TOLUENE	1.25E-03	—	4.50E-06	4.60E-07	6.73E-04	—	2.32E-05	1.98E-06	1.80E-07	1.70E-07	1.12E-06	1.80E-07	1.30E-07	2.45E-06	2.55E-06	2.10E-06	<0.01	<0.001 - 0.001	0.10%
AROCLOR-1254	1.50E-04	—	—	1.19E-04	3.17E-04	—	8.52E-06	—	—	5.28E-06	3.31E-05	—	—	—	1.17E-04	—	<0.01	<0.001 - <0.001	0.08%
COBALT	1.52E-04	1.17E-04	1.30E-04	7.58E-05	2.30E-04	3.77E-06	1.70E-04	3.27E-05	8.41E-05	1.15E-04	8.21E-06	2.58E-05	—	—	6.65E-05	1.82E-04	<0.01	<0.001 - <0.001	0.07%
4-METHYL-2-PENTANONE	4.47E-04	—	—	1.40E-07	2.78E-04	—	4.51E-06	—	—	—	3.40E-07	—	1.00E-08	1.70E-07	3.80E-07	—	<0.01	<0.001 - <0.001	0.07%
BENZO(a)PYRENE	5.08E-05	—	—	2.48E-04	6.36E-05	—	3.51E-05	8.89E-06	—	—	1.41E-06	—	—	—	5.97E-05	—	<0.01	<0.001 - <0.001	0.05%
CHLOROFORM	1.31E-04	—	8.32E-06	3.98E-06	1.21E-04	—	5.17E-05	—	—	5.53E-06	4.20E-07	—	1.00E-08	—	—	7.00E-06	<0.01	<0.001 - <0.001	0.03%
delta-BHC	—	—	—	—	—	—	—	—	3.18E-05	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.02%
DIBENZO(a,h)ANTHRACENE	1.36E-05	—	—	6.88E-05	1.70E-05	—	—	2.07E-06	—	—	—	—	—	—	1.54E-05	—	<0.01	<0.001 - <0.001	0.02%
TOTAL XYLENES	3.54E-05	—	—	7.20E-07	2.19E-05	—	8.14E-05	—	—	—	—	—	—	4.00E-08	3.20E-07	—	<0.01	<0.001 - <0.001	0.02%
BIS(2-ETHYLHEXYL)PHTHALAT	1.45E-04	1.90E-06	1.19E-05	7.35E-06	2.05E-05	—	2.82E-06	2.37E-06	—	—	6.35E-06	—	—	6.00E-08	1.63E-05	8.65E-06	<0.01	<0.001 - <0.001	0.01%
DIELDRIN	—	—	—	1.82E-05	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.01%
ENDRIN KETONE	—	—	—	1.58E-05	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.01%
PENTACHLOROPHENOL	2.12E-06	—	—	4.00E-05	—	—	—	—	—	—	—	—	—	—	2.87E-06	—	<0.01	<0.001 - <0.001	0.01%
BENZO(k)FLUORANTHENE	4.55E-06	—	—	1.53E-05	5.75E-06	—	—	5.80E-07	—	—	—	—	—	—	2.61E-05	—	<0.01	<0.001 - <0.001	0.01%
BENZO(b)FLUORANTHENE	4.82E-06	—	—	2.90E-05	6.36E-06	—	4.41E-06	8.10E-07	—	—	1.80E-07	—	—	—	1.02E-05	—	<0.01	<0.001 - <0.001	0.01%
1,2-DICHLOROETHENE	3.22E-06	—	—	—	9.81E-06	—	6.45E-06	—	—	5.30E-06	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
BENZO(a)ANTHRACENE	5.44E-06	—	—	2.70E-05	6.53E-06	—	2.01E-06	7.10E-07	—	—	1.30E-07	—	—	1.00E-08	6.32E-06	—	<0.01	<0.001 - <0.001	<0.01%
INDENO(1,2,3-cd)PYRENE	3.01E-06	—	—	2.29E-05	3.48E-06	—	3.00E-08	6.70E-07	—	—	7.00E-08	—	—	—	3.96E-06	—	<0.01	<0.001 - <0.001	<0.01%
1,1-DICHLOROETHENE	1.15E-05	—	—	—	5.00E-07	—	2.17E-06	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
PYRENE	2.30E-05	—	9.00E-08	9.72E-06	5.85E-06	—	9.40E-07	1.20E-07	—	—	4.00E-08	—	—	1.00E-08	2.20E-06	—	<0.01	<0.001 - <0.001	<0.01%
BENZYL ALCOHOL	1.30E-06	—	—	—	6.31E-06	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
TRICHLOROETHENE	2.24E-06	—	—	1.11E-06	9.06E-06	—	1.53E-05	—	—	1.86E-06	5.00E-08	—	1.00E-08	—	—	3.50E-07	<0.01	<0.001 - <0.001	<0.01%
2-BUTANONE	2.24E-05	—	1.60E-07	1.00E-07	6.20E-07	—	6.00E-07	—	—	—	3.00E-08	—	2.00E-08	—	1.13E-06	3.80E-07	<0.01	<0.001 - <0.001	<0.01%
CHROMIUM	1.55E-06	5.40E-07	2.63E-06	4.80E-07	7.50E-06	1.00E-08	2.12E-06	1.50E-07	1.43E-05	1.01E-05	2.00E-08	6.00E-08	1.23E-06	3.08E-06	3.00E-07	6.60E-07	<0.01	<0.001 - <0.001	<0.01%
FLUORANTHENE	1.15E-05	—	5.00E-08	6.70E-06	3.16E-06	—	5.70E-07	7.00E-08	—	—	5.00E-08	—	—	2.40E-09	1.36E-06	—	<0.01	<0.001 - <0.001	<0.01%
1,2-DICHLOROETHANE	4.00E-06	2.03E-06	—	—	—	—	—	—	—	1.77E-06	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
PHENOL	—	—	—	2.57E-06	—	—	—	—	—	—	—	—	—	—	1.35E-06	—	<0.01	<0.001 - <0.001	<0.01%
ENDOSULFAN SULFATE	—	—	—	1.05E-06	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
HEPTACHLOR EPOXIDE	—	—	—	1.04E-06	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
ALDRIN	1.64E-06	—	—	9.90E-07	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%

Summary of Sitewide Ecotoxicological Risk to Coyotes at RFETS

COYOTE																			
Analyte	OU1 881 Hillside	OU5 Ash Pits	OU5 C Ponds	OU5 Old Landfill	OU2 903 Pad	OU5 Surface Disturbance	OU2 East Trenches	OU4 Downgradient	OU6 A Ponds	OU6 B Ponds	OU2 Mound Area	OU6 North Spray Field	OU6 Burial Trenches	OU7 Downgradient Areas	OU6 Soil Dump Areas	OU11 West Spray Field	Mean Hazard Quotient	Hazard Quotient Range	Percent of Total Risk
FLUORENE	4.00E-07	—	—	2.67E-06	2.80E-07	—	2.80E-07	—	—	—	—	—	—	—	2.20E-07	—	<0.01	<0.001 - <0.001	<0.01%
1,1-DICHLOROETHANE	7.00E-07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
PHENANTHRENE	3.39E-06	—	—	1.13E-06	7.70E-07	—	6.00E-08	3.26E-09	—	—	1.26E-09	—	—	6.67E-10	1.30E-07	—	<0.01	<0.001 - <0.001	<0.01%
CHRYSENE	6.30E-07	—	—	2.92E-06	6.90E-07	—	3.50E-07	1.00E-07	—	—	1.00E-08	—	—	7.41E-10	7.00E-07	—	<0.01	<0.001 - <0.001	<0.01%
METHOXYCHLOR	—	—	—	6.00E-07	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
BENZENE	—	—	—	—	—	—	1.63E-06	—	—	—	1.80E-07	—	2.80E-09	—	1.50E-07	—	<0.01	<0.001 - <0.001	<0.01%
4,4'-DDT	—	—	—	4.10E-07	—	—	8.00E-08	—	8.60E-07	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
AROCLOR-1260	—	—	—	2.00E-08	—	—	—	—	—	—	6.30E-07	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
BENZO(ghi)PERYLENE	3.00E-07	—	—	8.30E-07	3.50E-07	—	1.00E-08	8.00E-08	—	—	1.00E-08	—	—	—	3.50E-07	—	<0.01	<0.001 - <0.001	<0.01%
NAPHTHALENE	5.00E-08	—	—	8.00E-07	—	—	1.20E-07	—	—	—	—	—	—	—	1.00E-08	—	<0.01	<0.001 - <0.001	<0.01%
1,1,1-TRICHLOROETHANE	1.80E-07	—	—	1.19E-09	1.00E-08	—	1.03E-06	—	—	—	—	—	—	2.11E-10	—	—	<0.01	<0.001 - <0.001	<0.01%
BUTYL BENZYL PHTHALATE	—	—	—	3.80E-07	4.10E-07	—	—	1.00E-07	—	—	—	—	—	2.00E-08	1.10E-07	—	<0.01	<0.001 - <0.001	<0.01%
DI-n-BUTYL PHTHALATE	7.00E-08	—	—	5.00E-08	3.50E-07	—	4.00E-08	1.00E-08	5.60E-07	1.70E-07	2.00E-08	—	—	—	1.00E-07	4.90E-07	<0.01	<0.001 - <0.001	<0.01%
ISOPHORONE	—	—	—	1.40E-07	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
2-METHYLNAPHTHALENE	—	—	—	1.50E-07	—	—	8.00E-08	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
ANTHRACENE	5.00E-08	—	—	3.60E-07	5.00E-08	—	2.00E-08	—	—	—	—	—	—	—	5.00E-08	—	<0.01	<0.001 - <0.001	<0.01%
ACENAPHTHENE	6.00E-08	—	—	3.50E-07	4.00E-08	—	4.00E-08	—	—	—	—	—	—	—	3.00E-08	—	<0.01	<0.001 - <0.001	<0.01%
DI-n-OCTYL PHTHALATE	1.00E-08	—	—	1.00E-08	—	—	—	1.00E-08	—	—	—	—	—	—	8.00E-08	—	<0.01	<0.001 - <0.001	<0.01%

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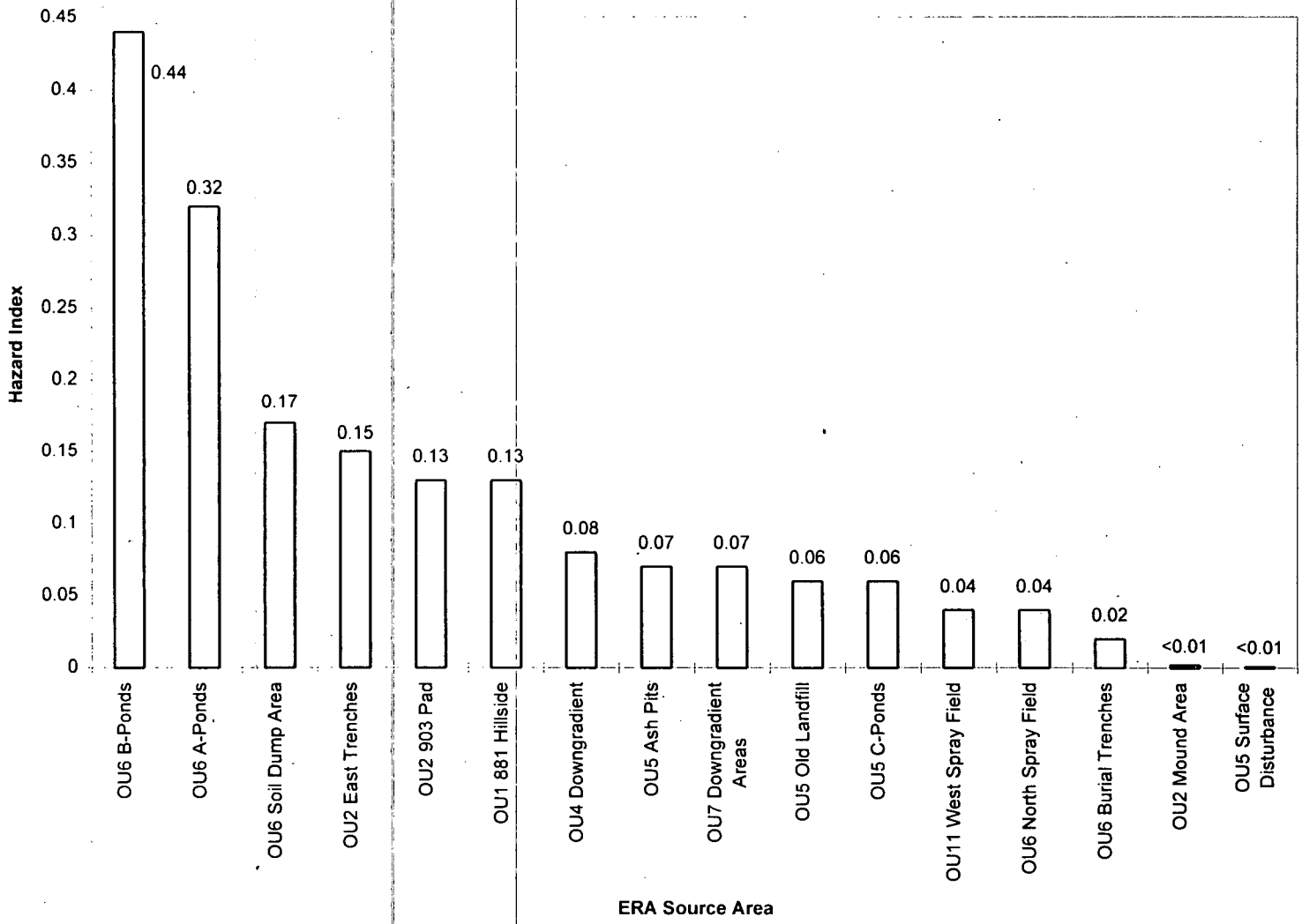
Summary of Ecotoxicological Risk to Coyotes at RFETS



Summary of Ecotoxicological Risk to Coyotes in the OU6 B-Ponds Source Area at RFETS

COYOTES OU6 B-PONDS		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.042 SUF = 0.006		IR = 0.005 SUF = 0.006			IR = 0.001 SUF = 0.006		IR = 0.077 SUF = 0.164					
ANTIMONY	X	121.202	0.031	ND		—	ND	—	0.009	1.07E-04	0.031	0.170	0.18	40.80%
SELENIUM		53.918	0.014	2.818		8.45E-05	ND	—	0.002	2.55E-05	0.014	0.137	0.10	22.62%
MAGNESIUM	X	5898.794	1.486	1669.753		0.050	3790.000	0.023	15.504	0.196	1.755	51.154	0.03	7.74%
MERCURY	X	0.235	5.92E-05	0.086		2.58E-06	ND	—	2.75E-04	3.47E-06	6.52E-05	0.002	0.03	6.94%
ALUMINUM		2019.911	0.509	172.535		0.005	18700.000	0.112	0.264	0.003	0.630	20.639	0.03	6.88%
VANADIUM	X	28.178	0.007	1.200		3.60E-05	38.900	2.33E-04	0.003	3.60E-05	0.007	0.255	0.03	6.54%
BARIUM	X	55.126	0.014	53.768		0.002	194.000	0.001	0.051	0.001	0.017	1.654	0.01	2.36%
LEAD	X	78.532	0.020	1.274		3.82E-05	37.200	2.23E-04	0.005	6.47E-05	0.020	2.435	0.01	1.86%
COPPER	X	112.560	0.028	29.452		0.001	17.000	1.02E-04	ND	—	0.029	5.041	0.01	1.31%
TIN		117.725	0.030	25.800		0.001	ND	—	0.006	8.01E-05	0.031	7.551	<0.01	0.91%
ZINC	X	606.869	0.153	116.031		0.003	64.100	3.85E-04	0.026	3.29E-04	0.157	48.696	<0.01	0.73%
ARSENIC	X	ND	—	2.700		8.10E-05	5.100	3.06E-05	0.002	2.84E-05	1.40E-04	0.063	<0.01	0.51%
MANGANESE	X	84.595	0.021	53.948		0.002	321.000	0.002	0.098	0.001	0.026	26.783	<0.01	0.22%
SILVER	X	16.472	0.004	4.700		1.41E-04	ND	—	ND	—	0.004	6.711	<0.01	0.14%
STRONTIUM	X	163.891	0.041	66.453		0.002	25.500	1.53E-04	0.255	0.003	0.047	80.043	<0.01	0.13%
CADMIUM		ND	—	2.034		6.10E-05	ND	—	0.001	1.25E-05	7.35E-05	0.135	<0.01	0.12%
MOLYBDENUM	X	ND	—	3.800		1.14E-04	ND	—	0.007	9.29E-05	2.07E-04	0.768	<0.01	0.06%
LITHIUM		ND	—	6.600		1.98E-04	5.900	3.54E-05	0.017	2.19E-04	4.52E-04	2.856	<0.01	0.04%
COBALT	X	ND	—	3.300		9.90E-05	9.000	5.40E-05	0.002	2.00E-05	1.73E-04	1.510	<0.01	0.03%
NICKEL	X	ND	—	13.890		4.17E-04	14.600	8.76E-05	0.004	4.49E-05	0.001	12.174	<0.01	0.01%
ACETONE	X	NR	—	NR	ND	—	NR	—	0.011	1.33E-04	1.33E-04	3.043	<0.01	0.01%
BERYLLIUM		ND	—	ND		—	0.970	5.82E-06	1.79E-04	2.26E-06	8.08E-06	0.201	<0.01	0.01%
TETRACHLOROETHENE	X	NR	—	NR	ND	—	NR	—	0.004	4.62E-05	4.62E-05	1.866	<0.01	0.01%
THALLIUM		ND	—	ND		—	0.230	1.38E-06	ND	—	1.38E-06	0.074	<0.01	<0.01%
CHROMIUM	X	32.115	0.008	5.293		1.59E-04	19.900	1.19E-04	0.002	2.79E-05	0.008	832.996	<0.01	<0.01%
CHLOROFORM	X	NR	—	NR	ND	—	NR	—	0.002	2.53E-05	2.53E-05	4.565	<0.01	<0.01%
1,2-DICHLOROETHENE	X	NR	—	NR	ND	—	NR	—	0.003	3.19E-05	3.19E-05	6.024	<0.01	<0.01%
AROCLOR-1254	X	NR	—	0.010		3.10E-07	ND	—	NR	—	3.10E-07	0.059	<0.01	<0.01%
TRICHLOROETHENE	X	NR	—	NR	ND	—	NR	—	0.003	3.63E-05	3.63E-05	19.579	<0.01	<0.01%
1,2-DICHLOROETHANE	X	NR	—	NR	ND	—	NR	—	0.001	1.26E-05	1.26E-05	7.118	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	NR	—	ND	—	0.001	1.26E-05	1.26E-05	74.412	<0.01	<0.01%
TOLUENE	X	NR	—	NR	0.020	6.10E-07	NR	—	ND	—	6.10E-07	3.515	<0.01	<0.01%

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Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor

I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU6 A-Ponds Source Area at RFETS

COYOTES OU6 A-PONDS		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.042 SUF = 0.008		IR = 0.005 SUF = 0.008			IR = 0.001 SUF = 0.008		IR = 0.077 SUF = 0.269					
ANTIMONY	X	95.780	0.032	ND		—	ND	—	0.009	1.83E-04	0.032	0.170	0.19	59.96%
MAGNESIUM	X	5030.433	1.690	2252.596		0.090	1880.000	0.015	18.851	0.390	2.186	51.154	0.04	13.42%
ALUMINUM		925.173	0.311	238.686		0.010	7830.000	0.063	0.405	0.008	0.391	20.639	0.02	5.96%
BARIUM	X	57.799	0.019	40.567		0.002	100.000	0.001	0.062	0.001	0.023	1.654	0.01	4.39%
VANADIUM	X	7.100	0.002	1.700		6.80E-05	51.100	4.09E-04	0.002	4.75E-05	0.003	0.255	0.01	3.58%
LEAD	X	80.277	0.027	1.107		4.43E-05	33.000	2.64E-04	0.003	6.87E-05	0.027	2.435	0.01	3.53%
COPPER	X	106.489	0.036	24.122		0.001	5.000	4.00E-05	0.002	4.35E-05	0.037	5.041	0.01	2.29%
TIN		102.000	0.034	5.798		2.32E-04	93.300	0.001	ND	—	0.035	7.551	<0.01	1.47%
ZINC	X	646.549	0.217	57.285		0.002	65.800	0.001	0.008	1.70E-04	0.220	48.696	<0.01	1.42%
MERCURY	X	ND	—	0.090		3.60E-06	ND	—	1.49E-04	3.09E-06	6.69E-06	0.002	<0.01	0.99%
ARSENIC	X	ND	—	0.920		3.68E-05	2.200	1.76E-05	0.004	7.36E-05	1.28E-04	0.063	<0.01	0.64%
NICKEL	X	54.095	0.018	14.200		0.001	13.100	1.05E-04	0.003	5.75E-05	0.019	12.174	<0.01	0.49%
MANGANESE	X	77.287	0.026	42.435		0.002	1110.000	0.009	0.179	0.004	0.040	26.783	<0.01	0.47%
SELENIUM		ND	—	2.516		1.01E-04	ND	—	0.003	6.80E-05	1.69E-04	0.137	<0.01	0.39%
LITHIUM		ND	—	37.901		0.002	4.800	3.84E-05	0.031	0.001	0.002	2.856	<0.01	0.24%
SILVER	X	14.724	0.005	ND		—	ND	—	0.002	3.86E-05	0.005	6.711	<0.01	0.23%
CADMIUM		ND	—	1.400		5.60E-05	2.200	1.76E-05	0.001	1.99E-05	9.35E-05	0.135	<0.01	0.22%
STRONTIUM	X	85.892	0.029	112.501		0.005	37.100	2.97E-04	0.278	0.006	0.039	80.043	<0.01	0.15%
MOLYBDENUM	X	ND	—	3.100		1.24E-04	5.300	4.24E-05	0.003	6.37E-05	2.30E-04	0.768	<0.01	0.09%
COBALT	X	ND	—	1.000		4.00E-05	7.100	5.68E-05	0.001	3.02E-05	1.27E-04	1.510	<0.01	0.03%
BERYLLIUM		ND	—	ND		—	1.300	1.04E-05	ND	—	1.04E-05	0.201	<0.01	0.02%
delta-BHC		NR	—	NR	NR	—	0.023	1.80E-07	NR	—	1.80E-07	0.006	<0.01	0.01%
METHYLENE CHLORIDE	X	NR	—	NR	ND	—	NR	—	0.002	4.14E-05	4.14E-05	1.780	<0.01	0.01%
CHROMIUM	X	35.026	0.012	ND		—	9.000	7.20E-05	0.002	3.38E-05	0.012	832.996	<0.01	<0.01%
ACETONE	X	NR	—	NR	0.693	2.77E-05	NR	—	ND	—	2.77E-05	3.043	<0.01	<0.01%
4,4'-DDT		NR	—	NR	NR	—	0.026	2.10E-07	NR	—	2.10E-07	0.243	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	NR	—	ND	—	0.002	4.14E-05	4.14E-05	74.412	<0.01	<0.01%
TOLUENE	X	NR	—	NR	0.016	6.40E-07	NR	—	ND	—	6.40E-07	3.515	<0.01	<0.01%

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Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor

I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU6 Soil Dump Areas Source Area at RFETS

COYOTES OU6 SOIL DUMP AREAS		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.042 SUF = 0.016		IR = 0.005 SUF = 0.016			IR = 0.001 SUF = 0.016		IR = I SUF = I					
MERCURY	X	0.302	2.03E-04	0.090		7.20E-06	0.139	2.22E-06	NR	—	2.12E-04	0.002	0.10	60.21%
ALUMINUM		451.741	0.304	141.997		0.011	9659.033	0.155	NR	—	0.469	20.639	0.02	13.69%
MAGNESIUM	X	1291.996	0.868	1537.931		0.123	2354.730	0.038	NR	—	1.029	51.154	0.02	12.10%
BARIUM	X	11.861	0.008	21.085		0.002	117.141	0.002	NR	—	0.012	1.654	0.01	4.19%
SELENIUM		ND	—	6.623		0.001	ND	—	NR	—	0.001	0.137	<0.01	2.33%
VANADIUM	X	ND	—	0.710		5.68E-05	26.996	4.32E-04	NR	—	4.89E-04	0.255	<0.01	1.15%
COPPER	X	9.200	0.006	8.057		0.001	15.408	2.47E-04	NR	—	0.007	5.041	<0.01	0.84%
ARSENIC	X	ND	—	ND		—	4.989	7.98E-05	NR	—	7.98E-05	0.063	<0.01	0.77%
ZINC	X	85.709	0.058	32.108		0.003	94.049	0.002	NR	—	0.062	48.696	<0.01	0.76%
BERYLLIUM		0.300	2.02E-04	ND		—	0.621	9.93E-06	NR	—	2.12E-04	0.201	<0.01	0.63%
LEAD	X	2.505	0.002	1.224		9.79E-05	24.511	3.92E-04	NR	—	0.002	2.435	<0.01	0.54%
MOLYBDENUM	X	ND	—	8.400		0.001	ND	—	NR	—	0.001	0.768	<0.01	0.53%
CADMIUM		ND	—	0.640		5.12E-05	3.054	4.89E-05	NR	—	1.00E-04	0.135	<0.01	0.45%
MANGANESE	X	15.079	0.010	48.491		0.004	244.118	0.004	NR	—	0.018	26.783	<0.01	0.40%
TIN		6.000	0.004	4.400		3.52E-04	22.063	3.53E-04	NR	—	0.005	7.551	<0.01	0.38%
LITHIUM		ND	—	16.100		0.001	9.142	1.46E-04	NR	—	0.001	2.856	<0.01	0.30%
STRONTIUM	X	33.631	0.023	80.644		0.006	37.401	0.001	NR	—	0.030	80.043	<0.01	0.22%
ACETONE	X	NR	—	NR	11.617	0.001	NR	—	NR	—	0.001	3.043	<0.01	0.18%
AROCLOR-1254	X	NR	—	NR	ND	—	0.429	6.86E-06	NR	—	6.86E-06	0.059	<0.01	0.07%
NICKEL	X	ND	—	12.700		0.001	11.325	1.81E-04	NR	—	0.001	12.174	<0.01	0.06%
COBALT	X	ND	—	ND		—	6.279	1.00E-04	NR	—	1.00E-04	1.510	<0.01	0.04%
BENZO(a)PYRENE	X	NR	—	NR	0.002	1.40E-07	0.495	7.92E-06	NR	—	8.06E-06	0.135	<0.01	0.04%
THALLIUM		ND	—	ND		—	0.260	4.16E-06	NR	—	4.16E-06	0.074	<0.01	0.03%
NITRATE/NITRITE		NR	—	NR		—	7.689	1.23E-04	NR	—	1.23E-04	3.969	<0.01	0.02%
BENZO(k)FLUORANTHENE	X	NR	—	NR	2.55E-04	2.00E-08	2.200	3.52E-05	NR	—	3.52E-05	1.350	<0.01	0.02%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.050	4.03E-06	2.270	3.63E-05	NR	—	4.04E-05	2.480	<0.01	0.01%
DIBENZO(a,h)ANTHRACENE	X	NR	—	NR	ND	—	0.130	2.08E-06	NR	—	2.08E-06	0.135	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	0.001	8.00E-08	0.855	1.37E-05	NR	—	1.38E-05	1.350	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.001	1.20E-07	0.526	8.42E-06	NR	—	8.54E-06	1.350	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	1.36E-04	1.00E-08	0.334	5.34E-06	NR	—	5.35E-06	1.350	<0.01	<0.01%
PENTACHLOROPHENOL		NR	—	NR	0.032	2.60E-06	ND	—	NR	—	2.60E-06	0.906	<0.01	<0.01%
TOLUENE	X	NR	—	NR	0.112	8.98E-06	NR	—	NR	—	8.98E-06	3.515	<0.01	<0.01%
PYRENE	X	NR	—	NR	0.008	6.60E-07	1.337	2.14E-05	NR	—	2.20E-05	9.996	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	0.007	5.90E-07	1.376	2.20E-05	NR	—	2.26E-05	16.659	<0.01	<0.01%
PHENOL	X	NR	—	NR	0.305	2.44E-05	ND	—	NR	—	2.44E-05	18.121	<0.01	<0.01%
2-BUTANONE	X	NR	—	NR	7.542	0.001	NR	—	NR	—	0.001	534.882	<0.01	<0.01%
METHYLENE CHLORIDE	X	NR	—	NR	0.021	1.65E-06	NR	—	NR	—	1.65E-06	1.780	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	0.003	2.10E-07	0.577	9.24E-06	NR	—	9.45E-06	13.503	<0.01	<0.01%
4-METHYL-2-PENTANONE	X	NR	—	NR	0.036	2.90E-06	NR	—	NR	—	2.90E-06	7.609	<0.01	<0.01%

Summary of Ecotoxicological Risk to Coyotes in the OU6 Soil Dump Areas Source Area at RFETS

COYOTES OU6 SOIL DUMP AREAS		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.042 SUF = 0.016		IR = 0.005 SUF = 0.016			IR = 0.001 SUF = 0.016		IR = I SUF = I					
BENZO(ghi)PERYLENE	X	NR	—	NR	ND	—	0.292	4.67E-06	NR	—	4.67E-06	13.503	<0.01	<0.01%
TOTAL XYLENES		NR	—	NR	0.001	9.00E-08	NR	—	NR	—	9.00E-08	0.279	<0.01	<0.01%
CHROMIUM	X	ND	—	ND		—	15.651	2.50E-04	NR	—	2.50E-04	832.996	<0.01	<0.01%
FLUORENE	X	NR	—	NR	ND	—	0.232	3.70E-06	NR	—	3.70E-06	16.659	<0.01	<0.01%
TETRACHLOROETHENE	X	NR	—	NR	0.004	3.30E-07	NR	—	NR	—	3.30E-07	1.866	<0.01	<0.01%
BENZENE	X	NR	—	NR	0.007	5.50E-07	NR	—	NR	—	5.50E-07	3.567	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	0.016	1.29E-06	1.056	1.69E-05	NR	—	1.82E-05	135.026	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	—	NR	ND	—	0.072	1.15E-06	NR	—	1.15E-06	10.686	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	ND	—	0.473	7.56E-06	NR	—	7.56E-06	74.412	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	—	NR	6.60E-05	1.00E-08	0.658	1.05E-05	NR	—	1.05E-05	139.384	<0.01	<0.01%
ANTHRACENE	X	NR	—	NR	ND	—	0.382	6.11E-06	NR	—	6.11E-06	133.274	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	NR	0.009	7.10E-07	0.244	3.90E-06	NR	—	4.61E-06	135.026	<0.01	<0.01%
NAPHTHALENE	X	NR	—	NR	ND	—	0.110	1.76E-06	NR	—	1.76E-06	135.026	<0.01	<0.01%

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Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU2 East Trenches Source Area at RFETS

COYOTES OU2 EAST TRENCHES		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = 0.042 SUF = 0.036		IR = 0.005 SUF = 0.036			IR = 0.001 SUF = 0.036		IR = I SUF = I					
SELENIUM		4.609	0.007	ND		—	0.510	1.84E-05	NR	—	0.007	0.137	0.05	34.55%
CADMIUM		2.548	0.004	2.217		3.99E-04	1.400	5.04E-05	NR	—	0.004	0.135	0.03	21.50%
ALUMINUM		NR	—	NR		—	12216.913	0.440	NR	—	0.440	20.639	0.02	14.39%
ZINC		308.380	0.466	33.840		0.006	54.004	0.002	NR	—	0.474	48.696	0.01	6.58%
LEAD	X	8.589	0.013	1.509		2.72E-04	45.985	0.002	NR	—	0.015	2.435	0.01	4.14%
COPPER		17.166	0.026	10.430		0.002	13.080	4.71E-04	NR	—	0.028	5.041	0.01	3.79%
ACETONE		NR	—	NR	86.139	0.016	NR	—	NR	—	0.016	3.043	0.01	3.44%
VANADIUM		NR	—	NR		—	27.790	0.001	NR	—	0.001	0.255	<0.01	2.65%
TETRACHLOROETHENE		NR	—	NR	37.359	0.007	NR	—	NR	—	0.007	1.866	<0.01	2.43%
ARSENIC		NR	—	NR		—	5.496	1.98E-04	NR	—	1.98E-04	0.063	<0.01	2.14%
BARIUM		NR	—	NR		—	128.840	0.005	NR	—	0.005	1.654	<0.01	1.89%
MAGNESIUM		NR	—	NR		—	2431.742	0.088	NR	—	0.088	51.154	<0.01	1.16%
METHYLENE CHLORIDE		NR	—	NR	6.373	0.001	NR	—	NR	—	0.001	1.780	<0.01	0.44%
MANGANESE		NR	—	NR		—	310.494	0.011	NR	—	0.011	26.783	<0.01	0.28%
COBALT		NR	—	NR		—	7.136	2.57E-04	NR	—	2.57E-04	1.510	<0.01	0.11%
LITHIUM		NR	—	NR		—	13.267	4.78E-04	NR	—	4.78E-04	2.856	<0.01	0.11%
TIN		NR	—	NR		—	34.188	0.001	NR	—	0.001	7.551	<0.01	0.11%
BERYLLIUM		NR	—	NR		—	0.590	2.12E-05	NR	—	2.12E-05	0.201	<0.01	0.07%
TOTAL XYLENES		NR	—	NR	0.126	2.27E-05	NR	—	NR	—	2.27E-05	0.279	<0.01	0.05%
CHLOROFORM		NR	—	NR	1.310	2.36E-04	NR	—	NR	—	2.36E-04	4.565	<0.01	0.03%
BENZO(a)PYRENE	X	NR	—	NR	0.002	4.20E-07	0.120	4.32E-06	NR	—	4.74E-06	0.135	<0.01	0.02%
NICKEL		NR	—	NR		—	11.629	4.19E-04	NR	—	4.19E-04	12.174	<0.01	0.02%
TOLUENE		NR	—	NR	0.453	8.15E-05	NR	—	NR	—	8.15E-05	3.515	<0.01	0.02%
SILVER		ND	—	0.520		9.36E-05	1.200	4.32E-05	NR	—	1.37E-04	6.711	<0.01	0.01%
STRONTIUM		NR	—	NR		—	34.852	0.001	NR	—	0.001	80.043	<0.01	0.01%
TRICHLOROETHENE		NR	—	NR	1.663	2.99E-04	NR	—	NR	—	2.99E-04	19.579	<0.01	0.01%
AROCLOR-1254	X	NR	—	NR	0.003	5.00E-07	ND	—	NR	—	5.00E-07	0.059	<0.01	0.01%
1,2-DICHLOROETHENE		NR	—	NR	0.216	3.89E-05	NR	—	NR	—	3.89E-05	6.024	<0.01	<0.01%
4-METHYL-2-PENTANONE		NR	—	NR	0.191	3.43E-05	NR	—	NR	—	3.43E-05	7.609	<0.01	<0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	0.001	2.00E-07	0.160	5.76E-06	NR	—	5.96E-06	1.350	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.024	4.26E-06	0.076	2.74E-06	NR	—	7.00E-06	2.480	<0.01	<0.01%
1,1-DICHLOROETHENE		NR	—	NR	0.030	5.42E-06	NR	—	NR	—	5.42E-06	2.497	<0.01	<0.01%
CHROMIUM	X	ND	—	7.227		0.001	12.981	4.67E-04	NR	—	0.002	832.996	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.003	4.80E-07	0.062	2.23E-06	NR	—	2.71E-06	1.350	<0.01	<0.01%
BENZENE		NR	—	NR	0.032	5.81E-06	NR	—	NR	—	5.81E-06	3.567	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	—	NR	0.813	1.46E-04	NR	—	NR	—	1.46E-04	142.350	<0.01	<0.01%
PYRENE	X	NR	—	NR	0.009	1.58E-06	0.218	7.86E-06	NR	—	9.44E-06	9.996	<0.01	<0.01%
2-BUTANONE		NR	—	NR	1.787	3.22E-04	NR	—	NR	—	3.22E-04	534.882	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	0.007	1.25E-06	0.229	8.24E-06	NR	—	9.49E-06	16.659	<0.01	<0.01%

Summary of Ecotoxicological Risk to Coyotes in the OU2 East Trenches Source Area at RFETS

COYOTES OU2 EAST TRENCHES		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = 0.042 SUF = 0.036		IR = 0.005 SUF = 0.036			IR = 0.001 SUF = 0.036		IR = I SUF = I					
CHRYSENE	X	NR	—	NR	0.004	7.00E-07	0.110	3.96E-06	NR	—	4.66E-06	13.503	<0.01	<0.01%
FLUORENE		NR	—	NR	0.026	4.59E-06	ND	—	NR	—	4.59E-06	16.659	<0.01	<0.01%
NAPHTHALENE		NR	—	NR	0.093	1.68E-05	ND	—	NR	—	1.68E-05	135.026	<0.01	<0.01%
2-METHYLNAPHTHALENE		NR	—	NR	0.060	1.09E-05	ND	—	NR	—	1.09E-05	135.026	<0.01	<0.01%
4,4'-DDT	X	NR	—	NR	1.15E-04	2.00E-08	ND	—	NR	—	2.00E-08	0.243	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	0.024	4.25E-06	0.091	3.28E-06	NR	—	7.53E-06	135.026	<0.01	<0.01%
ACENAPHTHENE		NR	—	NR	0.027	4.94E-06	ND	—	NR	—	4.94E-06	135.026	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	0.017	3.02E-06	ND	—	NR	—	3.02E-06	74.412	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	2.38E-04	4.00E-08	ND	—	NR	—	4.00E-08	1.350	<0.01	<0.01%
ANTHRACENE		NR	—	NR	0.018	3.22E-06	ND	—	NR	—	3.22E-06	133.274	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	0.001	1.00E-07	ND	—	NR	—	1.00E-07	13.503	<0.01	<0.01%

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Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU2 903 Pad Source Area at RFETS

COYOTES OU2 903 PAD		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = 0.042 SUF = 0.025		IR = 0.005 SUF = 0.025			IR = 0.001 SUF = 0.025		IR = 0.077 SUF = 0.064					
CADMIUM		3.448	0.004	2.100		2.63E-04	0.920	2.30E-05	0.002	1.13E-05	0.004	0.135	0.03	22.90%
SELENIUM		3.059	0.003	2.288		2.86E-04	0.620	1.55E-05	0.008	4.01E-05	0.004	0.137	0.03	20.56%
ALUMINUM		NR	—	297.170		0.037	11886.180	0.297	5.480	0.027	0.361	20.639	0.02	13.84%
MAGNESIUM		NR	—	1426.036		0.178	3426.354	0.086	39.934	0.197	0.461	51.154	0.01	7.12%
BARIUM		NR	—	59.791		0.007	143.681	0.004	0.261	0.001	0.012	1.654	0.01	5.90%
MERCURY		ND	—	0.098		1.22E-05	0.060	1.50E-06	1.14E-04	5.60E-07	1.43E-05	0.002	0.01	5.33%
VANADIUM		NR	—	2.400		3.00E-04	35.681	0.001	0.026	1.30E-04	0.001	0.255	0.01	4.09%
COPPER		19.385	0.020	10.420		0.001	21.815	0.001	0.024	1.19E-04	0.022	5.041	<0.01	3.50%
ZINC		154.647	0.162	29.152		0.004	72.699	0.002	0.227	0.001	0.169	48.696	<0.01	2.74%
ACETONE		NR	—	NR	73.447	0.009	NR	—	0.013	6.47E-05	0.009	3.043	<0.01	2.40%
LEAD	X	5.567	0.006	1.789		2.24E-04	32.367	0.001	0.007	3.28E-05	0.007	2.435	<0.01	2.24%
ARSENIC		NR	—	ND		—	3.998	1.00E-04	0.006	2.73E-05	1.27E-04	0.063	<0.01	1.61%
ANTIMONY		NR	—	ND		—	9.800	2.45E-04	0.020	9.74E-05	3.42E-04	0.170	<0.01	1.60%
AROCLOR-1248		NR	—	NR	0.027	3.39E-06	0.211	5.28E-06	ND	—	8.67E-06	0.007	<0.01	0.94%
MANGANESE		NR	—	169.997		0.021	318.236	0.008	0.312	0.002	0.031	26.783	<0.01	0.91%
MOLYBDENUM		NR	—	5.700		0.001	3.000	7.50E-05	0.016	7.64E-05	0.001	0.768	<0.01	0.89%
NITRATE/NITRITE		NR	—	NR		—	3.106	7.77E-05	0.793	0.004	0.004	3.969	<0.01	0.79%
TOLUENE		NR	—	NR	18.926	0.002	NR	—	ND	—	0.002	3.515	<0.01	0.53%
METHYLENE CHLORIDE		NR	—	NR	5.553	0.001	NR	—	0.004	1.83E-05	0.001	1.780	<0.01	0.32%
AROCLOR-1254	X	NR	—	NR	0.033	4.15E-06	0.208	5.21E-06	0.002	9.25E-06	1.86E-05	0.059	<0.01	0.25%
LITHIUM		NR	—	1.100		1.38E-04	13.592	3.40E-04	0.071	3.48E-04	0.001	2.856	<0.01	0.23%
4-METHYL-2-PENTANONE		NR	—	NR	16.929	0.002	NR	—	ND	—	0.002	7.609	<0.01	0.22%
COBALT		NR	—	0.830		1.04E-04	7.671	1.92E-04	0.011	5.17E-05	3.47E-04	1.510	<0.01	0.18%
TIN		NR	—	3.500		4.38E-04	33.323	0.001	0.053	2.60E-04	0.002	7.551	<0.01	0.16%
BERYLLIUM		NR	—	ND		—	1.200	3.00E-05	0.001	6.20E-06	3.62E-05	0.201	<0.01	0.14%
STRONTIUM		NR	—	46.852		0.006	43.040	0.001	1.028	0.005	0.012	80.043	<0.01	0.12%
THALLIUM		NR	—	ND		—	0.430	1.08E-05	ND	—	1.08E-05	0.074	<0.01	0.11%
CHLOROFORM		NR	—	NR	3.995	4.99E-04	NR	—	0.011	5.31E-05	0.001	4.565	<0.01	0.10%
NICKEL		NR	—	4.400		0.001	26.987	0.001	0.014	6.99E-05	0.001	12.174	<0.01	0.08%
BENZO(a)PYRENE	X	NR	—	NR	0.005	5.80E-07	0.320	8.01E-06	ND	—	8.59E-06	0.135	<0.01	0.05%
SILVER		ND	—	1.300		1.63E-04	ND	—	0.005	2.22E-05	1.85E-04	6.711	<0.01	0.02%
TOTAL XYLENES		NR	—	NR	0.049	6.09E-06	NR	—	ND	—	6.09E-06	0.279	<0.01	0.02%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.358	4.47E-05	0.248	6.21E-06	ND	—	5.09E-05	2.480	<0.01	0.02%
TETRACHLOROETHENE		NR	—	NR	0.035	4.42E-06	NR	—	0.006	3.10E-05	3.54E-05	1.866	<0.01	0.01%
DIBENZO(a,h)ANTHRACENE		NR	—	NR	ND	—	0.092	2.30E-06	ND	—	2.30E-06	0.135	<0.01	0.01%
1,2-DICHLOROETHENE		NR	—	NR	0.022	2.70E-06	NR	—	0.011	5.64E-05	5.91E-05	6.024	<0.01	0.01%
TRICHLOROETHENE		NR	—	NR	0.937	1.17E-04	NR	—	0.012	6.03E-05	1.77E-04	19.579	<0.01	0.01%
CHROMIUM	X	4.600	0.005	5.509		0.001	26.789	0.001	0.011	5.60E-05	0.006	832.996	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.004	4.70E-07	0.334	8.35E-06	ND	—	8.82E-06	1.350	<0.01	0.01%

Summary of Ecotoxicological Risk to Coyotes in the OU2 903 Pad Source Area at RFETS

COYOTES OU2 903 PAD		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = 0.042 SUF = 0.025		IR = 0.005 SUF = 0.025			IR = 0.001 SUF = 0.025		IR = 0.077 SUF = 0.064					
BENZO(b)FLUORANTHENE	X	NR	—	NR	0.001	1.80E-07	0.337	8.41E-06	ND	—	8.59E-06	1.350	<0.01	0.01%
BENZYL ALCOHOL		NR	—	NR	ND	—	ND	—	0.004	1.97E-05	1.97E-05	3.126	<0.01	<0.01%
PYRENE	X	NR	—	NR	0.339	4.24E-05	0.644	1.61E-05	ND	—	5.85E-05	9.996	<0.01	<0.01%
BENZO(k)FLUORANTHENE	X	NR	—	NR	ND	—	0.311	7.77E-06	ND	—	7.77E-06	1.350	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	ND	—	0.188	4.70E-06	ND	—	4.70E-06	1.350	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	0.284	3.55E-05	0.689	1.72E-05	ND	—	5.27E-05	16.659	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	0.716	8.95E-05	0.556	1.39E-05	ND	—	1.03E-04	135.026	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	0.007	8.30E-07	0.341	8.52E-06	ND	—	9.35E-06	13.503	<0.01	<0.01%
2-BUTANONE		NR	—	NR	2.668	3.33E-04	NR	—	ND	—	3.33E-04	534.882	<0.01	<0.01%
1,1-DICHLOROETHENE		NR	—	NR	0.010	1.25E-06	NR	—	ND	—	1.25E-06	2.497	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	—	NR	0.035	4.35E-06	ND	—	ND	—	4.35E-06	10.686	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	ND	—	0.191	4.78E-06	ND	—	4.78E-06	13.503	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	0.061	7.63E-06	0.353	8.83E-06	0.002	9.86E-06	2.63E-05	74.412	<0.01	<0.01%
FLUORENE		NR	—	NR	ND	—	0.190	4.74E-06	ND	—	4.74E-06	16.659	<0.01	<0.01%
ANTHRACENE		NR	—	NR	0.009	1.18E-06	0.201	5.01E-06	ND	—	6.19E-06	133.274	<0.01	<0.01%
ACENAPHTHENE		NR	—	NR	0.010	1.25E-06	0.186	4.65E-06	ND	—	5.90E-06	135.026	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	—	NR	0.014	1.81E-06	NR	—	ND	—	1.81E-06	142.350	<0.01	<0.01%

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Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU1 881 Hillside Source Area at RFETS

COYOTES OU1 881 HILLSIDE		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU1	IR = 0.042 SUF = 0.020		IR = 0.005 SUF = 0.020			IR = 0.001 SUF = 0.020		IR = 0.077 SUF = 0.126					
CADMIUM		5.607	0.005	1.409		1.41E-04	0.611	1.22E-05	0.002	1.56E-05	0.005	0.135	0.04	27.73%
SELENIUM		4.092	0.003	1.500		1.50E-04	0.511	1.02E-05	0.002	1.90E-05	0.004	0.137	0.03	20.34%
ALUMINUM		NR	—	NR		—	14308.320	0.286	0.926	0.009	0.295	20.639	0.01	10.99%
COPPER		72.817	0.061	9.256		0.001	35.484	0.001	0.009	9.09E-05	0.063	5.041	0.01	9.59%
ACETONE		NR	—	NR	271.965	0.027	NR	—	0.007	6.80E-05	0.027	3.043	0.01	6.88%
NITRATE/NITRITE		NR	—	NR		—	2.111	4.22E-05	2.624	0.025	0.025	3.969	0.01	4.94%
MAGNESIUM		NR	—	NR		—	3418.568	0.068	13.583	0.132	0.200	51.154	<0.01	3.01%
VANADIUM		NR	—	NR		—	41.858	0.001	0.009	8.56E-05	0.001	0.255	<0.01	2.78%
BARIUM		NR	—	NR		—	179.137	0.004	0.123	0.001	0.005	1.654	<0.01	2.22%
ZINC		151.809	0.128	28.068		0.003	85.548	0.002	0.051	4.91E-04	0.133	48.696	<0.01	2.09%
ARSENIC		NR	—	NR		—	5.377	1.08E-04	0.002	1.98E-05	1.27E-04	0.063	<0.01	1.57%
LEAD		4.542	0.004	1.100		1.10E-04	48.003	0.001	0.003	3.36E-05	0.005	2.435	<0.01	1.55%
AROCLOR-1248	X	NR	—	NR	0.082	8.20E-06	0.123	2.47E-06	ND	—	1.07E-05	0.007	<0.01	1.12%
TOLUENE	X	NR	—	NR	43.577	0.004	NR	—	0.003	2.56E-05	0.004	3.515	<0.01	0.96%
MERCURY		ND	—	ND		ND	0.054	1.08E-06	1.18E-04	1.14E-06	2.22E-06	0.002	<0.01	0.80%
ANTIMONY		NR	—	NR		—	ND	—	0.015	1.49E-04	1.49E-04	0.170	<0.01	0.67%
METHYLENE CHLORIDE		NR	—	NR	14.721	0.001	NR	—	0.004	3.67E-05	0.002	1.780	<0.01	0.65%
4-METHYL-2-PENTANONE		NR	—	NR	33.985	0.003	NR	—	ND	—	0.003	7.609	<0.01	0.34%
THALLIUM		NR	—	NR		—	0.510	1.02E-05	0.002	1.91E-05	2.93E-05	0.074	<0.01	0.30%
MOLYBDENUM		NR	—	NR		—	1.926	3.85E-05	0.018	1.70E-04	2.08E-04	0.768	<0.01	0.21%
MANGANESE		NR	—	NR		—	312.554	0.006	0.063	0.001	0.007	26.783	<0.01	0.20%
BERYLLIUM		NR	—	NR		—	1.257	2.51E-05	0.001	8.80E-06	3.39E-05	0.201	<0.01	0.13%
COBALT		NR	—	NR		—	8.343	1.67E-04	0.007	6.31E-05	2.30E-04	1.510	<0.01	0.12%
AROCLOR-1254	X	NR	—	NR	0.037	3.67E-06	0.257	5.15E-06	ND	—	8.82E-06	0.059	<0.01	0.12%
BIS(2-ETHYLHEXYL)PHTHALATE		NR	—	NR	3.395	3.40E-04	ND	—	0.002	1.94E-05	3.59E-04	2.480	<0.01	0.11%
TIN		NR	—	NR		—	43.094	0.001	0.024	2.31E-04	0.001	7.551	<0.01	0.11%
LITHIUM		NR	—	NR		—	9.473	1.89E-04	0.021	1.99E-04	3.88E-04	2.856	<0.01	0.10%
CHLOROFORM		NR	—	NR	5.967	0.001	NR	—	ND	—	0.001	4.565	<0.01	0.10%
STRONTIUM		NR	—	NR		—	61.651	0.001	0.413	0.004	0.005	80.043	<0.01	0.05%
NICKEL		NR	—	NR		—	29.863	0.001	0.008	7.37E-05	0.001	12.174	<0.01	0.04%
BENZO(a)PYRENE	X	NR	—	NR	0.006	6.30E-07	0.311	6.23E-06	ND	—	6.86E-06	0.135	<0.01	0.04%
TOTAL XYLENES	X	NR	—	NR	0.002	1.60E-07	NR	—	0.001	9.70E-06	9.86E-06	0.279	<0.01	0.03%
PYRENE	X	NR	—	NR	2.156	2.16E-04	0.693	1.39E-05	ND	—	2.29E-04	9.996	<0.01	0.02%
2-BUTANONE		NR	—	NR	119.240	0.012	NR	—	0.005	5.07E-05	0.012	534.882	<0.01	0.02%
TETRACHLOROETHENE	X	NR	—	NR	0.015	1.51E-06	NR	—	0.003	2.74E-05	2.89E-05	1.866	<0.01	0.01%
DIBENZO(a,h)ANTHRACENE	X	NR	—	NR	ND	—	0.092	1.84E-06	ND	—	1.84E-06	0.135	<0.01	0.01%
SILVER		ND	—	0.540		5.40E-05	ND	—	0.003	3.31E-05	8.71E-05	6.711	<0.01	0.01%
FLUORANTHENE	X	NR	—	NR	1.763	1.76E-04	0.762	1.52E-05	ND	—	1.92E-04	16.659	<0.01	0.01%
1,1-DICHLOROETHENE	X	NR	—	NR	0.040	4.01E-06	NR	—	0.003	2.46E-05	2.86E-05	2.497	<0.01	0.01%

Summary of Ecotoxicological Risk to Coyotes in the OU1 881 Hillside Source Area at RFETS

COYOTES OU1 881 HILLSIDE		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU1	IR = 0.042 SUF = 0.020		IR = 0.005 SUF = 0.020			IR = 0.001 SUF = 0.020		IR = 0.077 SUF = 0.126					
BENZO(a)ANTHRACENE	X	NR	—	NR	0.008	8.00E-07	0.327	6.54E-06	ND	—	7.34E-06	1.350	<0.01	<0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	0.002	2.40E-07	0.314	6.27E-06	ND	—	6.51E-06	1.350	<0.01	<0.01%
BENZO(k)FLUORANTHENE	X	NR	—	NR	0.002	2.00E-07	0.297	5.95E-06	ND	—	6.15E-06	1.350	<0.01	<0.01%
1,2-DICHLOROETHANE	X	NR	—	NR	0.027	2.70E-06	NR	—	0.003	2.58E-05	2.85E-05	7.118	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	4.472	4.47E-04	0.559	1.12E-05	ND	—	4.58E-04	135.026	<0.01	<0.01%
1,2-DICHLOROETHENE	X	NR	—	NR	ND	—	NR	—	0.002	1.94E-05	1.94E-05	6.024	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	ND	—	0.204	4.07E-06	ND	—	4.07E-06	1.350	<0.01	<0.01%
TRICHLOROETHENE	X	NR	—	NR	0.187	1.87E-05	NR	—	0.003	2.51E-05	4.38E-05	19.579	<0.01	<0.01%
PENTACHLOROPHENOL		NR	—	NR	0.019	1.92E-06	ND	—	ND	—	1.92E-06	0.906	<0.01	<0.01%
ALDRIN		NR	—	NR	ND	—	ND	—	1.00E-05	1.00E-07	1.00E-07	0.061	<0.01	<0.01%
CHROMIUM		ND	—	5.535		0.001	34.997	0.001	0.004	3.83E-05	0.001	832.996	<0.01	<0.01%
BENZYL ALCOHOL		NR	—	NR	ND	—	0.203	4.06E-06	ND	—	4.06E-06	3.126	<0.01	<0.01%
1,1-DICHLOROETHANE	X	NR	—	NR	ND	—	NR	—	0.003	2.44E-05	2.44E-05	34.733	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	0.012	1.24E-06	0.361	7.21E-06	ND	—	8.45E-06	13.503	<0.01	<0.01%
FLUORENE	X	NR	—	NR	0.028	2.82E-06	0.193	3.86E-06	ND	—	6.68E-06	16.659	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	ND	—	0.205	4.10E-06	ND	—	4.10E-06	13.503	<0.01	<0.01%
1,1,1-TRICHLOROETHANE	X	NR	—	NR	0.007	7.20E-07	NR	—	0.003	2.44E-05	2.51E-05	142.350	<0.01	<0.01%
DI-n-BUTYL PHTHALATE		NR	—	NR	0.056	5.57E-06	ND	—	ND	—	5.57E-06	74.412	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	NR	0.040	3.97E-06	0.195	3.90E-06	ND	—	7.87E-06	135.026	<0.01	<0.01%
ANTHRACENE	X	NR	—	NR	0.027	2.70E-06	0.202	4.05E-06	ND	—	6.75E-06	133.274	<0.01	<0.01%
NAPHTHALENE	X	NR	—	NR	0.040	4.03E-06	0.110	2.20E-06	ND	—	6.23E-06	135.026	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	—	NR	0.009	9.10E-07	ND	—	ND	—	9.10E-07	139.384	<0.01	<0.01%

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Notes:

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Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU4 Downgradient Source Area at RFETS

COYOTES OU4 DOWNGRADIENT		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU4	IR = 0.042 SUF = 0.006		IR = 0.005 SUF = 0.006			IR = 0.001 SUF = 0.006		IR = 0.077 SUF = 0.031					
MERCURY	X	0.380	9.58E-05	0.075		2.25E-06	0.107	6.40E-07	NR	—	9.87E-05	0.002	0.05	59.95%
ALUMINUM		614.000	0.155	413.229		0.012	12856.399	0.077	NR	—	0.244	20.639	0.01	15.25%
MAGNESIUM		1430.000	0.360	2057.159		0.062	2871.518	0.017	NR	—	0.439	51.154	0.01	11.07%
BARIUM		10.300	0.003	56.333		0.002	165.692	0.001	NR	—	0.005	1.654	<0.01	4.11%
COPPER		27.500	0.007	25.140		0.001	16.143	9.69E-05	NR	—	0.008	5.041	<0.01	1.99%
VANADIUM		ND	—	3.100		9.30E-05	35.665	2.14E-04	NR	—	3.07E-04	0.255	<0.01	1.55%
ARSENIC		ND	—	1.100		3.30E-05	4.565	2.74E-05	NR	—	6.04E-05	0.063	<0.01	1.25%
SELENIUM		ND	—	3.643		1.09E-04	ND	—	NR	—	1.09E-04	0.137	<0.01	1.03%
ZINC		109.000	0.027	42.863		0.001	74.594	4.48E-04	NR	—	0.029	48.696	<0.01	0.77%
BERYLLIUM	X	0.290	7.31E-05	0.500		1.50E-05	ND	—	NR	—	8.81E-05	0.201	<0.01	0.57%
LITHIUM		ND	—	33.600		0.001	9.207	5.52E-05	NR	—	0.001	2.856	<0.01	0.48%
CADMIUM	X	ND	—	1.400		4.20E-05	1.109	6.65E-06	NR	—	4.87E-05	0.135	<0.01	0.46%
MANGANESE		17.700	0.004	51.289		0.002	337.070	0.002	NR	—	0.008	26.783	<0.01	0.39%
MOLYBDENUM		ND	—	7.200		2.16E-04	ND	—	NR	—	2.16E-04	0.768	<0.01	0.36%
TIN		5.900	0.001	8.500		2.55E-04	38.477	2.31E-04	NR	—	0.002	7.551	<0.01	0.34%
STRONTIUM		29.000	0.007	78.059		0.002	52.509	3.15E-04	NR	—	0.010	80.043	<0.01	0.16%
LEAD		ND	—	1.745		5.24E-05	20.053	1.20E-04	NR	—	1.73E-04	2.435	<0.01	0.09%
THALLIUM		ND	—	ND		—	0.630	3.78E-06	NR	—	3.78E-06	0.074	<0.01	0.07%
COBALT		ND	—	ND		—	8.238	4.94E-05	NR	—	4.94E-05	1.510	<0.01	0.04%
NICKEL		ND	—	6.800		2.04E-04	14.767	8.86E-05	NR	—	2.93E-04	12.174	<0.01	0.03%
ACETONE		NR	—	NR	1.085	3.25E-05	NR	—	NR	—	3.25E-05	3.043	<0.01	0.01%
BENZO(a)PYRENE	X	NR	—	NR	NR	—	0.200	1.20E-06	NR	—	1.20E-06	0.135	<0.01	0.01%
NITRATE/NITRITE	X	NR	—	NR		—	3.975	2.39E-05	NR	—	2.39E-05	3.969	<0.01	0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	NR	—	0.978	5.87E-06	NR	—	5.87E-06	2.480	<0.01	<0.01%
DIBENZO(a,h)ANTHRACENE		NR	—	NR	NR	—	0.047	2.80E-07	NR	—	2.80E-07	0.135	<0.01	<0.01%
TOLUENE		NR	—	NR	0.232	6.97E-06	NR	—	NR	—	6.97E-06	3.515	<0.01	<0.01%
METHYLENE CHLORIDE		NR	—	NR	0.078	2.34E-06	NR	—	NR	—	2.34E-06	1.780	<0.01	<0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	NR	—	0.182	1.09E-06	NR	—	1.09E-06	1.350	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	NR	—	0.160	9.60E-07	NR	—	9.60E-07	1.350	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	NR	—	0.150	9.00E-07	NR	—	9.00E-07	1.350	<0.01	<0.01%
BENZO(k)FLUORANTHENE	X	NR	—	NR	NR	—	0.130	7.80E-07	NR	—	7.80E-07	1.350	<0.01	<0.01%
CHROMIUM		ND	—	1.400		4.20E-05	14.049	8.43E-05	NR	—	1.26E-04	832.996	<0.01	<0.01%
PYRENE	X	NR	—	NR	NR	—	0.191	1.15E-06	NR	—	1.15E-06	9.996	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	—	NR	NR	—	0.170	1.02E-06	NR	—	1.02E-06	10.686	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	NR	—	0.220	1.32E-06	NR	—	1.32E-06	13.503	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	NR	—	0.170	1.02E-06	NR	—	1.02E-06	13.503	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	NR	—	0.183	1.10E-06	NR	—	1.10E-06	16.659	<0.01	<0.01%
TETRACHLOROETHENE		NR	—	NR	0.002	5.00E-08	NR	—	NR	—	5.00E-08	1.866	<0.01	<0.01%

Summary of Ecotoxicological Risk to Coyotes in the OU4 Downgradient Source Area at RFETS

COYOTES OU4 DOWNGRADIENT		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU4	IR = 0.042 SUF = 0.006		IR = 0.005 SUF = 0.006			IR = 0.001 SUF = 0.006		IR = 0.077 SUF = 0.031					
DI-n-BUTYL PHTHALATE	X	NR	—	NR	NR	—	0.079	4.70E-07	NR	—	4.70E-07	74.412	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	—	NR	NR	—	0.295	1.77E-06	NR	—	1.77E-06	139.384	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	NR	—	0.074	4.40E-07	NR	—	4.40E-07	135.026	<0.01	<0.01%

HAZARD INDEX 0.08

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU5 Ash Pits Source Area at RFETS

COYOTES OU5 ASH PITS		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU5	IR = 0.042 SUF = 0.017		IR = 0.005 SUF = 0.017			IR = 0.001 SUF = 0.017		IR = 0.077 SUF = 0.061					
ALUMINUM		413.418	0.295	264.435		0.022	13038.844	0.222	0.855	0.004	0.543	20.639	0.03	37.55%
MAGNESIUM		776.812	0.555	1466.885		0.125	2929.961	0.050	6.862	0.032	0.761	51.154	0.01	21.23%
BARIUM	X	9.863	0.007	66.746		0.006	143.888	0.002	0.071	3.31E-04	0.015	1.654	0.01	13.36%
MERCURY	X	ND	—	0.073		6.21E-06	0.078	1.32E-06	1.10E-04	5.20E-07	8.05E-06	0.002	<0.01	5.41%
VANADIUM		ND	—	2.300		1.96E-04	36.213	0.001	0.009	4.04E-05	0.001	0.255	<0.01	4.76%
COPPER	X	21.419	0.015	7.604		0.001	16.938	2.88E-04	0.006	2.65E-05	0.016	5.041	<0.01	4.60%
ARSENIC		ND	—	0.840		7.14E-05	5.715	9.72E-05	0.002	9.80E-06	1.78E-04	0.063	<0.01	4.07%
CADMIUM		ND	—	2.179		1.85E-04	1.349	2.29E-05	0.001	4.70E-06	2.13E-04	0.135	<0.01	2.25%
ZINC	X	78.515	0.056	29.216		0.002	69.631	0.001	0.018	8.42E-05	0.060	48.696	<0.01	1.75%
LEAD	X	2.692	0.002	1.581		1.34E-04	33.783	0.001	0.004	1.78E-05	0.003	2.435	<0.01	1.55%
MANGANESE		11.936	0.009	42.730		0.004	337.520	0.006	0.148	0.001	0.019	26.783	<0.01	0.99%
ANTIMONY	X	ND	—	ND		—	ND	—	0.015	7.22E-05	7.22E-05	0.170	<0.01	0.61%
STRONTIUM	X	20.606	0.015	45.069		0.004	38.768	0.001	0.247	0.001	0.020	80.043	<0.01	0.36%
BERYLLIUM		ND	—	0.084		7.14E-06	0.940	1.60E-05	0.001	6.43E-06	2.96E-05	0.201	<0.01	0.21%
MOLYBDENUM		ND	—	ND		—	0.928	1.58E-05	0.020	9.26E-05	1.08E-04	0.768	<0.01	0.20%
NICKEL		ND	—	14.803		0.001	13.578	2.31E-04	0.009	4.09E-05	0.002	12.174	<0.01	0.18%
THALLIUM		ND	—	ND		—	0.520	8.84E-06	ND	—	8.84E-06	0.074	<0.01	0.17%
COBALT	X	ND	—	ND		—	8.402	1.43E-04	0.007	3.45E-05	1.77E-04	1.510	<0.01	0.17%
NITRATE/NITRITE		NR	—	NR		—	NR	—	0.088	4.15E-04	4.15E-04	3.969	<0.01	0.15%
SELENIUM		ND	—	ND		—	0.410	6.97E-06	0.001	5.17E-06	1.21E-05	0.137	<0.01	0.13%
TIN		ND	—	3.200		2.72E-04	16.661	2.83E-04	0.019	8.88E-05	0.001	7.551	<0.01	0.12%
LITHIUM	X	ND	—	ND		—	10.380	1.76E-04	0.009	4.09E-05	2.17E-04	2.856	<0.01	0.11%
SILVER	X	ND	—	0.970		8.25E-05	1.807	3.07E-05	0.003	1.51E-05	1.28E-04	6.711	<0.01	0.03%
ACETONE		NR	—	NR	NR	—	NR	—	0.009	4.21E-05	4.21E-05	3.043	<0.01	0.02%
METHYLENE CHLORIDE	X	NR	—	NR	NR	—	NR	—	0.005	2.23E-05	2.23E-05	1.780	<0.01	0.02%
1,2-DICHLOROETHANE		NR	—	NR	NR	—	NR	—	0.003	1.44E-05	1.44E-05	7.118	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	NR	—	NR	—	0.001	4.70E-06	4.70E-06	2.480	<0.01	<0.01%
CHROMIUM		ND	—	1.900		1.62E-04	15.956	2.71E-04	0.004	1.83E-05	4.51E-04	832.996	<0.01	<0.01%

HAZARD INDEX 0.07

Notes:

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SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU7 Downgradient Areas Source Area at RFETS

COYOTES OU7 DOWNGRADIENT AREAS		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU7	IR = 0.042 SUF = 0.002		IR = 0.005 SUF = 0.002			IR = 0.001 SUF = 0.002		IR = I SUF = I					
SELENIUM	X	26.500	0.002	4.398		4.40E-05	NR	—	0.007	—	0.002	0.137	0.02	25.16%
MERCURY		0.300	2.52E-05	ND		—	NR	—	1.15E-04	—	2.52E-05	0.002	0.01	17.99%
CADMIUM		18.700	0.002	1.600		1.60E-05	NR	—	0.002	—	0.002	0.135	0.01	17.77%
MAGNESIUM	X	4680.000	0.393	2549.843		0.025	NR	—	25.696	—	0.419	51.154	0.01	12.39%
VANADIUM	X	14.100	0.001	1.300		1.30E-05	NR	—	0.007	—	0.001	0.255	<0.01	7.10%
BARIUM	X	67.100	0.006	52.799		0.001	NR	—	0.189	—	0.006	1.654	<0.01	5.64%
ALUMINUM	X	624.000	0.052	212.406		0.002	NR	—	0.403	—	0.055	20.639	<0.01	4.00%
LEAD	X	55.600	0.005	1.532		1.53E-05	NR	—	0.009	—	0.005	2.435	<0.01	2.91%
COPPER	X	106.000	0.009	42.778		4.28E-04	NR	—	0.009	—	0.009	5.041	<0.01	2.80%
ZINC	X	746.000	0.063	32.779		3.28E-04	NR	—	0.055	—	0.063	48.696	<0.01	1.96%
TIN	X	52.700	0.004	3.200		3.20E-05	NR	—	0.030	—	0.004	7.551	<0.01	0.89%
SILVER		24.400	0.002	ND		—	NR	—	ND	—	0.002	6.711	<0.01	0.46%
MANGANESE	X	64.400	0.005	18.571		1.86E-04	NR	—	0.084	—	0.006	26.783	<0.01	0.32%
STRONTIUM	X	118.000	0.010	91.649		0.001	NR	—	0.774	—	0.011	80.043	<0.01	0.20%
ARSENIC	X	ND	—	0.700		7.00E-06	NR	—	0.003	—	7.00E-06	0.063	<0.01	0.17%
BERYLLIUM	X	ND	—	1.100		1.10E-05	NR	—	ND	—	1.10E-05	0.201	<0.01	0.08%
MOLYBDENUM	X	ND	—	3.500		3.50E-05	NR	—	0.004	—	3.50E-05	0.768	<0.01	0.07%
LITHIUM	X	ND	—	10.900		1.09E-04	NR	—	0.020	—	1.09E-04	2.856	<0.01	0.06%
NICKEL	X	ND	—	14.300		1.43E-04	NR	—	0.010	—	1.43E-04	12.174	<0.01	0.02%
NITRATE/NITRITE	X	NR	—	NR		—	10.779	2.16E-05	1.056	—	2.16E-05	3.969	<0.01	0.01%
CHROMIUM	X	29.700	0.002	7.413		7.41E-05	NR	—	ND	—	0.003	832.996	<0.01	<0.01%
TOLUENE	X	NR	—	NR	0.862	8.62E-06	NR	—	0.008	—	8.62E-06	3.515	<0.01	<0.01%
4-METHYL-2-PENTANONE		NR	—	NR	0.131	1.31E-06	NR	—	ND	—	1.31E-06	7.609	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.014	1.40E-07	NR	—	0.002	—	1.40E-07	2.480	<0.01	<0.01%
TOTAL XYLENES		NR	—	NR	0.001	1.00E-08	NR	—	0.004	—	1.00E-08	0.279	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	—	NR	0.020	2.00E-07	NR	—	ND	—	2.00E-07	10.686	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.001	1.00E-08	NR	—	ND	—	1.00E-08	1.350	<0.01	<0.01%
PYRENE	X	NR	—	NR	0.005	5.00E-08	NR	—	ND	—	5.00E-08	9.996	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	0.004	4.00E-08	NR	—	ND	—	4.00E-08	16.659	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	0.001	1.00E-08	NR	—	ND	—	1.00E-08	13.503	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	0.009	9.00E-08	NR	—	ND	—	9.00E-08	135.026	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	—	NR	0.003	3.00E-08	NR	—	ND	—	3.00E-08	142.350	<0.01	<0.01%

HAZARD INDEX 0.07

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NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU5 Old Landfill Source Area at RFETS

COYOTES OU5 OLD LANDFILL		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU5	IR = 0.042 SUF = 0.012		IR = 0.005 SUF = 0.012			IR = 0.001 SUF = 0.012		IR = 0.077 SUF = 0.093					
ALUMINUM		431.427	0.217	199.127		0.012	11074.656	0.133	1.471	0.011	0.373	20.639	0.02	29.89%
MAGNESIUM		967.466	0.488	2448.896		0.147	2298.534	0.028	19.837	0.142	0.804	51.154	0.02	26.01%
BARIUM	X	10.068	0.005	66.461		0.004	115.593	0.001	0.162	0.001	0.012	1.654	0.01	11.61%
COPPER	X	31.629	0.016	7.863		4.72E-04	37.703	4.52E-04	0.006	4.06E-05	0.017	5.041	<0.01	5.55%
NITRATE/NITRITE		NR	—	NR		—	NR	—	1.490	0.011	0.011	3.969	<0.01	4.45%
VANADIUM		ND	—	1.400		8.40E-05	30.425	3.65E-04	0.008	5.86E-05	0.001	0.255	<0.01	3.29%
ARSENIC		ND	—	0.590		3.54E-05	5.702	6.84E-05	0.002	1.53E-05	1.19E-04	0.063	<0.01	3.15%
ZINC	X	130.097	0.066	44.205		0.003	66.571	0.001	0.022	1.60E-04	0.069	48.696	<0.01	2.35%
ANTIMONY	X	ND	—	ND		—	8.677	1.04E-04	0.015	1.09E-04	2.13E-04	0.170	<0.01	2.08%
LEAD	X	4.363	0.002	1.683		1.01E-04	28.695	3.44E-04	0.004	2.87E-05	0.003	2.435	<0.01	1.82%
MERCURY	X	ND	—	ND		—	0.124	1.49E-06	1.11E-04	7.90E-07	2.28E-06	0.002	<0.01	1.78%
CADMIUM		ND	—	1.900		1.14E-04	0.880	1.06E-05	0.002	1.15E-05	1.36E-04	0.135	<0.01	1.66%
MOLYBDENUM		ND	—	8.700		0.001	4.400	5.28E-05	0.004	3.15E-05	0.001	0.768	<0.01	1.31%
SELENIUM		ND	—	1.400		8.40E-05	0.459	5.51E-06	0.003	1.81E-05	1.08E-04	0.137	<0.01	1.30%
MANGANESE		8.234	0.004	47.237		0.003	277.661	0.003	0.061	4.40E-04	0.011	26.783	<0.01	0.66%
STRONTIUM	X	29.983	0.015	79.000		0.005	30.813	3.70E-04	0.484	0.003	0.024	80.043	<0.01	0.49%
NICKEL		4.800	0.002	8.000		4.80E-04	14.939	1.79E-04	0.009	6.75E-05	0.003	12.174	<0.01	0.43%
BENZO(a)PYRENE	X	NR	—	NR	0.030	1.81E-06	2.636	3.16E-05	ND	—	3.34E-05	0.135	<0.01	0.41%
THALLIUM		ND	—	ND		—	0.310	3.72E-06	0.002	1.42E-05	1.79E-05	0.074	<0.01	0.40%
AROCLOR-1254	X	NR	—	NR	0.001	9.00E-08	0.572	6.87E-06	ND	—	6.96E-06	0.059	<0.01	0.20%
LITHIUM	X	ND	—	1.100		6.60E-05	8.005	9.61E-05	0.013	9.22E-05	2.54E-04	2.856	<0.01	0.15%
BERYLLIUM		ND	—	ND		—	0.882	1.06E-05	0.001	6.79E-06	1.74E-05	0.201	<0.01	0.14%
ACETONE		NR	—	NR	1.397	8.38E-05	ND	—	0.022	1.59E-04	2.43E-04	3.043	<0.01	0.13%
COBALT	X	ND	—	ND		—	8.348	1.00E-04	0.002	1.43E-05	1.14E-04	1.510	<0.01	0.13%
DIBENZO(a,h)ANTHRACENE	X	NR	—	NR	0.003	1.90E-07	0.758	9.10E-06	ND	—	9.29E-06	0.135	<0.01	0.11%
TIN		ND	—	2.100		1.26E-04	9.714	1.17E-04	0.021	1.50E-04	3.93E-04	7.551	<0.01	0.09%
PENTACHLOROPHENOL	X	NR	—	NR	0.008	4.70E-07	ND	—	0.005	3.58E-05	3.63E-05	0.906	<0.01	0.07%
BENZO(b)FLUORANTHENE	X	NR	—	NR	0.016	9.50E-07	3.179	3.82E-05	ND	—	3.91E-05	1.350	<0.01	0.05%
BENZO(a)ANTHRACENE	X	NR	—	NR	0.038	2.27E-06	2.850	3.42E-05	ND	—	3.65E-05	1.350	<0.01	0.04%
SILVER	X	ND	—	1.000		6.00E-05	7.180	8.62E-05	0.003	2.50E-05	1.71E-04	6.711	<0.01	0.04%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	0.001	7.00E-08	2.572	3.09E-05	ND	—	3.09E-05	1.350	<0.01	0.04%
DIELDRIN	X	NR	—	NR	ND	—	0.009	1.10E-07	ND	—	1.10E-07	0.006	<0.01	0.03%
ENDRIN KETONE	X	NR	—	NR	NO LOG K_{OW}	—	0.009	1.10E-07	ND	—	1.10E-07	0.007	<0.01	0.03%
BENZO(k)FLUORANTHENE	X	NR	—	NR	0.005	2.80E-07	1.694	2.03E-05	ND	—	2.06E-05	1.350	<0.01	0.03%
METHYLENE CHLORIDE	X	NR	—	NR	0.042	2.49E-06	ND	—	0.003	2.19E-05	2.44E-05	1.780	<0.01	0.02%
PYRENE	X	NR	—	NR	0.201	1.21E-05	7.090	8.51E-05	ND	—	9.72E-05	9.996	<0.01	0.02%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.023	1.38E-06	0.210	2.52E-06	0.002	1.43E-05	1.82E-05	2.480	<0.01	0.01%
FLUORANTHENE	X	NR	—	NR	0.208	1.25E-05	8.267	9.92E-05	ND	—	1.12E-04	16.659	<0.01	0.01%
CHLOROFORM		NR	—	NR	ND	—	ND	—	0.003	1.82E-05	1.82E-05	4.565	<0.01	0.01%
CHRYSENE	X	NR	—	NR	0.061	3.64E-06	2.987	3.58E-05	ND	—	3.95E-05	13.503	<0.01	<0.01%
FLUORENE	X	NR	—	NR	0.268	1.61E-05	2.363	2.84E-05	ND	—	4.44E-05	16.659	<0.01	<0.01%

Summary of Ecotoxicological Risk to Coyotes in the OU5 Old Landfill Source Area at RFETS

COYOTES OU5 OLD LANDFILL		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU5	IR = 0.042 SUF = 0.012		IR = 0.005 SUF = 0.012			IR = 0.001 SUF = 0.012		IR = 0.077 SUF = 0.093					
PHENOL	X	NR	—	NR	0.777	4.66E-05	ND	—	ND	—	4.66E-05	18.121	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	0.610	3.66E-05	9.640	1.16E-04	ND	—	1.52E-04	135.026	<0.01	<0.01%
TRICHLOROETHENE		NR	—	NR	0.019	1.12E-06	ND	—	0.003	2.06E-05	2.17E-05	19.579	<0.01	<0.01%
ENDOSULFAN SULFATE	X	NR	—	NR	ND	—	0.009	1.10E-07	ND	—	1.10E-07	0.104	<0.01	<0.01%
HEPTACHLOR EPOXIDE	X	NR	—	NR	0.001	8.00E-08	0.004	5.00E-08	ND	—	1.30E-07	0.125	<0.01	<0.01%
ALDRIN	X	NR	—	NR	ND	—	0.005	6.00E-08	ND	—	6.00E-08	0.061	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	0.002	1.40E-07	0.922	1.11E-05	ND	—	1.12E-05	13.503	<0.01	<0.01%
NAPHTHALENE	X	NR	—	NR	1.297	7.78E-05	2.498	3.00E-05	ND	—	1.08E-04	135.026	<0.01	<0.01%
TOTAL XYLENES		NR	—	NR	0.003	2.00E-07	ND	—	ND	—	2.00E-07	0.279	<0.01	<0.01%
METHOXYCHLOR	X	NR	—	NR	ND	—	0.060	7.20E-07	ND	—	7.20E-07	1.208	<0.01	<0.01%
CHROMIUM		ND	—	3.600		2.16E-04	13.088	1.57E-04	0.004	3.06E-05	4.04E-04	832.996	<0.01	<0.01%
TOLUENE	X	NR	—	NR	0.027	1.60E-06	ND	—	ND	—	1.60E-06	3.515	<0.01	<0.01%
TETRACHLOROETHENE		NR	—	NR	0.013	7.80E-07	ND	—	ND	—	7.80E-07	1.866	<0.01	<0.01%
4,4'-DDT	X	NR	—	NR	ND	—	0.009	1.00E-07	ND	—	1.00E-07	0.243	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	—	NR	0.024	1.44E-06	0.220	2.64E-06	ND	—	4.08E-06	10.686	<0.01	<0.01%
ANTHRACENE	X	NR	—	NR	0.243	1.46E-05	2.816	3.38E-05	ND	—	4.84E-05	133.274	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	NR	0.258	1.55E-05	2.636	3.16E-05	ND	—	4.71E-05	135.026	<0.01	<0.01%
2-METHYLNAPHTHALENE	X	NR	—	NR	0.141	8.48E-06	0.944	1.13E-05	ND	—	1.98E-05	135.026	<0.01	<0.01%
4-METHYL-2-PENTANONE		NR	—	NR	0.018	1.09E-06	ND	—	ND	—	1.09E-06	7.609	<0.01	<0.01%
ISOPHORONE	X	NR	—	NR	0.344	2.06E-05	ND	—	ND	—	2.06E-05	149.804	<0.01	<0.01%
2-BUTANONE		NR	—	NR	0.234	1.41E-05	ND	—	0.006	4.03E-05	5.44E-05	534.882	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	0.027	1.59E-06	0.200	2.40E-06	ND	—	3.99E-06	74.412	<0.01	<0.01%
AROCLOR-1260		NR	—	NR	0.001	4.00E-08	ND	—	ND	—	4.00E-08	2.084	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	—	NR	ND	—	0.083	1.00E-06	ND	—	1.00E-06	139.384	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	—	NR	0.003	1.70E-07	ND	—	ND	—	1.70E-07	142.350	<0.01	<0.01%

HAZARD INDEX 0.06

Notes:

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NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU5 C-Ponds Source Area at RFETS

COYOTES OU5 C-PONDS		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU5	IR = 0.042 SUF = 0.010		IR = 0.005 SUF = 0.010			IR = 0.001 SUF = 0.010		IR = 0.077 SUF = 0.192					
SELENIUM		7.964	0.003	ND		—	0.510	5.10E-06	0.002	2.74E-05	0.003	0.137	0.02	38.14%
CADMIUM		3.375	0.001	1.500		7.50E-05	ND	—	0.003	3.83E-05	0.002	0.135	0.01	17.46%
ALUMINUM		NR	—	NR		—	13000.000	0.130	2.432	0.036	0.166	20.639	0.01	12.40%
MAGNESIUM		NR	—	NR		—	2860.000	0.029	10.768	0.159	0.188	51.154	<0.01	5.66%
ZINC	X	331.676	0.139	41.397		0.002	56.700	0.001	0.048	0.001	0.143	48.696	<0.01	4.52%
VANADIUM		NR	—	NR		—	34.700	3.47E-04	0.012	1.71E-04	0.001	0.255	<0.01	3.13%
NITRATE/NITRITE		NR	—	NR		—	NR	—	0.541	0.008	0.008	3.969	<0.01	3.11%
COPPER	X	21.044	0.009	8.926		4.46E-04	10.200	1.02E-04	0.008	1.18E-04	0.010	5.041	<0.01	2.91%
BARIUM	X	NR	—	NR		—	144.000	0.001	0.109	0.002	0.003	1.654	<0.01	2.85%
ANTIMONY	X	NR	—	NR		—	ND	—	0.015	2.27E-04	2.27E-04	0.170	<0.01	2.07%
LEAD	X	6.573	0.003	1.355		6.78E-05	26.100	2.61E-04	0.006	9.33E-05	0.003	2.435	<0.01	2.02%
ARSENIC		NR	—	NR		—	3.500	3.50E-05	0.002	3.29E-05	6.79E-05	0.063	<0.01	1.68%
MERCURY	X	ND	—	ND		—	ND	—	1.41E-04	2.08E-06	2.08E-06	0.002	<0.01	1.51%
THALLIUM		NR	—	NR		—	ND	—	0.002	3.45E-05	3.45E-05	0.074	<0.01	0.72%
MOLYBDENUM		NR	—	NR		—	ND	—	0.017	2.45E-04	2.45E-04	0.768	<0.01	0.49%
MANGANESE		NR	—	NR		—	360.000	0.004	0.120	0.002	0.005	26.783	<0.01	0.31%
LITHIUM	X	NR	—	NR		—	10.700	1.07E-04	0.020	2.96E-04	4.03E-04	2.856	<0.01	0.22%
COBALT	X	NR	—	NR		—	7.900	7.90E-05	0.008	1.17E-04	1.96E-04	1.510	<0.01	0.20%
TIN		NR	—	NR		—	32.700	3.27E-04	0.021	3.17E-04	0.001	7.551	<0.01	0.13%
ACETONE		NR	—	NR	0.266	1.33E-05	NR	—	0.014	2.14E-04	2.27E-04	3.043	<0.01	0.12%
BERYLLIUM		NR	—	NR		—	ND	—	0.001	1.48E-05	1.48E-05	0.201	<0.01	0.11%
STRONTIUM	X	NR	—	NR		—	41.700	4.17E-04	0.337	0.005	0.005	80.043	<0.01	0.10%
METHYLENE CHLORIDE	X	NR	—	NR	0.027	1.37E-06	NR	—	0.004	5.42E-05	5.56E-05	1.780	<0.01	0.05%
NICKEL		NR	—	NR		—	13.800	1.38E-04	0.009	1.28E-04	2.66E-04	12.174	<0.01	0.03%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	ND	—	ND	—	0.002	2.96E-05	2.96E-05	2.480	<0.01	0.02%
CHLOROFORM		NR	—	NR	ND	—	NR	—	0.003	3.80E-05	3.80E-05	4.565	<0.01	0.01%
SILVER	X	ND	—	ND		—	ND	—	0.004	5.32E-05	5.32E-05	6.711	<0.01	0.01%
TOLUENE	X	NR	—	NR	0.020	1.02E-06	NR	—	0.001	1.48E-05	1.58E-05	3.515	<0.01	0.01%
CHROMIUM		3.400	0.001	10.957		0.001	14.800	1.48E-04	0.005	7.04E-05	0.002	832.996	<0.01	<0.01%
2-BUTANONE		NR	—	NR	ND	—	NR	—	0.006	8.58E-05	8.58E-05	534.882	<0.01	<0.01%
PYRENE	X	NR	—	NR	ND	—	0.094	9.40E-07	ND	—	9.40E-07	9.996	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	ND	—	0.078	7.80E-07	ND	—	7.80E-07	16.659	<0.01	<0.01%

HAZARD INDEX 0.06

Notes:

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SUF = Site Use Factor

I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU11 West Spray Field Source Area at RFETS

COYOTES OU11 WEST SPRAY FIELD		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU11	IR = NR SUF = 0.041		IR = 0.047 SUF = 0.041			IR = 0.001 SUF = 0.041		IR = I SUF = I					
ALUMINUM		NR	—	NR		—	12185.807	0.500	NR	—	0.500	20.639	0.02	56.40%
ARSENIC		NR	—	NR		—	8.032	3.29E-04	NR	—	3.29E-04	0.063	0.01	12.28%
VANADIUM		NR	—	NR		—	30.669	0.001	NR	—	0.001	0.255	<0.01	11.47%
BARIUM		NR	—	NR		—	130.524	0.005	NR	—	0.005	1.654	<0.01	7.54%
MAGNESIUM		NR	—	NR		—	1746.670	0.072	NR	—	0.072	51.154	<0.01	3.26%
ANTIMONY		NR	—	NR		—	3.500	1.44E-04	NR	—	1.44E-04	0.170	<0.01	1.97%
LEAD		NR	—	NR		—	46.092	0.002	NR	—	0.002	2.435	<0.01	1.81%
MANGANESE		NR	—	NR		—	332.865	0.014	NR	—	0.014	26.783	<0.01	1.19%
CADMIUM		NR	—	NR		—	0.737	3.02E-05	NR	—	3.02E-05	0.135	<0.01	0.52%
ACETONE		NR	—	NR	0.296	0.001	NR	—	NR	—	0.001	3.043	<0.01	0.44%
COBALT		NR	—	NR		—	6.719	2.75E-04	NR	—	2.75E-04	1.510	<0.01	0.43%
NITRATE/NITRITE		NR	—	NR		—	15.866	0.001	NR	—	0.001	3.969	<0.01	0.38%
SELENIUM		NR	—	NR		—	0.509	2.09E-05	NR	—	2.09E-05	0.137	<0.01	0.36%
THALLIUM		NR	—	NR		—	0.270	1.11E-05	NR	—	1.11E-05	0.074	<0.01	0.35%
LITHIUM		NR	—	NR		—	10.111	4.15E-04	NR	—	4.15E-04	2.856	<0.01	0.34%
BERYLLIUM		NR	—	NR		—	0.682	2.80E-05	NR	—	2.80E-05	0.201	<0.01	0.32%
MOLYBDENUM		NR	—	NR		—	2.600	1.07E-04	NR	—	1.07E-04	0.768	<0.01	0.32%
COPPER		NR	—	NR		—	13.023	0.001	NR	—	0.001	5.041	<0.01	0.25%
ZINC		NR	—	NR		—	44.730	0.002	NR	—	0.002	48.696	<0.01	0.09%
METHYLENE CHLORIDE		NR	—	NR	0.034	6.51E-05	NR	—	NR	—	6.51E-05	1.780	<0.01	0.09%
NICKEL		NR	—	NR		—	9.190	3.77E-04	NR	—	3.77E-04	12.174	<0.01	0.07%
TIN		NR	—	NR		—	4.900	2.01E-04	NR	—	2.01E-04	7.551	<0.01	0.06%
STRONTIUM		NR	—	NR		—	23.573	0.001	NR	—	0.001	80.043	<0.01	0.03%
BIS(2-ETHYLHEXYL)PHTHALATE		NR	—	NR	0.011	2.14E-05	NR	—	NR	—	2.14E-05	2.480	<0.01	0.02%
CHLOROFORM		NR	—	NR	0.017	3.19E-05	NR	—	NR	—	3.19E-05	4.565	<0.01	0.02%
TOLUENE		NR	—	NR	0.004	7.39E-06	NR	—	NR	—	7.39E-06	3.515	<0.01	<0.01%
CHROMIUM		NR	—	NR		—	13.479	0.001	NR	—	0.001	832.996	<0.01	<0.01%
DI-n-BUTYL PHTHALATE		NR	—	NR	0.019	3.65E-05	NR	—	NR	—	3.65E-05	74.412	<0.01	<0.01%
2-BUTANONE		NR	—	NR	0.107	2.06E-04	NR	—	NR	—	2.06E-04	534.882	<0.01	<0.01%
TRICHLOROETHENE		NR	—	NR	0.004	6.90E-06	NR	—	NR	—	6.90E-06	19.579	<0.01	<0.01%

HAZARD INDEX 0.04

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NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU6 North Spray Field Source Area at RFETS

COYOTES OU6 NORTH SPRAY FIELD		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = NR SUF = 0.004		IR = 0.047 SUF = 0.004			IR = 0.001 SUF = 0.004		IR = I SUF = I					
MAGNESIUM	X	NR	—	4253.480		0.800	2397.398	0.010	NR	—	0.809	51.154	0.02	41.74%
BARIUM	X	NR	—	83.888		0.016	170.910	0.001	NR	—	0.016	1.654	0.01	26.24%
ALUMINUM		NR	—	347.535		0.065	11820.163	0.047	NR	—	0.113	20.639	0.01	14.40%
CADMIUM		NR	—	1.400		2.63E-04	0.990	3.96E-06	NR	—	2.67E-04	0.135	<0.01	5.21%
VANADIUM	X	NR	—	1.300		2.44E-04	33.599	1.34E-04	NR	—	3.79E-04	0.255	<0.01	3.91%
THALLIUM		NR	—	0.450		8.46E-05	0.340	1.36E-06	NR	—	8.60E-05	0.074	<0.01	3.06%
ARSENIC	X	NR	—	ND		—	6.579	2.63E-05	NR	—	2.63E-05	0.063	<0.01	1.11%
ANTIMONY	X	NR	—	ND		—	16.765	6.71E-05	NR	—	6.71E-05	0.170	<0.01	1.04%
MANGANESE	X	NR	—	35.254		0.007	315.526	0.001	NR	—	0.008	26.783	<0.01	0.78%
COPPER	X	NR	—	6.541		0.001	13.985	5.59E-05	NR	—	0.001	5.041	<0.01	0.67%
LEAD	X	NR	—	1.764		3.32E-04	40.050	1.60E-04	NR	—	4.92E-04	2.435	<0.01	0.53%
STRONTIUM	X	NR	—	76.343		0.014	31.283	1.25E-04	NR	—	0.014	80.043	<0.01	0.48%
MERCURY	X	NR	—	ND		—	0.066	2.70E-07	NR	—	2.70E-07	0.002	<0.01	0.34%
ZINC	X	NR	—	21.241		0.004	48.942	1.96E-04	NR	—	0.004	48.696	<0.01	0.23%
NICKEL	X	NR	—	1.700		3.20E-04	15.387	6.16E-05	NR	—	3.81E-04	12.174	<0.01	0.08%
COBALT	X	NR	—	ND		—	9.750	3.90E-05	NR	—	3.90E-05	1.510	<0.01	0.07%
SELENIUM		NR	—	ND		—	0.574	2.30E-06	NR	—	2.30E-06	0.137	<0.01	0.04%
BERYLLIUM		NR	—	ND		—	0.686	2.75E-06	NR	—	2.75E-06	0.201	<0.01	0.04%
LITHIUM		NR	—	ND		—	6.643	2.66E-05	NR	—	2.66E-05	2.856	<0.01	0.02%
NITRATE/NITRITE		NR	—	NR		—	1.000	4.00E-06	NR	—	4.00E-06	3.969	<0.01	<0.01%
TOLUENE	X	NR	—	NR	0.003	6.40E-07	NR	—	NR	—	6.40E-07	3.515	<0.01	<0.01%
CHROMIUM	X	NR	—	ND		—	13.137	5.26E-05	NR	—	5.26E-05	832.996	<0.01	<0.01%

HAZARD INDEX 0.04

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SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU6 Burial Trenches Source Area at RFETS

COYOTES OU6 BURIAL TRENCHES		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.042 SUF = 0.001		IR = 0.005 SUF = 0.001			IR = NR SUF = 0.001		IR = I SUF = I					
MAGNESIUM	X	5840.000	0.245	1586.864		0.008	NR	—	NR	—	0.253	51.154	<0.01	31.91%
VANADIUM	X	14.300	0.001	1.400		7.00E-06	NR	—	NR	—	0.001	0.255	<0.01	15.34%
ALUMINUM		1080.000	0.045	296.486		0.001	NR	—	NR	—	0.047	20.639	<0.01	14.63%
BARIUM	X	62.500	0.003	48.775		2.44E-04	NR	—	NR	—	0.003	1.654	<0.01	11.18%
SELENIUM		3.900	1.64E-04	2.580		1.29E-05	NR	—	NR	—	1.77E-04	0.137	<0.01	8.34%
COPPER	X	103.000	0.004	19.589		9.79E-05	NR	—	NR	—	0.004	5.041	<0.01	5.66%
ZINC	X	887.000	0.037	26.858		1.34E-04	NR	—	NR	—	0.037	48.696	<0.01	4.95%
LEAD	X	25.100	0.001	1.183		5.92E-06	NR	—	NR	—	0.001	2.435	<0.01	2.81%
TIN		52.900	0.002	2.900		1.45E-05	NR	—	NR	—	0.002	7.551	<0.01	1.91%
MANGANESE	X	103.000	0.004	21.320		1.07E-04	NR	—	NR	—	0.004	26.783	<0.01	1.07%
MERCURY	X	ND	—	0.058		2.90E-07	NR	—	NR	—	2.90E-07	0.002	<0.01	0.88%
STRONTIUM	X	104.000	0.004	50.056		2.50E-04	NR	—	NR	—	0.005	80.043	<0.01	0.37%
ARSENIC	X	ND	—	0.630		3.15E-06	NR	—	NR	—	3.15E-06	0.063	<0.01	0.32%
CADMIUM		ND	—	1.300		6.50E-06	NR	—	NR	—	6.50E-06	0.135	<0.01	0.31%
SILVER	X	3.000	1.26E-04	ND		—	NR	—	NR	—	1.26E-04	6.711	<0.01	0.12%
MOLYBDENUM	X	ND	—	2.100		1.05E-05	NR	—	NR	—	1.05E-05	0.768	<0.01	0.09%
LITHIUM		ND	—	2.500		1.25E-05	NR	—	NR	—	1.25E-05	2.856	<0.01	0.03%
NICKEL	X	ND	—	10.500		5.25E-05	NR	—	NR	—	5.25E-05	12.174	<0.01	0.03%
BERYLLIUM		ND	—	0.130		6.50E-07	NR	—	NR	—	6.50E-07	0.201	<0.01	0.02%
ACETONE	X	NR	—	NR	1.066	5.33E-06	NR	—	NR	—	5.33E-06	3.043	<0.01	0.01%
CHROMIUM	X	24.300	0.001	1.600		8.00E-06	NR	—	NR	—	0.001	832.996	<0.01	0.01%
METHYLENE CHLORIDE	X	NR	—	NR	0.371	1.85E-06	NR	—	NR	—	1.85E-06	1.780	<0.01	0.01%
TOLUENE	X	NR	—	NR	0.089	4.40E-07	NR	—	NR	—	4.40E-07	3.515	<0.01	<0.01%
2-BUTANONE	X	NR	—	NR	2.157	1.08E-05	NR	—	NR	—	1.08E-05	534.882	<0.01	<0.01%
4-METHYL-2-PENTANONE	X	NR	—	NR	0.018	9.00E-08	NR	—	NR	—	9.00E-08	7.609	<0.01	<0.01%
CHLOROFORM	X	NR	—	NR	0.006	3.00E-08	NR	—	NR	—	3.00E-08	4.565	<0.01	<0.01%
TRICHLOROETHENE	X	NR	—	NR	0.028	1.40E-07	NR	—	NR	—	1.40E-07	19.579	<0.01	<0.01%
BENZENE	X	NR	—	NR	0.002	1.00E-08	NR	—	NR	—	1.00E-08	3.567	<0.01	<0.01%

HAZARD INDEX 0.02

Notes:

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SUF = Site Use Factor

I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU2 Mound Area Source Area at RFETS

COYOTES OU2 MOUND AREA		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = NR SUF = 0.002		IR = 0.047 SUF = 0.002			IR = 0.001 SUF = 0.002		IR = I SUF = I					
ALUMINUM		NR	—	NR		—	10100.000	0.020	NR	—	0.020	20.639	<0.01	54.48%
VANADIUM		NR	—	NR		—	31.100	6.22E-05	NR	—	6.22E-05	0.255	<0.01	13.56%
ARSENIC		NR	—	NR		—	5.900	1.18E-05	NR	—	1.18E-05	0.063	<0.01	10.51%
BARIUM		NR	—	NR		—	108.000	2.16E-04	NR	—	2.16E-04	1.654	<0.01	7.27%
MAGNESIUM		NR	—	NR		—	2730.000	0.005	NR	—	0.005	51.154	<0.01	5.94%
AROCLOR-1254	X	NR	—	NR	ND	—	0.970	1.94E-06	NR	—	1.94E-06	0.059	<0.01	1.84%
ACETONE		NR	—	NR	0.989	9.29E-05	NR	—	NR	—	9.29E-05	3.043	<0.01	1.70%
MANGANESE		NR	—	NR		—	240.000	4.80E-04	NR	—	4.80E-04	26.783	<0.01	1.00%
THALLIUM		NR	—	NR		—	0.500	1.00E-06	NR	—	1.00E-06	0.074	<0.01	0.75%
LEAD	X	NR	—	NR		—	16.000	3.20E-05	NR	—	3.20E-05	2.435	<0.01	0.73%
COBALT		NR	—	NR		—	6.200	1.24E-05	NR	—	1.24E-05	1.510	<0.01	0.46%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	NR	0.166	1.57E-05	0.052	1.00E-07	NR	—	1.58E-05	2.480	<0.01	0.35%
LITHIUM		NR	—	NR		—	8.800	1.76E-05	NR	—	1.76E-05	2.856	<0.01	0.34%
COPPER		NR	—	NR		—	13.100	2.62E-05	NR	—	2.62E-05	5.041	<0.01	0.29%
METHYLENE CHLORIDE		NR	—	NR	0.062	5.87E-06	NR	—	NR	—	5.87E-06	1.780	<0.01	0.18%
ZINC		NR	—	NR		—	46.300	9.26E-05	NR	—	9.26E-05	48.696	<0.01	0.11%
NICKEL		NR	—	NR		—	11.400	2.28E-05	NR	—	2.28E-05	12.174	<0.01	0.10%
STRONTIUM		NR	—	NR		—	66.300	1.33E-04	NR	—	1.33E-04	80.043	<0.01	0.09%
BENZO(a)PYRENE	X	NR	—	NR	ND	—	0.096	1.90E-07	NR	—	1.90E-07	0.135	<0.01	0.08%
TOLUENE		NR	—	NR	0.042	3.94E-06	NR	—	NR	—	3.94E-06	3.515	<0.01	0.06%
AROCLOR-1260	X	NR	—	NR	ND	—	0.660	1.32E-06	NR	—	1.32E-06	2.084	<0.01	0.04%
TETRACHLOROETHENE		NR	—	NR	0.011	1.01E-06	NR	—	NR	—	1.01E-06	1.866	<0.01	0.03%
CHLOROFORM		NR	—	NR	0.020	1.92E-06	NR	—	NR	—	1.92E-06	4.565	<0.01	0.02%
4-METHYL-2-PENTANONE		NR	—	NR	0.027	2.56E-06	NR	—	NR	—	2.56E-06	7.609	<0.01	0.02%
BENZENE		NR	—	NR	0.007	6.50E-07	NR	—	NR	—	6.50E-07	3.567	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	—	NR	ND	—	0.120	2.40E-07	NR	—	2.40E-07	1.350	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	—	NR	ND	—	0.086	1.70E-07	NR	—	1.70E-07	1.350	<0.01	0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	—	NR	ND	—	0.045	9.00E-08	NR	—	9.00E-08	1.350	<0.01	<0.01%
FLUORANTHENE	X	NR	—	NR	0.004	3.80E-07	0.200	4.00E-07	NR	—	7.80E-07	16.659	<0.01	<0.01%
TRICHLOROETHENE		NR	—	NR	0.010	9.40E-07	NR	—	NR	—	9.40E-07	19.579	<0.01	<0.01%
PYRENE	X	NR	—	NR	ND	—	0.180	3.60E-07	NR	—	3.60E-07	9.996	<0.01	<0.01%
2-BUTANONE		NR	—	NR	0.186	1.75E-05	NR	—	NR	—	1.75E-05	534.882	<0.01	<0.01%
CHROMIUM	X	NR	—	NR		—	10.200	2.04E-05	NR	—	2.04E-05	832.996	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	—	NR	0.015	1.41E-06	ND	—	NR	—	1.41E-06	74.412	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	—	NR	ND	—	0.045	9.00E-08	NR	—	9.00E-08	13.503	<0.01	<0.01%
CHRYSENE	X	NR	—	NR	ND	—	0.100	2.00E-07	NR	—	2.00E-07	13.503	<0.01	<0.01%
PHENANTHRENE	X	NR	—	NR	ND	—	0.083	1.70E-07	NR	—	1.70E-07	135.026	<0.01	<0.01%

HAZARD INDEX <0.01

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Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Coyotes in the OU5 Surface Disturbance Source Area at RFETS

COYOTES OU5 SURFACE DISTURBANCE		EXPOSURE POINT									SUMMARY			
		Small Mammal		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Estimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU5	IR = NR SUF = 0.001		IR = 0.047 SUF = 0.001			IR = 0.001 SUF = 0.001		IR = I SUF = I					
ALUMINUM		NR	—	NR		—	7680.000	0.008	NR	—	0.008	20.639	<0.01	39.39%
MERCURY	X	NR	—	NR		—	0.660	6.60E-07	NR	—	6.60E-07	0.002	<0.01	32.94%
VANADIUM		NR	—	NR		—	22.200	2.22E-05	NR	—	2.22E-05	0.255	<0.01	9.20%
ARSENIC		NR	—	NR		—	3.900	3.90E-06	NR	—	3.90E-06	0.063	<0.01	6.60%
BARIUM	X	NR	—	NR		—	80.800	8.08E-05	NR	—	8.08E-05	1.654	<0.01	5.17%
MAGNESIUM		NR	—	NR		—	1810.000	0.002	NR	—	0.002	51.154	<0.01	3.74%
MANGANESE		NR	—	NR		—	218.000	2.18E-04	NR	—	2.18E-04	26.783	<0.01	0.86%
LEAD	X	NR	—	NR		—	14.100	1.41E-05	NR	—	1.41E-05	2.435	<0.01	0.61%
COBALT	X	NR	—	NR		—	5.700	5.70E-06	NR	—	5.70E-06	1.510	<0.01	0.40%
BERYLLIUM		NR	—	NR		—	0.600	6.00E-07	NR	—	6.00E-07	0.201	<0.01	0.32%
COPPER	X	NR	—	NR		—	14.200	1.42E-05	NR	—	1.42E-05	5.041	<0.01	0.30%
LITHIUM	X	NR	—	NR		—	6.500	6.50E-06	NR	—	6.50E-06	2.856	<0.01	0.24%
NICKEL		NR	—	NR		—	10.100	1.01E-05	NR	—	1.01E-05	12.174	<0.01	0.09%
ZINC	X	NR	—	NR		—	40.000	4.00E-05	NR	—	4.00E-05	48.696	<0.01	0.09%
STRONTIUM	X	NR	—	NR		—	38.600	3.86E-05	NR	—	3.86E-05	80.043	<0.01	0.05%
CHROMIUM		NR	—	NR		—	7.800	7.80E-06	NR	—	7.80E-06	832.996	<0.01	<0.01%

HAZARD INDEX <0.01

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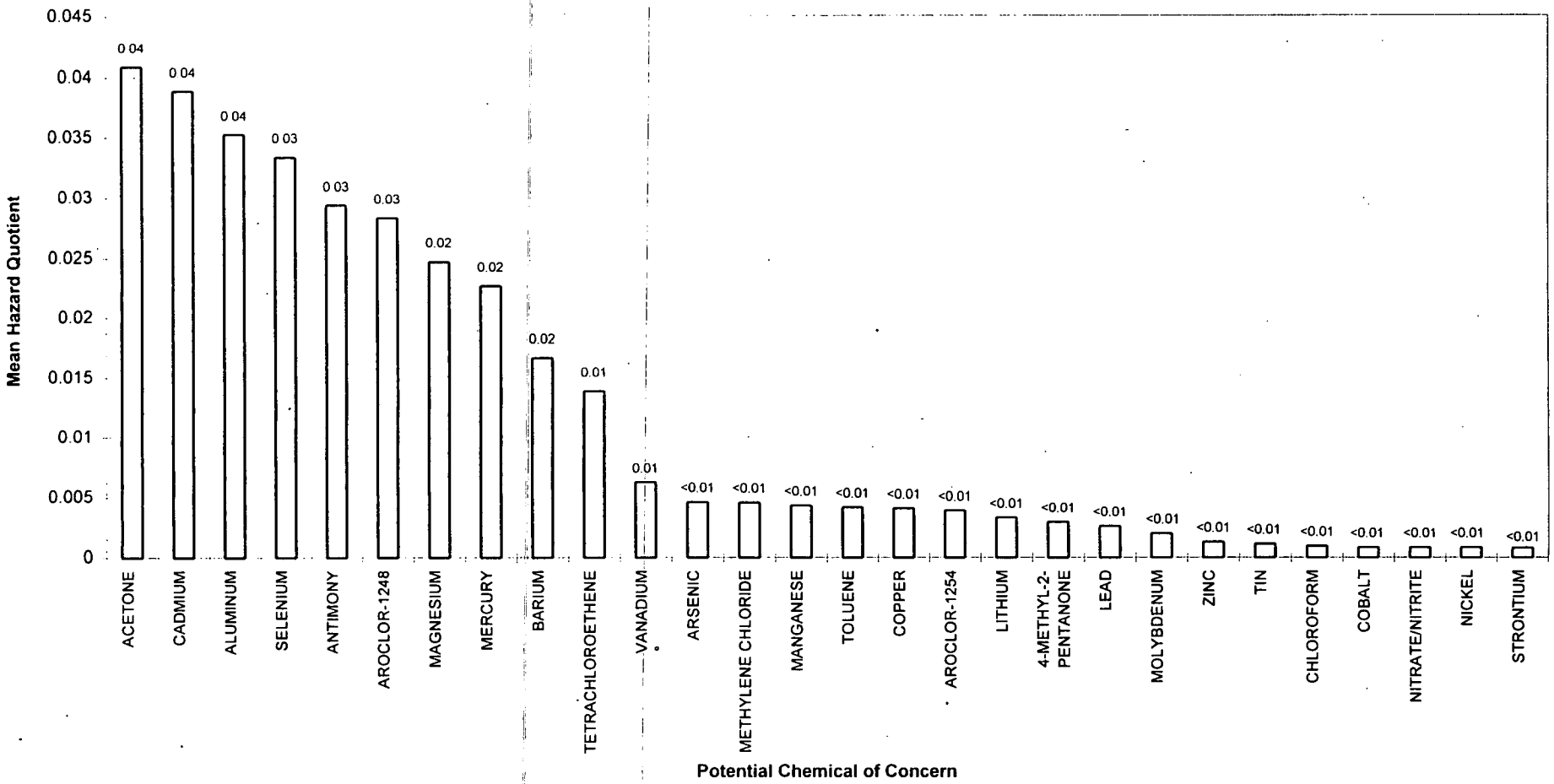
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer

Summary of Sitewide Ecotoxicological Risk to Mule Deer at RFETS

Mean Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



Note: Variation in similar values is due to rounding

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Summary of Sitewide Ecotoxicological Risk to Mule Deer at RFETS

MULE DEER																			
Analyte	OU1 881 Hillside	OU5 Ash Pits	OU6 C-Ponds	OU5 Old Landfill	OU2 903 Pad	OU5 Surface Disturbance	OU2 East Trenches	OU4 Downgradient	OU6 A-Ponds	OU6 B-Ponds	OU2 Mound Area	OU6 North Spray Field	OU11 West Spray Field	OU6 Burial Trenches	OU7 Downgradient Areas	OU6 Soil Dump Areas	Mean Hazard Quotient	Hazard Quotient Range	Percent of Total Risk
ACETONE	0.27	1.50E-05	1.56E-04	8.85E-04	0.09	—	0.16	3.16E-04	2.98E-04	1.76E-05	1.00E-04	—	6.04E-04	5.39E-05	—	0.01	0.04	<0.001 - 0.27	12.08%
CADMIUM	0.05	0.07	0.03	0.04	0.10	—	0.15	0.02	0.02	0.02	—	0.01	2.47E-03	2.38E-03	0.01	0.02	0.04	<0.001 - 0.15	11.48%
ALUMINUM	0.05	0.06	0.02	0.03	0.09	2.16E-03	0.08	0.02	0.02	0.03	3.79E-03	0.01	0.09	1.22E-03	2.19E-03	0.04	0.04	<0.001 - 0.09	10.42%
SELENIUM	0.05	5.65E-04	4.65E-04	0.03	0.09	—	1.34E-03	0.03	0.03	0.03	—	1.69E-04	1.51E-03	4.18E-03	0.02	0.17	0.03	<0.001 - 0.17	9.85%
ANTIMONY	4.78E-03	4.79E-03	4.80E-03	0.05	0.11	—	—	—	2.76E-03	2.65E-03	—	0.03	0.06	—	—	—	0.03	<0.001 - 0.11	8.68%
AROCLOR-1248	0.04	—	—	—	0.02	—	—	—	—	—	—	—	—	—	—	—	0.03	0.02 - 0.04	8.37%
MAGNESIUM	0.01	0.05	3.08E-03	0.06	0.08	2.34E-04	0.01	0.02	0.04	0.02	4.70E-04	0.03	0.01	3.01E-03	0.01	0.05	0.02	<0.001 - 0.08	7.30%
MERCURY	1.91E-03	0.05	1.71E-04	2.61E-03	0.09	1.65E-03	—	0.02	0.03	0.02	—	4.42E-04	—	2.13E-03	—	0.06	0.02	<0.001 - 0.09	6.71%
BARIUM	0.01	0.05	2.75E-03	0.04	0.07	2.25E-04	0.01	0.02	0.02	0.02	4.01E-04	0.01	0.01	1.99E-03	0.01	0.02	0.02	<0.001 - 0.07	4.93%
TETRACHLOROETHENE	3.26E-05	—	—	1.29E-05	9.00E-05	—	0.11	8.30E-07	—	1.00E-05	1.80E-06	—	—	—	—	5.65E-06	0.01	<0.001 - 0.11	4.11%
VANADIUM	0.01	0.01	3.48E-03	0.01	0.02	3.34E-04	0.01	0.01	0.01	4.12E-03	6.24E-04	2.50E-03	0.01	3.09E-04	7.18E-04	0.01	0.01	<0.001 - 0.02	1.86%
ARSENIC	3.60E-03	0.01	1.19E-03	0.01	3.44E-03	1.95E-04	0.01	0.01	0.01	0.01	3.94E-04	8.79E-04	0.01	4.63E-04	1.29E-03	2.71E-03	<0.01	<0.001 - 0.01	1.37%
METHYLENE CHLORIDE	0.03	1.35E-05	3.36E-05	5.18E-05	0.01	—	0.02	3.87E-05	5.71E-06	—	1.08E-05	—	1.17E-04	3.21E-05	—	2.89E-05	<0.01	<0.001 - 0.03	1.36%
MANGANESE	1.63E-03	0.01	9.40E-04	4.14E-03	0.03	8.55E-05	2.90E-03	2.20E-03	4.57E-03	2.48E-03	1.25E-04	1.14E-03	3.50E-03	1.23E-04	2.67E-04	0.01	<0.01	<0.001 - 0.03	1.29%
TOLUENE	0.04	—	1.02E-05	1.40E-05	0.02	—	7.09E-04	5.85E-05	5.93E-06	5.61E-06	3.67E-06	6.00E-07	6.76E-06	3.89E-06	9.45E-05	8.00E-05	<0.01	<0.001 - 0.04	1.24%
COPPER	0.01	4.29E-03	2.81E-03	3.52E-03	0.01	2.96E-05	0.01	4.55E-03	0.01	0.01	3.64E-05	8.77E-04	7.28E-04	5.99E-04	3.27E-03	4.35E-03	<0.01	<0.001 - 0.01	1.21%
AROCLOR-1254	0.01	—	—	3.11E-03	0.01	—	9.32E-04	—	—	6.02E-04	8.33E-04	—	—	—	—	2.99E-03	<0.01	<0.001 - 0.01	1.16%
LITHIUM	4.95E-04	4.41E-04	2.91E-04	9.69E-04	2.42E-03	2.39E-05	1.16E-03	0.01	0.02	2.34E-03	4.31E-05	6.51E-05	9.97E-04	1.35E-04	1.47E-03	0.01	<0.01	<0.001 - 0.02	0.98%
4-METHYL-2-PENTANONE	0.01	—	—	4.41E-06	0.01	—	1.38E-04	—	—	—	1.10E-06	—	—	3.70E-07	6.60E-06	1.19E-05	<0.01	<0.001 - 0.01	0.88%
LEAD	4.11E-03	3.31E-03	1.58E-03	2.28E-03	0.01	6.08E-05	0.01	9.66E-04	1.40E-03	1.18E-03	9.20E-05	9.07E-04	0.01	7.49E-05	2.42E-04	2.40E-03	<0.01	<0.001 - 0.01	0.78%
MOLYBDENUM	9.23E-05	5.43E-05	2.19E-05	4.28E-03	0.01	—	—	1.66E-03	1.14E-03	9.60E-04	—	—	1.90E-04	8.40E-05	3.50E-04	0.01	<0.01	<0.001 - 0.01	0.60%
ZINC	2.00E-03	1.72E-03	1.36E-03	1.79E-03	2.56E-03	8.62E-06	4.10E-03	8.41E-04	1.62E-03	2.35E-03	1.33E-05	2.97E-04	2.59E-04	8.49E-05	2.59E-04	1.87E-03	<0.01	<0.001 - <0.001	0.39%
TIN	8.11E-04	1.37E-03	3.12E-04	6.41E-04	2.59E-03	—	1.14E-03	1.21E-03	1.75E-03	3.32E-03	—	—	1.84E-04	5.96E-05	1.64E-04	1.80E-03	<0.01	<0.001 - <0.001	0.35%
CHLOROFORM	3.97E-03	—	2.86E-06	2.82E-06	3.35E-03	—	1.58E-03	—	—	5.20E-07	1.38E-06	—	2.25E-05	2.10E-07	—	—	<0.01	<0.001 - <0.001	0.29%
COBALT	7.92E-04	6.82E-04	3.87E-04	4.75E-04	3.03E-03	3.99E-05	1.19E-03	2.21E-04	1.16E-03	2.39E-03	5.79E-05	1.82E-04	1.26E-03	—	—	4.76E-04	<0.01	<0.001 - <0.001	0.26%
NITRATE/NITRITE	3.46E-03	1.14E-04	6.97E-04	1.92E-03	1.16E-03	—	—	4.06E-05	—	—	—	7.11E-06	1.13E-03	—	4.79E-05	2.22E-04	<0.01	<0.001 - <0.001	0.26%
NICKEL	3.42E-04	3.27E-03	8.10E-05	1.32E-03	1.77E-03	8.71E-06	2.39E-04	5.43E-04	1.59E-03	1.15E-03	1.31E-05	1.21E-04	2.13E-04	1.33E-04	4.52E-04	2.72E-03	<0.01	<0.001 - <0.001	0.26%
STRONTIUM	1.33E-04	1.52E-03	5.69E-05	1.89E-03	2.39E-03	5.06E-06	1.09E-04	8.90E-04	1.88E-03	8.29E-04	1.16E-05	5.98E-04	8.30E-05	9.63E-05	4.41E-04	2.57E-03	<0.01	<0.001 - <0.001	0.25%
BERYLLIUM	8.90E-04	1.67E-03	2.53E-05	3.93E-04	1.07E-03	3.14E-05	7.37E-04	2.21E-03	3.86E-04	2.16E-04	—	9.59E-05	9.59E-04	9.99E-05	2.11E-03	3.52E-04	<0.01	<0.001 - <0.001	0.22%
BENZO(a)PYRENE	4.61E-04	—	—	2.05E-03	5.41E-04	—	3.17E-04	5.95E-05	—	—	9.96E-06	—	—	—	—	4.48E-04	<0.01	<0.001 - <0.001	0.16%
TOTAL XYLENES	3.62E-05	—	—	2.16E-05	6.67E-04	—	2.49E-03	—	—	—	—	—	—	—	1.51E-06	9.86E-06	<0.01	<0.001 - <0.001	0.16%
BIS(2-ETHYLHEXYL)PHTHALATE	4.17E-03	2.05E-06	4.10E-06	2.84E-05	5.67E-04	—	6.03E-05	1.59E-05	—	—	2.10E-05	—	2.78E-05	—	2.22E-06	1.55E-04	<0.01	<0.001 - <0.001	0.14%
SILVER	2.49E-04	4.10E-04	2.75E-06	3.71E-04	7.47E-04	—	4.75E-04	—	1.42E-06	6.79E-04	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.11%
THALLIUM	4.02E-04	3.05E-04	5.93E-05	1.81E-04	3.72E-04	—	—	1.27E-04	—	5.03E-05	3.50E-05	1.43E-03	3.80E-04	—	—	1.48E-04	<0.01	<0.001 - <0.001	0.09%
DIBENZO(a,h)ANTHRACENE	5.14E-04	—	—	5.14E-04	1.18E-04	—	—	1.40E-05	—	—	—	—	—	—	—	1.09E-04	<0.01	<0.001 - <0.001	0.07%
DIELDRIN	—	—	—	1.28E-04	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.04%
ENDRIN KETONE	—	—	—	1.14E-04	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.03%
PYRENE	6.71E-04	—	6.47E-07	9.75E-05	1.42E-04	—	1.04E-05	7.70E-07	—	—	2.50E-07	—	—	—	1.90E-07	1.74E-05	<0.01	<0.001 - <0.001	0.03%
TRICHLOROETHENE	2.99E-05	—	—	2.53E-06	1.87E-04	—	4.71E-04	—	—	7.52E-07	1.60E-07	—	1.14E-06	2.20E-07	—	—	<0.01	<0.001 - <0.001	0.03%
2-BUTANONE	6.83E-04	—	5.55E-08	8.70E-07	1.92E-05	—	1.85E-05	—	—	—	1.10E-07	—	1.25E-06	6.30E-07	—	3.56E-05	<0.01	<0.001 - <0.001	0.02%
BENZO(k)FLUORANTHENE	3.48E-05	—	—	1.12E-04	3.98E-05	—	—	3.87E-06	—	—	—	—	—	—	—	1.86E-04	<0.01	<0.001 - <0.001	0.02%
PENTACHLOROPHENOL	6.49E-05	—	—	4.44E-05	—	—	—	—	—	—	—	—	—	—	—	9.04E-05	<0.01	<0.001 - <0.001	0.02%
PHENOL	—	—	—	7.98E-05	—	—	—	—	—	—	—	—	—	—	—	4.25E-05	<0.01	<0.001 - <0.001	0.02%
BENZO(b)FLUORANTHENE	3.75E-05	—	—	2.19E-04	4.71E-05	—	3.42E-05	5.40E-06	—	—	1.24E-06	—	—	—	—	7.39E-05	<0.01	<0.001 - <0.001	0.02%
1,2-DICHLOROETHENE	1.70E-06	—	—	—	2.35E-05	—	1.99E-04	—	—	2.15E-06	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.02%
FLUORANTHENE	3.31E-04	—	3.22E-07	6.52E-05	7.26E-05	—	5.78E-06	4.50E-07	—	—	2.50E-07	—	—	—	1.00E-07	1.06E-05	<0.01	<0.001 - <0.001	0.02%
BENZO(a)ANTHRACENE	5.14E-05	—	—	2.29E-04	5.34E-05	—	2.23E-05	4.76E-06	—	—	8.90E-07	—	—	—	2.10E-07	4.70E-05	<0.01	<0.001 - <0.001	0.02%
1,1-DICHLOROETHENE	5.45E-05	—	—	—	1.54E-05	—	6.69E-05	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.01%
INDENO(1,2,3-cd)PYRENE	2.08E-05	—	—	1.61E-04	2.41E-05	—	9.70E-07	4.46E-06	—	—	4.70E-07	—	—	—	—	2.83E-05	<0.01	<0.001 - <0.001	0.01%
HEPTACHLOR EPOXIDE	—	—	—	2.23E-05	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.01%
PHENANTHRENE	1.01E-04	—	—	1.43E-05	2.09E-05	—	1.13E-06	2.00E-08	—	—	1.00E-08	—	—	—	3.00E-08	1.19E-06	<0.01	<0.001 - <0.001	<0.01%
BENZENE	—	—	—	—	—	—	4.98E-05	—	—	—	6.00E-07	—	—	1.00E-07	—	4.85E-06	<0.01	<0.001 - <0.001	<0.01%
FLUORENE	6.80E-06	—	—	4.20E-05	1.99E-06	—	8.49E-06	—	—	—	—	—	—	—	—	1.59E-06	<0.01	<0.001 - <0.001	<0.01%
CHROMIUM	2.60E-05	8.15E-06	2.10E-05	9.33E-06	3.08E-05	1.00E-07	5.17E-05	2.17E-06	6.53E-07	7.17E-06	1.70E-07	4.40E-07	4.56E-06	3.00E-07	3.43E-06	2.14E-06	<0.01	<0.001 - <0.001	<0.01%
BENZYL ALCOHOL	9.06E-06	—	—	—	6.55E-06	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
ENDOSULFAN SULFATE	—	—	—	7.10E-06	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%

Summary of Sitewide Ecotoxicological Risk to Mule Deer at RFETS

MULE DEER																			
Analyte	OU1 881 Hillside	OU5 Ash Pits	OU6 C-Ponds	OU5 Old Landfill	OU2 903 Pad	OU5 Surface Disturbance	OU2 East Trenches	OU4 Downgradient	OU6 A-Ponds	OU6 B-Ponds	OU2 Mound Area	OU6 North Spray Field	OU11 West Spray Field	OU6 Burial Trenches	OU7 Downgradient Areas	OU6 Soil Dump Areas	Mean Hazard Quotient	Hazard Quotient Range	Percent of Total Risk
1,1,1-TRICHLOROETHANE	1.70E-07	—	—	3.76E-08	3.87E-07	—	3.15E-05	—	—	—	—	—	—	—	1.00E-08	—	<0.01	<0.001 - <0.001	<0.01%
CHRYSENE	6.48E-06	—	—	2.68E-05	6.24E-06	—	3.61E-06	6.50E-07	—	—	1.00E-07	—	—	—	3.00E-08	5.35E-06	<0.01	<0.001 - <0.001	<0.01%
NAPHTHALENE	1.02E-06	—	—	1.93E-05	—	—	3.80E-06	—	—	—	—	—	—	—	—	9.00E-08	<0.01	<0.001 - <0.001	<0.01%
1,2-DICHLOROETHANE	1.34E-05	2.19E-06	—	—	—	—	—	—	—	7.14E-07	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
ISOPHORONE	—	—	—	4.28E-06	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
METHOXYCHLOR	—	—	—	4.20E-06	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
BUTYL BENZYL PHTHALATE	—	—	—	5.94E-06	1.25E-05	—	—	6.50E-07	—	—	—	—	—	—	7.10E-07	7.70E-07	<0.01	<0.001 - <0.001	<0.01%
4,4'-DDT	—	—	—	2.96E-06	—	—	2.59E-06	—	6.34E-06	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
ALDRIN	8.43E-07	—	—	6.39E-06	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
delta-BHC	—	—	—	—	—	—	—	—	2.80E-06	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
AROCLOR-1260	—	—	—	5.67E-07	—	—	—	—	—	—	4.47E-06	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
2-METHYLNAPHTHALENE	—	—	—	2.52E-06	—	—	2.46E-06	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
BENZO(ghi)PERYLENE	2.10E-06	—	—	6.05E-06	2.45E-06	—	2.20E-07	5.10E-07	—	—	5.00E-08	—	—	—	—	2.46E-06	<0.01	<0.001 - <0.001	<0.01%
ACENAPHTHENE	1.09E-06	—	—	5.16E-06	5.20E-07	—	1.12E-06	—	—	—	—	—	—	—	—	3.70E-07	<0.01	<0.001 - <0.001	<0.01%
ANTHRACENE	8.30E-07	—	—	5.18E-06	5.35E-07	—	7.40E-07	—	—	—	—	—	—	—	—	3.30E-07	<0.01	<0.001 - <0.001	<0.01%
DI-n-BUTYL PHTHALATE	2.28E-06	—	—	8.84E-07	4.08E-06	—	1.24E-06	4.00E-08	1.37E-07	6.83E-08	6.00E-08	—	1.58E-06	—	—	7.20E-07	<0.01	<0.001 - <0.001	<0.01%
1,1-DICHLOROETHANE	3.70E-07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
DI-n-OCTYL PHTHALATE	2.01E-07	—	—	5.03E-08	—	—	—	9.00E-08	—	—	—	—	—	—	—	5.40E-07	<0.01	<0.001 - <0.001	<0.01%

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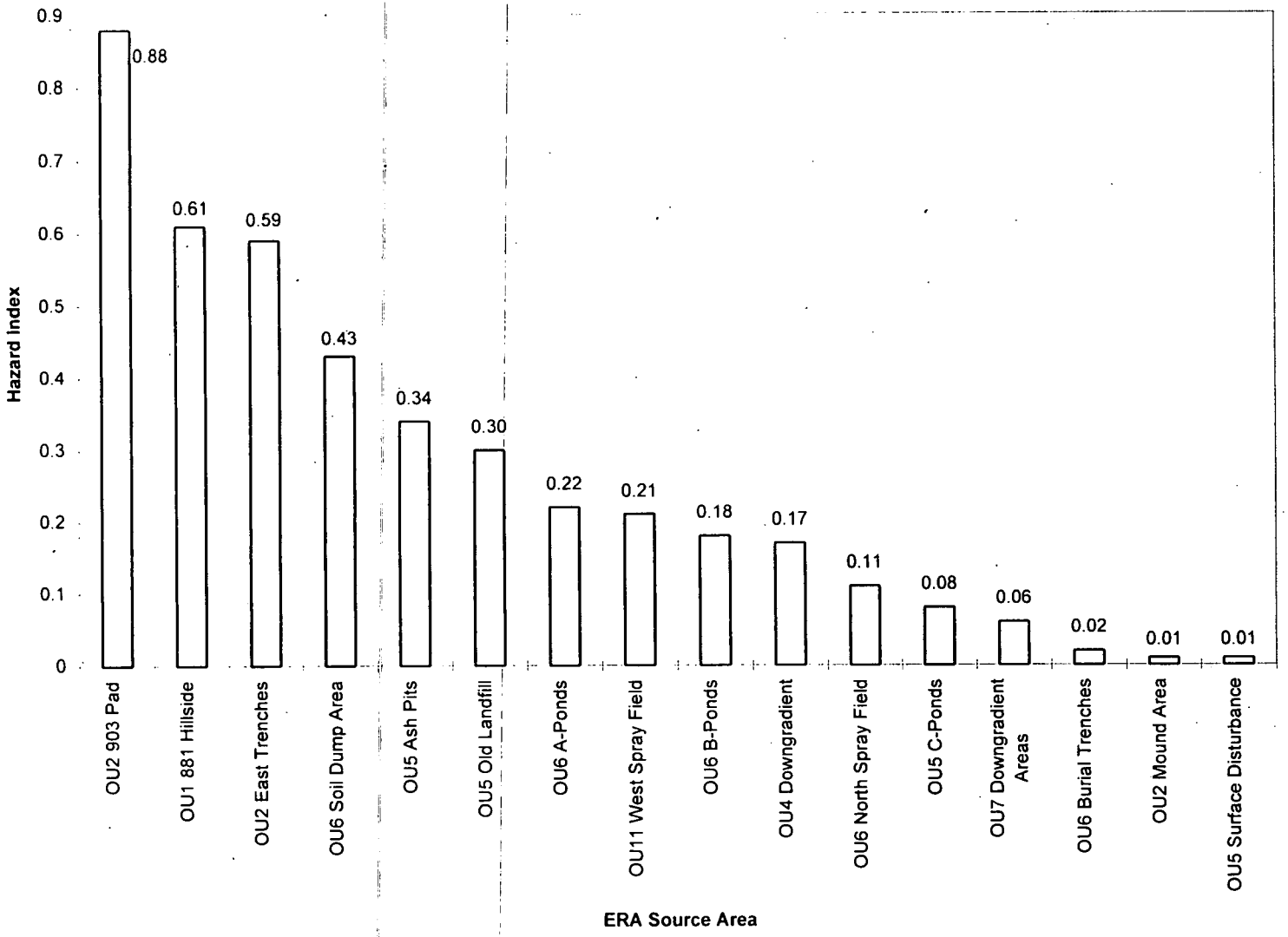
Summary of Ecotoxicological Risk to Mule Deer at RFETS



Summary of Ecotoxicological Risk to Mule Deer in the OU2 903 Pad Source Area at RFETS

MULE DEER OU2 903 PAD		EXPOSURE POINT							SUMMARY				
		Vegetation			Surficial Soil		Surface Water						
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	HQ	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = 0.022 SUF = 0.099			IR = 0.001 SUF = 0.099		IR = 0.044 SUF = 0.066						
ANTIMONY		ND		—	9.800	0.001	0.020	5.74E-05	0.001	0.009	0.11	0.11	12.53%
CADMIUM		2.100		0.005	0.920	9.11E-05	0.002	6.68E-06	0.005	0.048	0.10	0.10	11.02%
SELENIUM		2.288		0.005	0.620	6.14E-05	0.008	2.36E-05	0.005	0.054	0.09	0.09	10.59%
ACETONE		NR	73.447	0.160	NR	—	0.013	3.81E-05	0.160	1.739	0.09	0.09	10.44%
MERCURY		0.098		2.13E-04	0.060	5.94E-06	1.14E-04	3.31E-07	2.20E-04	0.002	0.09	0.09	10.39%
ALUMINUM		297.170		0.647	11886.180	1.177	5.480	1.59E-02	1.840	21.331	0.09	0.09	9.79%
MAGNESIUM		1426.036		3.106	3426.354	0.339	39.934	1.16E-01	3.561	46.422	0.08	0.08	8.71%
BARIUM		59.791		0.130	143.681	0.014	0.261	7.59E-04	0.145	2.154	0.07	0.07	7.65%
MANGANESE		169.997		0.370	318.236	0.032	0.312	9.05E-04	0.403	15.306	0.03	0.03	2.99%
VANADIUM		2.400		0.005	35.681	0.004	0.026	7.66E-05	0.009	0.399	0.02	0.02	2.52%
TOLUENE		NR	18.926	0.041	NR	—	ND	—	0.041	2.008	0.02	0.02	2.33%
AROCLOR-1248		NR	0.027	5.91E-05	0.211	2.09E-05	ND	—	8.00E-05	0.004	0.02	0.02	2.19%
METHYLENE CHLORIDE		NR	5.553	0.012	NR	—	0.004	1.08E-05	0.012	1.018	0.01	0.01	1.35%
AROCLOR-1254	X	NR	0.033	7.24E-05	0.208	2.06E-05	0.002	5.45E-06	9.85E-05	0.009	0.01	0.01	1.20%
COPPER		10.420		0.023	21.815	0.002	0.024	6.99E-05	0.025	2.880	0.01	0.01	0.98%
4-METHYL-2-PENTANONE		NR	16.929	0.037	NR	—	ND	—	0.037	4.348	0.01	0.01	0.96%
MOLYBDENUM		5.700		0.012	3.000	2.97E-04	0.016	4.50E-05	0.013	2.200	0.01	0.01	0.66%
LEAD	X	1.789		0.004	32.367	0.003	0.007	1.93E-05	0.007	1.391	0.01	0.01	0.58%
ARSENIC		ND		—	3.998	3.96E-04	0.006	1.61E-05	4.12E-04	0.120	3.44E-03	<0.01	0.39%
CHLOROFORM		NR	3.995	0.009	NR	—	0.011	3.13E-05	0.009	2.609	3.35E-03	<0.01	0.38%
COBALT		0.830		0.002	7.671	0.001	0.011	3.05E-05	0.003	0.856	3.03E-03	<0.01	0.34%
TIN		3.500		0.008	33.323	0.003	0.053	1.53E-04	0.011	4.282	2.59E-03	<0.01	0.29%
ZINC		29.152		0.063	72.699	0.007	0.227	6.60E-04	0.071	27.830	2.56E-03	<0.01	0.29%
LITHIUM		1.100		0.002	13.592	0.001	0.071	2.05E-04	0.004	1.633	2.42E-03	<0.01	0.27%
STRONTIUM		46.852		0.102	43.040	0.004	1.028	2.99E-03	0.109	45.745	2.39E-03	<0.01	0.27%
NICKEL		4.400		0.010	26.987	0.003	0.014	4.12E-05	0.012	6.957	1.77E-03	<0.01	0.20%
NITRATE/NITRITE		NR		—	3.106	3.07E-04	0.793	2.30E-03	0.003	2.251	1.16E-03	<0.01	0.13%
BERYLLIUM		ND		—	1.200	1.19E-04	0.001	3.66E-06	0.000	0.115	1.07E-03	<0.01	0.12%
SILVER		1.300		0.003	ND	—	0.005	1.31E-05	0.003	3.806	7.47E-04	<0.01	0.08%
TOTAL XYLENES		NR	0.049	1.06E-04	NR	—	ND	—	1.06E-04	0.159	6.67E-04	<0.01	0.08%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	0.358	0.001	0.248	2.46E-05	ND	—	0.001	1.417	5.67E-04	<0.01	0.06%
BENZO(a)PYRENE	X	NR	0.005	1.01E-05	0.320	3.17E-05	ND	—	4.18E-05	0.077	5.41E-04	<0.01	0.06%
THALLIUM		ND		—	0.430	4.26E-05	ND	—	4.26E-05	0.114	3.72E-04	<0.01	0.04%
TRICHLOROETHENE		NR	0.937	0.002	NR	—	0.012	3.55E-05	0.002	11.105	1.87E-04	<0.01	0.02%
PYRENE	X	NR	0.339	0.001	0.644	6.37E-05	ND	—	0.001	5.669	1.42E-04	<0.01	0.02%
DIBENZO(a,h)ANTHRACENE		NR	ND	—	0.092	9.11E-06	ND	—	9.11E-06	0.077	1.18E-04	<0.01	0.01%
TETRACHLOROETHENE		NR	0.035	7.70E-05	NR	—	0.006	1.83E-05	9.53E-05	1.058	9.00E-05	<0.01	0.01%
FLUORANTHENE	X	NR	0.284	0.001	0.689	6.82E-05	ND	—	0.001	9.449	7.26E-05	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	0.004	8.20E-06	0.334	3.31E-05	ND	—	4.13E-05	0.773	5.34E-05	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	0.001	3.09E-06	0.337	3.33E-05	ND	—	3.64E-05	0.773	4.71E-05	<0.01	0.01%
BENZO(k)FLUORANTHENE	X	NR	ND	—	0.311	3.08E-05	ND	—	3.08E-05	0.773	3.98E-05	<0.01	<0.01%

Summary of Ecotoxicological Risk to Mule Deer in the OU2 903 Pad Source Area at RFETS

MULE DEER OU2 903 PAD		EXPOSURE POINT							SUMMARY				
		Vegetation			Surficial Soil		Surface Water						
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	HQ	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = 0.022 SUF = 0.099			IR = 0.001 SUF = 0.099		IR = 0.044 SUF = 0.066						
CHROMIUM	X	5.509		0.012	26.789	0.003	0.011	3.30E-05	0.015	476.065	3.08E-05	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	ND	—	0.188	1.86E-05	ND	—	1.86E-05	0.773	2.41E-05	<0.01	<0.01%
1,2-DICHLOROETHENE		NR	0.022	4.70E-05	NR	—	0.011	3.32E-05	8.03E-05	3.417	2.35E-05	<0.01	<0.01%
PHENANTHRENE	X	NR	0.716	0.002	0.556	5.50E-05	ND	—	0.002	77.285	2.09E-05	<0.01	<0.01%
2-BUTANONE		NR	2.668	0.006	NR	—	ND	—	0.006	303.372	1.92E-05	<0.01	<0.01%
1,1-DICHLOROETHENE		NR	0.010	2.19E-05	NR	—	ND	—	2.19E-05	1.416	1.54E-05	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	0.035	7.57E-05	ND	—	ND	—	7.57E-05	6.061	1.25E-05	<0.01	<0.01%
BENZYL ALCOHOL		NR	ND	—	ND	—	0.004	1.16E-05	1.16E-05	1.773	6.55E-06	<0.01	<0.01%
CHRYSENE	X	NR	0.007	1.45E-05	0.341	3.37E-05	ND	—	4.82E-05	7.728	6.24E-06	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	0.061	1.33E-04	0.353	3.50E-05	0.002	5.81E-06	1.74E-04	42.527	4.08E-06	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	ND	—	0.191	1.89E-05	ND	—	1.89E-05	7.728	2.45E-06	<0.01	<0.01%
FLUORENE		NR	ND	—	0.190	1.88E-05	ND	—	1.88E-05	9.449	1.99E-06	<0.01	<0.01%
ANTHRACENE		NR	0.009	2.06E-05	0.201	1.99E-05	ND	—	4.04E-05	75.590	5.35E-07	<0.01	<0.01%
ACENAPHTHENE		NR	0.010	2.18E-05	0.186	1.84E-05	ND	—	4.02E-05	77.285	5.20E-07	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	0.014	3.15E-05	NR	—	ND	—	3.15E-05	81.354	3.87E-07	<0.01	<0.01%
									HAZARD INDEX		0.88	***0.88***	

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU1 881 Hillside Source Area at RFETS

MULE DEER OU1 881 HILLSIDE		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU1	IR = 0.022 SUF = 0.079			IR = 0.001 SUF = 0.001		IR = 0.044 SUF = 0.130					
ACETONE		NR	271.965	0.473	NR	—	0.007	2.03E-05	0.473	1.739	0.27	44.35%
ALUMINUM		NR		—	14308.320	1.130	0.926	0.003	1.133	21.331	0.05	8.67%
CADMIUM		1.409		0.002	0.611	4.83E-05	0.002	4.67E-06	0.003	0.048	0.05	8.49%
SELENIUM		1.500		0.003	0.511	4.04E-05	0.002	5.67E-06	0.003	0.054	0.05	7.97%
TOLUENE	X	NR	43.577	0.076	NR	—	0.003	7.65E-06	0.076	2.008	0.04	6.15%
AROCLOR-1248	X	NR	0.082	1.43E-04	0.123	9.74E-06	ND	—	1.52E-04	0.004	0.04	5.98%
METHYLENE CHLORIDE		NR	14.721	0.026	NR	—	0.004	1.10E-05	0.026	1.018	0.03	4.10%
4-METHYL-2-PENTANONE		NR	33.985	0.059	NR	—	ND	—	0.059	4.348	0.01	2.22%
AROCLOR-1254	X	NR	0.037	6.37E-05	0.257	2.03E-05	ND	—	8.41E-05	0.009	0.01	1.47%
VANADIUM		NR		—	41.858	0.003	0.009	2.56E-05	0.003	0.399	0.01	1.36%
BARIUM		NR		—	179.137	0.014	0.123	3.58E-04	0.015	2.154	0.01	1.10%
COPPER		9.256		0.016	35.484	0.003	0.009	2.72E-05	0.019	2.880	0.01	1.07%
MAGNESIUM		NR		—	3418.568	0.270	13.583	0.039	0.310	46.422	0.01	1.09%
BIS(2-ETHYLHEXYL)PHTHALATE		NR	3.395	0.006	ND	—	0.002	5.81E-06	0.006	1.417	<0.01	0.68%
LEAD		1.100		0.002	48.003	0.004	0.003	1.01E-05	0.006	1.391	<0.01	0.67%
CHLOROFORM		NR	5.967	0.010	NR	—	ND	—	0.010	2.609	<0.01	0.65%
ARSENIC		NR		—	5.377	4.25E-04	0.002	5.93E-06	4.31E-04	0.120	<0.01	0.59%
ZINC		28.068		0.049	85.548	0.007	0.051	1.47E-04	0.056	27.830	<0.01	0.33%
MERCURY		ND		—	0.054	4.25E-06	1.18E-04	3.43E-07	4.59E-06	0.002	<0.01	0.31%
MANGANESE		NR		—	312.554	0.025	0.063	1.82E-04	0.025	15.306	<0.01	0.27%
BERYLLIUM		NR		—	1.257	9.93E-05	0.001	2.63E-06	1.02E-04	0.115	<0.01	0.15%
ANTIMONY		NR		—	ND	—	0.015	4.45E-05	4.45E-05	0.009	<0.01	0.78%
TIN		NR		—	43.094	0.003	0.024	6.90E-05	0.003	4.282	<0.01	0.13%
COBALT		NR		—	8.343	0.001	0.007	1.89E-05	0.001	0.856	<0.01	0.13%
2-BUTANONE		NR	119.240	0.207	NR	—	0.005	1.52E-05	0.207	303.372	<0.01	0.11%
NITRATE/NITRITE		NR		—	2.111	1.67E-04	2.624	0.008	0.008	2.251	<0.01	0.56%
PYRENE	X	NR	2.156	0.004	0.693	5.47E-05	ND	—	0.004	5.669	<0.01	0.11%
LITHIUM		NR		—	9.473	0.001	0.021	5.95E-05	0.001	1.633	<0.01	0.08%
BENZO(a)PYRENE	X	NR	0.006	1.10E-05	0.311	2.46E-05	ND	—	3.56E-05	0.077	<0.01	0.08%
THALLIUM		NR		—	0.510	4.03E-05	0.002	5.70E-06	4.60E-05	0.114	<0.01	0.07%
NICKEL		NR		—	29.863	0.002	0.008	2.21E-05	0.002	6.957	<0.01	0.06%
FLUORANTHENE	X	NR	1.763	0.003	0.762	6.02E-05	ND	—	0.003	9.449	<0.01	0.05%
SILVER		0.540		0.001	ND	—	0.003	9.90E-06	0.001	3.806	<0.01	0.04%
STRONTIUM		NR		—	61.651	0.005	0.413	0.001	0.006	45.745	<0.01	0.02%
PHENANTHRENE	X	NR	4.472	0.008	0.559	4.42E-05	ND	—	0.008	77.285	<0.01	0.02%
DIBENZO(a,h)ANTHRACENE	X	NR	ND	—	0.092	7.27E-06	ND	—	7.27E-06	0.077	<0.01	0.02%
MOLYBDENUM		NR		—	1.926	1.52E-04	0.018	5.08E-05	2.03E-04	2.200	<0.01	0.02%
PENTACHLOROPHENOL		NR	0.019	3.34E-05	ND	—	ND	—	3.34E-05	0.514	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	0.008	1.39E-05	0.327	2.58E-05	ND	—	3.97E-05	0.773	<0.01	0.01%

Summary of Ecotoxicological Risk to Mule Deer in the OU1 881 Hillside Source Area at RFETS

MULE DEER OU1 881 HILLSIDE		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU1	IR = 0.022 SUF = 0.079			IR = 0.001 SUF = 0.001		IR = 0.044 SUF = 0.130					
1,1-DICHLOROETHENE	X	NR	0.040	6.98E-05	NR	—	0.003	7.35E-06	7.71E-05	1.416	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	0.002	4.19E-06	0.314	2.48E-05	ND	—	2.90E-05	0.773	<0.01	0.01%
BENZO(k)FLUORANTHENE	X	NR	0.002	3.40E-06	0.297	2.35E-05	ND	—	2.69E-05	0.773	<0.01	0.01%
TRICHLOROETHENE	X	NR	0.187	3.25E-04	NR	—	0.003	7.50E-06	3.32E-04	11.105	<0.01	<0.01%
TETRACHLOROETHENE	X	NR	0.015	2.63E-05	NR	—	0.003	8.19E-06	3.44E-05	1.058	<0.01	<0.01%
CHROMIUM		5.535		0.010	34.997	0.003	0.004	1.15E-05	0.012	476.065	<0.01	<0.01%
TOTAL XYLENES	X	NR	0.002	2.86E-06	NR	—	0.001	2.90E-06	5.76E-06	0.159	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	ND	—	0.204	1.61E-05	ND	—	1.61E-05	0.773	<0.01	<0.01%
1,2-DICHLOROETHANE	X	NR	0.027	4.69E-05	NR	—	0.003	7.72E-06	5.47E-05	4.068	<0.01	<0.01%
BENZYL ALCOHOL		NR	ND	—	0.203	1.61E-05	ND	—	1.61E-05	1.773	<0.01	<0.01%
FLUORENE	X	NR	0.028	4.91E-05	0.193	1.52E-05	ND	—	6.43E-05	9.449	<0.01	<0.01%
CHRYSENE	X	NR	0.012	2.16E-05	0.361	2.85E-05	ND	—	5.01E-05	7.728	<0.01	<0.01%
DI-n-BUTYL PHTHALATE		NR	0.056	9.68E-05	ND	—	ND	—	9.68E-05	42.527	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	ND	—	0.205	1.62E-05	ND	—	1.62E-05	7.728	<0.01	<0.01%
ACENAPHTHENE	X	NR	0.040	6.90E-05	0.195	1.54E-05	ND	—	8.44E-05	77.285	<0.01	<0.01%
NAPHTHALENE	X	NR	0.040	7.00E-05	0.110	8.69E-06	ND	—	7.87E-05	77.285	<0.01	<0.01%
ANTHRACENE	X	NR	0.027	4.69E-05	0.202	1.60E-05	ND	—	6.29E-05	75.590	<0.01	<0.01%
1,2-DICHLOROETHENE	X	NR	ND	—	NR	—	0.002	5.81E-06	5.81E-06	3.417	<0.01	<0.01%
ALDRIN		NR	ND	—	ND	—	1.00E-05	2.90E-08	2.90E-08	0.034	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	0.009	1.59E-05	ND	—	ND	—	1.59E-05	79.055	<0.01	<0.01%
1,1,1-TRICHLOROETHANE	X	NR	0.007	1.26E-05	NR	—	0.003	7.30E-06	1.99E-05	81.354	<0.01	<0.01%
1,1-DICHLOROETHANE	X	NR	ND	—	NR	—	0.003	7.29E-06	7.29E-06	19.699	<0.01	<0.01%

HAZARD INDEX 0.61

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU2 East Trenches Source Area at RFETS

MULE DEER OU2 EAST TRENCHES		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = 0.022 SUF = 0.143			IR = 0.001 SUF = 0.143		IR = I SUF = I					
ACETONE		NR	86.139	0.271	NR	—	NR	—	0.271	1.739	0.16	26.36%
CADMIUM		2.217		0.007	1.400	2.00E-04	NR	—	0.007	0.048	0.15	25.24%
TETRACHLOROETHENE		NR	37.359	0.118	NR	—	NR	—	0.118	1.058	0.11	18.79%
ALUMINUM		NR		—	12216.913	1.747	NR	—	1.747	21.331	0.08	13.86%
METHYLENE CHLORIDE		NR	6.373	0.020	NR	—	NR	—	0.020	1.018	0.02	3.33%
COPPER		10.430		0.033	13.080	0.002	NR	—	0.035	2.880	0.01	2.04%
VANADIUM		NR		—	27.790	0.004	NR	—	0.004	0.399	0.01	1.69%
BARIUM		NR		—	128.840	0.018	NR	—	0.018	2.154	0.01	1.45%
LEAD	X	1.509		0.005	45.985	0.007	NR	—	0.011	1.391	0.01	1.38%
MAGNESIUM		NR		—	2431.742	0.348	NR	—	0.348	46.422	0.01	1.27%
ARSENIC		NR		—	5.496	0.001	NR	—	0.001	0.120	0.01	1.11%
ZINC		33.840		0.106	54.004	0.008	NR	—	0.114	27.830	<0.01	0.69%
MANGANESE		NR		—	310.494	0.044	NR	—	0.044	15.306	<0.01	0.49%
TOTAL XYLENES		NR	0.126	3.96E-04	NR	—	NR	—	3.96E-04	0.159	<0.01	0.42%
CHLOROFORM		NR	1.310	0.004	NR	—	NR	—	0.004	2.609	<0.01	0.27%
SELENIUM		ND		—	0.510	7.29E-05	NR	—	7.29E-05	0.054	<0.01	0.23%
COBALT		NR		—	7.136	0.001	NR	—	0.001	0.856	<0.01	0.20%
LITHIUM		NR		—	13.267	0.002	NR	—	0.002	1.633	<0.01	0.20%
TIN		NR		—	34.188	0.005	NR	—	0.005	4.282	<0.01	0.19%
AROCLOR-1254	X	NR	0.003	8.68E-06	ND	—	NR	—	8.68E-06	0.009	<0.01	0.16%
BERYLLIUM		NR		—	0.590	8.44E-05	NR	—	8.44E-05	0.115	<0.01	0.12%
TOLUENE		NR	0.453	0.001	NR	—	NR	—	0.001	2.008	<0.01	0.12%
SILVER		0.520		0.002	1.200	1.72E-04	NR	—	0.002	3.806	<0.01	0.08%
TRICHLOROETHENE		NR	1.663	0.005	NR	—	NR	—	0.005	11.105	<0.01	0.08%
BENZO(a)PYRENE	X	NR	0.002	7.32E-06	0.120	1.72E-05	NR	—	2.45E-05	0.077	<0.01	0.05%
NICKEL		NR		—	11.629	0.002	NR	—	0.002	6.957	<0.01	0.04%
1,2-DICHLOROETHENE		NR	0.216	0.001	NR	—	NR	—	0.001	3.417	<0.01	0.03%
4-METHYL-2-PENTANONE		NR	0.191	0.001	NR	—	NR	—	0.001	4.348	<0.01	0.02%
STRONTIUM		NR		—	34.852	0.005	NR	—	0.005	45.745	<0.01	0.02%
1,1-DICHLOROETHENE		NR	0.030	9.47E-05	NR	—	NR	—	9.47E-05	1.416	<0.01	0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	0.024	7.45E-05	0.076	1.09E-05	NR	—	8.54E-05	1.417	<0.01	0.01%
CHROMIUM	X	7.227		0.023	12.981	0.002	NR	—	0.025	476.065	<0.01	0.01%
BENZENE		NR	0.032	1.02E-04	NR	—	NR	—	1.02E-04	2.038	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	0.001	3.55E-06	0.160	2.29E-05	NR	—	2.64E-05	0.773	<0.01	0.01%
1,1,1-TRICHLOROETHANE		NR	0.813	0.003	NR	—	NR	—	0.003	81.354	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	0.003	8.37E-06	0.062	8.87E-06	NR	—	1.72E-05	0.773	<0.01	<0.01%
2-BUTANONE		NR	1.787	0.006	NR	—	NR	—	0.006	303.372	<0.01	<0.01%
PYRENE	X	NR	0.009	2.77E-05	0.218	3.12E-05	NR	—	5.89E-05	5.669	<0.01	<0.01%
FLUORENE		NR	0.026	8.02E-05	ND	—	NR	—	8.02E-05	9.449	<0.01	<0.01%
FLUORANTHENE	X	NR	0.007	2.19E-05	0.229	3.27E-05	NR	—	5.46E-05	9.449	<0.01	<0.01%
NAPHTHALENE		NR	0.093	2.94E-04	ND	—	NR	—	2.94E-04	77.285	<0.01	<0.01%

Summary of Ecotoxicological Risk to Mule Deer in the OU2 East Trenches Source Area at RFETS

MULE DEER OU2 EAST TRENCHES		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = 0.022 SUF = 0.143			IR = 0.001 SUF = 0.143		IR = I SUF = I					
CHRYSENE	X	NR	0.004	1.22E-05	0.110	1.57E-05	NR	—	2.79E-05	7.728	<0.01	<0.01%
4,4'-DDT	X	NR	1.15E-04	3.60E-07	ND	—	NR	—	3.60E-07	0.139	<0.01	<0.01%
2-METHYLNAPHTHALENE		NR	0.060	1.90E-04	ND	—	NR	—	1.90E-04	77.285	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	0.017	5.28E-05	ND	—	NR	—	5.28E-05	42.527	<0.01	<0.01%
PHENANTHRENE	X	NR	0.024	7.43E-05	0.091	1.30E-05	NR	—	8.73E-05	77.285	<0.01	<0.01%
ACENAPHTHENE		NR	0.027	8.63E-05	ND	—	NR	—	8.63E-05	77.285	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	2.38E-04	7.50E-07	ND	—	NR	—	7.50E-07	0.773	<0.01	<0.01%
ANTHRACENE		NR	0.018	5.63E-05	ND	—	NR	—	5.63E-05	75.590	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	0.001	1.67E-06	ND	—	NR	—	1.67E-06	7.728	<0.01	<0.01%

HAZARD INDEX 0.59

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU6 Soil Dump Areas Source Area at RFETS

MULE DEER OU6 SOIL DUMP AREAS		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.022 SUF = 0.065			IR = 0.001 SUF = 0.065		IR = I SUF = I					
SELENIUM		6.623		0.009	ND	—	NR	—	0.009	0.054	0.17	40.74%
MERCURY	X	0.090		1.29E-04	0.139	9.03E-06	NR	—	1.38E-04	0.002	0.06	13.40%
MAGNESIUM	X	1537.931		2.199	2354.730	0.153	NR	—	2.352	46.422	0.05	11.84%
ALUMINUM		141.997		0.203	9659.033	0.628	NR	—	0.831	21.331	0.04	9.10%
CADMIUM		0.640		0.001	3.054	1.98E-04	NR	—	0.001	0.048	0.02	5.41%
BARIUM	X	21.085		0.030	117.141	0.008	NR	—	0.038	2.154	0.02	4.09%
LITHIUM		16.100		0.023	9.142	0.001	NR	—	0.024	1.633	0.01	3.38%
ACETONE	X	NR	11.617	0.017	NR	—	NR	—	0.017	1.739	0.01	2.23%
VANADIUM	X	0.710		0.001	26.996	0.002	NR	—	0.003	0.399	0.01	1.62%
MANGANESE	X	48.491		0.069	244.118	0.016	NR	—	0.085	15.306	0.01	1.30%
MOLYBDENUM	X	8.400		0.012	ND	—	NR	—	0.012	2.200	0.01	1.28%
COPPER	X	8.057		0.012	15.408	0.001	NR	—	0.013	2.880	<0.01	1.02%
AROCLOR-1254	X	NR	ND	—	0.429	2.79E-05	NR	—	2.79E-05	0.009	<0.01	0.70%
NICKEL	X	12.700		0.018	11.325	0.001	NR	—	0.019	6.957	<0.01	0.63%
ARSENIC	X	ND		—	4.989	3.24E-04	NR	—	3.24E-04	0.120	<0.01	0.63%
STRONTIUM	X	80.644		0.115	37.401	0.002	NR	—	0.118	45.745	<0.01	0.60%
LEAD	X	1.224		0.002	24.511	0.002	NR	—	0.003	1.391	<0.01	0.56%
ZINC	X	32.108		0.046	94.049	0.006	NR	—	0.052	27.830	<0.01	0.44%
TIN		4.400		0.006	22.063	0.001	NR	—	0.008	4.282	<0.01	0.42%
COBALT	X	ND		—	6.279	4.08E-04	NR	—	4.08E-04	0.856	<0.01	0.11%
BENZO(a)PYRENE	X	NR	0.002	2.45E-06	0.495	3.22E-05	NR	—	3.46E-05	0.077	<0.01	0.10%
BERYLLIUM		ND		—	0.621	4.03E-05	NR	—	4.03E-05	0.115	<0.01	0.08%
NITRATE/NITRITE		NR		—	7.689	5.00E-04	NR	—	5.00E-04	2.251	<0.01	0.05%
BENZO(k)FLUORANTHENE	X	NR	2.55E-04	3.60E-07	2.200	1.43E-04	NR	—	1.43E-04	0.773	<0.01	0.04%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	0.050	7.20E-05	2.270	1.48E-04	NR	—	2.20E-04	1.417	<0.01	0.04%
THALLIUM		ND		—	0.260	1.69E-05	NR	—	1.69E-05	0.114	<0.01	0.03%
DIBENZO(a,h)ANTHRACENE	X	NR	ND	—	0.130	8.45E-06	NR	—	8.45E-06	0.077	<0.01	0.03%
PENTACHLOROPHENOL		NR	0.032	4.65E-05	ND	—	NR	—	4.65E-05	0.514	<0.01	0.02%
TOLUENE	X	NR	0.112	1.61E-04	NR	—	NR	—	1.61E-04	2.008	<0.01	0.02%
BENZO(b)FLUORANTHENE	X	NR	0.001	1.50E-06	0.855	5.56E-05	NR	—	5.71E-05	0.773	<0.01	0.02%
BENZO(a)ANTHRACENE	X	NR	0.001	2.13E-06	0.526	3.42E-05	NR	—	3.63E-05	0.773	<0.01	0.01%
PHENOL	X	NR	0.305	4.36E-04	ND	—	NR	—	4.36E-04	10.278	<0.01	0.01%
2-BUTANONE	X	NR	7.542	0.011	NR	—	NR	—	0.011	303.372	<0.01	0.01%
METHYLENE CHLORIDE	X	NR	0.021	2.95E-05	NR	—	NR	—	2.95E-05	1.018	<0.01	0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	1.36E-04	1.90E-07	0.334	2.17E-05	NR	—	2.19E-05	0.773	<0.01	0.01%
PYRENE	X	NR	0.008	1.18E-05	1.337	8.69E-05	NR	—	9.87E-05	5.669	<0.01	<0.01%
4-METHYL-2-PENTANONE	X	NR	0.036	5.19E-05	NR	—	NR	—	5.19E-05	4.348	<0.01	<0.01%
FLUORANTHENE	X	NR	0.007	1.06E-05	1.376	8.94E-05	NR	—	1.00E-04	9.449	<0.01	<0.01%
TOTAL XYLENES		NR	0.001	1.57E-06	NR	—	NR	—	1.57E-06	0.159	<0.01	<0.01%

Summary of Ecotoxicological Risk to Mule Deer in the OU6 Soil Dump Areas Source Area at RFETS

MULE DEER OU6 SOIL DUMP AREAS		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.022 SUF = 0.065			IR = 0.001 SUF = 0.065		IR = I SUF = I					
TETRACHLOROETHENE	X	NR	0.004	5.98E-06	NR	—	NR	—	5.98E-06	1.058	<0.01	<0.01%
CHRYSENE	X	NR	0.003	3.80E-06	0.577	3.75E-05	NR	—	4.13E-05	7.728	<0.01	<0.01%
BENZENE	X	NR	0.007	9.89E-06	NR	—	NR	—	9.89E-06	2.038	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	ND	—	0.292	1.90E-05	NR	—	1.90E-05	7.728	<0.01	<0.01%
CHROMIUM	X	ND		—	15.651	0.001	NR	—	0.001	476.065	<0.01	<0.01%
FLUORENE	X	NR	ND	—	0.232	1.51E-05	NR	—	1.51E-05	9.449	<0.01	<0.01%
PHENANTHRENE	X	NR	0.016	2.30E-05	1.056	6.87E-05	NR	—	9.16E-05	77.285	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	ND	—	0.072	4.68E-06	NR	—	4.68E-06	6.061	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	ND	—	0.473	3.07E-05	NR	—	3.07E-05	42.527	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	6.60E-05	9.00E-08	0.658	4.28E-05	NR	—	4.29E-05	79.055	<0.01	<0.01%
ACENAPHTHENE	X	NR	0.009	1.27E-05	0.244	1.59E-05	NR	—	2.86E-05	77.285	<0.01	<0.01%
ANTHRACENE	X	NR	ND	—	0.382	2.48E-05	NR	—	2.48E-05	75.590	<0.01	<0.01%
NAPHTHALENE	X	NR	ND	—	0.110	7.15E-06	NR	—	7.15E-06	77.285	<0.01	<0.01%

HAZARD INDEX 0.43

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU5 Ash Pits Source Area at RFETS

MULE DEER OU5 ASH PITS		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU5	IR = 0.022 SUF = 0.067			IR = 0.001 SUF = 0.067		IR = 0.044 SUF = 0.063					
CADMIUM		2.179		0.003	1.349	9.04E-05	0.001	2.90E-06	0.003	0.048	0.07	20.51%
ALUMINUM		264.435		0.390	13038.844	0.874	0.855	0.002	1.266	21.331	0.06	17.71%
MAGNESIUM		1466.885		2.162	2929.961	0.196	6.862	0.020	2.378	46.422	0.05	15.29%
BARIUM	X	66.746		0.098	143.888	0.010	0.071	2.05E-04	0.108	2.154	0.05	14.99%
MERCURY	X	0.073		1.08E-04	0.078	5.21E-06	1.10E-04	3.19E-07	1.13E-04	0.002	0.05	14.07%
VANADIUM		2.300		0.003	36.213	0.002	0.009	2.50E-05	0.006	0.399	0.01	4.37%
ARSENIC		0.840		0.001	5.715	3.83E-04	0.002	6.06E-06	0.002	0.120	0.01	4.05%
MANGANESE		42.730		0.063	337.520	0.023	0.148	4.29E-04	0.086	15.306	0.01	1.68%
COPPER	X	7.604		0.011	16.938	0.001	0.006	1.64E-05	0.012	2.880	<0.01	1.28%
LEAD	X	1.581		0.002	33.783	0.002	0.004	1.10E-05	0.005	1.391	<0.01	0.99%
NICKEL		14.803		0.022	13.578	0.001	0.009	2.53E-05	0.023	6.957	<0.01	0.98%
ZINC	X	29.216		0.043	69.631	0.005	0.018	5.20E-05	0.048	27.830	<0.01	0.51%
BERYLLIUM		0.084		1.24E-04	0.940	6.30E-05	0.001	3.98E-06	1.91E-04	0.115	<0.01	0.50%
STRONTIUM	X	45.069		0.066	38.768	0.003	0.247	0.001	0.070	45.745	<0.01	0.45%
TIN		3.200		0.005	16.661	0.001	0.019	5.49E-05	0.006	4.282	<0.01	0.41%
COBALT	X	ND		—	8.402	0.001	0.007	2.13E-05	0.001	0.856	<0.01	0.20%
SELENIUM		ND		—	0.410	2.75E-05	0.001	3.19E-06	3.07E-05	0.054	<0.01	0.17%
LITHIUM	X	ND		—	10.380	0.001	0.009	2.53E-05	0.001	1.633	<0.01	0.13%
ANTIMONY	X	ND		—	ND	—	0.015	4.46E-05	4.46E-05	0.009	<0.01	1.43%
SILVER	X	0.970		0.001	1.807	1.21E-04	0.003	9.35E-06	0.002	3.806	<0.01	0.12%
THALLIUM		ND		—	0.520	3.48E-05	ND	—	3.48E-05	0.114	<0.01	0.09%
NITRATE/NITRITE		NR		—	NR	—	0.088	2.57E-04	2.57E-04	2.251	<0.01	0.03%
MOLYBDENUM		ND		—	0.928	6.22E-05	0.020	5.73E-05	1.19E-04	2.200	<0.01	0.02%
ACETONE		NR	NR	—	NR	—	0.009	2.60E-05	2.60E-05	1.739	<0.01	<0.01%
METHYLENE CHLORIDE	X	NR	NR	—	NR	—	0.005	1.38E-05	1.38E-05	1.018	<0.01	<0.01%
CHROMIUM		1.900		0.003	15.956	0.001	0.004	1.13E-05	0.004	476.065	<0.01	<0.01%
1,2-DICHLOROETHANE		NR	NR	—	NR	—	0.003	8.92E-06	8.92E-06	4.068	<0.01	<0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	NR	—	NR	—	0.001	2.90E-06	2.90E-06	1.417	<0.01	<0.01%

HAZARD INDEX 0.34

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU5 Old Landfill Source Area at RFETS

MULE DEER OU5 OLD LANDFILL		EXPOSURE POINT							SUMMARY				
		Vegetation			Surficial Soil		Surface Water						
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	HQ	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU5	IR = 0.022 SUF = 0.048			IR = 0.001 SUF = 0.048		IR = 0.044 SUF = 0.096						
MAGNESIUM		2448.896		2.586	2298.534	0.110	19.837	0.058	2.754	46.422	0.06	0.06	19.81%
ANTIMONY	X	ND		—	8.677	4.17E-04	0.015	4.41E-05	4.61E-04	0.009	0.05	0.05	16.52%
CADMIUM		1.900		0.002	0.880	4.23E-05	0.002	4.65E-06	0.002	0.048	0.04	0.04	14.25%
BARIUM	X	66.461		0.070	115.593	0.006	0.162	4.70E-04	0.076	2.154	0.04	0.04	11.81%
ALUMINUM		199.127		0.210	11074.656	0.532	1.471	0.004	0.746	21.331	0.03	0.03	11.68%
SELENIUM		1.400		0.001	0.459	2.20E-05	0.003	7.33E-06	0.002	0.054	0.03	0.03	9.27%
ARSENIC		0.590		0.001	5.702	2.74E-04	0.002	6.21E-06	0.001	0.120	0.01	0.01	2.52%
VANADIUM		1.400		0.001	30.425	0.001	0.008	2.38E-05	0.003	0.399	0.01	0.01	2.48%
MOLYBDENUM		8.700		0.009	4.400	2.11E-04	0.004	1.28E-05	0.009	2.200	4.28E-03	<0.01	1.43%
MANGANESE		47.237		0.050	277.661	0.013	0.061	1.78E-04	0.063	15.306	4.14E-03	<0.01	1.38%
COPPER	X	7.863		0.008	37.703	0.002	0.006	1.65E-05	0.010	2.880	3.52E-03	<0.01	1.17%
AROCLOR-1254	X	NR	0.001	1.53E-06	0.572	2.75E-05	ND	—	2.90E-05	0.009	3.11E-03	<0.01	1.04%
MERCURY	X	ND		—	0.124	5.94E-06	1.11E-04	3.22E-07	6.26E-06	0.002	2.61E-03	<0.01	0.87%
LEAD	X	1.683		0.002	28.695	0.001	0.004	1.16E-05	0.003	1.391	2.28E-03	<0.01	0.76%
BENZO(a)PYRENE	X	NR	0.030	3.18E-05	2.636	1.27E-04	ND	—	1.58E-04	0.077	2.05E-03	<0.01	0.68%
NITRATE/NITRITE		NR		—	NR	—	1.490	0.004	0.004	2.251	1.92E-03	<0.01	0.64%
STRONTIUM	X	79.000		0.083	30.813	0.001	0.484	0.001	0.086	45.745	1.89E-03	<0.01	0.63%
ZINC	X	44.205		0.047	66.571	0.003	0.022	6.49E-05	0.050	27.830	1.79E-03	<0.01	0.60%
NICKEL		8.000		0.008	14.939	0.001	0.009	2.74E-05	0.009	6.957	1.32E-03	<0.01	0.44%
LITHIUM	X	1.100		0.001	8.005	3.84E-04	0.013	3.74E-05	0.002	1.633	9.69E-04	<0.01	0.32%
ACETONE		NR	1.397	0.001	ND	—	0.022	6.46E-05	0.002	1.739	8.85E-04	<0.01	0.30%
TIN		2.100		0.002	9.714	4.66E-04	0.021	6.10E-05	0.003	4.282	6.41E-04	<0.01	0.21%
DIBENZO(a,h)ANTHRACENE	X	NR	0.003	3.29E-06	0.758	3.64E-05	ND	—	3.97E-05	0.077	5.14E-04	<0.01	0.17%
COBALT	X	ND		—	8.348	4.01E-04	0.002	5.81E-06	4.06E-04	0.856	4.75E-04	<0.01	0.16%
BERYLLIUM		ND		—	0.882	4.23E-05	0.001	2.75E-06	4.51E-05	0.115	3.93E-04	<0.01	0.13%
SILVER	X	1.000		0.001	7.180	3.45E-04	0.003	1.01E-05	0.001	3.806	3.71E-04	<0.01	0.12%
BENZO(a)ANTHRACENE	X	NR	0.038	4.00E-05	2.850	1.37E-04	ND	—	1.77E-04	0.773	2.29E-04	<0.01	0.08%
BENZO(b)FLUORANTHENE	X	NR	0.016	1.67E-05	3.179	1.53E-04	ND	—	1.69E-04	0.773	2.19E-04	<0.01	0.07%
THALLIUM		ND		—	0.310	1.49E-05	0.002	5.75E-06	2.06E-05	0.114	1.81E-04	<0.01	0.06%
INDENO(1,2,3-cd)PYRENE	X	NR	0.001	1.26E-06	2.572	1.23E-04	ND	—	1.25E-04	0.773	1.61E-04	<0.01	0.05%
DIELDRIN	X	NR	ND	—	0.009	4.40E-07	ND	—	4.40E-07	0.003	1.28E-04	<0.01	0.04%
ENDRIN KETONE	X	NR	NO LOG K_{OW}	—	0.009	4.50E-07	ND	—	4.50E-07	0.004	1.14E-04	<0.01	0.04%
BENZO(k)FLUORANTHENE	X	NR	0.005	5.01E-06	1.694	8.13E-05	ND	—	8.63E-05	0.773	1.12E-04	<0.01	0.04%
PYRENE.	X	NR	0.201	2.12E-04	7.090	3.40E-04	ND	—	0.001	5.669	9.75E-05	<0.01	0.03%
PHENOL	X	NR	0.777	0.001	ND	—	ND	—	0.001	10.278	7.98E-05	<0.01	0.03%
FLUORANTHENE	X	NR	0.208	2.19E-04	8.267	3.97E-04	ND	—	0.001	9.449	6.52E-05	<0.01	0.02%
METHYLENE CHLORIDE	X	NR	0.042	4.38E-05	ND	—	0.003	8.89E-06	5.27E-05	1.018	5.18E-05	<0.01	0.02%
PENTACHLOROPHENOL	X	NR	0.008	8.32E-06	ND	—	0.005	1.45E-05	2.28E-05	0.514	4.44E-05	<0.01	0.01%
FLUORENE	X	NR	0.268	2.83E-04	2.363	1.13E-04	ND	—	3.96E-04	9.449	4.20E-05	<0.01	0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	0.023	2.43E-05	0.210	1.01E-05	0.002	5.81E-06	4.02E-05	1.417	2.84E-05	<0.01	0.01%
CHRYSENE	X	NR	0.061	6.41E-05	2.987	1.43E-04	ND	—	2.07E-04	7.728	2.68E-05	<0.01	0.01%

Summary of Ecotoxicological Risk to Mule Deer in the OU5 Old Landfill Source Area at RFETS

MULE DEER OU5 OLD LANDFILL		EXPOSURE POINT							SUMMARY				
		Vegetation			Surficial Soil		Surface Water						
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	HQ	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU5	IR = 0.022 SUF = 0.048			IR = 0.001 SUF = 0.048		IR = 0.044 SUF = 0.096						
HEPTACHLOR EPOXIDE	X	NR	0.001	1.37E-06	0.004	2.10E-07	ND	—	1.58E-06	0.071	2.23E-05	<0.01	0.01%
TOTAL XYLENES		NR	0.003	3.44E-06	ND	—	ND	—	3.44E-06	0.159	2.16E-05	<0.01	0.01%
NAPHTHALENE	X	NR	1.297	0.001	2.498	1.20E-04	ND	—	0.001	77.285	1.93E-05	<0.01	0.01%
PHENANTHRENE	X	NR	0.610	0.001	9.640	4.63E-04	ND	—	0.001	77.285	1.43E-05	<0.01	<0.01%
TOLUENE	X	NR	0.027	2.81E-05	ND	—	ND	—	2.81E-05	2.008	1.40E-05	<0.01	<0.01%
TETRACHLOROETHENE		NR	0.013	1.36E-05	ND	—	ND	—	1.36E-05	1.058	1.29E-05	<0.01	<0.01%
CHROMIUM		3.600		0.004	13.088	0.001	0.004	1.24E-05	0.004	476.065	9.33E-06	<0.01	<0.01%
ENDOSULFAN SULFATE	X	NR	ND	—	0.009	4.20E-07	ND	—	4.20E-07	0.059	7.10E-06	<0.01	<0.01%
ALDRIN	X	NR	ND	—	0.005	2.20E-07	ND	—	2.20E-07	0.034	6.39E-06	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	0.002	2.45E-06	0.922	4.43E-05	ND	—	4.67E-05	7.728	6.05E-06	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	0.024	2.54E-05	0.220	1.06E-05	ND	—	3.60E-05	6.061	5.94E-06	<0.01	<0.01%
ANTHRACENE	X	NR	0.243	2.57E-04	2.816	1.35E-04	ND	—	3.92E-04	75.590	5.18E-06	<0.01	<0.01%
ACENAPHTHENE	X	NR	0.258	2.72E-04	2.636	1.27E-04	ND	—	3.99E-04	77.285	5.16E-06	<0.01	<0.01%
4-METHYL-2-PENTANONE		NR	0.018	1.92E-05	ND	—	ND	—	1.92E-05	4.348	4.41E-06	<0.01	<0.01%
ISOPHORONE	X	NR	0.344	3.63E-04	ND	—	ND	—	3.63E-04	84.965	4.28E-06	<0.01	<0.01%
METHOXYCHLOR	X	NR	ND	—	0.060	2.88E-06	ND	—	2.88E-06	0.685	4.20E-06	<0.01	<0.01%
4,4'-DDT	X	NR	ND	—	0.009	4.10E-07	ND	—	4.10E-07	0.139	2.96E-06	<0.01	<0.01%
CHLOROFORM		NR	ND	—	ND	—	0.003	7.36E-06	7.36E-06	2.609	2.82E-06	<0.01	<0.01%
TRICHLOROETHENE		NR	0.019	1.98E-05	ND	—	0.003	8.33E-06	2.81E-05	11.105	2.53E-06	<0.01	<0.01%
2-METHYLNAPHTHALENE	X	NR	0.141	1.49E-04	0.944	4.53E-05	ND	—	1.94E-04	77.285	2.52E-06	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	0.027	2.80E-05	0.200	9.60E-06	ND	—	3.76E-05	42.527	8.84E-07	<0.01	<0.01%
2-BUTANONE		NR	0.234	2.47E-04	ND	—	0.006	1.63E-05	2.64E-04	303.372	8.70E-07	<0.01	<0.01%
AROCLOR-1260		NR	0.001	6.70E-07	ND	—	ND	—	6.70E-07	1.182	5.67E-07	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	ND	—	0.083	3.98E-06	ND	—	3.98E-06	79.055	5.03E-08	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	0.003	3.06E-06	ND	—	ND	—	3.06E-06	81.354	3.76E-08	<0.01	<0.01%
										HAZARD INDEX	0.30	***0.30***	

Notes:

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Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
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Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU6 A-Ponds Source Area at RFETS

MULE DEER OU6 A-PONDS		EXPOSURE POINT							SUMMARY				
		Vegetation			Surficial Soil		Surface Water						
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	HQ	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.022 SUF = 0.034			IR = 0.001 SUF = 0.034		IR = 0.044 SUF = 0.277						
MAGNESIUM	X	2252.596		1.685	1880.000	0.064	18.851	0.055	1.804	46.422	0.04	0.04	17.79%
SELENIUM		2.516		0.002	ND	—	0.003	9.53E-06	0.002	0.054	0.03	0.03	15.95%
MERCURY	X	0.090		6.73E-05	ND	—	1.49E-04	4.33E-07	6.78E-05	0.002	0.03	0.03	12.93%
CADMIUM		1.400		0.001	2.200	7.48E-05	0.001	2.79E-06	0.001	0.048	0.02	0.02	10.71%
ALUMINUM		238.686		0.179	7830.000	0.266	0.405	0.001	0.446	21.331	0.02	0.02	9.57%
LITHIUM		37.901		0.028	4.800	1.63E-04	0.031	8.88E-05	0.029	1.633	0.02	0.02	8.02%
BARIUM	X	40.567		0.030	100.000	0.003	0.062	1.80E-04	0.034	2.154	0.02	0.02	7.21%
VANADIUM	X	1.700		0.001	51.100	0.002	0.002	6.66E-06	0.003	0.399	0.01	0.01	3.46%
ARSENIC	X	0.920		0.001	2.200	7.48E-05	0.004	1.03E-05	0.001	0.120	0.01	0.01	2.96%
COPPER	X	24.122		0.018	5.000	1.70E-04	0.002	6.09E-06	0.018	2.880	0.01	0.01	2.90%
MANGANESE	X	42.435		0.032	1110.000	0.038	0.179	0.001	0.070	15.306	4.57E-03	<0.01	2.09%
ANTIMONY	X	ND		—	ND	—	0.009	2.57E-05	2.57E-05	0.009	2.76E-03	<0.01	1.26%
STRONTIUM	X	112.501		0.084	37.100	0.001	0.278	0.001	0.086	45.745	1.88E-03	<0.01	0.86%
TIN		5.798		0.004	93.300	0.003	ND	—	0.008	4.282	1.75E-03	<0.01	0.80%
ZINC	X	57.285		0.043	65.800	0.002	0.008	2.39E-05	0.045	27.830	1.62E-03	<0.01	0.74%
NICKEL	X	14.200		0.011	13.100	4.45E-04	0.003	8.07E-06	0.011	6.957	1.59E-03	<0.01	0.73%
LEAD	X	1.107		0.001	33.000	0.001	0.003	9.63E-06	0.002	1.391	1.41E-03	<0.01	0.65%
COBALT	X	1.000		0.001	7.100	2.41E-04	0.001	4.24E-06	0.001	0.856	1.16E-03	<0.01	0.53%
MOLYBDENUM	X	3.100		0.002	5.300	1.80E-04	0.003	8.94E-06	0.003	2.200	1.14E-03	<0.01	0.52%
BERYLLIUM		ND		—	1.300	4.42E-05	ND	—	4.42E-05	0.115	3.86E-04	<0.01	0.18%
ACETONE	X	NR	0.693	0.001	NR	—	ND	—	0.001	1.739	2.98E-04	<0.01	0.14%
4,4'-DDT		NR	NR	—	0.026	8.80E-07	NR	—	8.80E-07	0.139	6.34E-06	<0.01	<0.01%
TOLUENE	X	NR	0.016	1.19E-05	NR	—	ND	—	1.19E-05	2.008	5.93E-06	<0.01	<0.01%
METHYLENE CHLORIDE	X	NR	ND	—	NR	—	0.002	5.81E-06	5.81E-06	1.018	5.71E-06	<0.01	<0.01%
delta-BHC		NR	NR	—	0.023	7.80E-07	NR	—	7.80E-07	0.278	2.80E-06	<0.01	<0.01%
SILVER	X	ND		—	ND	—	0.002	5.41E-06	5.41E-06	3.806	1.42E-06	<0.01	<0.01%
CHROMIUM	X	ND		—	9.000	3.06E-04	0.002	4.73E-06	3.11E-04	476.065	6.53E-07	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	NR	—	ND	—	0.002	5.81E-06	5.81E-06	42.527	1.37E-07	<0.01	<0.01%
										HAZARD INDEX	0.22	***0.22***	

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Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU11 West Spray Field Source Area at RFETS

MULE DEER OU11 WEST SPRAY FIELD		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU11	IR = 0.022 SUF = 0.161			IR = 0.001 SUF = 0.161		IR = I SUF = I					
ALUMINUM		NR		—	12185.807	1.962	NR	—	1.962	21.331	0.09	43.49%
ANTIMONY		NR		—	3.500	0.001	NR	—	0.001	0.009	0.06	28.62%
VANADIUM		NR		—	30.669	0.005	NR	—	0.005	0.399	0.01	5.86%
ARSENIC		NR		—	8.032	0.001	NR	—	0.001	0.120	0.01	5.10%
BARIUM		NR		—	130.524	0.021	NR	—	0.021	2.154	0.01	4.61%
MAGNESIUM		NR		—	1746.670	0.281	NR	—	0.281	46.422	0.01	2.86%
LEAD		NR		—	46.092	0.007	NR	—	0.007	1.391	0.01	2.52%
MANGANESE		NR		—	332.865	0.054	NR	—	0.054	15.306	<0.01	1.66%
CADMIUM		NR		—	0.737	1.19E-04	NR	—	1.19E-04	0.048	<0.01	1.17%
SELENIUM		NR		—	0.509	8.20E-05	NR	—	8.20E-05	0.054	<0.01	0.71%
COBALT		NR		—	6.719	0.001	NR	—	0.001	0.856	<0.01	0.60%
NITRATE/NITRITE.		NR		—	15.866	0.003	NR	—	0.003	2.251	<0.01	0.54%
LITHIUM		NR		—	10.111	0.002	NR	—	0.002	1.633	<0.01	0.47%
BERYLLIUM		NR		—	0.682	1.10E-04	NR	—	1.10E-04	0.115	<0.01	0.45%
COPPER		NR		—	13.023	0.002	NR	—	0.002	2.880	<0.01	0.34%
ACETONE		NR	0.296	0.001	NR	—	NR	—	0.001	1.739	<0.01	0.29%
THALLIUM		NR		—	0.270	4.35E-05	NR	—	4.35E-05	0.114	<0.01	0.18%
ZINC		NR		—	44.730	0.007	NR	—	0.007	27.830	<0.01	0.12%
NICKEL		NR		—	9.190	0.001	NR	—	0.001	6.957	<0.01	0.10%
MOLYBDENUM		NR		—	2.600	4.19E-04	NR	—	4.19E-04	2.200	<0.01	0.09%
TIN		NR		—	4.900	0.001	NR	—	0.001	4.282	<0.01	0.09%
METHYLENE CHLORIDE		NR	0.034	1.20E-04	NR	—	NR	—	1.20E-04	1.018	<0.01	0.06%
STRONTIUM		NR		—	23.573	0.004	NR	—	0.004	45.745	<0.01	0.04%
BIS(2-ETHYLHEXYL)PHTHALATE		NR	0.011	3.94E-05	NR	—	NR	—	3.94E-05	1.417	<0.01	0.01%
CHLOROFORM		NR	0.017	5.87E-05	NR	—	NR	—	5.87E-05	2.609	<0.01	0.01%
TOLUENE		NR	0.004	1.36E-05	NR	—	NR	—	1.36E-05	2.008	<0.01	<0.01%
CHROMIUM		NR		—	13.479	0.002	NR	—	0.002	476.065	<0.01	<0.01%
DI-n-BUTYL PHTHALATE		NR	0.019	6.70E-05	NR	—	NR	—	6.70E-05	42.527	<0.01	<0.01%
2-BUTANONE		NR	0.107	3.78E-04	NR	—	NR	—	3.78E-04	303.372	<0.01	<0.01%
TRICHLOROETHENE		NR	0.004	1.27E-05	NR	—	NR	—	1.27E-05	11.105	<0.01	<0.01%

HAZARD INDEX 0.21

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Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU6 B-Ponds Source Area at RFETS

MULE DEER OU6 B-PONDS		EXPOSURE POINT							SUMMARY				
		Vegetation			Surficial Soil		Surface Water						
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	HQ	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.022 SUF = 0.025			IR = 0.001 SUF = 0.025		IR = 0.044 SUF = 0.169						
SELENIUM		2.818		0.002	ND	—	0.002	5.87E-06	0.002	0.054	0.03	0.03	15.75%
ALUMINUM		172.535		0.095	18700.000	0.468	0.264	0.001	0.563	21.331	0.03	0.03	14.51%
CADMIUM		2.034		0.001	ND	—	0.001	2.86E-06	0.001	0.048	0.02	0.02	12.82%
MAGNESIUM	X	1669.753		0.918	3790.000	0.095	15.504	0.045	1.058	46.422	0.02	0.02	12.53%
MERCURY	X	0.086		4.73E-05	ND	—	2.75E-04	7.99E-07	0.000	0.002	0.02	0.02	11.02%
BARIUM	X	53.768		0.030	194.000	0.005	0.051	1.50E-04	0.035	2.154	0.02	0.02	8.82%
ARSENIC	X	2.700		0.001	5.100	1.28E-04	0.002	6.54E-06	0.002	0.120	0.01	0.01	7.43%
COPPER	X	29.452		0.016	17.000	4.25E-04	ND	—	0.017	2.880	0.01	0.01	3.17%
VANADIUM	X	1.200		0.001	38.900	0.001	0.003	8.29E-06	0.002	0.399	4.12E-03	<0.01	2.26%
TIN		25.800		0.014	ND	—	0.006	1.84E-05	0.014	4.282	3.32E-03	<0.01	1.82%
ANTIMONY	X	ND		—	ND	—	0.009	2.47E-05	2.47E-05	0.009	2.65E-03	<0.01	1.46%
MANGANESE	X	53.948		0.030	321.000	0.008	0.098	2.85E-04	0.038	15.306	2.48E-03	<0.01	1.36%
COBALT	X	3.300		0.002	9.000	2.25E-04	0.002	4.59E-06	0.002	0.856	2.39E-03	<0.01	1.31%
ZINC	X	116.031		0.064	64.100	0.002	0.026	7.57E-05	0.065	27.830	2.35E-03	<0.01	1.29%
LITHIUM		6.600		0.004	5.900	1.48E-04	0.017	5.03E-05	0.004	1.633	2.34E-03	<0.01	1.29%
LEAD	X	1.274		0.001	37.200	0.001	0.005	1.49E-05	0.002	1.391	1.18E-03	<0.01	0.65%
NICKEL	X	13.890		0.008	14.600	3.65E-04	0.004	1.03E-05	0.008	6.957	1.15E-03	<0.01	0.63%
MOLYBDENUM	X	3.800		0.002	ND	—	0.007	2.14E-05	0.002	2.200	9.60E-04	<0.01	0.53%
STRONTIUM	X	66.453		0.037	25.500	0.001	0.255	0.001	0.038	45.745	8.29E-04	<0.01	0.46%
SILVER	X	4.700		0.003	ND	—	ND	—	0.003	3.806	6.79E-04	<0.01	0.37%
AROCLOR-1254	X	0.010		5.61E-06	ND	—	NR	—	5.61E-06	0.009	6.02E-04	<0.01	0.33%
BERYLLIUM		ND		—	0.970	2.43E-05	1.79E-04	5.20E-07	2.48E-05	0.115	2.16E-04	<0.01	0.12%
THALLIUM		ND		—	0.230	5.75E-06	ND	—	5.75E-06	0.114	5.03E-05	<0.01	0.03%
ACETONE	X	NR	ND	—	NR	—	0.011	3.07E-05	3.07E-05	1.739	1.76E-05	<0.01	<0.01%
TETRACHLOROETHENE	X	NR	ND	—	NR	—	0.004	1.06E-05	1.06E-05	1.058	1.00E-05	<0.01	<0.01%
CHROMIUM	X	5.293		0.003	19.900	4.98E-04	0.002	6.42E-06	0.003	476.065	7.17E-06	<0.01	<0.01%
TOLUENE	X	NR	0.020	1.13E-05	NR	—	ND	—	1.13E-05	2.008	5.61E-06	<0.01	<0.01%
CHLOROFORM	X	NR	ND	—	NR	—	0.002	5.81E-06	5.81E-06	2.609	2.23E-06	<0.01	<0.01%
1,2-DICHLOROETHENE	X	NR	ND	—	NR	—	0.003	7.34E-06	7.34E-06	3.417	2.15E-06	<0.01	<0.01%
TRICHLOROETHENE	X	NR	ND	—	NR	—	0.003	8.35E-06	8.35E-06	11.105	7.52E-07	<0.01	<0.01%
1,2-DICHLOROETHANE	X	NR	ND	—	NR	—	0.001	2.90E-06	2.90E-06	4.068	7.14E-07	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	NR	—	ND	—	0.001	2.90E-06	2.90E-06	42.527	6.83E-08	<0.01	<0.01%
									HAZARD INDEX		0.18	***0.18***	

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
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I = Incomplete pathway
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NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU4 Downgradient Source Area at RFETS

MULE DEER OU4 DOWNGRADIENT		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU4	IR = 0.022 SUF = 0.023			IR = 0.001 SUF = 0.023		IR = 0.004 SUF = 0.031					
SELENIUM		3.643		0.002	ND	—	NR	—	0.002	0.054	0.03	20.38%
MAGNESIUM		2057.159		1.041	2871.518	0.066	NR	—	1.107	46.422	0.02	14.31%
ALUMINUM		413.229		0.209	12856.399	0.296	NR	—	0.505	21.331	0.02	14.21%
MERCURY	X	0.075		3.80E-05	0.107	2.45E-06	NR	—	4.04E-05	0.002	0.02	10.11%
CADMIUM	X	1.400		0.001	1.109	2.55E-05	NR	—	0.001	0.048	0.02	9.16%
BARIUM		56.333		0.029	165.692	0.004	NR	—	0.032	2.154	0.02	9.00%
LITHIUM		33.600		0.017	9.207	2.12E-04	NR	—	0.017	1.633	0.01	6.33%
VANADIUM		3.100		0.002	35.665	0.001	NR	—	0.002	0.399	0.01	3.60%
ARSENIC		1.100		0.001	4.565	1.05E-04	NR	—	0.001	0.120	0.01	3.32%
COPPER		25.140		0.013	16.143	3.71E-04	NR	—	0.013	2.880	<0.01	2.73%
BERYLLIUM	X	0.500		2.53E-04	ND	—	NR	—	2.53E-04	0.115	<0.01	1.33%
MANGANESE		51.289		0.026	337.070	0.008	NR	—	0.034	15.306	<0.01	1.32%
MOLYBDENUM		7.200		0.004	ND	—	NR	—	0.004	2.200	<0.01	0.99%
TIN		8.500		0.004	38.477	0.001	NR	—	0.005	4.282	<0.01	0.73%
LEAD		1.745		0.001	20.053	4.61E-04	NR	—	0.001	1.391	<0.01	0.58%
STRONTIUM		78.059		0.039	52.509	0.001	NR	—	0.041	45.745	<0.01	0.53%
ZINC		42.863		0.022	74.594	0.002	NR	—	0.023	27.830	<0.01	0.50%
NICKEL		6.800		0.003	14.767	3.40E-04	NR	—	0.004	6.957	<0.01	0.33%
ACETONE		NR	1.085	0.001	NR	—	NR	—	0.001	1.739	<0.01	0.19%
COBALT		ND		—	8.238	1.89E-04	NR	—	1.89E-04	0.856	<0.01	0.13%
THALLIUM		ND		—	0.630	1.45E-05	NR	—	1.45E-05	0.114	<0.01	0.08%
BENZO(a)PYRENE	X	NR	NR	—	0.200	4.60E-06	NR	—	4.60E-06	0.077	<0.01	0.04%
TOLUENE		NR	0.232	1.18E-04	NR	—	NR	—	1.18E-04	2.008	<0.01	0.04%
NITRATE/NITRITE	X	NR		—	3.975	9.14E-05	NR	—	9.14E-05	2.251	<0.01	0.02%
METHYLENE CHLORIDE		NR	0.078	3.94E-05	NR	—	NR	—	3.94E-05	1.018	<0.01	0.02%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	NR	—	0.978	2.25E-05	NR	—	2.25E-05	1.417	<0.01	0.01%
DIBENZO(a,h)ANTHRACENE		NR	NR	—	0.047	1.08E-06	NR	—	1.08E-06	0.077	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	NR	—	0.182	4.17E-06	NR	—	4.17E-06	0.773	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	NR	—	0.160	3.68E-06	NR	—	3.68E-06	0.773	<0.01	<0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	NR	—	0.150	3.45E-06	NR	—	3.45E-06	0.773	<0.01	<0.01%
BENZO(k)FLUORANTHENE	X	NR	NR	—	0.130	2.99E-06	NR	—	2.99E-06	0.773	<0.01	<0.01%
CHROMIUM		1.400		0.001	14.049	3.23E-04	NR	—	0.001	476.065	<0.01	<0.01%
TETRACHLOROETHENE		NR	0.002	8.80E-07	NR	—	NR	—	8.80E-07	1.058	<0.01	<0.01%
PYRENE	X	NR	NR	—	0.191	4.39E-06	NR	—	4.39E-06	5.669	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	NR	—	0.170	3.91E-06	NR	—	3.91E-06	6.061	<0.01	<0.01%
CHRYSENE	X	NR	NR	—	0.220	5.06E-06	NR	—	5.06E-06	7.728	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	NR	—	0.170	3.91E-06	NR	—	3.91E-06	7.728	<0.01	<0.01%

Summary of Ecotoxicological Risk to Mule Deer in the OU4 Downgradient Source Area at RFETS

MULE DEER OU4 DOWNGRADIENT		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU4	IR = 0.022 SUF = 0.023			IR = 0.001 SUF = 0.023		IR = 0.004 SUF = 0.031					
FLUORANTHENE	X	NR	NR	—	0.183	4.21E-06	NR	—	4.21E-06	9.449	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	NR	—	0.295	6.78E-06	NR	—	6.78E-06	79.055	<0.01	<0.01%
DI-n-BUTYL PHTHALATE	X	NR	NR	—	0.079	1.82E-06	NR	—	1.82E-06	42.527	<0.01	<0.01%
PHENANTHRENE	X	NR	NR	—	0.074	1.70E-06	NR	—	1.70E-06	77.285	<0.01	<0.01%

HAZARD INDEX 0.17

Notes:

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IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU6 North Spray Field Source Area at RFETS

MULE DEER OU6 NORTH SPRAY FIELD		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.022 SUF = 0.016			IR = 0.001 SUF = 0.016		IR = I SUF = I					
MAGNESIUM	X	4253.480		1.497	2397.398	0.038	NR	—	1.536	46.422	0.03	29.60%
ANTIMONY	X	ND		—	16.765	2.68E-04	NR	—	2.68E-04	0.009	0.03	25.78%
BARIUM	X	83.888		0.030	170.910	0.003	NR	—	0.032	2.154	0.01	13.40%
ALUMINUM		347.535		0.122	11820.163	0.189	NR	—	0.311	21.331	0.01	13.07%
CADMIUM		1.400		4.93E-04	0.990	1.58E-05	NR	—	0.001	0.048	0.01	9.46%
VANADIUM	X	1.300		4.58E-04	33.599	0.001	NR	—	0.001	0.399	<0.01	2.23%
THALLIUM		0.450		1.58E-04	0.340	5.44E-06	NR	—	1.64E-04	0.114	<0.01	1.28%
MANGANESE	X	35.254		0.012	315.526	0.005	NR	—	0.017	15.306	<0.01	1.02%
LEAD	X	1.764		0.001	40.050	0.001	NR	—	0.001	1.391	<0.01	0.81%
ARSENIC	X	ND		—	6.579	1.05E-04	NR	—	1.05E-04	0.120	<0.01	0.79%
COPPER	X	6.541		0.002	13.985	2.24E-04	NR	—	0.003	2.880	<0.01	0.78%
STRONTIUM	X	76.343		0.027	31.283	0.001	NR	—	0.027	45.745	<0.01	0.54%
MERCURY	X	ND		—	0.066	1.06E-06	NR	—	1.06E-06	0.002	<0.01	0.40%
ZINC	X	21.241		0.007	48.942	0.001	NR	—	0.008	27.830	<0.01	0.27%
COBALT	X	ND		—	9.750	1.56E-04	NR	—	1.56E-04	0.856	<0.01	0.16%
SELENIUM		ND		—	0.574	9.19E-06	NR	—	9.19E-06	0.054	<0.01	0.15%
NICKEL	X	1.700		0.001	15.387	2.46E-04	NR	—	0.001	6.957	<0.01	0.11%
BERYLLIUM		ND		—	0.686	1.10E-05	NR	—	1.10E-05	0.115	<0.01	0.09%
LITHIUM		ND		—	6.643	1.06E-04	NR	—	1.06E-04	1.633	<0.01	0.06%
NITRATE/NITRITE		NR		—	1.000	1.60E-05	NR	—	1.60E-05	2.251	<0.01	0.01%
TOLUENE	X	NR	0.003	1.20E-06	NR	—	NR	—	1.20E-06	2.008	<0.01	<0.01%
CHROMIUM	X	ND		—	13.137	2.10E-04	NR	—	2.10E-04	476.065	<0.01	<0.01%

HAZARD INDEX 0.11

Notes:

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NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU5 C-Ponds Source Area at RFETS

MULE DEER OU5 C-PONDS		EXPOSURE POINT							SUMMARY				
		Vegetation			Surficial Soil		Surface Water						
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	HQ	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU5	IR = 0.022 SUF = 0.039			IR = 0.001 SUF = 0.039		IR = 0.044 SUF = 0.198						
CADMIUM		1.500		0.001	ND	—	0.003	7.52E-06	0.001	0.048	0.03	0.03	35.51%
ALUMINUM		NR		—	13000.000	0.507	2.432	0.007	0.514	21.331	0.02	0.02	31.79%
ANTIMONY	X	NR		—	ND	—	0.015	4.47E-05	4.47E-05	0.009	4.80E-03	<0.01	6.33%
VANADIUM		NR		—	34.700	0.001	0.012	3.36E-05	0.001	0.399	3.48E-03	<0.01	4.59%
MAGNESIUM		NR		—	2860.000	0.112	10.768	0.031	0.143	46.422	3.08E-03	<0.01	4.06%
COPPER	X	8.926		0.008	10.200	3.98E-04	0.008	2.32E-05	0.008	2.880	2.81E-03	<0.01	3.70%
BARIUM	X	NR		—	144.000	0.006	0.109	3.17E-04	0.006	2.154	2.75E-03	<0.01	3.63%
LEAD	X	1.355		0.001	26.100	0.001	0.006	1.83E-05	0.002	1.391	1.58E-03	<0.01	2.09%
ZINC	X	41.397		0.036	56.700	0.002	0.048	1.41E-04	0.038	27.830	1.36E-03	<0.01	1.80%
ARSENIC		NR		—	3.500	1.37E-04	0.002	6.46E-06	1.43E-04	0.120	1.19E-03	<0.01	1.57%
MANGANESE		NR		—	360.000	0.014	0.120	3.49E-04	0.014	15.306	9.40E-04	<0.01	1.24%
NITRATE/NITRITE		NR		—	NR	—	0.541	0.002	0.002	2.251	6.97E-04	<0.01	0.92%
SELENIUM		ND		—	0.510	1.99E-05	0.002	5.38E-06	2.53E-05	0.054	4.65E-04	<0.01	0.61%
COBALT	X	NR		—	7.900	3.08E-04	0.008	2.31E-05	3.31E-04	0.856	3.87E-04	<0.01	0.51%
TIN		NR		—	32.700	0.001	0.021	6.22E-05	0.001	4.282	3.12E-04	<0.01	0.41%
LITHIUM	X	NR		—	10.700	4.17E-04	0.020	5.81E-05	4.75E-04	1.633	2.91E-04	<0.01	0.38%
MERCURY	X	ND		—	ND	—	1.41E-04	4.09E-07	4.09E-07	0.002	1.71E-04	<0.01	0.23%
ACETONE		NR	0.266	2.29E-04	NR	—	0.014	4.20E-05	2.71E-04	1.739	1.56E-04	<0.01	0.21%
NICKEL		NR		—	13.800	0.001	0.009	2.52E-05	0.001	6.957	8.10E-05	<0.01	0.11%
THALLIUM		NR		—	ND	—	0.002	6.78E-06	6.78E-06	0.114	5.93E-05	<0.01	0.08%
STRONTIUM	X	NR		—	41.700	0.002	0.337	0.001	0.003	45.745	5.69E-05	<0.01	0.08%
METHYLENE CHLORIDE	X	NR	0.027	2.36E-05	NR	—	0.004	1.06E-05	3.42E-05	1.018	3.36E-05	<0.01	0.04%
BERYLLIUM		NR		—	ND	—	0.001	2.90E-06	2.90E-06	0.115	2.53E-05	<0.01	0.03%
MOLYBDENUM		NR		—	ND	—	0.017	4.82E-05	4.82E-05	2.200	2.19E-05	<0.01	0.03%
CHROMIUM		10.957		0.009	14.800	0.001	0.005	1.38E-05	0.010	476.065	2.10E-05	<0.01	0.03%
TOLUENE	X	NR	0.020	1.75E-05	NR	—	0.001	2.90E-06	2.04E-05	2.008	1.02E-05	<0.01	0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	ND	—	ND	—	0.002	5.81E-06	5.81E-06	1.417	4.10E-06	<0.01	<0.01%
CHLOROFORM		NR	ND	—	NR	—	0.003	7.46E-06	7.46E-06	2.609	2.86E-06	<0.01	<0.01%
SILVER	X	ND		—	ND	—	0.004	1.05E-05	1.05E-05	3.806	2.75E-06	<0.01	<0.01%
PYRENE	X	NR	ND	—	0.094	3.67E-06	ND	—	3.67E-06	5.669	6.47E-07	<0.01	<0.01%
FLUORANTHENE	X	NR	ND	—	0.078	3.04E-06	ND	—	3.04E-06	9.449	3.22E-07	<0.01	<0.01%
2-BUTANONE		NR	ND	—	NR	—	0.006	1.69E-05	1.69E-05	303.372	5.55E-08	<0.01	<0.01%
										HAZARD INDEX	0.08	***0.08***	

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Summary of Ecotoxicological Risk to Mule Deer in the OU7 Downgradient Areas Source Area at RFETS

MULE DEER OU7 DOWNGRADIENT AREAS		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU7	IR = 0.022 SUF = 0.010			IR = 0.001 SUF = 0.010		IR = I SUF = I					
SELENIUM	X	4.398		0.001	NR	—	0.007	—	0.001	0.054	0.02	31.83%
MAGNESIUM	X	2549.843		0.561	NR	—	25.696	—	0.561	46.422	0.01	21.58%
CADMIUM		1.600		3.52E-04	NR	—	0.002	—	3.52E-04	0.048	0.01	13.07%
BARIUM	X	52.799		0.012	NR	—	0.189	—	0.012	2.154	0.01	9.63%
COPPER	X	42.778		0.009	NR	—	0.009	—	0.009	2.880	<0.01	5.84%
ALUMINUM	X	212.406		0.047	NR	—	0.403	—	0.047	21.331	<0.01	3.91%
BERYLLIUM	X	1.100		2.42E-04	NR	—	ND	—	2.42E-04	0.115	<0.01	3.77%
LITHIUM	X	10.900		0.002	NR	—	0.020	—	0.002	1.633	<0.01	2.62%
ARSENIC	X	0.700		1.54E-04	NR	—	0.003	—	1.54E-04	0.120	<0.01	2.30%
VANADIUM	X	1.300		2.86E-04	NR	—	0.007	—	2.86E-04	0.399	<0.01	1.28%
NICKEL	X	14.300		0.003	NR	—	0.010	—	0.003	6.957	<0.01	0.81%
STRONTIUM	X	91.649		0.020	NR	—	0.774	—	0.020	45.745	<0.01	0.79%
MOLYBDENUM	X	3.500		0.001	NR	—	0.004	—	0.001	2.200	<0.01	0.63%
MANGANESE	X	18.571		0.004	NR	—	0.084	—	0.004	15.306	<0.01	0.48%
ZINC	X	32.779		0.007	NR	—	0.055	—	0.007	27.830	<0.01	0.46%
LEAD	X	1.532		3.37E-04	NR	—	0.009	—	3.37E-04	1.391	<0.01	0.43%
TIN	X	3.200		0.001	NR	—	0.030	—	0.001	4.282	<0.01	0.29%
TOLUENE	X	NR	0.862	1.90E-04	NR	—	0.008	—	1.90E-04	2.008	<0.01	0.17%
NITRATE/NITRITE	X	NR		—	10.779	1.08E-04	1.056	—	1.08E-04	2.251	<0.01	0.09%
4-METHYL-2-PENTANONE		NR	0.131	2.87E-05	NR	—	ND	—	2.87E-05	4.348	<0.01	0.01%
CHROMIUM	X	7.413		0.002	NR	—	ND	—	0.002	476.065	<0.01	0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	0.014	3.15E-06	NR	—	0.002	—	3.15E-06	1.417	<0.01	<0.01%
TOTAL XYLENES		NR	0.001	2.40E-07	NR	—	0.004	—	2.40E-07	0.159	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	0.020	4.29E-06	NR	—	ND	—	4.29E-06	6.061	<0.01	<0.01%
BENZO(a)ANTHRACENE	X	NR	0.001	1.60E-07	NR	—	ND	—	1.60E-07	0.773	<0.01	<0.01%
PYRENE	X	NR	0.005	1.07E-06	NR	—	ND	—	1.07E-06	5.669	<0.01	<0.01%
FLUORANTHENE	X	NR	0.004	9.00E-07	NR	—	ND	—	9.00E-07	9.449	<0.01	<0.01%
CHRYSENE	X	NR	0.001	2.10E-07	NR	—	ND	—	2.10E-07	7.728	<0.01	<0.01%
PHENANTHRENE	X	NR	0.009	2.08E-06	NR	—	ND	—	2.08E-06	77.285	<0.01	<0.01%
1,1,1-TRICHLOROETHANE		NR	0.003	6.40E-07	NR	—	ND	—	6.40E-07	81.354	<0.01	<0.01%

HAZARD INDEX 0.06

Notes:
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SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU6 Burial Trenches Source Area at RFETS

MULE DEER OU6 BURIAL TRENCHES		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU6	IR = 0.022 SUF = 0.004			IR = NR SUF = 0.004		IR = I SUF = I					
SELENIUM		2.580		2.27E-04	NR	—	NR	—	2.27E-04	0.054	<0.01	24.23%
MAGNESIUM	X	1586.864		0.140	NR	—	NR	—	0.140	46.422	<0.01	17.43%
CADMIUM		1.300		1.14E-04	NR	—	NR	—	1.14E-04	0.048	<0.01	13.78%
MERCURY	X	0.058		5.10E-06	NR	—	NR	—	5.10E-06	0.002	<0.01	12.31%
BARIUM	X	48.775		0.004	NR	—	NR	—	0.004	2.154	<0.01	11.54%
ALUMINUM		296.486		0.026	NR	—	NR	—	0.026	21.331	<0.01	7.09%
COPPER	X	19.589		0.002	NR	—	NR	—	0.002	2.880	<0.01	3.47%
ARSENIC	X	0.630		5.54E-05	NR	—	NR	—	5.54E-05	0.120	<0.01	2.68%
VANADIUM	X	1.400		1.23E-04	NR	—	NR	—	1.23E-04	0.399	<0.01	1.79%
LITHIUM		2.500		2.20E-04	NR	—	NR	—	2.20E-04	1.633	<0.01	0.78%
NICKEL	X	10.500		0.001	NR	—	NR	—	0.001	6.957	<0.01	0.77%
MANGANESE	X	21.320		0.002	NR	—	NR	—	0.002	15.306	<0.01	0.71%
BERYLLIUM		0.130		1.14E-05	NR	—	NR	—	1.14E-05	0.115	<0.01	0.58%
STRONTIUM	X	50.056		0.004	NR	—	NR	—	0.004	45.745	<0.01	0.56%
ZINC	X	26.858		0.002	NR	—	NR	—	0.002	27.830	<0.01	0.49%
MOLYBDENUM	X	2.100		1.85E-04	NR	—	NR	—	1.85E-04	2.200	<0.01	0.49%
LEAD	X	1.183		1.04E-04	NR	—	NR	—	1.04E-04	1.391	<0.01	0.43%
TIN		2.900		2.55E-04	NR	—	NR	—	2.55E-04	4.282	<0.01	0.35%
ACETONE	X	NR	1.066	9.38E-05	NR	—	NR	—	9.38E-05	1.739	<0.01	0.31%
METHYLENE CHLORIDE	X	NR	0.371	3.26E-05	NR	—	NR	—	3.26E-05	1.018	<0.01	0.19%
TOLUENE	X	NR	0.089	7.82E-06	NR	—	NR	—	7.82E-06	2.008	<0.01	0.02%
2-BUTANONE	X	NR	2.157	1.90E-04	NR	—	NR	—	1.90E-04	303.372	<0.01	<0.01%
4-METHYL-2-PENTANONE	X	NR	0.018	1.60E-06	NR	—	NR	—	1.60E-06	4.348	<0.01	<0.01%
CHROMIUM	X	1.600		1.41E-04	NR	—	NR	—	1.41E-04	476.065	<0.01	<0.01%
TRICHLOROETHENE	X	NR	0.028	2.47E-06	NR	—	NR	—	2.47E-06	11.105	<0.01	<0.01%
CHLOROFORM	X	NR	0.006	5.40E-07	NR	—	NR	—	5.40E-07	2.609	<0.01	<0.01%
BENZENE	X	NR	0.002	2.00E-07	NR	—	NR	—	2.00E-07	2.038	<0.01	<0.01%

HAZARD INDEX 0.02

Notes:

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NR = Not reported/analyzed in sample information
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NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU2 Mound Area Source Area at RFETS

MULE DEER OU2 MOUND AREA		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = 0.022 SUF = 0.008			IR = 0.001 SUF = 0.008		IR = I SUF = I					
ALUMINUM		NR		—	10100.000	0.081	NR	—	0.081	21.331	<0.01	53.37%
AROCLOR-1254	X	NR	ND	—	0.970	7.76E-06	NR	—	7.76E-06	0.009	<0.01	11.74%
VANADIUM		NR		—	31.100	2.49E-04	NR	—	2.49E-04	0.399	<0.01	8.79%
MAGNESIUM		NR		—	2730.000	0.022	NR	—	0.022	46.422	<0.01	6.63%
BARIUM		NR		—	108.000	0.001	NR	—	0.001	2.154	<0.01	5.65%
ARSENIC		NR		—	5.900	4.72E-05	NR	—	4.72E-05	0.120	<0.01	5.55%
MANGANESE		NR		—	240.000	0.002	NR	—	0.002	15.306	<0.01	1.77%
ACETONE		NR	0.989	1.74E-04	NR	—	NR	—	1.74E-04	1.739	<0.01	1.41%
LEAD	X	NR		—	16.000	1.28E-04	NR	—	1.28E-04	1.391	<0.01	1.30%
COBALT		NR		—	6.200	4.96E-05	NR	—	4.96E-05	0.856	<0.01	0.82%
LITHIUM		NR		—	8.800	7.04E-05	NR	—	7.04E-05	1.633	<0.01	0.61%
COPPER		NR		—	13.100	1.05E-04	NR	—	1.05E-04	2.880	<0.01	0.51%
THALLIUM		NR		—	0.500	4.00E-06	NR	—	4.00E-06	0.114	<0.01	0.49%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	0.166	2.93E-05	0.052	4.20E-07	NR	—	2.97E-05	1.417	<0.01	0.30%
ZINC		NR		—	46.300	3.70E-04	NR	—	3.70E-04	27.830	<0.01	0.19%
NICKEL		NR		—	11.400	9.12E-05	NR	—	9.12E-05	6.957	<0.01	0.18%
STRONTIUM		NR		—	66.300	0.001	NR	—	0.001	45.745	<0.01	0.16%
METHYLENE CHLORIDE		NR	0.062	1.10E-05	NR	—	NR	—	1.10E-05	1.018	<0.01	0.15%
BENZO(a)PYRENE	X	NR	ND	—	0.096	7.70E-07	NR	—	7.70E-07	0.077	<0.01	0.14%
AROCLOR-1260	X	NR	ND	—	0.660	5.28E-06	NR	—	5.28E-06	1.182	<0.01	0.06%
TOLUENE		NR	0.042	7.38E-06	NR	—	NR	—	7.38E-06	2.008	<0.01	0.05%
TETRACHLOROETHENE		NR	0.011	1.90E-06	NR	—	NR	—	1.90E-06	1.058	<0.01	0.03%
CHLOROFORM		NR	0.020	3.59E-06	NR	—	NR	—	3.59E-06	2.609	<0.01	0.02%
BENZO(b)FLUORANTHENE	X	NR	ND	—	0.120	9.60E-07	NR	—	9.60E-07	0.773	<0.01	0.02%
4-METHYL-2-PENTANONE		NR	0.027	4.79E-06	NR	—	NR	—	4.79E-06	4.348	<0.01	0.02%
BENZO(a)ANTHRACENE	X	NR	ND	—	0.086	6.90E-07	NR	—	6.90E-07	0.773	<0.01	0.01%
BENZENE		NR	0.007	1.22E-06	NR	—	NR	—	1.22E-06	2.038	<0.01	0.01%
INDENO(1,2,3-cd)PYRENE	X	NR	ND	—	0.045	3.60E-07	NR	—	3.60E-07	0.773	<0.01	0.01%
FLUORANTHENE	X	NR	0.004	7.20E-07	0.200	1.60E-06	NR	—	2.32E-06	9.449	<0.01	<0.01%
PYRENE	X	NR	ND	—	0.180	1.44E-06	NR	—	1.44E-06	5.669	<0.01	<0.01%
CHROMIUM	X	NR		—	10.200	8.16E-05	NR	—	8.16E-05	476.065	<0.01	<0.01%
TRICHLOROETHENE		NR	0.010	1.76E-06	NR	—	NR	—	1.76E-06	11.105	<0.01	<0.01%
2-BUTANONE		NR	0.186	3.27E-05	NR	—	NR	—	3.27E-05	303.372	<0.01	<0.01%
CHRYSENE	X	NR	ND	—	0.100	8.00E-07	NR	—	8.00E-07	7.728	<0.01	<0.01%

Summary of Ecotoxicological Risk to Mule Deer in the OU2 Mound Area Source Area at RFETS

MULE DEER OU2 MOUND AREA		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU2	IR = 0.022 SUF = 0.008			IR = 0.001 SUF = 0.008		IR = I SUF = I					
DI-n-BUTYL PHTHALATE	X	NR	0.015	2.65E-06	ND	—	NR	—	2.65E-06	42.527	<0.01	<0.01%
BENZO(ghi)PERYLENE	X	NR	ND	—	0.045	3.60E-07	NR	—	3.60E-07	7.728	<0.01	<0.01%
PHENANTHRENE	X	NR	ND	—	0.083	6.60E-07	NR	—	6.60E-07	77.285	<0.01	<0.01%

HAZARD INDEX 0.01

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ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Mule Deer in the OU5 Surface Disturbance Source Area at RFETS

MULE DEER OU5 SURFACE DISTURBANCE		EXPOSURE POINT							SUMMARY			
		Vegetation			Surficial Soil		Surface Water					
		Exp. Point Conc.	Extimated Value	Intake	Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC in OU5	IR = NR SUF = 0.006			IR = 0.001 SUF = 0.006		IR = I SUF = I					
ALUMINUM		NR		—	7680.000	0.046	NR	—	0.046	21.331	<0.01	42.42%
MERCURY	X	NR		—	0.660	3.96E-06	NR	—	3.96E-06	0.002	<0.01	32.40%
VANADIUM		NR		—	22.200	1.33E-04	NR	—	1.33E-04	0.399	<0.01	6.56%
MAGNESIUM		NR		—	1810.000	0.011	NR	—	0.011	46.422	<0.01	4.59%
BARIUM	X	NR		—	80.800	4.85E-04	NR	—	4.85E-04	2.154	<0.01	4.42%
ARSENIC		NR		—	3.900	2.34E-05	NR	—	2.34E-05	0.120	<0.01	3.84%
MANGANESE		NR		—	218.000	0.001	NR	—	0.001	15.306	<0.01	1.68%
LEAD	X	NR		—	14.100	8.46E-05	NR	—	8.46E-05	1.391	<0.01	1.19%
COBALT	X	NR		—	5.700	3.42E-05	NR	—	3.42E-05	0.856	<0.01	0.78%
BERYLLIUM		NR		—	0.600	3.60E-06	NR	—	3.60E-06	0.115	<0.01	0.62%
COPPER	X	NR		—	14.200	8.52E-05	NR	—	8.52E-05	2.880	<0.01	0.58%
LITHIUM	X	NR		—	6.500	3.90E-05	NR	—	3.90E-05	1.633	<0.01	0.47%
NICKEL		NR		—	10.100	6.06E-05	NR	—	6.06E-05	6.957	<0.01	0.17%
ZINC	X	NR		—	40.000	2.40E-04	NR	—	2.40E-04	27.830	<0.01	0.17%
STRONTIUM	X	NR		—	38.600	2.32E-04	NR	—	2.32E-04	45.745	<0.01	0.10%
CHROMIUM		NR		—	7.800	4.68E-05	NR	—	4.68E-05	476.065	<0.01	<0.01%

HAZARD INDEX 0.01

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I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
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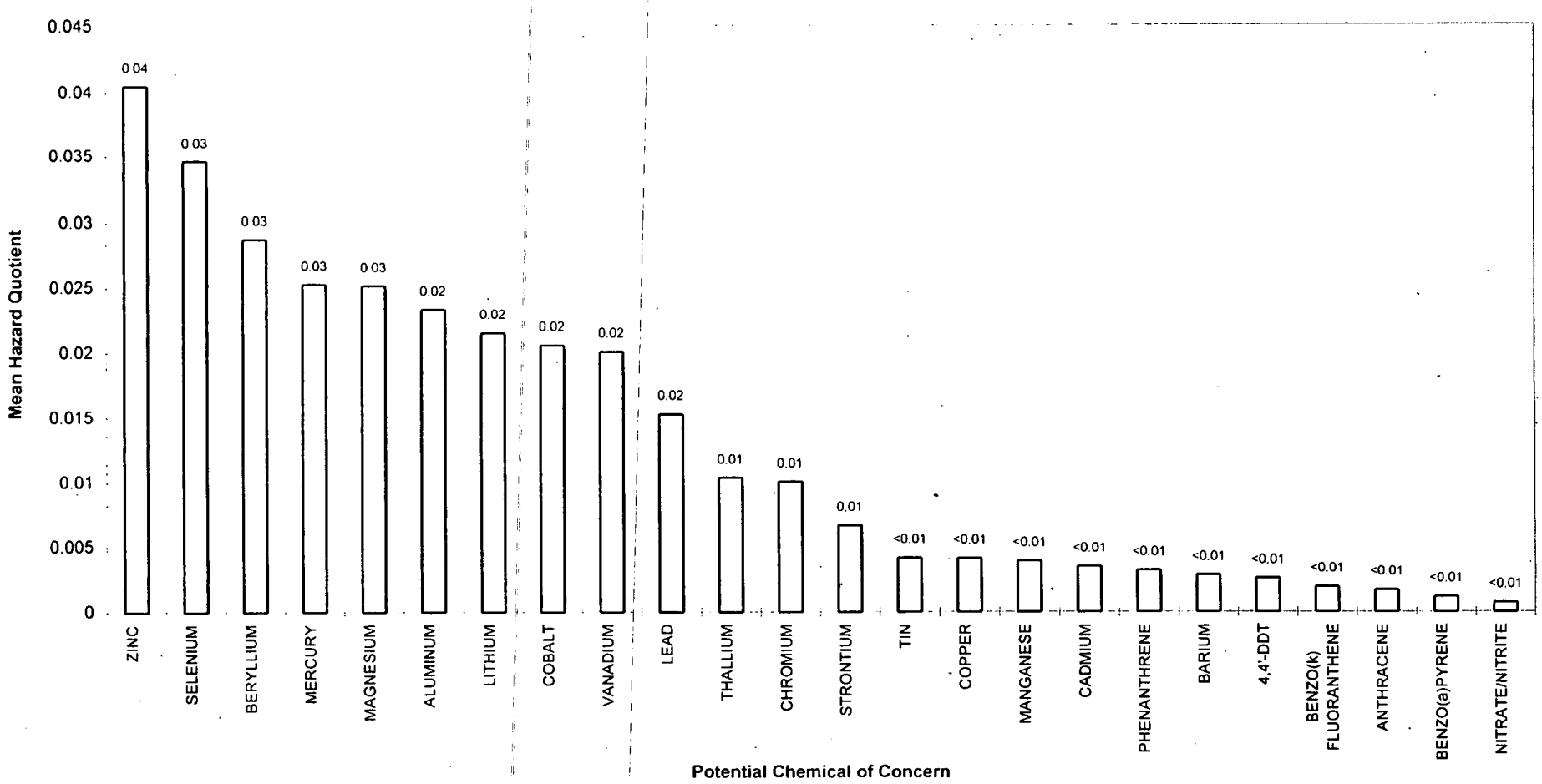
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks

Summary of Sitewide Ecotoxicological Risk to Red-tailed Hawks at RFETS

Mean Hazard Quotients for the PCOCs Contributing ≥ 1% of Risk



Note: Variation in similar values is due to rounding

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Summary of Sitewide Ecotoxicological Risk to Red-tailed Hawks at RFETS

RED-TAILED HAWK																			
Analyte	OU1 881 Hillside	OU5 Ash Pits	OU5 C Ponds	OU5 Old Landfill	OU2 903 Pad	OU5 Surface Disturbance	OU2 East Trenches	OU4 Downgradient	OU6 A Ponds	OU6 B Ponds	OU2 Mound Area	OU6 North Spray Field	OU11 West Spray Field	OU6 Burial Trenches	OU7 Downgradient Areas	OU6 Soil Dump Areas	Mean Hazard Quotient	Hazard Quotient Range	Percent of Total Risk
ZINC	0.05	0.02	0.06	0.03	0.06	3.31E-05	0.17	0.01	0.12	0.07	3.84E-05	9.46E-05	8.77E-04	0.02	0.03	0.02	0.04	<0.001 - 0.171	12.83%
SELENIUM	0.03	9.08E-05	0.04	7.36E-05	0.03	—	0.07	—	—	0.17	—	3.07E-05	2.76E-04	1.95E-03	0.03	—	0.03	<0.001 - 0.175	10.96%
BERYLLIUM	0.02	0.01	—	0.01	0.03	9.47E-04	0.02	0.05	0.01	0.01	—	2.53E-03	0.03	—	—	0.15	0.03	0.001 - 0.154	9.09%
MERCURY	8.33E-04	1.03E-03	—	1.18E-03	1.15E-03	9.01E-04	—	0.06	—	0.05	—	2.11E-04	—	—	0.02	0.13	0.03	<0.001 - 0.127	8.00%
MAGNESIUM	4.35E-03	0.03	2.14E-03	0.03	0.01	2.03E-04	0.01	0.02	0.12	0.10	3.06E-04	6.28E-04	4.64E-03	0.01	0.02	0.05	0.03	<0.001 - 0.124	7.96%
ALUMINUM	0.02	0.04	0.01	0.03	0.03	1.18E-03	0.04	0.02	0.04	0.06	1.55E-03	4.22E-03	0.04	3.60E-03	4.16E-03	0.03	0.02	0.001 - 0.056	7.38%
LITHIUM	0.03	0.02	0.02	0.01	0.05	1.58E-03	0.07	0.01	0.01	0.01	2.14E-03	3.77E-03	0.06	—	—	0.02	0.02	0.002 - 0.066	6.81%
COBALT	0.03	0.03	0.02	0.02	0.03	1.81E-03	0.05	0.01	0.02	0.01	1.97E-03	0.01	0.05	—	—	0.02	0.02	0.002 - 0.051	6.51%
VANADIUM	0.01	0.01	0.01	0.01	0.02	6.77E-04	0.02	3.62E-03	0.06	0.13	9.48E-04	2.39E-03	0.02	0.01	0.02	0.01	0.02	0.001 - 0.127	6.35%
LEAD	0.01	0.01	0.01	0.01	0.01	6.88E-05	0.03	3.26E-04	0.09	0.05	7.80E-05	4.56E-04	0.01	2.67E-03	0.01	4.84E-03	0.02	<0.001 - 0.086	4.83%
THALLIUM	0.02	0.02	—	0.01	0.02	—	—	0.01	—	3.20E-03	1.61E-03	2.55E-03	0.02	—	—	0.01	0.01	0.002 - 0.021	3.28%
CHROMIUM	3.37E-03	1.31E-03	0.01	7.79E-04	0.02	6.64E-05	2.25E-03	3.98E-04	0.07	0.04	8.68E-05	2.61E-04	2.71E-03	4.50E-03	0.01	1.24E-03	0.01	<0.001 - 0.065	3.18%
STRONTIUM	9.27E-04	0.01	3.69E-04	0.01	7.99E-04	5.12E-05	9.40E-04	4.42E-03	0.03	0.03	8.80E-05	9.68E-05	7.40E-04	3.00E-03	0.01	0.01	0.01	<0.001 - 0.031	2.11%
TIN	5.55E-04	1.83E-04	2.48E-04	7.73E-05	5.31E-04	—	7.91E-04	8.76E-04	0.03	0.02	—	—	1.32E-04	1.31E-03	2.61E-03	2.31E-03	<0.01	<0.001 - 0.026	1.33%
COPPER	0.02	3.86E-03	2.59E-03	4.18E-03	0.01	7.91E-06	0.01	1.70E-03	0.01	0.01	7.30E-06	1.82E-05	1.72E-04	1.25E-03	2.57E-03	1.64E-03	<0.01	<0.001 - 0.015	1.32%
MANGANESE	2.51E-03	4.98E-03	1.70E-03	2.71E-03	3.16E-03	1.54E-04	4.47E-03	2.16E-03	0.02	0.01	1.70E-04	5.22E-04	0.01	1.59E-03	1.99E-03	4.87E-03	<0.01	<0.001 - 0.017	1.25%
CADMIUM	0.01	7.86E-05	4.43E-03	3.71E-05	0.01	—	0.01	2.23E-05	8.84E-05	—	—	1.39E-05	1.05E-04	—	4.91E-03	1.72E-04	<0.01	<0.001 - 0.013	1.12%
PHENANTHRENE	1.54E-03	—	—	0.02	1.89E-03	—	4.49E-04	5.98E-05	—	—	2.02E-05	—	—	—	—	2.39E-03	<0.01	<0.001 - 0.016	1.03%
BARIUM	1.80E-03	4.00E-03	8.52E-04	2.76E-03	1.78E-03	7.17E-05	2.32E-03	1.49E-03	0.01	0.01	9.58E-05	3.54E-04	2.74E-03	1.21E-03	2.59E-03	4.18E-03	<0.01	<0.001 - 0.012	0.90%
4,4'-DDT	—	—	—	1.35E-03	—	—	—	—	3.90E-03	—	—	—	—	—	—	—	<0.01	0.001 - 0.004	0.83%
BENZO(k) FLUORANTHENE	8.17E-04	—	—	2.88E-03	1.06E-03	—	—	1.05E-04	—	—	—	—	—	—	—	4.98E-03	<0.01	<0.001 - 0.005	0.62%
ANTHRACENE	5.55E-04	—	—	4.77E-03	6.79E-04	—	—	—	—	—	—	—	—	—	—	8.63E-04	<0.01	0.001 - 0.005	0.54%
BENZO(a)PYRENE	8.53E-04	—	—	4.46E-03	1.09E-03	—	5.90E-04	1.61E-04	—	—	2.31E-05	—	—	—	—	1.12E-03	<0.01	<0.001 - 0.004	0.37%
NITRATE/NITRITE	2.24E-04	—	—	—	4.07E-04	—	—	1.24E-04	—	—	—	2.18E-05	3.51E-03	—	1.34E-04	6.71E-04	<0.01	<0.001 - 0.004	0.23%
ARSENIC	6.20E-04	5.62E-04	2.37E-04	4.06E-04	5.69E-04	3.97E-05	1.14E-03	1.55E-04	1.49E-04	2.25E-04	6.00E-05	1.56E-04	1.93E-03	—	—	4.73E-04	<0.01	<0.001 - 0.002	0.15%
DIBENZO(a,h)ANTHRACENE	2.52E-04	—	—	1.28E-03	3.11E-04	—	—	3.79E-05	—	—	—	—	—	—	—	2.93E-04	<0.01	<0.001 - 0.001	0.14%
DI-n-BUTYL PHTHALATE	—	—	—	2.17E-04	7.67E-04	—	—	4.09E-05	—	—	—	—	—	—	—	6.84E-04	<0.01	<0.001 - 0.001	0.14%
INDENO(1,2,3-cd)PYRENE	2.23E-04	—	—	1.74E-03	2.54E-04	—	—	4.83E-05	—	—	4.40E-06	—	—	—	—	3.01E-04	<0.01	<0.001 - 0.002	0.14%
FLUORANTHENE	2.09E-04	—	1.26E-05	1.40E-03	2.33E-04	—	1.13E-04	1.48E-05	—	—	4.84E-06	—	—	—	—	3.10E-04	<0.01	<0.001 - 0.001	0.09%
PYRENE	1.90E-04	—	1.52E-05	1.20E-03	2.18E-04	—	1.07E-04	1.54E-05	—	—	4.35E-06	—	—	—	—	3.02E-04	<0.01	<0.001 - 0.001	0.08%
MOLYBDENUM	1.64E-04	6.74E-05	—	2.32E-04	3.16E-04	—	—	—	2.66E-04	—	—	—	4.63E-04	—	—	—	<0.01	<0.001 - <0.001	0.08%
AROCLOR-1254	1.52E-04	—	—	2.08E-04	1.52E-04	—	—	—	—	—	5.05E-05	—	—	—	—	2.08E-04	<0.01	<0.001 - <0.001	0.05%
BENZO(b)FLUORANTHENE	8.62E-05	—	—	5.40E-04	1.14E-04	—	7.89E-05	1.47E-05	—	—	2.91E-06	—	—	—	—	1.94E-04	<0.01	<0.001 - 0.001	0.05%
FLUORENE	5.30E-05	—	—	4.01E-04	6.44E-05	—	—	—	—	—	—	—	—	—	—	5.24E-05	<0.01	<0.001 - <0.001	0.05%
NICKEL	4.35E-05	1.69E-05	1.18E-05	1.54E-04	4.85E-05	1.30E-06	3.04E-05	6.32E-06	1.52E-03	8.13E-06	1.46E-06	4.61E-06	2.79E-05	—	—	1.36E-05	<0.01	<0.001 - 0.002	0.04%
CHRYSENE	9.88E-05	—	—	5.06E-04	1.15E-04	—	5.41E-05	1.77E-05	—	—	2.42E-06	—	—	—	—	1.30E-04	<0.01	<0.001 - 0.001	0.04%
BENZO(a)ANTHRACENE	8.96E-05	—	—	4.82E-04	1.13E-04	—	3.05E-05	1.29E-05	—	—	2.07E-06	—	—	—	—	1.19E-04	<0.01	<0.001 - <0.001	0.04%
AROCLOR-1248	7.27E-05	—	—	—	1.54E-04	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.04%
BIS(2-ETHYLHEXYL)PHTHALATE	—	—	—	2.29E-05	5.43E-05	—	2.41E-05	5.08E-05	—	—	8.10E-07	—	—	—	—	3.30E-04	<0.01	<0.001 - <0.001	0.03%
HEPTACHLOR EPOXIDE	—	—	—	7.33E-05	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	0.02%
BENZO(ghi)PERYLENE	5.62E-05	—	—	1.56E-04	6.47E-05	—	—	1.37E-05	—	—	1.10E-06	—	—	—	—	6.59E-05	<0.01	<0.001 - <0.001	0.02%
DIELDRIN	—	—	—	9.89E-06	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
SILVER	—	1.40E-07	—	4.10E-07	—	—	2.00E-07	—	2.61E-05	1.90E-05	—	—	—	5.30E-07	8.66E-06	—	<0.01	<0.001 - <0.001	<0.01%
AROCLOR-1260	—	—	—	—	—	—	—	—	—	—	6.74E-06	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
ALDRIN	—	—	—	4.94E-06	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
delta-BHC	—	—	—	—	—	—	—	—	4.78E-06	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
2-METHYLNAPHTHALENE	—	—	—	1.60E-06	—	—	—	—	—	—	—	—	—	—	—	—	<0.01	<0.001 - <0.001	<0.01%
NAPHTHALENE	3.00E-07	—	—	4.23E-06	—	—	—	—	—	—	—	—	—	—	—	2.50E-07	<0.01	<0.001 - <0.001	<0.01%
ACENAPHTHENE	5.30E-07	—	—	4.46E-06	6.30E-07	—	—	—	—	—	—	—	—	—	—	5.50E-07	<0.01	<0.001 - <0.001	<0.01%
DI-n-OCTYL PHTHALATE	—	—	—	1.10E-07	—	—	—	1.90E-07	—	—	—	—	—	—	—	1.16E-06	<0.01	<0.001 - <0.001	<0.01%
BUTYL BENZYL PHTHALATE	—	—	—	1.30E-07	—	—	—	5.00E-08	—	—	—	—	—	—	—	6.00E-08	<0.01	<0.001 - <0.001	<0.01%

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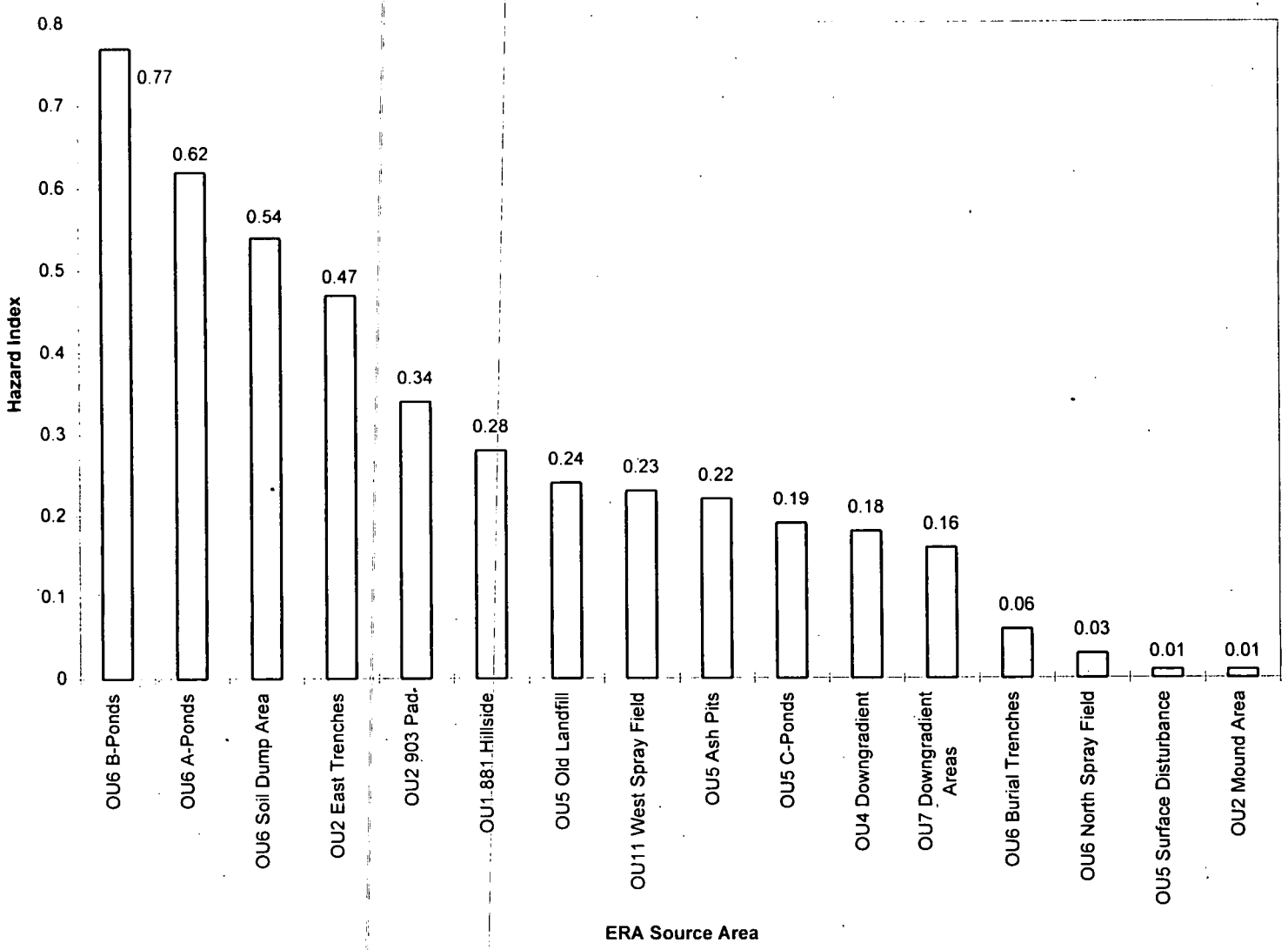
Summary of Ecotoxicological Risk to Red-tailed Hawks at RFETS



Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU6 B-Ponds Source Area at RFETS

RED-TAILED HAWK OU6 B-PONDS		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.098 SUF = 0.013		IR = 0.003 SUF = 0.013					
SELENIUM		53.918	0.069	ND	—	0.069	0.393	0.18	22.92%
VANADIUM	X	28.178	0.036	38.900	0.002	0.037	0.295	0.13	16.37%
MAGNESIUM	X	5898.794	7.515	3790.000	0.148	7.663	80.217	0.10	12.47%
ZINC	X	606.869	0.773	64.100	0.002	0.776	10.863	0.07	9.32%
ALUMINUM		2019.911	2.573	18700.000	0.729	3.303	58.820	0.06	7.33%
LEAD	X	78.532	0.100	37.200	0.001	0.102	1.846	0.06	7.21%
MERCURY	X	0.235	2.99E-04	ND	—	2.99E-04	0.007	0.04	5.58%
CHROMIUM	X	32.115	0.041	19.900	0.001	0.042	1.058	0.04	5.18%
STRONTIUM	X	163.891	0.209	25.500	0.001	0.210	6.784	0.03	4.04%
TIN		117.725	0.150	ND	—	0.150	7.914	0.02	2.47%
COBALT	X	ND	—	9.000	3.51E-04	3.51E-04	0.028	0.01	1.64%
MANGANESE	X	84.595	0.108	321.000	0.013	0.120	12.701	0.01	1.23%
COPPER	X	112.560	0.143	17.000	0.001	0.144	16.147	0.01	1.16%
BARIUM	X	55.126	0.070	194.000	0.008	0.078	10.142	0.01	1.00%
BERYLLIUM		ND	—	0.970	3.78E-05	3.78E-05	0.006	0.01	0.82%
LITHIUM		ND	—	5.900	2.30E-04	2.30E-04	0.037	0.01	0.81%
THALLIUM		ND	—	0.230	8.97E-06	8.97E-06	0.003	<0.01	0.39%
ARSENIC	X	ND	—	5.100	1.99E-04	1.99E-04	0.885	<0.01	0.03%
SILVER	X	16.472	0.021	ND	—	0.021	1105.027	<0.01	<0.01%
NICKEL	X	ND	—	14.600	0.001	0.001	70.054	<0.01	<0.01%

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Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU6 A-Ponds Source Area at RFETS

RED-TAILED HAWK OU6 A-PONDS		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.098 SUF = 0.020		IR = 0.003 SUF = 0.020					
MAGNESIUM	X	5030.433	9.860	1880.000	0.113	9.972	80.217	0.12	19.92%
ZINC	X	646.549	1.267	65.800	0.004	1.271	10.863	0.12	18.75%
LEAD	X	80.277	0.157	33.000	0.002	0.159	1.846	0.09	13.80%
CHROMIUM	X	35.026	0.069	9.000	0.001	0.069	1.058	0.07	10.45%
VANADIUM	X	7.100	0.014	51.100	0.003	0.017	0.295	0.06	9.23%
ALUMINUM		925.173	1.813	7830.000	0.470	2.283	58.820	0.04	6.22%
TIN		102.000	0.200	93.300	0.006	0.206	7.914	0.03	4.17%
STRONTIUM	X	85.892	0.168	37.100	0.002	0.171	6.784	0.03	4.04%
MANGANESE	X	77.287	0.151	1110.000	0.067	0.218	12.701	0.02	2.75%
COBALT	X	ND	ND	7.100	4.26E-04	4.26E-04	0.028	0.02	2.44%
BERYLLIUM		ND	ND	1.300	7.80E-05	7.80E-05	0.006	0.01	2.08%
COPPER	X	106.489	0.209	5.000	3.00E-04	0.209	16.147	0.01	2.07%
BARIUM	X	57.799	0.113	100.000	0.006	0.119	10.142	0.01	1.88%
LITHIUM		ND	ND	4.800	2.88E-04	2.88E-04	0.037	0.01	1.25%
4,4'-DDT		NR	NR	0.026	1.56E-06	1.56E-06	4.00E-04	<0.01	0.62%
NICKEL	X	54.095	0.106	13.100	0.001	0.107	70.054	<0.01	0.24%
MOLYBDENUM	X	ND	ND	5.300	3.18E-04	3.18E-04	1.197	<0.01	0.04%
ARSENIC	X	ND	ND	2.200	1.32E-04	1.32E-04	0.885	<0.01	0.02%
CADMIUM		ND	ND	2.200	1.32E-04	1.32E-04	1.494	<0.01	0.01%
SILVER	X	14.724	0.029	ND	ND	0.029	1105.027	<0.01	<0.01%
delta-BHC		NR	NR	0.023	1.38E-06	1.38E-06	0.289	<0.01	<0.01%

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Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU6 Soil Dump Areas Source Area at RFETS

RED-TAILED HAWK OU6 SOIL DUMP AREAS		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.098 SUF = 0.028		IR = 0.003 SUF = 0.028					
BERYLLIUM		0.300	0.001	0.621	5.21E-05	0.001	0.006	0.17	31.03%
MERCURY	X	0.302	0.001	0.139	1.17E-05	0.001	0.007	0.14	26.60%
MAGNESIUM	X	1291.996	3.545	2354.730	0.198	3.743	80.217	0.05	8.69%
COBALT	X	ND	—	6.279	0.001	0.001	0.028	0.04	6.65%
ALUMINUM		451.741	1.240	9659.033	0.811	2.051	58.820	0.03	6.49%
LITHIUM		ND	—	9.142	0.001	0.001	0.037	0.03	5.03%
ZINC	X	85.709	0.235	94.049	0.008	0.243	10.863	0.02	4.16%
STRONTIUM	X	33.631	0.092	37.401	0.003	0.095	6.784	0.01	2.61%
THALLIUM		ND	—	0.260	2.18E-05	2.18E-05	0.003	0.01	1.36%
VANADIUM	X	ND	—	26.996	0.002	0.002	0.295	0.01	1.26%
BENZO(k)FLUORANTHENE	X	NR	—	2.200	1.85E-04	1.85E-04	0.037	<0.01	0.93%
MANGANESE	X	15.079	0.041	244.118	0.021	0.062	12.701	<0.01	0.91%
LEAD	X	2.505	0.007	24.511	0.002	0.009	1.846	<0.01	0.91%
BARIUM	X	11.861	0.033	117.141	0.010	0.042	10.142	<0.01	0.77%
PHENANTHRENE	X	NR	—	1.056	8.87E-05	8.87E-05	0.037	<0.01	0.45%
TIN		6.000	0.016	22.063	0.002	0.018	7.914	<0.01	0.42%
COPPER	X	9.200	0.025	15.408	0.001	0.027	16.147	<0.01	0.31%
BENZO(a)PYRENE	X	NR	—	0.495	4.16E-05	4.16E-05	0.037	<0.01	0.21%
NITRATE/NITRITE		NR	—	7.689	0.001	0.001	0.962	<0.01	0.19%
CHROMIUM	X	ND	—	15.651	0.001	0.001	1.058	<0.01	0.18%
ANTHRACENE	X	NR	—	0.382	3.21E-05	3.21E-05	0.037	<0.01	0.16%
DI-n-BUTYL PHTHALATE	X	NR	—	0.473	3.97E-05	3.97E-05	0.058	<0.01	0.13%
ARSENIC	X	ND	—	4.989	4.19E-04	4.19E-04	0.885	<0.01	0.09%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	2.270	1.91E-04	1.91E-04	0.577	<0.01	0.06%
FLUORANTHENE	X	NR	—	1.376	1.16E-04	1.16E-04	0.372	<0.01	0.06%
PYRENE	X	NR	—	1.337	1.12E-04	1.12E-04	0.372	<0.01	0.06%
INDENO(1,2,3-cd)PYRENE	X	NR	—	0.334	2.81E-05	2.81E-05	0.093	<0.01	0.06%
DIBENZO(a,h)ANTHRACENE	X	NR	—	0.130	1.09E-05	1.09E-05	0.037	<0.01	0.05%
AROCLOR-1254	X	NR	—	0.429	3.60E-05	3.60E-05	0.173	<0.01	0.04%
BENZO(b)FLUORANTHENE	X	NR	—	0.855	7.19E-05	7.19E-05	0.371	<0.01	0.04%
CADMIUM		ND	—	3.054	2.57E-04	2.57E-04	1.494	<0.01	0.03%
CHRYSENE	X	NR	—	0.577	4.85E-05	4.85E-05	0.372	<0.01	0.02%
BENZO(a)ANTHRACENE	X	NR	—	0.526	4.42E-05	4.42E-05	0.372	<0.01	0.02%
BENZO(ghi)PERYLENE	X	NR	—	0.292	2.45E-05	2.45E-05	0.372	<0.01	0.01%
FLUORENE	X	NR	—	0.232	1.95E-05	1.95E-05	0.371	<0.01	0.01%
NICKEL	X	ND	—	11.325	0.001	0.001	70.054	<0.01	<0.01%

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU6 Soil Dump Areas Source Area at RFETS

RED-TAILED HAWK OU6 SOIL DUMP AREAS		EXPOSURE POINT				*SUMMARY*			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.098 SUF = 0.028		IR = 0.003 SUF = 0.028					
DI-n-OCTYL PHTHALATE	X	NR	—	0.658	5.53E-05	5.53E-05	47.492	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	0.244	2.05E-05	2.05E-05	37.215	<0.01	<0.01%
NAPHTHALENE	X	NR	—	0.110	9.24E-06	9.24E-06	37.215	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	—	0.072	6.05E-06	6.05E-06	108.554	<0.01	<0.01%

HAZARD INDEX 0.54

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU2 East Trenches Source Area at RFETS

RED-TAILED HAWK OU2 EAST TRENCHES		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU2	IR = 0.098 SUF = 0.061		IR = 0.003 SUF = 0.061					
ZINC		308.380	1.843	54.004	0.010	1.853	10.863	0.17	36.13%
SELENIUM		4.609	0.028	0.510	9.33E-05	0.028	0.393	0.07	15.09%
LITHIUM		NR	—	13.267	0.002	0.002	0.037	0.05	11.45%
COBALT		NR	—	7.136	0.001	0.001	0.028	0.04	7.56%
ALUMINUM		NR	—	12216.913	2.236	2.236	58.820	0.04	8.05%
LEAD	X	8.589	0.051	45.985	0.008	0.060	1.846	0.03	6.88%
BERYLLIUM		NR	—	0.590	1.08E-04	1.08E-04	0.006	0.02	3.81%
VANADIUM		NR	—	27.790	0.005	0.005	0.295	0.02	3.59%
CADMIUM		2.548	0.015	1.400	2.56E-04	0.015	1.494	0.01	2.13%
COPPER		17.166	0.103	13.080	0.002	0.105	16.147	0.01	1.38%
MAGNESIUM		NR	—	2431.742	0.445	0.445	80.217	0.01	1.17%
MANGANESE		NR	—	310.494	0.057	0.057	12.701	<0.01	0.95%
BARIUM		NR	—	128.840	0.024	0.024	10.142	<0.01	0.50%
CHROMIUM	X	ND	—	12.981	0.002	0.002	1.058	<0.01	0.40%
ARSENIC		NR	—	5.496	0.001	0.001	0.885	<0.01	0.24%
STRONTIUM		NR	—	34.852	0.006	0.006	6.784	<0.01	0.19%
TIN		NR	—	34.188	0.006	0.006	7.914	<0.01	0.16%
BENZO(a)PYRENE	X	NR	—	0.120	2.20E-05	2.20E-05	0.037	<0.01	0.13%
PHENANTHRENE	X	NR	—	0.091	1.67E-05	1.67E-05	0.037	<0.01	0.10%
FLUORANTHENE	X	NR	—	0.229	4.19E-05	4.19E-05	0.372	<0.01	0.02%
PYRENE	X	NR	—	0.218	4.00E-05	4.00E-05	0.372	<0.01	0.02%
BENZO(b)FLUORANTHENE	X	NR	—	0.160	2.93E-05	2.93E-05	0.371	<0.01	0.02%
CHRYSENE	X	NR	—	0.110	2.01E-05	2.01E-05	0.372	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	—	0.062	1.14E-05	1.14E-05	0.372	<0.01	0.01%
NICKEL		NR	—	11.629	0.002	0.002	70.054	<0.01	0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	0.076	1.39E-05	1.39E-05	0.577	<0.01	0.01%
SILVER		ND	—	1.200	2.20E-04	2.20E-04	1105.027	<0.01	<0.01%

HAZARD INDEX 0.47

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU2 903 Pad Source Area at RFETS

RED-TAILED HAWK OU2 903 PAD		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU2	IR = 0.098 SUF = 0.042		IR = 0.003 SUF = 0.042					
ZINC		154.647	0.637	72.699	0.009	0.646	10.863	0.06	17.68%
LITHIUM		NR	—	13.592	0.002	0.002	0.037	0.05	16.07%
COBALT		NR	—	7.671	0.001	0.001	0.028	0.04	10.62%
SELENIUM		3.059	0.013	0.620	7.81E-05	0.013	0.393	0.03	9.83%
BERYLLIUM		NR	—	1.200	1.51E-04	1.51E-04	0.006	0.03	7.49%
ALUMINUM		NR	—	11886.180	1.498	1.498	58.820	0.03	7.57%
CHROMIUM	X	4.600	0.019	26.789	0.003	0.022	1.058	0.02	6.18%
THALLIUM		NR	—	0.430	5.42E-05	5.42E-05	0.003	0.02	5.37%
VANADIUM		NR	—	35.681	0.004	0.004	0.295	0.01	4.03%
LEAD	X	5.567	0.023	32.367	0.004	0.027	1.846	0.01	4.35%
CADMIUM		3.448	0.014	0.920	1.16E-04	0.014	1.494	0.01	2.79%
MAGNESIUM		NR	—	3426.354	0.432	0.432	80.217	0.01	1.60%
COPPER		19.385	0.080	21.815	0.003	0.083	16.147	0.01	1.53%
MANGANESE		NR	—	318.236	0.040	0.040	12.701	<0.01	0.94%
PHENANTHRENE	X	NR	—	0.556	7.00E-05	7.00E-05	0.037	<0.01	0.56%
BARIUM		NR	—	143.681	0.018	0.018	10.142	<0.01	0.53%
MERCURY		ND	—	0.060	7.56E-06	7.56E-06	0.007	<0.01	0.32%
BENZO(a)PYRENE	X	NR	—	0.320	4.04E-05	4.04E-05	0.037	<0.01	0.32%
BENZO(k)FLUORANTHENE	X	NR	—	0.311	3.92E-05	3.92E-05	0.037	<0.01	0.31%
STRONTIUM		NR	—	43.040	0.005	0.005	6.784	<0.01	0.22%
DI-n-BUTYL PHTHALATE	X	NR	—	0.353	4.45E-05	4.45E-05	0.058	<0.01	0.23%
ANTHRACENE		NR	—	0.201	2.53E-05	2.53E-05	0.037	<0.01	0.20%
ARSENIC		NR	—	3.998	0.001	0.001	0.885	<0.01	0.34%
TIN		NR	—	33.323	0.004	0.004	7.914	<0.01	0.15%
NITRATE/NITRITE		NR	—	3.106	3.91E-04	3.91E-04	0.962	<0.01	0.12%
MOLYBDENUM		NR	—	3.000	3.78E-04	3.78E-04	1.197	<0.01	0.09%
DIBENZO(a,h)ANTHRACENE		NR	—	0.092	1.16E-05	1.16E-05	0.037	<0.01	0.09%
INDENO(1,2,3-cd)PYRENE	X	NR	—	0.188	2.37E-05	2.37E-05	0.093	<0.01	0.08%
FLUORANTHENE	X	NR	—	0.689	8.68E-05	8.68E-05	0.372	<0.01	0.07%
PYRENE	X	NR	—	0.644	8.11E-05	8.11E-05	0.372	<0.01	0.06%
AROCLOR-1248		NR	—	0.211	2.66E-05	2.66E-05	0.173	<0.01	0.05%
AROCLOR-1254	X	NR	—	0.208	2.63E-05	2.63E-05	0.173	<0.01	0.05%
CHRYSENE	X	NR	—	0.341	4.29E-05	4.29E-05	0.372	<0.01	0.03%
BENZO(b)FLUORANTHENE	X	NR	—	0.337	4.24E-05	4.24E-05	0.371	<0.01	0.03%
BENZO(a)ANTHRACENE	X	NR	—	0.334	4.21E-05	4.21E-05	0.372	<0.01	0.03%
BENZO(ghi)PERYLENE	X	NR	—	0.191	2.41E-05	2.41E-05	0.372	<0.01	0.02%
FLUORENE		NR	—	0.190	2.39E-05	2.39E-05	0.371	<0.01	0.02%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	0.248	3.13E-05	3.13E-05	0.577	<0.01	0.02%

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU2 903 Pad Source Area at RFETS

RED-TAILED HAWK *OU2 903 PAD*		EXPOSURE POINT				*SUMMARY*			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU2	IR = 0.098 SUF = 0.042		IR = 0.003 SUF = 0.042					
NICKEL		NR	—	26.987	0.003	0.003	70.054	<0.01	0.01%
ACENAPHTHENE		NR	—	0.186	2.35E-05	2.35E-05	37.215	<0.01	<0.01%

HAZARD INDEX 0.34

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU1 881 Hillside Source Area at RFETS

RED-TAILED HAWK OU1 881 HILLSIDE		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU1	IR = 0.098 SUF = 0.034		IR = 0.003 SUF = 0.034					
ZINC		151.809	0.506	85.548	0.009	0.515	10.863	0.05	16.75%
COBALT		NR	—	8.343	0.001	0.001	0.028	0.04	12.62%
SELENIUM		4.092	0.014	0.511	5.21E-05	0.014	0.393	0.04	12.59%
LITHIUM		NR	—	9.473	0.001	0.001	0.037	0.03	9.55%
ALUMINUM		NR	—	14308.320	1.459	1.459	58.820	0.02	8.76%
BERYLLIUM		NR	—	1.257	1.28E-04	1.28E-04	0.006	0.02	7.55%
THALLIUM		NR	—	0.510	5.20E-05	5.20E-05	0.003	0.02	6.13%
COPPER		72.817	0.243	35.484	0.004	0.246	16.147	0.02	5.38%
VANADIUM		NR	—	41.858	0.004	0.004	0.295	0.01	4.79%
CADMIUM		5.607	0.019	0.611	6.23E-05	0.019	1.494	0.01	4.49%
LEAD		4.542	0.015	48.003	0.005	0.020	1.846	0.01	3.83%
MAGNESIUM		NR	—	3418.568	0.349	0.349	80.217	<0.01	1.54%
CHROMIUM		ND	—	34.997	0.004	0.004	1.058	<0.01	1.34%
MANGANESE		NR	—	312.554	0.032	0.032	12.701	<0.01	0.89%
BARIUM		NR	—	179.137	0.018	0.018	10.142	<0.01	0.63%
PHENANTHRENE	X	NR	—	0.559	5.70E-05	5.70E-05	0.037	<0.01	0.54%
ARSENIC		NR	—	5.377	0.001	0.001	0.885	<0.01	0.40%
STRONTIUM		NR	—	61.651	0.006	0.006	6.784	<0.01	0.31%
BENZO(a)PYRENE	X	NR	—	0.311	3.18E-05	3.18E-05	0.037	<0.01	0.30%
BENZO(k)FLUORANTHENE	X	NR	—	0.297	3.03E-05	3.03E-05	0.037	<0.01	0.29%
MERCURY		ND	—	0.054	5.49E-06	5.49E-06	0.007	<0.01	0.28%
ANTHRACENE	X	NR	—	0.202	2.06E-05	2.06E-05	0.037	<0.01	0.20%
TIN		NR	—	43.094	0.004	0.004	7.914	<0.01	0.18%
DIBENZO(a,h)ANTHRACENE	X	NR	—	0.092	9.38E-06	9.38E-06	0.037	<0.01	0.09%
NITRATE/NITRITE		NR	—	2.111	2.15E-04	2.15E-04	0.962	<0.01	0.08%
INDENO(1,2,3-cd)PYRENE	X	NR	—	0.204	2.08E-05	2.08E-05	0.093	<0.01	0.08%
FLUORANTHENE	X	NR	—	0.762	7.77E-05	7.77E-05	0.372	<0.01	0.07%
PYRENE	X	NR	—	0.693	7.07E-05	7.07E-05	0.372	<0.01	0.07%
MOLYBDENUM		NR	—	1.926	1.96E-04	1.96E-04	1.197	<0.01	0.06%
AROCLOR-1254	X	NR	—	0.257	2.63E-05	2.63E-05	0.173	<0.01	0.05%
CHRYSENE	X	NR	—	0.361	3.68E-05	3.68E-05	0.372	<0.01	0.03%
BENZO(a)ANTHRACENE	X	NR	—	0.327	3.33E-05	3.33E-05	0.372	<0.01	0.03%
BENZO(b)FLUORANTHENE	X	NR	—	0.314	3.20E-05	3.20E-05	0.371	<0.01	0.03%
AROCLOR-1248	X	NR	—	0.123	1.26E-05	1.26E-05	0.173	<0.01	0.03%
BENZO(ghi)PERYLENE	X	NR	—	0.205	2.09E-05	2.09E-05	0.372	<0.01	0.02%
FLUORENE	X	NR	—	0.193	1.97E-05	1.97E-05	0.371	<0.01	0.02%

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU1 881 Hillside Source Area at RFETS

RED-TAILED HAWK OU1 881 HILLSIDE		EXPOSURE POINT				*SUMMARY*			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU1	IR = 0.098 SUF = 0.034		IR = 0.003 SUF = 0.034					
NICKEL		NR	—	29.863	0.003	0.003	70.054	<0.01	0.02%
ACENAPHTHENE	X	NR	—	0.195	1.99E-05	1.99E-05	37.215	<0.01	<0.01%
NAPHTHALENE	X	NR	—	0.110	1.12E-05	1.12E-05	37.215	<0.01	<0.01%

HAZARD INDEX 0.28

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU5 Old Landfill Source Area at RFETS

RED-TAILED HAWK OU5 OLD LANDFILL		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.098 SUF = 0.021		IR = 0.003 SUF = 0.021					
COBALT	X	ND	—	8.348	0.001	0.001	0.028	0.04	14.75%
PHENANTHRENE	X	NR	—	9.640	0.001	0.001	0.037	0.03	11.16%
LITHIUM	X	ND	—	8.005	0.001	0.001	0.037	0.03	11.16%
ALUMINUM		431.427	0.888	11074.656	0.698	1.586	58.820	0.03	11.14%
MAGNESIUM		967.466	1.991	2298.534	0.145	2.136	80.217	0.03	11.00%
ZINC	X	130.097	0.268	66.571	0.004	0.272	10.863	0.03	10.34%
STRONTIUM	X	29.983	0.062	30.813	0.002	0.064	6.784	0.01	3.90%
BERYLLIUM		ND	—	0.882	5.55E-05	5.55E-05	0.006	0.01	3.82%
VANADIUM		ND	—	30.425	0.002	0.002	0.295	0.01	2.80%
THALLIUM		ND	—	0.310	1.95E-05	1.95E-05	0.003	0.01	2.69%
LEAD	X	4.363	0.009	28.695	0.002	0.011	1.846	0.01	2.46%
ANTHRACENE	X	NR	—	2.816	1.77E-04	1.77E-04	0.037	<0.01	1.98%
BENZO(a)PYRENE	X	NR	—	2.636	1.66E-04	1.66E-04	0.037	<0.01	1.85%
COPPER	X	31.629	0.065	37.703	0.002	0.067	16.147	<0.01	1.71%
BENZO(k)FLUORANTHENE	X	NR	—	1.694	1.07E-04	1.07E-04	0.037	<0.01	1.19%
BARIUM	X	10.068	0.021	115.593	0.007	0.028	10.142	<0.01	1.14%
FLUORANTHENE	X	NR	—	8.267	0.001	0.001	0.372	<0.01	1.11%
MANGANESE		8.234	0.017	277.661	0.017	0.034	12.701	<0.01	1.11%
INDENO(1,2,3-cd)PYRENE	X	NR	—	2.572	1.62E-04	1.62E-04	0.093	<0.01	0.72%
4,4'-DDT	X	NR	—	0.009	5.40E-07	5.40E-07	4.00E-04	<0.01	0.56%
DIBENZO(a,h)ANTHRACENE	X	NR	—	0.758	4.78E-05	4.78E-05	0.037	<0.01	0.53%
PYRENE	X	NR	—	7.090	4.47E-04	4.47E-04	0.372	<0.01	0.50%
MERCURY	X	ND	—	0.124	7.80E-06	7.80E-06	0.007	<0.01	0.46%
CHROMIUM		ND	—	13.088	0.001	0.001	1.058	<0.01	0.39%
BENZO(b)FLUORANTHENE	X	NR	—	3.179	2.00E-04	2.00E-04	0.371	<0.01	0.22%
CHRYSENE	X	NR	—	2.987	1.88E-04	1.88E-04	0.372	<0.01	0.21%
BENZO(a)ANTHRACENE	X	NR	—	2.850	1.80E-04	1.80E-04	0.372	<0.01	0.20%
ARSENIC		ND	—	5.702	3.59E-04	3.59E-04	0.885	<0.01	0.17%
FLUORENE	X	NR	—	2.363	1.49E-04	1.49E-04	0.371	<0.01	0.17%
MOLYBDENUM		ND	—	4.400	2.77E-04	2.77E-04	1.197	<0.01	0.10%
DI-n-BUTYL PHTHALATE	X	NR	—	0.200	1.26E-05	1.26E-05	0.058	<0.01	0.09%
AROCLOR-1254	X	NR	—	0.572	3.61E-05	3.61E-05	0.173	<0.01	0.09%
NICKEL		4.800	0.010	14.939	0.001	0.011	70.054	<0.01	0.06%
BENZO(ghi)PERYLENE	X	NR	—	0.922	5.81E-05	5.81E-05	0.372	<0.01	0.06%
TIN		ND	—	9.714	0.001	0.001	7.914	<0.01	0.05%
SELENIUM		ND	—	0.459	2.89E-05	2.89E-05	0.393	<0.01	0.03%
HEPTACHLOR EPOXIDE	X	NR	—	0.004	2.70E-07	2.70E-07	0.004	<0.01	0.03%
CADMIUM		ND	—	0.880	5.55E-05	5.55E-05	1.494	<0.01	0.02%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	0.210	1.32E-05	1.32E-05	0.577	<0.01	0.01%

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU5 Old Landfill Source Area at RFETS

RED-TAILED HAWK OU5 OLD LANDFILL		EXPOSURE POINT				*SUMMARY*			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.098 SUF = 0.021		IR = 0.003 SUF = 0.021					
DIELDRIN	X	NR	—	0.009	5.80E-07	5.80E-07	0.059	<0.01	<0.01%
ALDRIN	X	NR	—	0.005	2.90E-07	2.90E-07	0.059	<0.01	<0.01%
ACENAPHTHENE	X	NR	—	2.636	1.66E-04	1.66E-04	37.215	<0.01	<0.01%
NAPHTHALENE	X	NR	—	2.498	1.57E-04	1.57E-04	37.215	<0.01	<0.01%
2-METHYLNAPHTHALENE	X	NR	—	0.944	5.95E-05	5.95E-05	37.215	<0.01	<0.01%
SILVER	X	ND	—	7.180	4.52E-04	4.52E-04	1105.027	<0.01	<0.01%
BUTYL BENZYL PHTHALATE	X	NR	—	0.220	1.39E-05	1.39E-05	108.554	<0.01	<0.01%
DI-n-OCTYL PHTHALATE	X	NR	—	0.083	5.23E-06	5.23E-06	47.492	<0.01	<0.01%

HAZARD INDEX 0.24

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU11 West Spray Field Source Area at RFETS

RED-TAILED HAWK OU11 WEST SPRAY FIELD		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU11	IR = NR SUF = 0.071		IR = 0.003 SUF = 0.071					
LITHIUM		NR	—	10.111	0.002	0.002	0.037	0.05	23.42%
ALUMINUM		NR	—	12185.807	2.596	2.596	58.820	0.04	19.12%
COBALT		NR	—	6.719	0.001	0.001	0.028	0.04	15.47%
BERYLLIUM		NR	—	0.682	1.45E-04	1.45E-04	0.006	0.02	10.49%
VANADIUM		NR	—	30.669	0.007	0.007	0.295	0.02	10.28%
THALLIUM		NR	—	0.270	5.75E-05	5.75E-05	0.003	0.02	8.30%
MANGANESE		NR	—	332.865	0.071	0.071	12.701	0.01	2.42%
LEAD		NR	—	46.092	0.010	0.010	1.846	0.01	2.35%
MAGNESIUM		NR	—	1746.670	0.372	0.372	80.217	<0.01	2.01%
NITRATE/NITRITE		NR	—	15.866	0.003	0.003	0.962	<0.01	1.35%
CHROMIUM		NR	—	13.479	0.003	0.003	1.058	<0.01	1.23%
BARIUM		NR	—	130.524	0.028	0.028	10.142	<0.01	1.20%
ARSENIC		NR	—	8.032	0.002	0.002	0.885	<0.01	0.98%
ZINC		NR	—	44.730	0.010	0.010	10.863	<0.01	0.40%
MOLYBDENUM		NR	—	2.600	0.001	0.001	1.197	<0.01	0.36%
STRONTIUM		NR	—	23.573	0.005	0.005	6.784	<0.01	0.32%
SELENIUM		NR	—	0.509	1.08E-04	1.08E-04	0.393	<0.01	0.12%
COPPER		NR	—	13.023	0.003	0.003	16.147	<0.01	0.08%
TIN		NR	—	4.900	0.001	0.001	7.914	<0.01	0.05%
CADMIUM		NR	—	0.737	1.57E-04	1.57E-04	1.494	<0.01	0.05%
NICKEL		NR	—	9.190	0.002	0.002	70.054	<0.01	0.01%

HAZARD INDEX 0.23

Notes:

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SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU5 Ash Pits Source Area at RFETS

RED-TAILED HAWK OU5 ASH PITS		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.098 SUF = 0.029		IR = 0.003 SUF = 0.029					
ALUMINUM		413.418	1.175	13038.844	1.134	2.309	58.820	0.04	17.57%
COBALT	X	ND	—	8.402	0.001	0.001	0.028	0.04	15.98%
MAGNESIUM		776.812	2.208	2929.961	0.255	2.463	80.217	0.03	13.74%
LITHIUM	X	ND	—	10.380	0.001	0.001	0.037	0.03	12.10%
ZINC	X	78.515	0.223	69.631	0.006	0.229	10.863	0.02	9.43%
THALLIUM		ND	—	0.520	4.52E-05	4.52E-05	0.003	0.02	6.75%
BERYLLIUM		ND	—	0.940	8.18E-05	8.18E-05	0.006	0.01	6.10%
VANADIUM		ND	—	36.213	0.003	0.003	0.295	0.01	4.55%
STRONTIUM	X	20.606	0.059	38.768	0.003	0.062	6.784	0.01	4.09%
LEAD	X	2.692	0.008	33.783	0.003	0.011	1.846	0.01	2.67%
MANGANESE		11.936	0.034	337.520	0.029	0.063	12.701	<0.01	2.22%
BARIUM	X	9.863	0.028	143.888	0.013	0.041	10.142	<0.01	1.81%
COPPER	X	21.419	0.061	16.938	0.001	0.062	16.147	<0.01	1.72%
MERCURY	X	ND	—	0.078	6.76E-06	6.76E-06	0.007	<0.01	0.43%
CHROMIUM		ND	—	15.956	0.001	0.001	1.058	<0.01	0.42%
ARSENIC		ND	—	5.715	4.97E-04	4.97E-04	0.885	<0.01	0.25%
TIN		ND	—	16.661	0.001	0.001	7.914	<0.01	0.06%
SELENIUM		ND	—	0.410	3.57E-05	3.57E-05	0.393	<0.01	0.04%
CADMIUM		ND	—	1.349	1.17E-04	1.17E-04	1.494	<0.01	0.04%
MOLYBDENUM		ND	—	0.928	8.07E-05	8.07E-05	1.197	<0.01	0.03%
NICKEL		ND	—	13.578	0.001	0.001	70.054	<0.01	0.01%
SILVER	X	ND	—	1.807	1.57E-04	1.57E-04	1105.027	<0.01	<0.01%

HAZARD INDEX 0.22

Notes:

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SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU5 C-Ponds Source Area at RFETS

RED-TAILED HAWK OU5 C-PONDS		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = 0.098 SUF = 0.020		IR = 0.003 SUF = 0.020					
ZINC	X	331.676	0.650	56.700	0.003	0.653	10.863	0.06	31.15%
SELENIUM		7.964	0.016	0.510	3.06E-05	0.016	0.393	0.04	21.10%
LITHIUM	X	NR	—	10.700	0.001	0.001	0.037	0.03	14.00%
COBALT	X	NR	—	7.900	4.74E-04	4.74E-04	0.028	0.02	8.77%
ALUMINUM		NR	—	13000.000	0.780	0.780	58.820	0.01	6.87%
LEAD	X	6.573	0.013	26.100	0.002	0.014	1.846	0.01	3.93%
CHROMIUM		3.400	0.007	14.800	0.001	0.008	1.058	0.01	3.92%
VANADIUM		NR	—	34.700	0.002	0.002	0.295	0.01	3.51%
CADMIUM		3.375	—	ND	—	0.007	1.494	<0.01	2.43%
COPPER	X	21.044	0.041	10.200	0.001	0.042	16.147	<0.01	1.35%
MAGNESIUM		NR	—	2860.000	0.172	0.172	80.217	<0.01	1.11%
MANGANESE		NR	—	360.000	0.022	0.022	12.701	<0.01	0.90%
BARIUM	X	NR	—	144.000	0.009	0.009	10.142	<0.01	0.46%
STRONTIUM	X	NR	—	41.700	0.003	0.003	6.784	<0.01	0.23%
TIN		NR	—	32.700	0.002	0.002	7.914	<0.01	0.13%
ARSENIC		NR	—	3.500	2.10E-04	2.10E-04	0.885	<0.01	0.12%
PYRENE	X	NR	—	0.094	5.64E-06	5.64E-06	0.372	<0.01	0.01%
NICKEL		NR	—	13.800	0.001	0.001	70.054	<0.01	0.01%
FLUORANTHENE	X	NR	—	0.078	4.68E-06	4.68E-06	0.372	<0.01	0.01%

HAZARD INDEX 0.19

Notes:

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SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU4 Downgradient Source Area at RFETS

RED-TAILED HAWK OU4 DOWNGRADIENT		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU4	IR = 0.098 SUF = 0.010		IR = 0.003 SUF = 0.010					
MERCURY	X	0.380	3.72E-04	0.107	3.20E-06	3.76E-04	0.007	0.05	29.04%
BERYLLIUM	X	0.290	2.84E-04	ND	—	2.84E-04	0.006	0.05	25.63%
MAGNESIUM		1430.000	1.401	2871.518	0.086	1.488	80.217	0.02	10.04%
ALUMINUM		614.000	0.602	12856.399	0.386	0.987	58.820	0.02	9.08%
ZINC		109.000	0.107	74.594	0.002	0.109	10.863	0.01	5.43%
COBALT		ND	—	8.238	2.47E-04	2.47E-04	0.028	0.01	4.78%
LITHIUM		ND	—	9.207	2.76E-04	2.76E-04	0.037	0.01	4.04%
THALLIUM		ND	—	0.630	1.89E-05	1.89E-05	0.003	0.01	3.41%
STRONTIUM		29.000	0.028	52.509	0.002	0.030	6.784	<0.01	2.39%
VANADIUM		ND	—	35.665	0.001	0.001	0.295	<0.01	1.83%
MANGANESE		17.700	0.017	337.070	0.010	0.027	12.701	<0.01	1.15%
COPPER		27.500	0.027	16.143	4.84E-04	0.027	16.147	<0.01	0.90%
BARIUM		10.300	0.010	165.692	0.005	0.015	10.142	<0.01	0.80%
TIN		5.900	0.006	38.477	0.001	0.007	7.914	<0.01	0.48%
LEAD		ND	—	20.053	0.001	0.001	1.846	<0.01	0.29%
CHROMIUM		ND	—	14.049	4.21E-04	4.21E-04	1.058	<0.01	0.22%
BENZO(a)PYRENE	X	NR	—	0.200	6.00E-06	6.00E-06	0.037	<0.01	0.09%
ARSENIC		ND	—	4.565	1.37E-04	1.37E-04	0.885	<0.01	0.08%
NITRATE/NITRITE	X	NR	—	3.975	1.19E-04	1.19E-04	0.962	<0.01	0.07%
BENZO(k)FLUORANTHENE	X	NR	—	0.130	3.90E-06	3.90E-06	0.037	<0.01	0.06%
PHENANTHRENE	X	NR	—	0.074	2.22E-06	2.22E-06	0.037	<0.01	0.03%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	0.978	2.93E-05	2.93E-05	0.577	<0.01	0.03%
INDENO(1,2,3-cd)PYRENE	X	NR	—	0.150	4.50E-06	4.50E-06	0.093	<0.01	0.03%
DI-n-BUTYL PHTHALATE	X	NR	—	0.079	2.37E-06	2.37E-06	0.058	<0.01	0.02%
DIBENZO(a,h)ANTHRACENE		NR	—	0.047	1.41E-06	1.41E-06	0.037	<0.01	0.02%
CADMIUM	X	ND	—	1.109	3.33E-05	3.33E-05	1.494	<0.01	0.01%
CHRYSENE	X	NR	—	0.220	6.60E-06	6.60E-06	0.372	<0.01	0.01%
PYRENE	X	NR	—	0.191	5.73E-06	5.73E-06	0.372	<0.01	0.01%
FLUORANTHENE	X	NR	—	0.183	5.49E-06	5.49E-06	0.372	<0.01	0.01%
BENZO(b)FLUORANTHENE	X	NR	—	0.182	5.45E-06	5.45E-06	0.371	<0.01	0.01%
BENZO(ghi)PERYLENE	X	NR	—	0.170	5.10E-06	5.10E-06	0.372	<0.01	0.01%
BENZO(a)ANTHRACENE	X	NR	—	0.160	4.80E-06	4.80E-06	0.372	<0.01	0.01%
NICKEL		ND	—	14.767	4.43E-04	4.43E-04	70.054	<0.01	<0.01%
DI-n-OCTYL PHTHALATE		NR	—	0.295	8.84E-06	8.84E-06	47.492	<0.01	<0.01%
BUTYL BENZYL PHTHALATE		NR	—	0.170	5.10E-06	5.10E-06	108.554	<0.01	<0.01%

HAZARD INDEX 0.18

Notes:

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I = Incomplete pathway

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Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU7 Downgradient Areas Source Area at RFETS

RED-TAILED HAWK OU7 DOWNGRADIENT AREAS		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU7	IR = 0.098 SUF = 0.004		IR = 0.003 SUF = 0.004					
ZINC	X	746.000	0.292	NR	—	0.292	10.863	0.03	16.68%
SELENIUM	X	26.500	0.010	NR	—	0.010	0.393	0.03	15.79%
MAGNESIUM	X	4680.000	1.835	NR	—	1.835	80.217	0.02	14.19%
VANADIUM	X	14.100	0.006	NR	—	0.006	0.295	0.02	12.62%
MERCURY		0.300	1.18E-04	NR	—	1.18E-04	0.007	0.02	10.42%
LEAD	X	55.600	0.022	NR	—	0.022	1.846	0.01	7.39%
CHROMIUM	X	29.700	0.012	NR	—	0.012	1.058	0.01	7.04%
STRONTIUM	X	118.000	0.046	NR	—	0.046	6.784	0.01	4.21%
CADMIUM		18.700	0.007	NR	—	0.007	1.494	<0.01	2.91%
ALUMINUM	X	624.000	0.245	NR	—	0.245	58.820	<0.01	2.58%
TIN	X	52.700	0.021	NR	—	0.021	7.914	<0.01	1.65%
COPPER	X	106.000	0.042	NR	—	0.042	16.147	<0.01	1.61%
BARIUM	X	67.100	0.026	NR	—	0.026	10.142	<0.01	1.59%
MANGANESE	X	64.400	0.025	NR	—	0.025	12.701	<0.01	1.22%
NITRATE/NITRITE	X	NR	—	10.779	1.29E-04	1.29E-04	0.962	<0.01	0.08%
SILVER		24.400	0.010	NR	—	0.010	1105.027	<0.01	0.01%

HAZARD INDEX 0.16

Notes:

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Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU6 Burial Trenches Source Area at RFETS

RED-TAILED HAWK OU6 BURIAL TRENCHES		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = 0.098 SUF = 0.002		IR = 0.003 SUF = 0.002					
ZINC	X	887.000	0.174	NR	—	0.174	10.863	0.02	25.73%
MAGNESIUM	X	5840.000	1.145	NR	—	1.145	80.217	0.01	22.93%
VANADIUM	X	14.300	0.003	NR	—	0.003	0.295	0.01	16.34%
CHROMIUM	X	24.300	0.005	NR	—	0.005	1.058	<0.01	7.59%
ALUMINUM		1080.000	0.212	NR	—	0.212	58.820	<0.01	5.79%
STRONTIUM	X	104.000	0.020	NR	—	0.020	6.784	<0.01	4.74%
LEAD	X	25.100	0.005	NR	—	0.005	1.846	<0.01	4.35%
SELENIUM		3.900	0.001	NR	—	0.001	0.393	<0.01	4.09%
MANGANESE	X	103.000	0.020	NR	—	0.020	12.701	<0.01	2.53%
TIN		52.900	0.010	NR	—	0.010	7.914	<0.01	2.03%
COPPER	X	103.000	0.020	NR	—	0.020	16.147	<0.01	1.99%
BARIUM	X	62.500	0.012	NR	—	0.012	10.142	<0.01	1.90%
SILVER	X	3.000	0.001	NR	—	0.001	1105.027	<0.01	<0.01%

HAZARD INDEX 0.06

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
OU = Operable Unit
IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU6 North Spray Field Source Area at RFETS

RED-TAILED HAWK OU6 NORTH SPRAY FIELD		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU6	IR = NR SUF = 0.007		IR = 0.003 SUF = 0.007					
COBALT	X	NR	—	9.750	2.05E-04	2.05E-04	0.028	0.01	27.57%
ALUMINUM		NR	—	11820.163	0.248	0.248	58.820	<0.01	15.90%
LITHIUM		NR	—	6.643	1.40E-04	1.40E-04	0.037	<0.01	14.21%
VANADIUM	X	NR	—	33.599	0.001	0.001	0.295	<0.01	12.78%
BERYLLIUM		NR	—	0.686	1.44E-05	1.44E-05	0.006	<0.01	9.05%
THALLIUM		NR	—	0.340	7.14E-06	7.14E-06	0.003	<0.01	8.97%
MAGNESIUM	X	NR	—	2397.398	0.050	0.050	80.217	<0.01	2.35%
MANGANESE	X	NR	—	315.526	0.007	0.007	12.701	<0.01	2.08%
LEAD	X	NR	—	40.050	0.001	0.001	1.846	<0.01	2.04%
BARIUM	X	NR	—	170.910	0.004	0.004	10.142	<0.01	1.49%
CHROMIUM	X	NR	—	13.137	2.76E-04	2.76E-04	1.058	<0.01	0.98%
MERCURY	X	NR	—	0.066	1.39E-06	1.39E-06	0.007	<0.01	0.75%
ARSENIC	X	NR	—	6.579	1.38E-04	1.38E-04	0.885	<0.01	0.59%
STRONTIUM	X	NR	—	31.283	0.001	0.001	6.784	<0.01	0.56%
ZINC	X	NR	—	48.942	0.001	0.001	10.863	<0.01	0.35%
SELENIUM		NR	—	0.574	1.21E-05	1.21E-05	0.393	<0.01	0.12%
NITRATE/NITRITE		NR	—	1.000	2.10E-05	2.10E-05	0.962	<0.01	0.08%
COPPER	X	NR	—	13.985	2.94E-04	2.94E-04	16.147	<0.01	0.07%
CADMIUM		NR	—	0.990	2.08E-05	2.08E-05	1.494	<0.01	0.05%
NICKEL	X	NR	—	15.387	3.23E-04	3.23E-04	70.054	<0.01	0.02%

HAZARD INDEX 0.03

Notes:

RFETS = Rocky Flats Environmental Technology Site
PCOC = Potential Chemical of Concern
Exp. Point Conc. = Exposure Point Concentration
TRV = Toxicity Reference Value
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IR = Ingestion Rate
SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU5 Surface Disturbance Source Area at RFETS

RED-TAILED HAWK OU5 SURFACE DISTURBANCE		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU5	IR = NR SUF = 0.003		IR = 0.003 SUF = 0.003					
COBALT	X	NR	—	5.700	5.13E-05	5.13E-05	0.028	<0.01	23.68%
LITHIUM	X	NR	—	6.500	5.85E-05	5.85E-05	0.037	<0.01	20.44%
ALUMINUM		NR	—	7680.000	0.069	0.069	58.820	<0.01	15.16%
BERYLLIUM		NR	—	0.600	5.40E-06	5.40E-06	0.006	<0.01	11.63%
MERCURY	X	NR	—	0.660	5.94E-06	5.94E-06	0.007	<0.01	10.97%
VANADIUM		NR	—	22.200	2.00E-04	2.00E-04	0.295	<0.01	8.76%
MAGNESIUM		NR	—	1810.000	0.016	0.016	80.217	<0.01	2.58%
MANGANESE		NR	—	218.000	0.002	0.002	12.701	<0.01	2.04%
BARIUM	X	NR	—	80.800	0.001	0.001	10.142	<0.01	1.27%
LEAD	X	NR	—	14.100	1.27E-04	1.27E-04	1.846	<0.01	0.89%
CHROMIUM		NR	—	7.800	7.02E-05	7.02E-05	1.058	<0.01	0.86%
STRONTIUM	X	NR	—	38.600	3.47E-04	3.47E-04	6.784	<0.01	0.66%
ARSENIC		NR	—	3.900	3.51E-05	3.51E-05	0.885	<0.01	0.51%
ZINC	X	NR	—	40.000	3.60E-04	3.60E-04	10.863	<0.01	0.43%
COPPER	X	NR	—	14.200	1.28E-04	1.28E-04	16.147	<0.01	0.10%
NICKEL		NR	—	10.100	9.09E-05	9.09E-05	70.054	<0.01	0.02%

HAZARD INDEX 0.01

Notes:

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SUF = Site Use Factor
I = Incomplete pathway
NR = Not reported/analyzed in sample information
ND = Not detected in laboratory samples
NO BCF = No bioconcentration factor available; BCFs are used to estimate tissue uptake of chemicals found in surface water and sediments
NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Summary of Ecotoxicological Risk to Red-tailed Hawks in the OU2 Mound Area Source Area at RFETS

RED-TAILED HAWK OU2 MOUND AREA		EXPOSURE POINT				SUMMARY			
		Small Mammal		Surficial Soil					
		Exp. Point Conc.	Intake	Exp. Point Conc.	Intake	Total Intake	Toxicity Ref. Value	Hazard Quotient	Percent of Total Risk
Analyte	PCOC for OU2	IR = NR SUF = 0.003		IR = 0.003 SUF = 0.003					
LITHIUM		NR	—	8.800	7.92E-05	7.92E-05	0.037	<0.01	23.17%
COBALT		NR	—	6.200	5.58E-05	5.58E-05	0.028	<0.01	21.57%
ALUMINUM		NR	—	10100.000	0.091	0.091	58.820	<0.01	16.74%
THALLIUM		NR	—	0.500	4.50E-06	4.50E-06	0.003	<0.01	16.23%
VANADIUM		NR	—	31.100	2.80E-04	2.80E-04	0.295	<0.01	10.27%
MAGNESIUM		NR	—	2730.000	0.025	0.025	80.217	<0.01	3.37%
MANGANESE		NR	—	240.000	0.002	0.002	12.701	<0.01	1.70%
STRONTIUM		NR	—	66.300	0.001	0.001	6.784	<0.01	1.60%
BARIUM		NR	—	108.000	0.001	0.001	10.142	<0.01	1.07%
CHROMIUM	X	NR	—	10.200	9.18E-05	9.18E-05	1.058	<0.01	0.94%
LEAD	X	NR	—	16.000	1.44E-04	1.44E-04	1.846	<0.01	0.84%
ARSENIC		NR	—	5.900	5.31E-05	5.31E-05	0.885	<0.01	0.65%
AROCLOR-1254	X	NR	—	0.970	8.73E-06	8.73E-06	0.173	<0.01	0.55%
ZINC		NR	—	46.300	4.17E-04	4.17E-04	10.863	<0.01	0.42%
BENZO(a)PYRENE	X	NR	—	0.096	8.60E-07	8.60E-07	0.037	<0.01	0.25%
PHENANTHRENE	X	NR	—	0.083	7.50E-07	7.50E-07	0.037	<0.01	0.22%
COPPER		NR	—	13.100	1.18E-04	1.18E-04	16.147	<0.01	0.08%
AROCLOR-1260	X	NR	—	0.660	5.94E-06	5.94E-06	0.881	<0.01	0.07%
FLUORANTHENE	X	NR	—	0.200	1.80E-06	1.80E-06	0.372	<0.01	0.05%
INDENO(1,2,3-cd)PYRENE	X	NR	—	0.045	4.10E-07	4.10E-07	0.093	<0.01	0.05%
PYRENE	X	NR	—	0.180	1.62E-06	1.62E-06	0.372	<0.01	0.05%
BENZO(b)FLUORANTHENE	X	NR	—	0.120	1.08E-06	1.08E-06	0.371	<0.01	0.03%
CHRYSENE	X	NR	—	0.100	9.00E-07	9.00E-07	0.372	<0.01	0.03%
BENZO(a)ANTHRACENE	X	NR	—	0.086	7.70E-07	7.70E-07	0.372	<0.01	0.02%
NICKEL		NR	—	11.400	1.03E-04	1.03E-04	70.054	<0.01	0.02%
BENZO(ghi)PERYLENE	X	NR	—	0.045	4.10E-07	4.10E-07	0.372	<0.01	0.01%
BIS(2-ETHYLHEXYL)PHTHALATE	X	NR	—	0.052	4.70E-07	4.70E-07	0.577	<0.01	0.01%

HAZARD INDEX 0.01

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NO LOG K_{OW} = No octonol-water partition coefficient available; LOG K_{OW}s are used to estimate vegetation uptake of organic compounds by comparing the relative affinities of a compound for water and octonal (a lipid analog)
Units for ingestion rates = kg/kg/day; units for concentrations = mg/kg

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU4 Downgradient Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU4 DOWNGRADIENT		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU4	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE		1	2	2	
1,2-DICHLOROETHANE		2	2	2	
1,2-DICHLOROETHENE		2	2	2	
2-BUTANONE		2	2	2	
2-METHYLNAPHTHALENE		1	2	2	
4,4'-DDT		1	2	2	
4-METHYL-2-PENTANONE		2	2	2	
ACENAPHTHENE		1	2	2	
ACENAPHTHYLENE		1	2	2	
ALDRIN		1	2	2	
ANTHRACENE		1	2	2	
ANTIMONY		1	2	2	
AROCLOR-1248		1	2	2	
AROCLOR-1254	X	1	2	2	
AROCLOR-1260		1	2	2	
BENZENE		2	2	2	
BENZOIC ACID		1	2	2	
BENZYL ALCOHOL		1	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	2	
CHLOROFORM		2	2	2	
delta-BHC		1	2	2	
DIBENZOFURAN		1	2	2	
DIELDRIN		1	2	2	
ENDOSULFAN SULFATE		1	2	2	
ENDRIN KETONE		1	2	2	
FLUORENE		1	2	2	
gamma-BHC (LINDANE)		1	2	2	
HEPTACHLOR		1	2	2	
HEPTACHLOR EPOXIDE		1	2	2	
ISOPHORONE		1	2	2	
METHOXYCHLOR		1	2	2	
NAPHTHALENE		1	2	2	
PENTACHLOROPHENOL		1	2	2	
PHENOL		1	2	2	
SILVER	X	1	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE		2	2	2	
VINYL ACETATE		2	2	2	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU6 B-Ponds Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 B-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU6	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
4,4'-DDT		1	1	2	
4-METHYL-2-PENTANONE	X	2	1	1	
ACENAPHTHYLENE		1	1	1	
ALDRIN	X	1	1	2	
BENZENE	X	2	1	1	
BENZOIC ACID	X	3	1	1	4
BENZYL ALCOHOL	X	1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
delta-BHC		1	1	2	
DIBENZOFURAN	X	1	3	1	4
DIELDRIN		1	1	2	
ENDOSULFAN SULFATE		1	1	2	
ENDRIN KETONE		1	1	2	
HEPTACHLOR EPOXIDE		1	1	2	
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	2	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		1	1	1	
TOTAL XYLENES		2	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

1 = Analyte not detected in medium
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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU6 Soil Dump Areas Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 SOIL DUMP AREAS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU6	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE	X	1	2	2	
1,2-DICHLOROETHANE	X	2	2	2	
1,2-DICHLOROETHENE	X	2	2	2	
2-METHYLNAPHTHALENE	X	1	2	2	
4,4'-DDT		1	2	2	
ACENAPHTHYLENE		1	2	2	
ALDRIN	X	1	2	2	
ANTIMONY	X	1	2	2	
AROCLOR-1248		1	2	2	
AROCLOR-1260	X	1	2	2	
BENZOIC ACID	X	1	2	2	
BENZYL ALCOHOL	X	1	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	2	
CHLOROFORM	X	2	2	2	
delta-BHC		1	2	2	
DIBENZOFURAN	X	3	2	2	4
DIELDRIN		1	2	2	
ENDOSULFAN SULFATE		1	2	2	
ENDRIN KETONE		1	2	2	
gamma-BHC (LINDANE)	X	1	2	2	
HEPTACHLOR	X	1	2	2	
HEPTACHLOR EPOXIDE		1	2	2	
ISOPHORONE		1	2	2	
METHOXYCHLOR		1	2	2	
SILVER	X	1	2	2	
TRICHLOROETHENE	X	2	2	2	
VINYL ACETATE		2	2	2	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU6 A-Ponds Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 A-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU6	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE	X	1	1	1	
1,2-DICHLOROETHANE	X	2	1	1	
1,2-DICHLOROETHENE	X	2	1	1	
2-METHYLNAPHTHALENE	X	1	1	1	
ACENAPHTHYLENE		1	1	1	
AROCLOR-1248		1	1	2	
AROCLOR-1260	X	1	1	2	
BENZOIC ACID	X	3	3	1	4
BENZYL ALCOHOL	X	1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
BUTYL BENZYL PHTHALATE	X	1	1	1	
CHLOROFORM	X	2	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	1	
DIBENZOFURAN	X	1	1	1	
DIELDRIN		1	1	2	
ENDOSULFAN SULFATE		1	1	2	
ENDRIN KETONE		1	1	2	
FLUORENE	X	1	1	1	
gamma-BHC (LINDANE)	X	1	1	2	
HEPTACHLOR	X	1	1	2	
HEPTACHLOR EPOXIDE		1	1	2	
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	2	
NAPHTHALENE	X	1	1	1	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		1	1	1	
TETRACHLOROETHENE	X	2	1	1	
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE	X	2	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU5 Old Landfill Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU5 OLD LANDFILL		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU5	Surficial Soil	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE		1	1	1	
1,1-DICHLOROETHENE		1	1	1	
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHANE		1	1	1	
1,2-DICHLOROETHENE		1	1	1	
ACENAPHTHYLENE	X	3	1	1	4
AROCLOR-1248		1	1	1	
BENZENE		1	1	1	
BENZOIC ACID	X	3	1	1	4
BENZYL ALCOHOL		1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
delta-BHC		1	1	1	
DIBENZOFURAN	X	3	1	1	4
gamma-BHC (LINDANE)		1	1	1	
HEPTACHLOR		1	1	1	
VINYL ACETATE		1	1	1	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU2 East Trenches Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU2 EAST TRENCHES		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU2	Surficial Soil	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE		2	2	2	
1,2,4-TRICHLOROBENZENE		1	2	2	
1,2-DICHLOROETHANE		2	2	2	
ACENAPHTHYLENE		1	2	2	
ALDRIN		1	2	2	
ANTIMONY		1	2	2	
AROCLOR-1248		1	2	2	
AROCLOR-1260	X	1	2	2	
BENZO(k)FLUORANTHENE	X	1	2	2	
BENZOIC ACID	X	3	2	2	4
BENZYL ALCOHOL		1	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	2	
BUTYL BENZYL PHTHALATE		1	2	2	
delta-BHC	X	1	2	2	
DI-n-OCTYL PHTHALATE		1	2	2	
DIBENZO(a,h)ANTHRACENE		1	2	2	
DIBENZOFURAN		1	2	2	
DIELDRIN		1	2	2	
ENDOSULFAN SULFATE		1	2	2	
ENDRIN KETONE		1	2	2	
gamma-BHC (LINDANE)		1	2	2	
HEPTACHLOR		1	2	2	
HEPTACHLOR EPOXIDE		1	2	2	
ISOPHORONE		1	2	2	
MERCURY		1	2	2	
METHOXYCHLOR		1	2	2	
MOLYBDENUM		1	2	2	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		1	2	2	
PHENOL		1	2	2	
THALLIUM		1	2	2	
VINYL ACETATE		2	2	2	

Reason Codes:

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2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU7 Downgradient Areas Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU7 DOWNGRADIENT AREAS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU7	Surficial Soil	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE		2	1	3	4
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE		2	1	1	
1,2-DICHLOROETHANE		2	1	1	
1,2-DICHLOROETHENE		2	1	1	
2-BUTANONE	X	2	1	1	
2-METHYLNAPHTHALENE		2	1	1	
4,4'-DDT		2	1	1	
ACENAPHTHENE	X	2	1	1	
ACENAPHTHYLENE		2	1	1	
ACETONE	X	2	3	3	4
ALDRIN		2	1	1	
ANTHRACENE	X	2	3	1	4
ANTIMONY	X	2	3	3	4
AROCLOR-1248		1	1	1	
AROCLOR-1254		1	1	1	
AROCLOR-1260		1	1	1	
BENZENE		2	1	3	4
BENZO(a)PYRENE	X	2	3	1	4
BENZO(b)FLUORANTHENE	X	2	3	1	4
BENZO(ghi)PERYLENE	X	2	3	1	4
BENZO(k)FLUORANTHENE	X	2	3	1	4
BENZOIC ACID	X	2	1	1	
BENZYL ALCOHOL		2	1	1	
BIS(2-CHLOROISOPROPYL)ETHER	X	2	1	1	
CHLOROFORM		2	1	1	
COBALT	X	2	3	1	4
delta-BHC		2	1	1	
DI-n-BUTYL PHTHALATE	X	2	1	1	
DI-n-OCTYL PHTHALATE		2	1	1	
DIBENZO(a,h)ANTHRACENE		2	1	1	
DIBENZOFURAN		2	1	1	
DIELDRIN		2	1	1	
ENDOSULFAN SULFATE		2	1	1	
ENDRIN KETONE		2	1	1	
FLUORENE	X	2	1	1	
gamma-BHC (LINDANE)		2	1	1	
HEPTACHLOR		2	1	1	
HEPTACHLOR EPOXIDE		2	1	1	
INDENO(1,2,3-cd)PYRENE	X	2	3	1	4
ISOPHORONE		2	1	1	
MERCURY		2	3	3	4
METHOXYCHLOR		2	1	1	
METHYLENE CHLORIDE	X	2	1	3	4
NAPHTHALENE		2	1	1	
PENTACHLOROPHENOL		2	1	1	
PHENOL		2	1	1	
SILVER		2	3	1	4
TETRACHLOROETHENE		2	1	1	
THALLIUM	X	2	3	1	4
TRICHLOROETHENE		2	1	1	
VINYL ACETATE	X	2	1	1	

Reason Codes:

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2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU6 North Spray Field Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 NORTH SPRAY FIELD		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU6	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE	X	2	2	2	
1,2-DICHLOROETHANE	X	2	2	2	
1,2-DICHLOROETHENE	X	2	2	2	
2-BUTANONE	X	2	2	2	
2-METHYLNAPHTHALENE	X	2	2	2	
4,4'-DDT		2	2	2	
4-METHYL-2-PENTANONE	X	2	2	2	
ACENAPHTHENE	X	2	2	2	
ACENAPHTHYLENE		2	2	2	
ACETONE	X	2	2	2	
ALDRIN	X	2	2	2	
ANTHRACENE	X	2	2	2	
AROCLOR-1248		2	2	2	
AROCLOR-1254	X	2	2	2	
AROCLOR-1260	X	2	2	2	
BENZENE	X	2	2	2	
BENZO(a)ANTHRACENE	X	2	2	2	
BENZO(a)PYRENE	X	2	2	2	
BENZO(b)FLUORANTHENE	X	2	2	2	
BENZO(ghi)PERYLENE	X	2	2	2	
BENZO(k)FLUORANTHENE	X	2	2	2	
BENZOIC ACID	X	2	2	2	
BENZYL ALCOHOL	X	2	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	2	2	
BUTYL BENZYL PHTHALATE	X	2	2	2	
CHLOROFORM	X	2	2	2	
CHRYSENE	X	2	2	2	
delta-BHC		2	2	2	
DI-n-BUTYL PHTHALATE	X	2	2	2	
DI-n-OCTYL PHTHALATE	X	2	2	2	
DIBENZO(a,h)ANTHRACENE	X	2	2	2	
DIBENZOFURAN	X	2	2	2	
DIELDRIN		2	2	2	
ENDOSULFAN SULFATE		2	2	2	
ENDRIN KETONE		2	2	2	
FLUORANTHENE	X	2	2	2	
FLUORENE	X	2	2	2	
gamma-BHC (LINDANE)	X	2	2	2	
HEPTACHLOR	X	2	2	2	
HEPTACHLOR EPOXIDE		2	2	2	
INDENO(1,2,3-cd)PYRENE	X	2	2	2	
ISOPHORONE		2	2	2	
METHOXYCHLOR		2	2	2	
METHYLENE CHLORIDE	X	2	2	2	
MOLYBDENUM	X	1	2	2	
NAPHTHALENE	X	2	2	2	
PENTACHLOROPHENOL		2	2	2	
PHENANTHRENE	X	2	2	2	
PHENOL	X	2	2	2	

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU6 North Spray Field Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 NORTH SPRAY FIELD		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU6**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
PYRENE	X	2	2	2	
SILVER	X	1	2	2	
TETRACHLOROETHENE	X	2	2	2	
TIN		1	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE	X	2	2	2	
VINYL ACETATE		2	2	2	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU2 903 Pad Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU2 903 PAD		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU2	Surficial Soil	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE		2	1	1	
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHANE		2	1	1	
2-METHYLNAPHTHALENE		1	1	1	
ACENAPHTHYLENE		1	1	1	
ALDRIN		1	1	1	
AROCLOR-1260	X	1	1	1	
BENZENE		2	1	1	
BENZOIC ACID	X	3	1	3	4
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
delta-BHC	X	1	1	1	
DIBENZOFURAN		3	1	1	4
DIELDRIN		1	1	1	
ENDOSULFAN SULFATE		1	1	1	
ENDRIN KETONE		1	1	1	
HEPTACHLOR		1	1	1	
HEPTACHLOR EPOXIDE		1	1	1	
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	1	
NAPHTHALENE		1	1	1	
PENTACHLOROPHENOL		1	1	1	
PHENOL		1	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU5 Ash Pits Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU5 ASH PITS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU5	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE		2	1	1	
1,2-DICHLOROETHENE		2	1	1	
2-METHYLNAPHTHALENE	X	2	1	1	
4,4'-DDT	X	2	1	1	
4-METHYL-2-PENTANONE		2	1	1	
ACENAPHTHENE	X	1	1	1	
ALDRIN	X	2	1	1	
ANTHRACENE	X	1	1	1	
AROCLOR-1248		2	1	1	
AROCLOR-1254	X	2	1	1	
AROCLOR-1260		2	1	1	
BENZENE		2	1	1	
BENZO(a)ANTHRACENE	X	2	1	1	
BENZO(a)PYRENE	X	1	1	1	
BENZO(b)FLUORANTHENE	X	1	1	1	
BENZO(ghi)PERYLENE	X	1	1	1	
BENZO(k)FLUORANTHENE	X	2	1	1	
BENZYL ALCOHOL		2	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		2	1	1	
BUTYL BENZYL PHTHALATE	X	2	1	1	
CHRYSENE	X	1	1	1	
delta-BHC		2	1	1	
DI-n-BUTYL PHTHALATE	X	2	1	1	
DI-n-OCTYL PHTHALATE	X	2	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	1	
DIELDRIN	X	2	1	1	
ENDOSULFAN SULFATE	X	2	1	1	
ENDRIN KETONE	X	2	1	1	
FLUORANTHENE	X	1	1	1	
FLUORENE	X	1	1	1	
gamma-BHC (LINDANE)		2	1	1	
HEPTACHLOR		2	1	1	
HEPTACHLOR EPOXIDE	X	2	1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	1	
ISOPHORONE	X	2	1	1	
METHOXYCHLOR	X	2	1	1	
NAPHTHALENE	X	1	1	1	
PENTACHLOROPHENOL	X	2	1	1	
PHENANTHRENE	X	1	1	1	
PHENOL	X	2	1	1	
PYRENE	X	1	1	1	
TETRACHLOROETHENE		2	1	1	
TOLUENE	X	2	1	1	
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE		2	1	1	
VINYL ACETATE		2	1	1	
ACENAPHTHYLENE	X	1	1	1	
BENZOIC ACID	X	2	3	1	4
DIBENZOFURAN	X	2	1	1	

Reason Codes:

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU6 Burial Trenches Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 BURIAL TRENCHES		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU6	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE	X	2	2	2	
1,2-DICHLOROETHANE	X	2	2	2	
1,2-DICHLOROETHENE	X	2	2	2	
2-METHYLNAPHTHALENE	X	2	2	2	
4,4'-DDT		2	2	2	
ACENAPHTHENE	X	2	2	2	
ACENAPHTHYLENE		2	2	2	
ALDRIN	X	2	2	2	
ANTHRACENE	X	2	2	2	
ANTIMONY	X	2	2	2	
AROCLOR-1248		2	2	2	
AROCLOR-1254	X	2	2	2	
AROCLOR-1260	X	2	2	2	
BENZO(a)ANTHRACENE	X	2	2	2	
BENZO(a)PYRENE	X	2	2	2	
BENZO(b)FLUORANTHENE	X	2	2	2	
BENZO(ghi)PERYLENE	X	2	2	2	
BENZO(k)FLUORANTHENE	X	2	2	2	
BENZOIC ACID	X	2	2	2	
BENZYL ALCOHOL	X	2	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	2	2	
BUTYL BENZYL PHTHALATE	X	2	2	2	
CHRYSENE	X	2	2	2	
COBALT	X	2	2	2	
delta-BHC		2	2	2	
DI-n-BUTYL PHTHALATE	X	2	2	2	
DI-n-OCTYL PHTHALATE	X	2	2	2	
DIBENZO(a,h)ANTHRACENE	X	2	2	2	
DIBENZOFURAN	X	2	2	2	
DIELDRIN		2	2	2	
ENDOSULFAN SULFATE		2	2	2	
ENDRIN KETONE		2	2	2	
FLUORANTHENE	X	2	2	2	
FLUORENE	X	2	2	2	
gamma-BHC (LINDANE)	X	2	2	2	
HEPTACHLOR	X	2	2	2	
HEPTACHLOR EPOXIDE		2	2	2	
INDENO(1,2,3-cd)PYRENE	X	2	2	2	
ISOPHORONE		2	2	2	
METHOXYCHLOR		2	2	2	
NAPHTHALENE	X	2	2	2	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		2	2	2	
PHENANTHRENE	X	2	2	2	
PHENOL	X	2	2	2	
PYRENE	X	2	2	2	
SILVER	X	2	2	2	

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU6 Burial Trenches Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU6 BURIAL TRENCHES		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	PCOC for OU6	Surficial Soil	Sediment	Surface Water	TRV
TETRACHLOROETHENE	X	2	2	2	
THALLIUM		2	2	2	
TOTAL XYLENES		2	2	2	
VINYL ACETATE		2	2	2	

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Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU1 881 Hillside Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU1 881 HILLSIDE		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU1	Surficial Soil	Sediment	Surface Water	TRV
1,2,4-TRICHLOROBENZENE		1	1	1	
2-METHYLNAPHTHALENE		1	1	1	
4,4'-DDT		1	1	1	
ACENAPHTHYLENE	X	3	1	1	4
AROCLOR-1260		1	1	1	
BENZENE		2	1	1	
BENZOIC ACID		1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
BUTYL BENZYL PHTHALATE		1	1	1	
delta-BHC		1	1	1	
DIBENZOFURAN		3	1	1	4
DIELDRIN		1	1	1	
ENDOSULFAN SULFATE		1	1	1	
ENDRIN KETONE		1	1	1	
gamma-BHC (LINDANE)		1	1	1	
HEPTACHLOR		1	1	1	
HEPTACHLOR EPOXIDE		1	1	1	
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	1	
PHENOL		1	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

1 = Analyte not detected in medium
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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU5 C-Ponds Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU5 C-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU5	Surficial Soil	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHANE		2	1	1	
1,2-DICHLOROETHENE		2	1	1	
2-METHYLNAPHTHALENE	X	1	1	1	
4,4'-DDT	X	1	1	1	
4-METHYL-2-PENTANONE		2	1	1	
ACENAPHTHENE	X	1	1	1	
ACENAPHTHYLENE	X	1	1	1	
ALDRIN	X	1	1	1	
ANTHRACENE	X	1	1	1	
AROCLOR-1248		1	1	1	
AROCLOR-1254	X	1	1	1	
AROCLOR-1260		1	1	1	
BENZENE		2	1	1	
BENZO(a)ANTHRACENE	X	1	1	1	
BENZO(a)PYRENE	X	1	1	1	
BENZO(b)FLUORANTHENE	X	1	1	1	
BENZO(ghi)PERYLENE	X	1	1	1	
BENZO(k)FLUORANTHENE	X	1	1	1	
BENZOIC ACID	X	3	3	3	4
BENZYL ALCOHOL		1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
CHRYSENE	X	1	1	1	
DI-n-OCTYL PHTHALATE	X	1	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	1	
DIBENZOFURAN	X	1	1	1	
DIELDRIN	X	1	1	1	
ENDOSULFAN SULFATE	X	1	1	1	
ENDRIN KETONE	X	1	1	1	
FLUORENE	X	1	1	1	
gamma-BHC (LINDANE)		1	1	1	
HEPTACHLOR		1	1	1	
HEPTACHLOR EPOXIDE	X	1	1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	1	
ISOPHORONE	X	1	1	1	
METHOXYCHLOR	X	1	1	1	
NAPHTHALENE	X	1	1	1	
PENTACHLOROPHENOL	X	1	1	1	
PHENANTHRENE	X	1	1	1	
TETRACHLOROETHENE		2	1	1	
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE		2	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

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2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU11 West Spray Field Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU11 WEST SPRAY FIELD		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU11	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE		2	2	2	
1,2-DICHLOROETHANE		2	2	2	
1,2-DICHLOROETHENE		2	2	2	
2-METHYLNAPHTHALENE		2	2	2	
4,4'-DDT		2	2	2	
4-METHYL-2-PENTANONE		2	2	2	
ACENAPHTHENE		2	2	2	
ACENAPHTHYLENE		2	2	2	
ALDRIN		2	2	2	
ANTHRACENE		2	2	2	
AROCLOR-1248		2	2	2	
AROCLOR-1254		2	2	2	
AROCLOR-1260		2	2	2	
BENZENE		2	2	2	
BENZO(a)ANTHRACENE		2	2	2	
BENZO(a)PYRENE		2	2	2	
BENZO(b)FLUORANTHENE		2	2	2	
BENZO(ghi)PERYLENE		2	2	2	
BENZO(k)FLUORANTHENE		2	2	2	
BENZOIC ACID		2	2	2	
BENZYL ALCOHOL		2	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	2	
BUTYL BENZYL PHTHALATE		2	2	2	
CHRYSENE		2	2	2	
delta-BHC		2	2	2	
DI-n-OCTYL PHTHALATE		2	2	2	
DIBENZO(a,h)ANTHRACENE		2	2	2	
DIBENZOFURAN		2	2	2	
DIELDRIN		2	2	2	
ENDOSULFAN SULFATE		2	2	2	
ENDRIN KETONE		2	2	2	
FLUORANTHENE		2	2	2	
FLUORENE		2	2	2	
gamma-BHC (LINDANE)		2	2	2	
HEPTACHLOR		2	2	2	
HEPTACHLOR EPOXIDE		2	2	2	
INDENO(1,2,3-cd)PYRENE		2	2	2	
ISOPHORONE		2	2	2	
MERCURY		1	2	2	
METHOXYCHLOR		2	2	2	
NAPHTHALENE		2	2	2	
PENTACHLOROPHENOL		2	2	2	
PHENANTHRENE		2	2	2	
PHENOL		2	2	2	
PYRENE		2	2	2	
SILVER		1	2	2	
TETRACHLOROETHENE		2	2	2	
TOTAL XYLENES		2	2	2	
VINYL ACETATE		2	2	2	

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Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU2 Mound Area Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU2 MOUND AREA		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU2	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE		1	2	2	
1,2-DICHLOROETHANE		2	2	2	
1,2-DICHLOROETHENE		2	2	2	
2-METHYLNAPHTHALENE		1	2	2	
4,4'-DDT	X	1	2	2	
ACENAPHTHENE		1	2	2	
ACENAPHTHYLENE		1	2	2	
ALDRIN		1	2	2	
ANTHRACENE		1	2	2	
ANTIMONY		2	2	2	
AROCLOR-1248		1	2	2	
BENZO(k)FLUORANTHENE	X	1	2	2	
BENZOIC ACID	X	3	2	2	4
BENZYL ALCOHOL		1	2	2	
BERYLLIUM		1	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	2	
BUTYL BENZYL PHTHALATE		1	2	2	
CADMIUM		1	2	2	
delta-BHC	X	1	2	2	
DI-n-OCTYL PHTHALATE		1	2	2	
DIBENZO(a,h)ANTHRACENE		1	2	2	
DIBENZOFURAN		1	2	2	
DIELDRIN		1	2	2	
ENDOSULFAN SULFATE		1	2	2	
ENDRIN KETONE		1	2	2	
FLUORENE		1	2	2	
gamma-BHC (LINDANE)		1	2	2	
HEPTACHLOR		1	2	2	
HEPTACHLOR EPOXIDE		1	2	2	
ISOPHORONE		1	2	2	
MERCURY		1	2	2	
METHOXYCHLOR		1	2	2	
MOLYBDENUM		1	2	2	
NAPHTHALENE		1	2	2	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		1	2	2	
PHENOL		1	2	2	
SELENIUM		1	2	2	
SILVER		1	2	2	
TIN		1	2	2	
TOTAL XYLENES		2	2	2	
VINYL ACETATE		2	2	2	

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU10 Outside Closures Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU10 OUTSIDE CLOSURES		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU10	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE		2	2	2	
1,2-DICHLOROETHANE		2	2	2	
1,2-DICHLOROETHENE		2	2	2	
2-BUTANONE		2	2	2	
2-METHYLNAPHTHALENE		2	2	2	
4,4'-DDT		2	2	2	
4-METHYL-2-PENTANONE		2	2	2	
ACENAPHTHENE		2	2	2	
ACENAPHTHYLENE		2	2	2	
ACETONE		2	2	2	
ALDRIN		2	2	2	
ALUMINUM		2	2	2	
ANTHRACENE		2	2	2	
ANTIMONY		2	2	2	
AROCLOR-1248		2	2	2	
AROCLOR-1254		2	2	2	
AROCLOR-1260		2	2	2	
ARSENIC		2	2	2	
BARIUM		2	2	2	
BENZENE		2	2	2	
BENZO(a)ANTHRACENE		2	2	2	
BENZO(a)PYRENE		2	2	2	
BENZO(b)FLUORANTHENE		2	2	2	
BENZO(ghi)PERYLENE		2	2	2	
BENZO(k)FLUORANTHENE		2	2	2	
BENZOIC ACID		2	2	2	
BENZYL ALCOHOL		2	2	2	
BERYLLIUM		2	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	2	
BIS(2-ETHYLHEXYL)PHTHALATE		2	2	2	
BUTYL BENZYL PHTHALATE		2	2	2	
CADMIUM		2	2	2	
CHLOROFORM		2	2	2	
CHROMIUM		2	2	2	
CHRYSENE		2	2	2	
COBALT		2	2	2	
COPPER		2	2	2	
delta-BHC		2	2	2	
DI-n-BUTYL PHTHALATE		2	2	2	
DI-n-OCTYL PHTHALATE		2	2	2	
DIBENZO(a,h)ANTHRACENE		2	2	2	
DIBENZOFURAN		2	2	2	
DIELDRIN		2	2	2	
ENDOSULFAN SULFATE		2	2	2	
ENDRIN KETONE		2	2	2	
FLUORANTHENE		2	2	2	
FLUORENE		2	2	2	
gamma-BHC (LINDANE)		2	2	2	
HEPTACHLOR		2	2	2	
HEPTACHLOR EPOXIDE		2	2	2	

Analytes not Included in the Wildlife Ecological Screen for Preble's Meadow Jumping Mice in the OU10 Outside Closures Source Area at RFETS

PREBLE'S MEADOW JUMPING MICE OU10 OUTSIDE CLOSURES		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU10**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
INDENO(1,2,3-cd)PYRENE		2	2	2	
ISOPHORONE		2	2	2	
LEAD		2	2	2	
LITHIUM		2	2	2	
MAGNESIUM		2	2	2	
MANGANESE		2	2	2	
MERCURY		2	2	2	
METHOXYCHLOR		2	2	2	
METHYLENE CHLORIDE		2	2	2	
MOLYBDENUM		2	2	2	
NAPHTHALENE		2	2	2	
NICKEL		2	2	2	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		2	2	2	
PHENANTHRENE		2	2	2	
PHENOL		2	2	2	
PYRENE		2	2	2	
SELENIUM		2	2	2	
SILVER		2	2	2	
STRONTIUM		2	2	2	
TETRACHLOROETHENE		2	2	2	
THALLIUM		2	2	2	
TIN		2	2	2	
TOLUENE		2	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE		2	2	2	
VANADIUM		2	2	2	
VINYL ACETATE		2	2	2	
ZINC		2	2	2	

Note: No data exists for OU10 Outside Closures, therefore, all analytes are listed above.

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for American Kestrels

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU2 East Trenches Source Area at RFETS

AMERICAN KESTRELS OU2 EAST TRENCHES		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU2	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE		1	
1,2-DICHLOROETHANE		2	
1,2-DICHLOROETHENE		2	
2-BUTANONE		2	
2-METHYLNAPHTHALENE		1	
4,4'-DDT	X	1	
4-METHYL-2-PENTANONE		2	
ACENAPHTHENE		1	
ACENAPHTHYLENE		1	
ACETONE		2	
ALDRIN		1	
ANTHRACENE		1	
ANTIMONY		1	
AROCLOR-1248		1	
AROCLOR-1254	X	1	
AROCLOR-1260	X	1	
BENZENE		2	
BENZO(ghi)PERYLENE	X	1	
BENZO(k)FLUORANTHENE	X	1	
BENZOIC ACID	X	3	4
BENZYL ALCOHOL		1	
BIS(2-CHLOROISOPROPYL)ETHER		1	
BUTYL BENZYL PHTHALATE		1	
CHLOROFORM		2	
delta-BHC	X	1	
DI-n-BUTYL PHTHALATE	X	1	
DI-n-OCTYL PHTHALATE		1	
DIBENZO(a,h)ANTHRACENE		1	
DIBENZOFURAN		1	
DIELDRIN		1	
ENDOSULFAN SULFATE		1	
ENDRIN KETONE		1	
FLUORENE		1	
gamma-BHC (LINDANE)		1	
HEPTACHLOR		1	
HEPTACHLOR EPOXIDE		1	
INDENO(1,2,3-cd)PYRENE	X	1	
ISOPHORONE		1	
MERCURY		1	
METHOXYCHLOR		1	
METHYLENE CHLORIDE		2	
MOLYBDENUM		1	
NAPHTHALENE		1	
NITRATE/NITRITE		2	
PENTACHLOROPHENOL		1	
PHENOL		1	
TETRACHLOROETHENE		2	
THALLIUM		1	
TOLUENE		2	
TOTAL XYLENES		2	
TRICHLOROETHENE		2	
VINYL ACETATE		2	

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU6 B-Ponds Source Area at RFETS

AMERICAN KESTRELS OU6 B-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU6	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE	X	1	
1,2-DICHLOROETHANE	X	2	
1,2-DICHLOROETHENE	X	2	
2-BUTANONE	X	2	
2-METHYLNAPHTHALENE	X	1	
4,4'-DDT		1	
4-METHYL-2-PENTANONE	X	2	
ACENAPHTHENE	X	1	
ACENAPHTHYLENE		1	
ACETONE	X	2	
ALDRIN	X	1	
ANTHRACENE	X	1	
ANTIMONY	X	1	
AROCLOR-1248		1	
AROCLOR-1254	X	1	
AROCLOR-1260	X	1	
BENZENE	X	2	
BENZO(a)ANTHRACENE	X	1	
BENZO(a)PYRENE	X	1	
BENZO(b)FLUORANTHENE	X	1	
BENZO(ghi)PERYLENE	X	1	
BENZO(k)FLUORANTHENE	X	1	
BENZOIC ACID	X	3	4
BENZYL ALCOHOL	X	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	
BUTYL BENZYL PHTHALATE	X	1	
CADMIUM		1	
CHLOROFORM	X	2	
CHRYSENE	X	1	
delta-BHC		1	
DI-n-BUTYL PHTHALATE	X	1	
DI-n-OCTYL PHTHALATE	X	1	
DIBENZO(a,h)ANTHRACENE	X	1	
DIBENZOFURAN	X	1	
DIELDRIN		1	
ENDOSULFAN SULFATE		1	
ENDRIN KETONE		1	
FLUORANTHENE	X	1	
FLUORENE	X	1	
gamma-BHC (LINDANE)	X	1	
HEPTACHLOR	X	1	
HEPTACHLOR EPOXIDE		1	
INDENO(1,2,3-cd)PYRENE	X	1	
ISOPHORONE		1	
METHOXYCHLOR		1	
METHYLENE CHLORIDE	X	2	
MOLYBDENUM	X	1	
NAPHTHALENE	X	1	
NITRATE/NITRITE		2	
PENTACHLOROPHENOL		1	

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU6 B-Ponds Source Area at RFETS

AMERICAN KESTRELS OU6 B-PONDS		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*	
Analyte	**PCOC in OU6**	**Surficial Soil**	**TRV**
PHENANTHRENE	X	1	
PHENOL	X	1	
PYRENE	X	1	
TETRACHLOROETHENE	X	2	
TOLUENE	X	2	
TOTAL XYLENES		2	
TRICHLOROETHENE	X	2	
VINYL ACETATE		2	

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Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU6 A-Ponds Source Area at RFETS

AMERICAN KESTRELS OU6 A-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU6	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,2-DICHLOROETHANE	X	2	
2-METHYLNAPHTHALENE	X	1	
ACENAPHTHENE	X	1	
ACETONE	X	2	
ALDRIN	X	1	
ANTHRACENE	X	1	
AROCLOR-1248		1	
AROCLOR-1254	X	1	
AROCLOR-1260	X	1	
BENZENE	X	2	
BENZO(a)ANTHRACENE	X	1	
BENZO(a)PYRENE	X	1	
BENZO(b)FLUORANTHENE	X	1	
BENZO(ghi)PERYLENE	X	1	
BENZO(k)FLUORANTHENE	X	1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	
BUTYL BENZYL PHTHALATE	X	1	
CHRYSENE	X	1	
DI-n-BUTYL PHTHALATE	X	1	
DI-n-OCTYL PHTHALATE	X	1	
DIBENZO(a,h)ANTHRACENE	X	1	
DIELDRIN		1	
FLUORANTHENE	X	1	
FLUORENE	X	1	
HEPTACHLOR	X	1	
HEPTACHLOR EPOXIDE		1	
INDENO(1,2,3-cd)PYRENE	X	1	
MERCURY	X	1	
METHYLENE CHLORIDE	X	2	
NAPHTHALENE	X	1	
NITRATE/NITRITE		2	
PENTACHLOROPHENOL		1	
PHENANTHRENE	X	1	
PHENOL	X	1	
PYRENE	X	1	
SELENIUM		1	
TETRACHLOROETHENE	X	2	
THALLIUM		1	
TOLUENE	X	2	
TOTAL XYLENES		2	
TRICHLOROETHENE	X	2	
gamma-BHC (LINDANE)	X	1	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE	X	1	
1,2-DICHLOROETHENE	X	2	
2-BUTANONE	X	2	
4-METHYL-2-PENTANONE	X	2	
ACENAPHTHYLENE		1	
ANTIMONY	X	1	
BENZOIC ACID	X	3	4
BENZYL ALCOHOL	X	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU6 A-Ponds Source Area at RFETS

AMERICAN KESTRELS OU6 A-PONDS		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*	
Analyte	**PCOC in OU6**	**Surficial Soil**	**TRV**
CHLOROFORM	X	2	
DIBENZOFURAN	X	1	
ENDOSULFAN SULFATE		1	
ENDRIN KETONE		1	
ISOPHORONE		1	
METHOXYCHLOR		1	
VINYL ACETATE		2	

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU6 Soil Dump Areas Source Area at RFETS

AMERICAN KESTRELS OU6 SOIL DUMP AREAS		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU6	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE	X	1	
1,2-DICHLOROETHANE	X	2	
1,2-DICHLOROETHENE	X	2	
2-BUTANONE	X	2	
2-METHYLNAPHTHALENE	X	1	
4,4'-DDT		1	
4-METHYL-2-PENTANONE	X	2	
ACENAPHTHYLENE		1	
ACETONE	X	2	
ALDRIN	X	1	
ANTIMONY	X	1	
AROCLOR-1248		1	
AROCLOR-1260	X	1	
BENZENE	X	2	
BENZOIC ACID	X	1	
BENZYL ALCOHOL	X	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	
CHLOROFORM	X	2	
delta-BHC		1	
DIBENZOFURAN	X	3	4
DIELDRIN		1	
ENDOSULFAN SULFATE		1	
ENDRIN KETONE		1	
gamma-BHC (LINDANE)	X	1	
HEPTACHLOR	X	1	
HEPTACHLOR EPOXIDE		1	
ISOPHORONE		1	
METHOXYCHLOR		1	
METHYLENE CHLORIDE	X	2	
MOLYBDENUM	X	1	
PENTACHLOROPHENOL		1	
PHENOL	X	1	
SELENIUM		1	
SILVER	X	1	
TETRACHLOROETHENE	X	2	
TOLUENE	X	2	
TOTAL XYLENES		2	
TRICHLOROETHENE	X	2	
VINYL ACETATE		2	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU2 903 Pad Source Area at RFETS

AMERICAN KESTRELS OU2 903 PAD		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU2	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,2-DICHLOROETHANE		2	
2-METHYLNAPHTHALENE		1	
4,4'-DDT	X	1	
ACETONE		2	
ALDRIN		1	
AROCLOR-1260	X	1	
BENZENE		2	
BUTYL BENZYL PHTHALATE		1	
DI-n-OCTYL PHTHALATE		1	
DIELDRIN		1	
HEPTACHLOR		1	
HEPTACHLOR EPOXIDE		1	
METHYLENE CHLORIDE		2	
NAPHTHALENE		1	
PENTACHLOROPHENOL		1	
PHENOL		1	
SILVER		1	
TETRACHLOROETHENE		2	
TOLUENE		2	
TOTAL XYLENES		2	
TRICHLOROETHENE		2	
delta-BHC	X	1	
gamma-BHC (LINDANE)		1	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE		1	
1,2-DICHLOROETHENE		2	
2-BUTANONE		2	
4-METHYL-2-PENTANONE		2	
ACENAPHTHYLENE		1	
ANTIMONY		3	4
BENZOIC ACID	X	3	4
BENZYL ALCOHOL		1	
BIS(2-CHLOROISOPROPYL)ETHER		1	
CHLOROFORM		2	
DIBENZOFURAN		3	4
ENDOSULFAN SULFATE		1	
ENDRIN KETONE		1	
ISOPHORONE		1	
METHOXYCHLOR		1	
VINYL ACETATE		2	

Reason Codes:

1 = Analyte not detected in medium
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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU1 881 Hillside Source Area at RFETS

AMERICAN KESTRELS OU1 881 HILLSIDE		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU1	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE	X	2	
1,1-DICHLOROETHANE	X	2	
1,1-DICHLOROETHENE	X	2	
1,2,4-TRICHLOROBENZENE		1	
1,2-DICHLOROETHANE	X	2	
1,2-DICHLOROETHENE	X	2	
2-BUTANONE		2	
2-METHYLNAPHTHALENE		1	
4,4'-DDT		1	
4-METHYL-2-PENTANONE		2	
ACENAPHTHYLENE	X	3	4
ACETONE		2	
ALDRIN		1	
ANTIMONY		1	
AROCLOR-1260		1	
BENZENE		2	
BENZOIC ACID		1	
BENZYL ALCOHOL		3	4
BIS(2-CHLOROISOPROPYL)ETHER		1	
BIS(2-ETHYLHEXYL)PHTHALATE		1	
BUTYL BENZYL PHTHALATE		1	
CHLOROFORM		2	
delta-BHC		1	
DI-n-BUTYL PHTHALATE		1	
DI-n-OCTYL PHTHALATE		1	
DIBENZOFURAN		3	4
DIELDRIN		1	
ENDOSULFAN SULFATE		1	
ENDRIN KETONE		1	
gamma-BHC (LINDANE)		1	
HEPTACHLOR		1	
HEPTACHLOR EPOXIDE		1	
ISOPHORONE		1	
METHOXYCHLOR		1	
METHYLENE CHLORIDE		2	
PENTACHLOROPHENOL		1	
PHENOL		1	
SILVER		1	
TETRACHLOROETHENE	X	2	
TOLUENE	X	2	
TOTAL XYLENES	X	2	
TRICHLOROETHENE	X	2	
VINYL ACETATE		2	

Reason Codes:

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU5 Ash Pits Source Area at RFETS

AMERICAN KESTRELS OU5 ASH PITS		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU5	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE		2	
1,2-DICHLOROETHANE		2	
1,2-DICHLOROETHENE		2	
2-BUTANONE		2	
2-METHYLNAPHTHALENE	X	2	
4,4'-DDT	X	2	
4-METHYL-2-PENTANONE		2	
ACENAPHTHENE	X	1	
ACENAPHTHYLENE	X	1	
ACETONE		2	
ALDRIN	X	2	
ANTHRACENE	X	1	
ANTIMONY	X	1	
AROCLOR-1248		2	
AROCLOR-1254	X	2	
AROCLOR-1260		2	
BENZENE		2	
BENZO(a)ANTHRACENE	X	2	
BENZO(a)PYRENE	X	1	
BENZO(b)FLUORANTHENE	X	1	
BENZO(ghi)PERYLENE	X	1	
BENZO(k)FLUORANTHENE	X	2	
BENZOIC ACID	X	2	
BENZYL ALCOHOL		2	
BIS(2-CHLOROISOPROPYL)ETHER		2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	
BUTYL BENZYL PHTHALATE	X	2	
CHLOROFORM		2	
CHRYSENE	X	1	
delta-BHC		2	
DI-n-BUTYL PHTHALATE	X	2	
DI-n-OCTYL PHTHALATE	X	2	
DIBENZO(a,h)ANTHRACENE	X	1	
DIBENZOFURAN	X	2	
DIELDRIN	X	2	
ENDOSULFAN SULFATE	X	2	
ENDRIN KETONE	X	2	
FLUORANTHENE	X	1	
FLUORENE	X	1	
gamma-BHC (LINDANE)		2	
HEPTACHLOR		2	
HEPTACHLOR EPOXIDE	X	2	
INDENO(1,2,3-cd)PYRENE	X	1	
ISOPHORONE	X	2	
METHOXYCHLOR	X	2	
METHYLENE CHLORIDE	X	2	
NAPHTHALENE	X	1	
NITRATE/NITRITE		2	
PENTACHLOROPHENOL	X	2	
PHENANTHRENE	X	1	
PHENOL	X	2	

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU5 Ash Pits Source Area at RFETS

AMERICAN KESTRELS OU5 ASH PITS		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*	
Analyte	**PCOC in OU5**	**Surficial Soil**	**TRV**
PYRENE	X	1	
TETRACHLOROETHENE		2	
TOLUENE	X	2	
TOTAL XYLENES		2	
TRICHLOROETHENE		2	
VINYL ACETATE		2	

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Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU5 Old Landfill Source Area at RFETS

AMERICAN KESTRELS OU5 OLD LANDFILL		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU5	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		1	
1,2-DICHLOROETHANE		1	
ACETONE		1	
AROCLOR-1248		1	
AROCLOR-1260		1	
BENZENE		1	
HEPTACHLOR		1	
METHYLENE CHLORIDE	X	1	
NITRATE/NITRITE		2	
PENTACHLOROPHENOL	X	1	
PHENOL	X	1	
TETRACHLOROETHENE		1	
TOLUENE	X	1	
TOTAL XYLENES		1	
TRICHLOROETHENE		1	
delta-BHC		1	
gamma-BHC (LINDANE)		1	
1,1-DICHLOROETHANE		1	
1,1-DICHLOROETHENE		1	
1,2,4-TRICHLOROBENZENE		1	
1,2-DICHLOROETHENE		1	
2-BUTANONE		1	
4-METHYL-2-PENTANONE		1	
ACENAPHTHYLENE	X	3	4
ANTIMONY	X	3	4
BENZOIC ACID	X	3	4
BENZYL ALCOHOL		1	
BIS(2-CHLOROISOPROPYL)ETHER		1	
CHLOROFORM		1	
DIBENZOFURAN	X	3	4
ENDOSULFAN SULFATE	X	3	4
ENDRIN KETONE	X	3	4
ISOPHORONE	X	1	
METHOXYCHLOR	X	3	4
VINYL ACETATE		1	

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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU7 Downgradient Areas Source Area at RFETS

AMERICAN KESTRELS OU7 DOWNGRADIENT AREAS		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU7	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE		2	
1,2-DICHLOROETHANE		2	
1,2-DICHLOROETHENE		2	
2-BUTANONE	X	2	
2-METHYLNAPHTHALENE		2	
4,4'-DDT		2	
4-METHYL-2-PENTANONE		2	
ACENAPHTHENE	X	2	
ACENAPHTHYLENE		2	
ACETONE	X	2	
ALDRIN		2	
ANTHRACENE	X	2	
ANTIMONY	X	2	
AROCLOR-1248		1	
AROCLOR-1254		1	
AROCLOR-1260		1	
ARSENIC	X	2	
BENZENE		2	
BENZO(a)ANTHRACENE	X	2	
BENZO(a)PYRENE	X	2	
BENZO(b)FLUORANTHENE	X	2	
BENZO(ghi)PERYLENE	X	2	
BENZO(k)FLUORANTHENE	X	2	
BENZOIC ACID	X	2	
BENZYL ALCOHOL		2	
BERYLLIUM	X	2	
BIS(2-CHLOROISOPROPYL)ETHER	X	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	
BUTYL BENZYL PHTHALATE		2	
CHLOROFORM		2	
CHRYSENE	X	2	
COBALT	X	2	
delta-BHC		2	
DI-n-BUTYL PHTHALATE	X	2	
DI-n-OCTYL PHTHALATE		2	
DIBENZO(a,h)ANTHRACENE		2	
DIBENZOFURAN		2	
DIELDRIN		2	
ENDOSULFAN SULFATE		2	
ENDRIN KETONE		2	
FLUORANTHENE	X	2	
FLUORENE	X	2	
gamma-BHC (LINDANE)		2	
HEPTACHLOR		2	
HEPTACHLOR EPOXIDE		2	
INDENO(1,2,3-cd)PYRENE	X	2	
ISOPHORONE		2	
LITHIUM	X	2	
METHOXYCHLOR		2	
METHYLENE CHLORIDE	X	2	
MOLYBDENUM	X	2	

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU7 Downgradient Areas Source Area at RFETS

AMERICAN KESTRELS OU7 DOWNGRADIENT AREAS		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*	
Analyte	**PCOC in OU7**	**Surficial Soil**	**TRV**
NAPHTHALENE		2	
NICKEL	X	2	
PENTACHLOROPHENOL		2	
PHENANTHRENE	X	2	
PHENOL		2	
PYRENE	X	2	
TETRACHLOROETHENE		2	
THALLIUM	X	2	
TOLUENE	X	2	
TOTAL XYLENES		2	
TRICHLOROETHENE		2	
VINYL ACETATE	X	2	

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Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU4 Downgradient Source Area at RFETS

AMERICAN KESTRELS OU4 DOWNGRADIENT		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU4	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,2-DICHLOROETHANE		2	
2-METHYLNAPHTHALENE		1	
4,4'-DDT		1	
ACENAPHTHENE		1	
ACETONE		2	
ALDRIN		1	
ANTHRACENE		1	
AROCLOR-1248		1	
AROCLOR-1254	X	1	
AROCLOR-1260		1	
BENZENE		2	
DIELDRIN		1	
FLUORENE		1	
HEPTACHLOR		1	
HEPTACHLOR EPOXIDE		1	
METHYLENE CHLORIDE		2	
MOLYBDENUM		1	
NAPHTHALENE		1	
PENTACHLOROPHENOL		1	
PHENOL		1	
SELENIUM		1	
SILVER	X	1	
TETRACHLOROETHENE		2	
TOLUENE		2	
TOTAL XYLENES		2	
TRICHLOROETHENE		2	
delta-BHC		1	
gamma-BHC (LINDANE)		1	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE		1	
1,2-DICHLOROETHENE		2	
2-BUTANONE		2	
4-METHYL-2-PENTANONE		2	
ACENAPHTHYLENE		1	
ANTIMONY		1	
BENZOIC ACID		1	
BENZYL ALCOHOL		1	
BIS(2-CHLOROISOPROPYL)ETHER		1	
CHLOROFORM		2	
DIBENZOFURAN		1	
ENDOSULFAN SULFATE		1	
ENDRIN KETONE		1	
ISOPHORONE		1	
METHOXYCHLOR		1	
VINYL ACETATE		2	

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Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU11 West Spray Field Source Area at RFETS

AMERICAN KESTRELS OU11 WEST SPRAY FIELD		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU11	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE		2	
1,2-DICHLOROETHANE		2	
1,2-DICHLOROETHENE		2	
2-BUTANONE		2	
2-METHYLNAPHTHALENE		2	
4,4'-DDT		2	
4-METHYL-2-PENTANONE		2	
ACENAPHTHENE		2	
ACENAPHTHYLENE		2	
ACETONE		2	
ALDRIN		2	
ANTHRACENE		2	
ANTIMONY		3	4
AROCLOR-1248		2	
AROCLOR-1254		2	
AROCLOR-1260		2	
BENZENE		2	
BENZO(a)ANTHRACENE		2	
BENZO(a)PYRENE		2	
BENZO(b)FLUORANTHENE		2	
BENZO(ghi)PERYLENE		2	
BENZO(k)FLUORANTHENE		2	
BENZOIC ACID		2	
BENZYL ALCOHOL		2	
BIS(2-CHLOROISOPROPYL)ETHER		2	
BIS(2-ETHYLHEXYL)PHTHALATE		2	
BUTYL BENZYL PHTHALATE		2	
CHLOROFORM		2	
CHRYSENE		2	
delta-BHC		2	
DI-n-BUTYL PHTHALATE		2	
DI-n-OCTYL PHTHALATE		2	
DIBENZO(a,h)ANTHRACENE		2	
DIBENZOFURAN		2	
DIELDRIN		2	
ENDOSULFAN SULFATE		2	
ENDRIN KETONE		2	
FLUORANTHENE		2	
FLUORENE		2	
gamma-BHC (LINDANE)		2	
HEPTACHLOR		2	
HEPTACHLOR EPOXIDE		2	
INDENO(1,2,3-cd)PYRENE		2	
ISOPHORONE		2	
MERCURY		1	
METHOXYCHLOR		2	
METHYLENE CHLORIDE		2	
NAPHTHALENE		2	
PENTACHLOROPHENOL		2	
PHENANTHRENE		2	
PHENOL		2	

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU11 West Spray Field Source Area at RFETS

AMERICAN KESTRELS OU11 WEST SPRAY FIELD		*Unable to estimate risk to wildlife for the following reasons: REASON CODE*	
Analyte	**PCOC in OU11**	**Surficial Soil**	**TRV**
PYRENE		2	
SILVER		1	
TETRACHLOROETHENE		2	
TOLUENE		2	
TOTAL XYLENES		2	
TRICHLOROETHENE		2	
VINYL ACETATE		2	

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Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU2 Mound Area Source Area at RFETS

AMERICAN KESTRELS OU2 MOUND AREA		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU2	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE		1	
1,2-DICHLOROETHANE		2	
1,2-DICHLOROETHENE		2	
2-BUTANONE		2	
2-METHYLNAPHTHALENE		1	
4,4'-DDT	X	1	
4-METHYL-2-PENTANONE		2	
ACENAPHTHENE		1	
ACENAPHTHYLENE		1	
ACETONE		2	
ALDRIN		1	
ANTHRACENE		1	
ANTIMONY		2	
AROCLOR-1248		1	
BENZENE		2	
BENZO(k)FLUORANTHENE	X	1	
BENZOIC ACID	X	3	4
BENZYL ALCOHOL		1	
BERYLLIUM		1	
BIS(2-CHLOROISOPROPYL)ETHER		1	
BUTYL BENZYL PHTHALATE		1	
CADMIUM		1	
CHLOROFORM		2	
delta-BHC	X	1	
DI-n-BUTYL PHTHALATE	X	1	
DI-n-OCTYL PHTHALATE		1	
DIBENZO(a,h)ANTHRACENE		1	
DIBENZOFURAN		1	
DIELDRIN		1	
ENDOSULFAN SULFATE		1	
ENDRIN KETONE		1	
FLUORENE		1	
gamma-BHC (LINDANE)		1	
HEPTACHLOR		1	
HEPTACHLOR EPOXIDE		1	
ISOPHORONE		1	
MERCURY		1	
METHOXYCHLOR		1	
METHYLENE CHLORIDE		2	
MOLYBDENUM		1	
NAPHTHALENE		1	
NITRATE/NITRITE		2	
PENTACHLOROPHENOL		1	
PHENOL		1	
SELENIUM		1	
SILVER		1	
TETRACHLOROETHENE		2	
TIN		1	
TOLUENE		2	
TOTAL XYLENES		2	
TRICHLOROETHENE		2	
VINYL ACETATE		2	

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Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU5 C-Ponds Source Area at RFETS

AMERICAN KESTRELS OU5 C-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU5	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE		1	
1,2-DICHLOROETHANE		2	
1,2-DICHLOROETHENE		2	
2-BUTANONE		2	
2-METHYLNAPHTHALENE	X	1	
4,4'-DDT	X	1	
4-METHYL-2-PENTANONE		2	
ACENAPHTHENE	X	1	
ACENAPHTHYLENE	X	1	
ACETONE		2	
ALDRIN	X	1	
ANTHRACENE	X	1	
ANTIMONY	X	1	
AROCLOR-1248		1	
AROCLOR-1254	X	1	
AROCLOR-1260		1	
BENZENE		2	
BENZO(a)ANTHRACENE	X	1	
BENZO(a)PYRENE	X	1	
BENZO(b)FLUORANTHENE	X	1	
BENZO(ghi)PERYLENE	X	1	
BENZO(k)FLUORANTHENE	X	1	
BENZOIC ACID	X	3	4
BENZYL ALCOHOL		1	
BERYLLIUM		1	
BIS(2-CHLOROISOPROPYL)ETHER		1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	
BUTYL BENZYL PHTHALATE	X	1	
CHLOROFORM		2	
CHRYSENE	X	1	
delta-BHC		1	
DI-n-BUTYL PHTHALATE	X	1	
DI-n-OCTYL PHTHALATE	X	1	
DIBENZO(a,h)ANTHRACENE	X	1	
DIBENZOFURAN	X	1	
DIELDRIN	X	1	
ENDOSULFAN SULFATE	X	1	
ENDRIN KETONE	X	1	
FLUORENE	X	1	
gamma-BHC (LINDANE)		1	
HEPTACHLOR		1	
HEPTACHLOR EPOXIDE	X	1	
INDENO(1,2,3-cd)PYRENE	X	1	
ISOPHORONE	X	1	
MERCURY	X	1	
METHOXYCHLOR	X	1	
METHYLENE CHLORIDE	X	2	
MOLYBDENUM		1	
NAPHTHALENE	X	1	
NITRATE/NITRITE		2	
PENTACHLOROPHENOL	X	1	

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU5 C-Ponds Source Area at RFETS

AMERICAN KESTRELS OU5 C-PONDS		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*	
Analyte	**PCOC in OU5**	**Surficial Soil**	**TRV**
PHENANTHRENE	X	1	
PHENOL	X	1	
SILVER	X	1	
TETRACHLOROETHENE		2	
THALLIUM		1	
TOLUENE	X	2	
TOTAL XYLENES		2	
TRICHLOROETHENE		2	
VINYL ACETATE		2	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU6 Burial Trenches Source Area at RFETS

AMERICAN KESTRELS OU6 BURIAL TRENCHES		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU6	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,2-DICHLOROETHANE	X	2	
2-METHYLNAPHTHALENE	X	2	
4,4'-DDT		2	
ACENAPHTHENE	X	2	
ACETONE	X	2	
ALDRIN	X	2	
ANTHRACENE	X	2	
AROCLOR-1248		2	
AROCLOR-1254	X	2	
AROCLOR-1260	X	2	
ARSENIC	X	2	
BENZENE	X	2	
BENZO(a)ANTHRACENE	X	2	
BENZO(a)PYRENE	X	2	
BENZO(b)FLUORANTHENE	X	2	
BENZO(ghi)PERYLENE	X	2	
BENZO(k)FLUORANTHENE	X	2	
BERYLLIUM		2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	
BUTYL BENZYL PHTHALATE	X	2	
CADMIUM		2	
CHRYSENE	X	2	
COBALT	X	2	
DI-n-BUTYL PHTHALATE	X	2	
DI-n-OCTYL PHTHALATE	X	2	
DIBENZO(a,h)ANTHRACENE	X	2	
DIELDRIN		2	
FLUORANTHENE	X	2	
FLUORENE	X	2	
HEPTACHLOR	X	2	
HEPTACHLOR EPOXIDE		2	
INDENO(1,2,3-cd)PYRENE	X	2	
LITHIUM		2	
MERCURY	X	2	
METHYLENE CHLORIDE	X	2	
MOLYBDENUM	X	2	
NAPHTHALENE	X	2	
NICKEL	X	2	
NITRATE/NITRITE		2	
PENTACHLOROPHENOL		2	
PHENANTHRENE	X	2	
PHENOL	X	2	
PYRENE	X	2	
TETRACHLOROETHENE	X	2	
THALLIUM		2	
TOLUENE	X	2	
TOTAL XYLENES		2	
TRICHLOROETHENE	X	2	
delta-BHC		2	
gamma-BHC (LINDANE)	X	2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE	X	2	

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU6 Burial Trenches Source Area at RFETS

AMERICAN KESTRELS OU6 BURIAL TRENCHES		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*	
Analyte	**PCOC in OU6**	**Surficial Soil**	**TRV**
1,2-DICHLOROETHENE	X	2	
2-BUTANONE	X	2	
4-METHYL-2-PENTANONE	X	2	
ACENAPHTHYLENE		2	
ANTIMONY	X	2	
BENZOIC ACID	X	2	
BENZYL ALCOHOL	X	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	
CHLOROFORM	X	2	
DIBENZOFURAN	X	2	
ENDOSULFAN SULFATE		2	
ENDRIN KETONE		2	
ISOPHORONE		2	
METHOXYCHLOR		2	
VINYL ACETATE		2	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU6 North Spray Field Source Area at RFETS

AMERICAN KESTRELS OU6 NORTH SPRAY FIELD		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU6	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE	X	2	
1,2-DICHLOROETHANE	X	2	
1,2-DICHLOROETHENE	X	2	
2-BUTANONE	X	2	
2-METHYLNAPHTHALENE	X	2	
4,4'-DDT		2	
4-METHYL-2-PENTANONE	X	2	
ACENAPHTHENE	X	2	
ACENAPHTHYLENE		2	
ACETONE	X	2	
ALDRIN	X	2	
ANTHRACENE	X	2	
ANTIMONY	X	3	4
AROCLOR-1248		2	
AROCLOR-1254	X	2	
AROCLOR-1260	X	2	
BENZENE	X	2	
BENZO(a)ANTHRACENE	X	2	
BENZO(a)PYRENE	X	2	
BENZO(b)FLUORANTHENE	X	2	
BENZO(ghi)PERYLENE	X	2	
BENZO(k)FLUORANTHENE	X	2	
BENZOIC ACID	X	2	
BENZYL ALCOHOL	X	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	
BUTYL BENZYL PHTHALATE	X	2	
CHLOROFORM	X	2	
CHRYSENE	X	2	
delta-BHC		2	
DI-n-BUTYL PHTHALATE	X	2	
DI-n-OCTYL PHTHALATE	X	2	
DIBENZO(a,h)ANTHRACENE	X	2	
DIBENZOFURAN	X	2	
DIELDRIN		2	
ENDOSULFAN SULFATE		2	
ENDRIN KETONE		2	
FLUORANTHENE	X	2	
FLUORENE	X	2	
gamma-BHC (LINDANE)	X	2	
HEPTACHLOR	X	2	
HEPTACHLOR EPOXIDE		2	
INDENO(1,2,3-cd)PYRENE	X	2	
ISOPHORONE		2	
METHOXYCHLOR		2	
METHYLENE CHLORIDE	X	2	
MOLYBDENUM	X	1	
NAPHTHALENE	X	2	
PENTACHLOROPHENOL		2	
PHENANTHRENE	X	2	
PHENOL	X	2	

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU6 North Spray Field Source Area at RFETS

AMERICAN KESTRELS OU6 NORTH SPRAY FIELD		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*	
Analyte	PCOC in OU6	Surficial Soil	TRV
PYRENE	X	2	
SILVER	X	1	
TETRACHLOROETHENE	X	2	
TIN		1	
TOLUENE	X	2	
TOTAL XYLENES		2	
TRICHLOROETHENE	X	2	
VINYL ACETATE		2	

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU5 Surface Disturbance Source Area at RFETS

AMERICAN KESTRELS OU5 SURFACE DISTURBANCE		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU5	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE		1	
1,2-DICHLOROETHANE		2	
1,2-DICHLOROETHENE		2	
2-BUTANONE		2	
2-METHYLNAPHTHALENE	X	1	
4,4'-DDT	X	1	
4-METHYL-2-PENTANONE		2	
ACENAPHTHENE	X	1	
ACENAPHTHYLENE	X	1	
ACETONE		2	
ALDRIN	X	1	
ANTHRACENE	X	1	
ANTIMONY	X	1	
AROCLOR-1248		1	
AROCLOR-1254	X	1	
AROCLOR-1260		1	
BENZENE		2	
BENZO(a)ANTHRACENE	X	1	
BENZO(a)PYRENE	X	1	
BENZO(b)FLUORANTHENE	X	1	
BENZO(ghi)PERYLENE	X	1	
BENZO(k)FLUORANTHENE	X	1	
BENZOIC ACID	X	1	
BENZYL ALCOHOL		1	
BIS(2-CHLOROISOPROPYL)ETHER		1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	
BUTYL BENZYL PHTHALATE	X	1	
CADMIUM		1	
CHLOROFORM		2	
CHRYSENE	X	1	
delta-BHC		1	
DI-n-BUTYL PHTHALATE	X	1	
DI-n-OCTYL PHTHALATE	X	1	
DIBENZO(a,h)ANTHRACENE	X	1	
DIBENZOFURAN	X	1	
DIELDRIN	X	1	
ENDOSULFAN SULFATE	X	1	
ENDRIN KETONE	X	1	
FLUORANTHENE	X	1	
FLUORENE	X	1	
gamma-BHC (LINDANE)		1	
HEPTACHLOR		1	
HEPTACHLOR EPOXIDE	X	1	
INDENO(1,2,3-cd)PYRENE	X	1	
ISOPHORONE	X	1	
METHOXYCHLOR	X	1	
METHYLENE CHLORIDE	X	2	
MOLYBDENUM		1	
NAPHTHALENE	X	1	
NITRATE/NITRITE		2	
PENTACHLOROPHENOL	X	1	

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU5 Surface Disturbance Source Area at RFETS

AMERICAN KESTRELS OU5 SURFACE DISTURBANCE		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*	
Analyte	**PCOC in OU5**	**Surficial Soil**	**TRV**
PHENANTHRENE	X	1	
PHENOL	X	1	
PYRENE	X	1	
SELENIUM		1	
SILVER	X	1	
TETRACHLOROETHENE		2	
THALLIUM		1	
TIN		1	
TOLUENE	X	2	
TOTAL XYLENES		2	
TRICHLOROETHENE		2	
VINYL ACETATE		2	

Reason Codes:

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Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU10 Outside Closures Source Area at RFETS

AMERICAN KESTRELS OU10 OUTSIDE CLOSURES		Unable to estimate risk to wildlife for the following reasons: REASON CODE	
Analyte	PCOC in OU10	Surficial Soil	TRV
1,1,1-TRICHLOROETHANE		2	
1,1-DICHLOROETHANE		2	
1,1-DICHLOROETHENE		2	
1,2,4-TRICHLOROBENZENE		2	
1,2-DICHLOROETHANE		2	
1,2-DICHLOROETHENE		2	
2-BUTANONE		2	
2-METHYLNAPHTHALENE		2	
4,4'-DDT		2	
4-METHYL-2-PENTANONE		2	
ACENAPHTHENE		2	
ACENAPHTHYLENE		2	
ACETONE		2	
ALDRIN		2	
ALUMINUM		2	
ANTHRACENE		2	
ANTIMONY		2	
AROCLOR-1248		2	
AROCLOR-1254		2	
AROCLOR-1260		2	
ARSENIC		2	
BARIUM		2	
BENZENE		2	
BENZO(a)ANTHRACENE		2	
BENZO(a)PYRENE		2	
BENZO(b)FLUORANTHENE		2	
BENZO(ghi)PERYLENE		2	
BENZO(k)FLUORANTHENE		2	
BENZOIC ACID		2	
BENZYL ALCOHOL		2	
BERYLLIUM		2	
BIS(2-CHLOROISOPROPYL)ETHER		2	
BIS(2-ETHYLHEXYL)PHTHALATE		2	
BUTYL BENZYL PHTHALATE		2	
CADMIUM		2	
CHLOROFORM		2	
CHROMIUM		2	
CHRYSENE		2	
COBALT		2	
COPPER		2	
delta-BHC		2	
DI-n-BUTYL PHTHALATE		2	
DI-n-OCTYL PHTHALATE		2	
DIBENZO(a,h)ANTHRACENE		2	
DIBENZOFURAN		2	
DIELDRIN		2	
ENDOSULFAN SULFATE		2	
ENDRIN KETONE		2	
FLUORANTHENE		2	
FLUORENE		2	
gamma-BHC (LINDANE)		2	
HEPTACHLOR		2	
HEPTACHLOR EPOXIDE		2	
INDENO(1,2,3-cd)PYRENE		2	
ISOPHORONE		2	

Analytes not Included in the Wildlife Ecological Screen for American Kestrels in the OU10 Outside Closures Source Area at RFETS

AMERICAN KESTRELS OU10 OUTSIDE CLOSURES		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*	
Analyte	**PCOC in OU10**	**Surficial Soil**	**TRV**
LEAD		2	
LITHIUM		2	
MAGNESIUM		2	
MANGANESE		2	
MERCURY		2	
METHOXYCHLOR		2	
METHYLENE CHLORIDE		2	
MOLYBDENUM		2	
NAPHTHALENE		2	
NICKEL		2	
NITRATE/NITRITE		2	
PENTACHLOROPHENOL		2	
PHENANTHRENE		2	
PHENOL		2	
PYRENE		2	
SELENIUM		2	
SILVER		2	
STRONTIUM		2	
TETRACHLOROETHENE		2	
THALLIUM		2	
TIN		2	
TOLUENE		2	
TOTAL XYLENES		2	
TRICHLOROETHENE		2	
VANADIUM		2	
VINYL ACETATE		2	
ZINC		2	

Note: No data exists for OU10 Outside Closures, therefore, all analytes are listed above.

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Great Blue Herons

Analytes not Included in the Wildlife Ecological Screen for Great Blue Herons in the OU5 Old Landfill Source Area at RFETS

GREAT BLUE HERONS OU5 OLD LANDFILL		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		1	1	
1,1-DICHLOROETHANE		1	1	
1,1-DICHLOROETHENE		1	1	
1,2,4-TRICHLOROBENZENE		1	1	
1,2-DICHLOROETHANE		1	1	
1,2-DICHLOROETHENE		1	1	
2-BUTANONE		1	3	4
2-METHYLNAPHTHALENE	X	1	1	
4,4'-DDT	X	1	1	
4-METHYL-2-PENTANONE		1	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE	X	1	1	
ALDRIN	X	1	1	
ANTHRACENE	X	1	1	
AROCLOR-1248		1	1	
AROCLOR-1260		1	1	
BENZENE		1	1	
BENZO(a)PYRENE	X	1	1	
BENZO(b)FLUORANTHENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZO(k)FLUORANTHENE	X	1	1	
BENZOIC ACID	X	1	1	
BENZYL ALCOHOL		1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BUTYL BENZYL PHTHALATE	X	1	1	
CHLOROFORM		1	3	4
delta-BHC		1	1	
DI-n-BUTYL PHTHALATE	X	1	1	
DI-n-OCTYL PHTHALATE	X	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	1	1	
DIELDRIN	X	1	1	
ENDOSULFAN SULFATE	X	1	1	
ENDRIN KETONE	X	1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
HEPTACHLOR EPOXIDE	X	1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE	X	1	1	
METHOXYCHLOR	X	1	1	
NAPHTHALENE	X	1	1	
PHENOL	X	1	1	
TOLUENE	X	1	1	
TOTAL XYLENES		1	1	
VINYL ACETATE		1	1	

Reason Codes:

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2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Great Blue Herons in the OU6 A-Ponds Source Area at RFETS

GREAT BLUE HERONS OU6 A-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		1	1	
1,1-DICHLOROETHANE		1	1	
1,1-DICHLOROETHENE		1	1	
1,2,4-TRICHLOROBENZENE	X	1	1	
1,2-DICHLOROETHANE	X	1	1	
1,2-DICHLOROETHENE	X	1	1	
2-BUTANONE	X	3	1	4
2-METHYLNAPHTHALENE	X	1	1	
4,4'-DDT		1	2	
4-METHYL-2-PENTANONE	X	3	1	4
ACENAPHTHYLENE		1	1	
AROCLOR-1248		1	2	
AROCLOR-1260	X	1	2	
BENZOIC ACID	X	3	1	4
BENZYL ALCOHOL	X	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BUTYL BENZYL PHTHALATE	X	1	1	
CHLOROFORM	X	1	1	
delta-BHC		1	2	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	1	1	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)	X	1	2	
HEPTACHLOR	X	1	2	
HEPTACHLOR EPOXIDE		1	2	
ISOPHORONE		1	1	
METHOXYCHLOR		1	2	
NAPHTHALENE	X	1	1	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		1	1	
TETRACHLOROETHENE	X	1	1	
TIN		1	1	
TOTAL XYLENES		1	1	
TRICHLOROETHENE	X	1	1	
VINYL ACETATE		1	1	

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Analytes not Included in the Wildlife Ecological Screen for Great Blue Herons in the OU6 B-Ponds Source Area at RFETS

GREAT BLUE HERONS OU6 B-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		1	1	
1,1-DICHLOROETHANE		1	1	
1,1-DICHLOROETHENE		1	1	
1,2,4-TRICHLOROBENZENE	X	3	1	4
1,2-DICHLOROETHENE	X	1	3	4
2-BUTANONE	X	3	1	4
4,4'-DDT		1	2	
4-METHYL-2-PENTANONE	X	1	1	
ACENAPHTHYLENE		1	1	
ALDRIN	X	1	2	
BENZENE	X	1	1	
BENZOIC ACID	X	1	1	
BENZYL ALCOHOL	X	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
CHLOROFORM	X	1	3	4
delta-BHC		1	2	
DIBENZOFURAN	X	3	1	4
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
HEPTACHLOR EPOXIDE		1	2	
ISOPHORONE		1	1	
METHOXYCHLOR		1	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		1	1	
TOTAL XYLENES		1	1	
VINYL ACETATE		1	1	

Reason Codes:

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not included in the Wildlife Ecological Screen for Great Blue Herons in the OU5 C-Ponds Source Area at RFETS

GREAT BLUE HERONS OU5 C-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE		1	1	
1,1-DICHLOROETHENE		1	1	
1,2,4-TRICHLOROBENZENE		1	1	
1,2-DICHLOROETHANE		1	1	
1,2-DICHLOROETHENE		1	1	
2-BUTANONE		3	3	4
2-METHYLNAPHTHALENE	X	1	1	
4,4'-DDT	X	1	1	
4-METHYL-2-PENTANONE		1	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE	X	1	1	
ALDRIN	X	1	1	
ANTHRACENE	X	1	1	
AROCLOR-1260		1	1	
BENZENE		1	1	
BENZO(a)ANTHRACENE	X	1	1	
BENZO(a)PYRENE	X	1	1	
BENZO(b)FLUORANTHENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZO(k)FLUORANTHENE	X	1	1	
BENZOIC ACID	X	3	3	4
BENZYL ALCOHOL		1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
CHLOROFORM		1	3	4
CHRYSENE	X	1	1	
DI-n-OCTYL PHTHALATE	X	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	1	1	
DIELDRIN	X	1	1	
ENDOSULFAN SULFATE	X	1	1	
ENDRIN KETONE	X	1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
HEPTACHLOR EPOXIDE	X	1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE	X	1	1	
METHOXYCHLOR	X	1	1	
NAPHTHALENE	X	1	1	
PENTACHLOROPHENOL	X	1	1	
PHENANTHRENE	X	1	1	
PYRENE	X	1	1	
TETRACHLOROETHENE		1	1	
TOTAL XYLENES		1	1	
TRICHLOROETHENE		1	1	
VINYL ACETATE		1	1	

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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Great Blue Herons in the OU1 881 Hillside Source Area at RFETS

GREAT BLUE HERONS OU1 881 HILLSIDE		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU1	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE	X	1	3	4
1,1-DICHLOROETHENE	X	1	3	4
1,2,4-TRICHLOROBENZENE		1	1	
1,2-DICHLOROETHENE	X	1	3	4
2-BUTANONE		3	3	4
2-METHYLNAPHTHALENE		1	1	
4,4'-DDT		1	1	
4-METHYL-2-PENTANONE		1	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE	X	1	1	
ANTHRACENE	X	1	1	
AROCLOR-1248	X	1	1	
AROCLOR-1254	X	1	1	
AROCLOR-1260		1	1	
BENZENE		1	1	
BENZO(a)ANTHRACENE	X	1	1	
BENZO(a)PYRENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZOIC ACID		1	1	
BENZYL ALCOHOL		1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BUTYL BENZYL PHTHALATE		1	1	
CHLOROFORM		1	1	
delta-BHC		1	1	
DI-n-BUTYL PHTHALATE		1	1	
DI-n-OCTYL PHTHALATE		1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN		1	1	
DIELDRIN		1	1	
ENDOSULFAN SULFATE		1	1	
ENDRIN KETONE		1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
HEPTACHLOR EPOXIDE		1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE		1	1	
METHOXYCHLOR		1	1	
NAPHTHALENE	X	1	1	
PENTACHLOROPHENOL		1	1	
PHENOL		1	1	
VINYL ACETATE		1	1	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Great Blue Herons in the OU5 Ash Pits Source Area at RFETS

GREAT BLUE HERONS OU5 ASH PITS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		3	3	4
1,1-DICHLOROETHANE		3	3	4
1,1-DICHLOROETHENE		3	3	4
1,2,4-TRICHLOROBENZENE		3	3	4
1,2-DICHLOROETHENE		3	3	4
2-BUTANONE		3	3	4
2-METHYLNAPHTHALENE	X	3	3	4
4,4'-DDT	X	3	3	4
4-METHYL-2-PENTANONE		3	3	4
ACENAPHTHENE	X	3	3	4
ACENAPHTHYLENE	X	3	3	4
ALDRIN	X	3	3	4
ANTHRACENE	X	3	3	4
AROCLOR-1248		3	3	4
AROCLOR-1254	X	3	3	4
AROCLOR-1260		3	3	4
BENZENE		3	3	4
BENZO(a)ANTHRACENE	X	3	3	4
BENZO(a)PYRENE	X	3	3	4
BENZO(b)FLUORANTHENE	X	3	3	4
BENZO(ghi)PERYLENE	X	3	3	4
BENZO(k)FLUORANTHENE	X	3	3	4
BENZOIC ACID	X	3	3	4
BENZYL ALCOHOL		3	3	4
BIS(2-CHLOROISOPROPYL)ETHER		3	3	4
BUTYL BENZYL PHTHALATE	X	3	3	4
CHLOROFORM		3	3	4
CHRYSENE	X	3	3	4
delta-BHC		3	3	4
DI-n-BUTYL PHTHALATE	X	3	3	4
DI-n-OCTYL PHTHALATE	X	3	3	4
DIBENZO(a,h)ANTHRACENE	X	3	3	4
DIBENZOFURAN	X	3	3	4
DIELDRIN	X	3	3	4
ENDOSULFAN SULFATE	X	3	3	4
ENDRIN KETONE	X	3	3	4
FLUORANTHENE	X	3	3	4
FLUORENE	X	3	3	4
gamma-BHC (LINDANE)		3	3	4
HEPTACHLOR		3	3	4
HEPTACHLOR EPOXIDE	X	3	3	4
INDENO(1,2,3-cd)PYRENE	X	3	3	4
ISOPHORONE	X	3	3	4
METHOXYCHLOR	X	3	3	4
NAPHTHALENE	X	3	3	4
PENTACHLOROPHENOL	X	3	3	4
PHENANTHRENE	X	3	3	4
PHENOL	X	3	3	4
PYRENE	X	3	3	4
TETRACHLOROETHENE		3	3	4
TOLUENE	X	3	3	4
TOTAL XYLENES		3	3	4
TRICHLOROETHENE		3	3	4
VINYL ACETATE		3	3	4

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Great Blue Herons in the OU2 903 Pad Source Area at RFETS

GREAT BLUE HERONS OU2 903 PAD		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC for OU2	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		1	1	
1,2-DICHLOROETHANE		1	1	
2-METHYLNAPHTHALENE		1	1	
ACENAPHTHENE		1	1	
ALDRIN		1	1	
ANTHRACENE		1	1	
AROCLOR-1248		1	1	
AROCLOR-1260	X	1	1	
BENZENE		1	1	
BENZO(ghi)PERYLENE	X	1	1	
BUTYL BENZYL PHTHALATE		1	1	
DIBENZO(a,h)ANTHRACENE		1	1	
DIELDRIN		1	1	
FLUORENE		1	1	
HEPTACHLOR		1	1	
HEPTACHLOR EPOXIDE		1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	
NAPHTHALENE		1	1	
PENTACHLOROPHENOL		1	1	
PHENOL		1	1	
TOTAL XYLENES		1	1	
delta-BHC	X	1	1	
1,1-DICHLOROETHANE		1	1	
1,1-DICHLOROETHENE		1	1	
1,2,4-TRICHLOROBENZENE		1	1	
1,2-DICHLOROETHENE		1	3	4
2-BUTANONE		3	1	4
4-METHYL-2-PENTANONE		3	1	4
ACENAPHTHYLENE		1	1	
BENZOIC ACID	X	1	3	4
BENZYL ALCOHOL		1	3	4
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
CHLOROFORM		1	3	4
DIBENZOFURAN		1	1	
ENDOSULFAN SULFATE		1	1	
ENDRIN KETONE		1	1	
ISOPHORONE		1	1	
METHOXYCHLOR		1	1	
VINYL ACETATE		1	1	

Reason Codes:

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2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mallards

Analytes not Included in the Wildlife Ecological Screen for Mallards in the OU6 A-Ponds Source Area at RFETS

MALLARDS OU6 A-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC in OU6	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE	X	1	1	1	
1,2-DICHLOROETHANE	X	2	1	1	
1,2-DICHLOROETHENE	X	2	1	1	
2-BUTANONE	X	2	3	1	4
2-METHYLNAPHTHALENE	X	1	1	1	
4-METHYL-2-PENTANONE	X	2	3	1	4
ACENAPHTHYLENE		1	1	1	
AROCLOR-1248		1	1	2	
BENZOIC ACID	X	3	3	1	4
BENZYL ALCOHOL	X	1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
BUTYL BENZYL PHTHALATE	X	1	1	1	
CHLOROFORM	X	2	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	1	
DIBENZOFURAN	X	1	1	1	
DIELDRIN		1	1	2	
ENDOSULFAN SULFATE		1	1	2	
ENDRIN KETONE		1	1	2	
FLUORENE	X	1	1	1	
gamma-BHC (LINDANE)	X	1	1	2	
HEPTACHLOR	X	1	1	2	
HEPTACHLOR EPOXIDE		1	1	2	
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	2	
NAPHTHALENE	X	1	1	1	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		1	1	1	
TETRACHLOROETHENE	X	2	1	1	
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE	X	2	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mallards in the OU5 C-Ponds Source Area at RFETS

MALLARDS OU5 C-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC in OU5	Surficial Soil	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHANE		2	1	1	
1,2-DICHLOROETHENE		2	1	1	
2-BUTANONE		2	3	3	4
2-METHYLNAPHTHALENE	X	1	1	1	
4,4'-DDT	X	1	1	1	
4-METHYL-2-PENTANONE		2	1	1	
ACENAPHTHENE	X	1	1	1	
ACENAPHTHYLENE	X	1	1	1	
ALDRIN	X	1	1	1	
ANTHRACENE	X	1	1	1	
AROCLOR-1248		1	1	1	
AROCLOR-1254	X	1	1	1	
AROCLOR-1260		1	1	1	
BENZENE		2	1	1	
BENZO(a)ANTHRACENE	X	1	1	1	
BENZO(a)PYRENE	X	1	1	1	
BENZO(b)FLUORANTHENE	X	1	1	1	
BENZO(ghi)PERYLENE	X	1	1	1	
BENZO(k)FLUORANTHENE	X	1	1	1	
BENZOIC ACID	X	3	3	3	4
BENZYL ALCOHOL		1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
CHLOROFORM		2	1	3	4
CHRYSENE	X	1	1	1	
DI-n-OCTYL PHTHALATE	X	1	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	1	
DIBENZOFURAN	X	1	1	1	
DIELDRIN	X	1	1	1	
ENDOSULFAN SULFATE	X	1	1	1	
ENDRIN KETONE	X	1	1	1	
FLUORENE	X	1	1	1	
gamma-BHC (LINDANE)		1	1	1	
HEPTACHLOR		1	1	1	
HEPTACHLOR EPOXIDE	X	1	1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	1	
ISOPHORONE	X	1	1	1	
METHOXYCHLOR	X	1	1	1	
NAPHTHALENE	X	1	1	1	
PENTACHLOROPHENOL	X	1	1	1	
PHENANTHRENE	X	1	1	1	
TETRACHLOROETHENE		2	1	1	
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE		2	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

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2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mallards in the OU6 B-Ponds Source Area at RFETS

MALLARDS OU6 B-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC in OU6	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE	X	1	3	1	4
1,2-DICHLOROETHENE	X	2	1	3	4
2-BUTANONE	X	2	3	1	4
4,4'-DDT		1	1	2	
4-METHYL-2-PENTANONE	X	2	1	1	
ACENAPHTHYLENE		1	1	1	
ALDRIN	X	1	1	2	
BENZENE	X	2	1	1	
BENZOIC ACID	X	3	1	1	4
BENZYL ALCOHOL	X	1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
CHLOROFORM	X	2	1	3	4
delta-BHC		1	1	2	
DIBENZOFURAN	X	1	3	1	4
DIELDRIN		1	1	2	
ENDOSULFAN SULFATE		1	1	2	
ENDRIN KETONE		1	1	2	
HEPTACHLOR EPOXIDE		1	1	2	
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	2	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		1	1	1	
TOTAL XYLENES		2	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mallards in the OU5 Old Landfill Source Area at RFETS

MALLARDS OU5 OLD LANDFILL		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU5	Surficial Soil	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE		1	1	1	
1,1-DICHLOROETHENE		1	1	1	
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHANE		1	1	1	
1,2-DICHLOROETHENE		1	1	1	
2-BUTANONE		1	1	3	4
4-METHYL-2-PENTANONE		1	1	1	
ACENAPHTHYLENE	X	3	1	1	4
AROCLOR-1248		1	1	1	
BENZENE		1	1	1	
BENZOIC ACID	X	3	1	1	4
BENZYL ALCOHOL		1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
CHLOROFORM		1	1	3	4
delta-BHC		1	1	1	
DIBENZOFURAN	X	3	1	1	4
ENDOSULFAN SULFATE	X	3	1	1	4
ENDRIN KETONE	X	3	1	1	4
gamma-BHC (LINDANE)		1	1	1	
HEPTACHLOR		1	1	1	
ISOPHORONE	X	1	1	1	
METHOXYCHLOR	X	3	1	1	4
VINYL ACETATE		1	1	1	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mallards in the OU2 903 Pad Source Area at RFETS

MALLARDS OU2 903 PAD		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC in OU2	Surficial Soil	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHANE		2	1	1	
1,2-DICHLOROETHENE		2	1	3	4
2-BUTANONE		2	3	1	4
2-METHYLNAPHTHALENE		1	1	1	
4-METHYL-2-PENTANONE		2	3	1	4
ACENAPHTHYLENE		1	1	1	
ALDRIN		1	1	1	
AROCLOR-1260	X	1	1	1	
BENZENE		2	1	1	
BENZOIC ACID	X	3	1	3	4
BENZYL ALCOHOL		1	1	3	4
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
CHLOROFORM		2	1	3	4
delta-BHC	X	1	1	1	
DIBENZOFURAN		3	1	1	4
DIELDRIN		1	1	1	
ENDOSULFAN SULFATE		1	1	1	
ENDRIN KETONE		1	1	1	
HEPTACHLOR		1	1	1	
HEPTACHLOR EPOXIDE		1	1	1	
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	1	
NAPHTHALENE		1	1	1	
PENTACHLOROPHENOL		1	1	1	
PHENOL		1	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mallards in the OU1 881 Hillside Source Area at RFETS

MALLARDS OU1 881 HILLSIDE		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC in OU1	Surficial Soil	Sediment	Surface Water	TRV
1,1-DICHLOROETHANE	X	2	1	3	4
1,1-DICHLOROETHENE	X	2	1	3	4
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHENE	X	2	1	3	4
2-BUTANONE		2	3	3	4
2-METHYLNAPHTHALENE		1	1	1	
4,4'-DDT		1	1	1	
4-METHYL-2-PENTANONE		2	1	1	
ACENAPHTHYLENE	X	3	1	1	4
AROCLOR-1260		1	1	1	
BENZENE		2	1	1	
BENZOIC ACID		1	1	1	
BENZYL ALCOHOL		3	1	1	4
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
BUTYL BENZYL PHTHALATE		1	1	1	
CHLOROFORM		2	1	1	
delta-BHC		1	1	1	
DIBENZOFURAN		3	1	1	4
DIELDRIN		1	1	1	
ENDOSULFAN SULFATE		1	1	1	
ENDRIN KETONE		1	1	1	
gamma-BHC (LINDANE)		1	1	1	
HEPTACHLOR		1	1	1	
HEPTACHLOR EPOXIDE		1	1	1	
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	1	
PHENOL		1	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mallards in the OU5 Ash Pits Source Area at RFETS

MALLARDS OU5 ASH PITS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC in OU5	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE		2	1	1	
1,2-DICHLOROETHENE		2	1	1	
2-BUTANONE		2	3	1	4
2-METHYLNAPHTHALENE	X	2	1	1	
4,4'-DDT	X	2	1	1	
4-METHYL-2-PENTANONE		2	1	1	
ACENAPHTHENE	X	1	1	1	
ACENAPHTHYLENE	X	1	1	1	
ALDRIN	X	2	1	1	
ANTHRACENE	X	1	1	1	
AROCLOR-1248		2	1	1	
AROCLOR-1254	X	2	1	1	
AROCLOR-1260		2	1	1	
BENZENE		2	1	1	
BENZO(a)ANTHRACENE	X	2	1	1	
BENZO(a)PYRENE	X	1	1	1	
BENZO(b)FLUORANTHENE	X	1	1	1	
BENZO(ghi)PERYLENE	X	1	1	1	
BENZO(k)FLUORANTHENE	X	2	1	1	
BENZOIC ACID	X	2	3	1	4
BENZYL ALCOHOL		2	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		2	1	1	
BUTYL BENZYL PHTHALATE	X	2	1	1	
CHLOROFORM		2	3	1	4
CHRYSENE	X	1	1	1	
delta-BHC		2	1	1	
DI-n-BUTYL PHTHALATE	X	2	1	1	
DI-n-OCTYL PHTHALATE	X	2	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	1	
DIBENZOFURAN	X	2	1	1	
DIELDRIN	X	2	1	1	
ENDOSULFAN SULFATE	X	2	1	1	
ENDRIN KETONE	X	2	1	1	
FLUORANTHENE	X	1	1	1	
FLUORENE	X	1	1	1	
gamma-BHC (LINDANE)		2	1	1	
HEPTACHLOR		2	1	1	
HEPTACHLOR EPOXIDE	X	2	1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	1	
ISOPHORONE	X	2	1	1	
METHOXYCHLOR	X	2	1	1	
NAPHTHALENE	X	1	1	1	
PENTACHLOROPHENOL	X	2	1	1	
PHENANTHRENE	X	1	1	1	
PHENOL	X	2	1	1	
PYRENE	X	1	1	1	
TETRACHLOROETHENE		2	1	1	
TOLUENE	X	2	1	1	
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE		2	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU6 B-Ponds Source Area at RFETS

COYOTES OU6 B-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	
1,1-DICHLOROETHANE		2	1	
1,1-DICHLOROETHENE		2	1	
1,2,4-TRICHLOROBENZENE	X	1	1	
2-BUTANONE	X	2	1	
2-METHYLNAPHTHALENE	X	1	1	
4,4'-DDT		1	2	
4-METHYL-2-PENTANONE	X	2	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE		1	1	
ALDRIN	X	1	2	
ANTHRACENE	X	1	1	
AROCLOR-1248		1	2	
AROCLOR-1260	X	1	2	
BENZENE	X	2	1	
BENZO(a)ANTHRACENE	X	1	1	
BENZO(a)PYRENE	X	1	1	
BENZO(b)FLUORANTHENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZO(k)FLUORANTHENE	X	1	1	
BENZOIC ACID	X	3	1	4
BENZYL ALCOHOL	X	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	1	
BUTYL BENZYL PHTHALATE	X	1	1	
CHRYSENE	X	1	1	
delta-BHC		1	2	
DI-n-OCTYL PHTHALATE	X	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	1	1	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
FLUORANTHENE	X	1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)	X	1	2	
HEPTACHLOR	X	1	2	
HEPTACHLOR EPOXIDE		1	2	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE		1	1	
METHOXYCHLOR		1	2	
METHYLENE CHLORIDE	X	2	1	
NAPHTHALENE	X	1	1	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		1	1	
PHENANTHRENE	X	1	1	
PHENOL	X	1	1	
PYRENE	X	1	1	
TOTAL XYLENES		2	1	
VINYL ACETATE		2	1	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU6 A-Ponds Source Area at RFETS

COYOTES OU6 A-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	
1,1-DICHLOROETHANE		2	1	
1,1-DICHLOROETHENE		2	1	
1,2,4-TRICHLOROBENZENE	X	1	1	
1,2-DICHLOROETHANE	X	2	1	
1,2-DICHLOROETHENE	X	2	1	
2-BUTANONE	X	2	1	
2-METHYLNAPHTHALENE	X	1	1	
4-METHYL-2-PENTANONE	X	2	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE		1	1	
ALDRIN	X	1	2	
ANTHRACENE	X	1	1	
AROCLOR-1248		1	2	
AROCLOR-1254	X	1	2	
AROCLOR-1260	X	1	2	
BENZENE	X	2	1	
BENZO(a)ANTHRACENE	X	1	1	
BENZO(a)PYRENE	X	1	1	
BENZO(b)FLUORANTHENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZO(k)FLUORANTHENE	X	1	1	
BENZOIC ACID	X	3	1	4
BENZYL ALCOHOL	X	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	1	
BUTYL BENZYL PHTHALATE	X	1	1	
CHLOROFORM	X	2	1	
CHRYSENE	X	1	1	
DI-n-OCTYL PHTHALATE	X	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	1	1	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
FLUORANTHENE	X	1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)	X	1	2	
HEPTACHLOR	X	1	2	
HEPTACHLOR EPOXIDE		1	2	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE		1	1	
METHOXYCHLOR		1	2	
NAPHTHALENE	X	1	1	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		1	1	
PHENANTHRENE	X	1	1	
PHENOL	X	1	1	
PYRENE	X	1	1	
TETRACHLOROETHENE	X	2	1	
THALLIUM		1	1	
TOTAL XYLENES		2	1	
TRICHLOROETHENE	X	2	1	
VINYL ACETATE		2	1	

Reason Codes:

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2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU6 Soil Dump Areas Source Area at RFETS

COYOTES OU6 SOIL DUMP AREAS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE	X	1	2	
1,2-DICHLOROETHANE	X	2	2	
1,2-DICHLOROETHENE	X	2	2	
2-METHYLNAPHTHALENE	X	1	2	
4,4'-DDT		1	2	
ACENAPHTHYLENE		1	2	
ALDRIN	X	1	2	
ANTIMONY	X	1	2	
AROCLOR-1248		1	2	
AROCLOR-1260	X	1	2	
BENZOIC ACID	X	1	2	
BENZYL ALCOHOL	X	1	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	
CHLOROFORM	X	2	2	
delta-BHC		1	2	
DIBENZOFURAN	X	3	2	4
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
gamma-BHC (LINDANE)	X	1	2	
HEPTACHLOR	X	1	2	
HEPTACHLOR EPOXIDE		1	2	
ISOPHORONE		1	2	
METHOXYCHLOR		1	2	
SILVER	X	1	2	
TRICHLOROETHENE	X	2	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU2 East Trenches Source Area at RFETS

COYOTES OU2 EAST TRENCHES		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU2	Surficial Soil	Surface Water	TRV
1,1-DICHLOROETHANE		2	2	
1,2,4-TRICHLOROBENZENE		1	2	
1,2-DICHLOROETHANE		2	2	
ACENAPHTHYLENE		1	2	
ALDRIN		1	2	
ANTIMONY		1	2	
AROCLOR-1248		1	2	
AROCLOR-1260	X	1	2	
BENZO(k)FLUORANTHENE	X	1	2	
BENZOIC ACID	X	3	2	4
BENZYL ALCOHOL		1	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	
BUTYL BENZYL PHTHALATE		1	2	
delta-BHC	X	1	2	
DI-n-OCTYL PHTHALATE		1	2	
DIBENZO(a,h)ANTHRACENE		1	2	
DIBENZOFURAN		1	2	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
gamma-BHC (LINDANE)		1	2	
HEPTACHLOR		1	2	
HEPTACHLOR EPOXIDE		1	2	
ISOPHORONE		1	2	
MERCURY		1	2	
METHOXYCHLOR		1	2	
MOLYBDENUM		1	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		1	2	
PHENOL		1	2	
THALLIUM		1	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU2 903 Pad Source Area at RFETS

COYOTES OU2 903 PAD		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*		
Analyte	**PCOC in OU2**	**Surficial Soil**	**Surface Water**	**TRV**
1,1-DICHLOROETHANE		2	1	
1,2,4-TRICHLOROBENZENE		1	1	
1,2-DICHLOROETHANE		2	1	
2-METHYLNAPHTHALENE		1	1	
4,4'-DDT	X	1	1	
ACENAPHTHYLENE		1	1	
ALDRIN		1	1	
AROCLOR-1260	X	1	1	
BENZENE		2	1	
BENZOIC ACID	X	3	3	4
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
delta-BHC	X	1	1	
DI-n-OCTYL PHTHALATE		1	1	
DIBENZOFURAN		3	1	4
DIELDRIN		1	1	
ENDOSULFAN SULFATE		1	1	
ENDRIN KETONE		1	1	
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
HEPTACHLOR EPOXIDE		1	1	
ISOPHORONE		1	1	
METHOXYCHLOR		1	1	
NAPHTHALENE		1	1	
PENTACHLOROPHENOL		1	1	
PHENOL		1	1	
VINYL ACETATE		2	1	

Reason Codes:

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2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU1 881 Hillside Source Area at RFETS

COYOTES OU1 881 HILLSIDE		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU1	Surficial Soil	Surface Water	TRV
1,2,4-TRICHLOROBENZENE		1	1	
2-METHYLNAPHTHALENE		1	1	
4,4'-DDT		1	1	
ACENAPHTHYLENE	X	3	1	4
AROCLOR-1260		1	1	
BENZENE		2	1	
BENZOIC ACID		1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BUTYL BENZYL PHTHALATE		1	1	
delta-BHC		1	1	
DIBENZOFURAN		3	1	4
DIELDRIN		1	1	
ENDOSULFAN SULFATE		1	1	
ENDRIN KETONE		1	1	
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
HEPTACHLOR EPOXIDE		1	1	
ISOPHORONE		1	1	
METHOXYCHLOR		1	1	
PHENOL		1	1	
VINYL ACETATE		2	1	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU4 Downgradient Source Area at RFETS

COYOTES OU4 DOWNGRADIENT		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU4	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE		1	2	
1,2-DICHLOROETHANE		2	2	
1,2-DICHLOROETHENE		2	2	
2-BUTANONE		2	2	
2-METHYLNAPHTHALENE		1	2	
4,4'-DDT		1	2	
4-METHYL-2-PENTANONE		2	2	
ACENAPHTHENE		1	2	
ACENAPHTHYLENE		1	2	
ALDRIN		1	2	
ANTHRACENE		1	2	
ANTIMONY		1	2	
AROCLOR-1248		1	2	
AROCLOR-1254	X	1	2	
AROCLOR-1260		1	2	
BENZENE		2	2	
BENZOIC ACID		1	2	
BENZYL ALCOHOL		1	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	
CHLOROFORM		2	2	
delta-BHC		1	2	
DIBENZOFURAN		1	2	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
FLUORENE		1	2	
gamma-BHC (LINDANE)		1	2	
HEPTACHLOR		1	2	
HEPTACHLOR EPOXIDE		1	2	
ISOPHORONE		1	2	
METHOXYCHLOR		1	2	
NAPHTHALENE		1	2	
PENTACHLOROPHENOL		1	2	
PHENOL		1	2	
SILVER	X	1	2	
TOTAL XYLENES		2	2	
TRICHLOROETHENE		2	2	
VINYL ACETATE		2	2	

Reason Codes:

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2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU5 Ash Pits Source Area at RFETS

COYOTES OU5 ASH PITS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	
1,1-DICHLOROETHANE		2	1	
1,1-DICHLOROETHENE		2	1	
1,2,4-TRICHLOROBENZENE		2	1	
1,2-DICHLOROETHENE		2	1	
2-BUTANONE		2	1	
2-METHYLNAPHTHALENE	X	2	1	
4,4'-DDT	X	2	1	
4-METHYL-2-PENTANONE		2	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE	X	1	1	
ALDRIN	X	2	1	
ANTHRACENE	X	1	1	
AROCLOR-1248		2	1	
AROCLOR-1254	X	2	1	
AROCLOR-1260		2	1	
BENZENE		2	1	
BENZO(a)ANTHRACENE	X	2	1	
BENZO(a)PYRENE	X	1	1	
BENZO(b)FLUORANTHENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZO(k)FLUORANTHENE	X	2	1	
BENZOIC ACID	X	2	1	
BENZYL ALCOHOL		2	1	
BIS(2-CHLOROISOPROPYL)ETHER		2	1	
BUTYL BENZYL PHTHALATE	X	2	1	
CHLOROFORM		2	1	
CHRYSENE	X	1	1	
delta-BHC		2	1	
DI-n-BUTYL PHTHALATE	X	2	1	
DI-n-OCTYL PHTHALATE	X	2	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	2	1	
DIELDRIN	X	2	1	
ENDOSULFAN SULFATE	X	2	1	
ENDRIN KETONE	X	2	1	
FLUORANTHENE	X	1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)		2	1	
HEPTACHLOR		2	1	
HEPTACHLOR EPOXIDE	X	2	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE	X	2	1	
METHOXYCHLOR	X	2	1	
NAPHTHALENE	X	1	1	
PENTACHLOROPHENOL	X	2	1	
PHENANTHRENE	X	1	1	
PHENOL	X	2	1	
PYRENE	X	1	1	
TETRACHLOROETHENE		2	1	
TOLUENE	X	2	1	
TOTAL XYLENES		2	1	
TRICHLOROETHENE		2	1	
VINYL ACETATE		2	1	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU7 Downgradient Areas Source Area at RFETS

COYOTES OU7 DOWNGRADIENT AREAS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU7	Surficial Soil	Surface Water	TRV
1,1-DICHLOROETHANE		2	3	4
1,1-DICHLOROETHENE		2	1	
1,2,4-TRICHLOROBENZENE		2	1	
1,2-DICHLOROETHANE		2	1	
1,2-DICHLOROETHENE		2	1	
2-BUTANONE	X	2	1	
2-METHYLNAPHTHALENE		2	1	
4,4'-DDT		2	1	
ACENAPHTHENE	X	2	1	
ACENAPHTHYLENE		2	1	
ACETONE	X	2	3	4
ALDRIN		2	1	
ANTHRACENE	X	2	1	
ANTIMONY	X	2	3	4
AROCLOR-1248		1	1	
AROCLOR-1254		1	1	
AROCLOR-1260		1	1	
BENZENE		2	3	4
BENZO(a)PYRENE	X	2	1	
BENZO(b)FLUORANTHENE	X	2	1	
BENZO(ghi)PERYLENE	X	2	1	
BENZO(k)FLUORANTHENE	X	2	1	
BENZOIC ACID	X	2	1	
BENZYL ALCOHOL		2	1	
BIS(2-CHLOROISOPROPYL)ETHER	X	2	1	
CHLOROFORM		2	1	
COBALT	X	2	1	
delta-BHC		2	1	
DI-n-BUTYL PHTHALATE	X	2	1	
DI-n-OCTYL PHTHALATE		2	1	
DIBENZO(a,h)ANTHRACENE		2	1	
DIBENZOFURAN		2	1	
DIELDRIN		2	1	
ENDOSULFAN SULFATE		2	1	
ENDRIN KETONE		2	1	
FLUORENE	X	2	1	
gamma-BHC (LINDANE)		2	1	
HEPTACHLOR		2	1	
HEPTACHLOR EPOXIDE		2	1	
INDENO(1,2,3-cd)PYRENE	X	2	1	
ISOPHORONE		2	1	
METHOXYCHLOR		2	1	
METHYLENE CHLORIDE	X	2	3	4
NAPHTHALENE		2	1	
PENTACHLOROPHENOL		2	1	
PHENOL		2	1	
TETRACHLOROETHENE		2	1	
THALLIUM	X	2	1	
TRICHLOROETHENE		2	1	
VINYL ACETATE	X	2	1	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU5 Old Landfill Source Area at RFETS

COYOTES OU5 OLD LANDFILL		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Surficial Soil	Surface Water	TRV
1,1-DICHLOROETHANE		1	1	
1,1-DICHLOROETHENE		1	1	
1,2,4-TRICHLOROBENZENE		1	1	
1,2-DICHLOROETHANE		1	1	
1,2-DICHLOROETHENE		1	1	
ACENAPHTHYLENE	X	3	1	4
AROCLOR-1248		1	1	
BENZENE		1	1	
BENZOIC ACID	X	3	1	4
BENZYL ALCOHOL		1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
delta-BHC		1	1	
DIBENZOFURAN	X	3	1	4
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
VINYL ACETATE		1	1	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU5 C-Ponds Source Area at RFETS

COYOTES OU5 C-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	
1,1-DICHLOROETHANE		2	1	
1,1-DICHLOROETHENE		2	1	
1,2,4-TRICHLOROBENZENE		1	1	
1,2-DICHLOROETHANE		2	1	
1,2-DICHLOROETHENE		2	1	
2-METHYLNAPHTHALENE	X	1	1	
4,4'-DDT	X	1	1	
4-METHYL-2-PENTANONE		2	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE	X	1	1	
ALDRIN	X	1	1	
ANTHRACENE	X	1	1	
AROCLOR-1248		1	1	
AROCLOR-1254	X	1	1	
AROCLOR-1260		1	1	
BENZENE		2	1	
BENZO(a)ANTHRACENE	X	1	1	
BENZO(a)PYRENE	X	1	1	
BENZO(b)FLUORANTHENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZO(k)FLUORANTHENE	X	1	1	
BENZOIC ACID	X	3	3	4
BENZYL ALCOHOL		1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BUTYL BENZYL PHTHALATE	X	1	1	
CHRYSENE	X	1	1	
delta-BHC		1	1	
DI-n-BUTYL PHTHALATE	X	1	1	
DI-n-OCTYL PHTHALATE	X	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	1	1	
DIELDRIN	X	1	1	
ENDOSULFAN SULFATE	X	1	1	
ENDRIN KETONE	X	1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
HEPTACHLOR EPOXIDE	X	1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE	X	1	1	
METHOXYCHLOR	X	1	1	
NAPHTHALENE	X	1	1	
PENTACHLOROPHENOL	X	1	1	
PHENANTHRENE	X	1	1	
PHENOL	X	1	1	
TETRACHLOROETHENE		2	1	
TOTAL XYLENES		2	1	
TRICHLOROETHENE		2	1	
VINYL ACETATE		2	1	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU11 West Spray Field Source Area at RFETS

COYOTES OU11 WEST SPRAY FIELD		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU11	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE		2	2	
1,2-DICHLOROETHANE		2	2	
1,2-DICHLOROETHENE		2	2	
2-METHYLNAPHTHALENE		2	2	
4,4'-DDT		2	2	
4-METHYL-2-PENTANONE		2	2	
ACENAPHTHENE		2	2	
ACENAPHTHYLENE		2	2	
ALDRIN		2	2	
ANTHRACENE		2	2	
AROCLOR-1248		2	2	
AROCLOR-1254		2	2	
AROCLOR-1260		2	2	
BENZENE		2	2	
BENZO(a)ANTHRACENE		2	2	
BENZO(a)PYRENE		2	2	
BENZO(b)FLUORANTHENE		2	2	
BENZO(ghi)PERYLENE		2	2	
BENZO(k)FLUORANTHENE		2	2	
BENZOIC ACID		2	2	
BENZYL ALCOHOL		2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	
BUTYL BENZYL PHTHALATE		2	2	
CHRYSENE		2	2	
delta-BHC		2	2	
DI-n-OCTYL PHTHALATE		2	2	
DIBENZO(a,h)ANTHRACENE		2	2	
DIBENZOFURAN		2	2	
DIELDRIN		2	2	
ENDOSULFAN SULFATE		2	2	
ENDRIN KETONE		2	2	
FLUORANTHENE		2	2	
FLUORENE		2	2	
gamma-BHC (LINDANE)		2	2	
HEPTACHLOR		2	2	
HEPTACHLOR EPOXIDE		2	2	
INDENO(1,2,3-cd)PYRENE		2	2	
ISOPHORONE		2	2	
MERCURY		1	2	
METHOXYCHLOR		2	2	
NAPHTHALENE		2	2	
PENTACHLOROPHENOL		2	2	
PHENANTHRENE		2	2	
PHENOL		2	2	
PYRENE		2	2	
SILVER		1	2	
TETRACHLOROETHENE		2	2	
TOTAL XYLENES		2	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU6 North Spray Field Source Area at RFETS

COYOTES OU6 NORTH SPRAY FIELD		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE	X	2	2	
1,2-DICHLOROETHANE	X	2	2	
1,2-DICHLOROETHENE	X	2	2	
2-BUTANONE	X	2	2	
2-METHYLNAPHTHALENE	X	2	2	
4,4'-DDT		2	2	
4-METHYL-2-PENTANONE	X	2	2	
ACENAPHTHENE	X	2	2	
ACENAPHTHYLENE		2	2	
ACETONE	X	2	2	
ALDRIN	X	2	2	
ANTHRACENE	X	2	2	
AROCLOR-1248		2	2	
AROCLOR-1254	X	2	2	
AROCLOR-1260	X	2	2	
BENZENE	X	2	2	
BENZO(a)ANTHRACENE	X	2	2	
BENZO(a)PYRENE	X	2	2	
BENZO(b)FLUORANTHENE	X	2	2	
BENZO(ghi)PERYLENE	X	2	2	
BENZO(k)FLUORANTHENE	X	2	2	
BENZOIC ACID	X	2	2	
BENZYL ALCOHOL	X	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	2	
BUTYL BENZYL PHTHALATE	X	2	2	
CHLOROFORM	X	2	2	
CHRYSENE	X	2	2	
delta-BHC		2	2	
DI-n-BUTYL PHTHALATE	X	2	2	
DI-n-OCTYL PHTHALATE	X	2	2	
DIBENZO(a,h)ANTHRACENE	X	2	2	
DIBENZOFURAN	X	2	2	
DIELDRIN		2	2	
ENDOSULFAN SULFATE		2	2	
ENDRIN KETONE		2	2	
FLUORANTHENE	X	2	2	
FLUORENE	X	2	2	
gamma-BHC (LINDANE)	X	2	2	
HEPTACHLOR	X	2	2	
HEPTACHLOR EPOXIDE		2	2	
INDENO(1,2,3-cd)PYRENE	X	2	2	
ISOPHORONE		2	2	
METHOXYCHLOR		2	2	
METHYLENE CHLORIDE	X	2	2	
MOLYBDENUM	X	1	2	
NAPHTHALENE	X	2	2	
PENTACHLOROPHENOL		2	2	
PHENANTHRENE	X	2	2	
PHENOL	X	2	2	
PYRENE	X	2	2	
SILVER	X	1	2	

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU6 North Spray Field Source Area at RFETS

COYOTES OU6 NORTH SPRAY FIELD		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*		
Analyte	**PCOC in OU6**	**Surficial Soil**	**Surface Water**	**TRV**
TETRACHLOROETHENE	X	2	2	
TIN		1	2	
TOTAL XYLENES		2	2	
TRICHLOROETHENE	X	2	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU6 Burial Trenches Source Area at RFETS

COYOTES OU6 BURIAL TRENCHES		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE	X	2	2	
1,2-DICHLOROETHANE	X	2	2	
1,2-DICHLOROETHENE	X	2	2	
2-METHYLNAPHTHALENE	X	2	2	
4,4'-DDT		2	2	
ACENAPHTHENE	X	2	2	
ACENAPHTHYLENE		2	2	
ALDRIN	X	2	2	
ANTHRACENE	X	2	2	
ANTIMONY	X	2	2	
AROCLOR-1248		2	2	
AROCLOR-1254	X	2	2	
AROCLOR-1260	X	2	2	
BENZO(a)ANTHRACENE	X	2	2	
BENZO(a)PYRENE	X	2	2	
BENZO(b)FLUORANTHENE	X	2	2	
BENZO(ghi)PERYLENE	X	2	2	
BENZO(k)FLUORANTHENE	X	2	2	
BENZOIC ACID	X	2	2	
BENZYL ALCOHOL	X	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	2	
BUTYL BENZYL PHTHALATE	X	2	2	
CHRYSENE	X	2	2	
COBALT	X	2	2	
delta-BHC		2	2	
DI-n-BUTYL PHTHALATE	X	2	2	
DI-n-OCTYL PHTHALATE	X	2	2	
DIBENZO(a,h)ANTHRACENE	X	2	2	
DIBENZOFURAN	X	2	2	
DIELDRIN		2	2	
ENDOSULFAN SULFATE		2	2	
ENDRIN KETONE		2	2	
FLUORANTHENE	X	2	2	
FLUORENE	X	2	2	
gamma-BHC (LINDANE)	X	2	2	
HEPTACHLOR	X	2	2	
HEPTACHLOR EPOXIDE		2	2	
INDENO(1,2,3-cd)PYRENE	X	2	2	
ISOPHORONE		2	2	
METHOXYCHLOR		2	2	
NAPHTHALENE	X	2	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		2	2	
PHENANTHRENE	X	2	2	
PHENOL	X	2	2	
PYRENE	X	2	2	
TETRACHLOROETHENE	X	2	2	
THALLIUM		2	2	
TOTAL XYLENES		2	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU2 Mound Area Source Area at RFETS

COYOTES OU2 MOUND AREA		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU2	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE		1	2	
1,2-DICHLOROETHANE		2	2	
1,2-DICHLOROETHENE		2	2	
2-METHYLNAPHTHALENE		1	2	
4,4'-DDT	X	1	2	
ACENAPHTHENE		1	2	
ACENAPHTHYLENE		1	2	
ALDRIN		1	2	
ANTHRACENE		1	2	
ANTIMONY		2	2	
AROCLOR-1248		1	2	
BENZO(k)FLUORANTHENE	X	1	2	
BENZOIC ACID	X	3	2	4
BENZYL ALCOHOL		1	2	
BERYLLIUM		1	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	
BUTYL BENZYL PHTHALATE		1	2	
CADMIUM		1	2	
delta-BHC	X	1	2	
DI-n-OCTYL PHTHALATE		1	2	
DIBENZO(a,h)ANTHRACENE		1	2	
DIBENZOFURAN		1	2	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
FLUORENE		1	2	
gamma-BHC (LINDANE)		1	2	
HEPTACHLOR		1	2	
HEPTACHLOR EPOXIDE		1	2	
ISOPHORONE		1	2	
MERCURY		1	2	
METHOXYCHLOR		1	2	
MOLYBDENUM		1	2	
NAPHTHALENE		1	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		1	2	
PHENOL		1	2	
SELENIUM		1	2	
SILVER		1	2	
TIN		1	2	
TOTAL XYLENES		2	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU5 Surface Disturbance Source Area at RFETS

COYOTES OU5 SURFACE DISTURBANCE		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE		1	2	
1,2-DICHLOROETHANE		2	2	
1,2-DICHLOROETHENE		2	2	
2-BUTANONE		2	2	
2-METHYLNAPHTHALENE	X	1	2	
4,4'-DDT	X	1	2	
4-METHYL-2-PENTANONE		2	2	
ACENAPHTHENE	X	1	2	
ACENAPHTHYLENE	X	1	2	
ACETONE		2	2	
ALDRIN	X	1	2	
ANTHRACENE	X	1	2	
ANTIMONY	X	1	2	
AROCLOR-1248		1	2	
AROCLOR-1254	X	1	2	
AROCLOR-1260		1	2	
BENZENE		2	2	
BENZO(a)ANTHRACENE	X	1	2	
BENZO(a)PYRENE	X	1	2	
BENZO(b)FLUORANTHENE	X	1	2	
BENZO(ghi)PERYLENE	X	1	2	
BENZO(k)FLUORANTHENE	X	1	2	
BENZOIC ACID	X	1	2	
BENZYL ALCOHOL		1	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	2	
BUTYL BENZYL PHTHALATE	X	1	2	
CADMIUM		1	2	
CHLOROFORM		2	2	
CHRYSENE	X	1	2	
delta-BHC		1	2	
DI-n-BUTYL PHTHALATE	X	1	2	
DI-n-OCTYL PHTHALATE	X	1	2	
DIBENZO(a,h)ANTHRACENE	X	1	2	
DIBENZOFURAN	X	1	2	
DIELDRIN	X	1	2	
ENDOSULFAN SULFATE	X	1	2	
ENDRIN KETONE	X	1	2	
FLUORANTHENE	X	1	2	
FLUORENE	X	1	2	
gamma-BHC (LINDANE)		1	2	
HEPTACHLOR		1	2	
HEPTACHLOR EPOXIDE	X	1	2	
INDENO(1,2,3-cd)PYRENE	X	1	2	
ISOPHORONE	X	1	2	
METHOXYCHLOR	X	1	2	
METHYLENE CHLORIDE	X	2	2	
MOLYBDENUM		1	2	
NAPHTHALENE	X	1	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL	X	1	2	
PHENANTHRENE	X	1	2	

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU5 Surface Disturbance Source Area at RFETS

COYOTES OU5 SURFACE DISTURBANCE		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*		
Analyte	**PCOC in OU5**	**Surficial Soil**	**Surface Water**	**TRV**
PHENOL	X	1	2	
PYRENE	X	1	2	
SELENIUM		1	2	
SILVER	X	1	2	
TETRACHLOROETHENE		2	2	
THALLIUM		1	2	
TIN		1	2	
TOLUENE	X	2	2	
TOTAL XYLENES		2	2	
TRICHLOROETHENE		2	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU10 Outside Closures Source Area at RFETS

COYOTES OU10 OUTSIDE CLOSURES		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU10	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE		2	2	
1,2-DICHLOROETHANE		2	2	
1,2-DICHLOROETHENE		2	2	
2-BUTANONE		2	2	
2-METHYLNAPHTHALENE		2	2	
4,4'-DDT		2	2	
4-METHYL-2-PENTANONE		2	2	
ACENAPHTHENE		2	2	
ACENAPHTHYLENE		2	2	
ACETONE		2	2	
ALDRIN		2	2	
ALUMINUM		2	2	
ANTHRACENE		2	2	
ANTIMONY		2	2	
AROCLOR-1248		2	2	
AROCLOR-1254		2	2	
AROCLOR-1260		2	2	
ARSENIC		2	2	
BARIUM		2	2	
BENZENE		2	2	
BENZO(a)ANTHRACENE		2	2	
BENZO(a)PYRENE		2	2	
BENZO(b)FLUORANTHENE		2	2	
BENZO(ghi)PERYLENE		2	2	
BENZO(k)FLUORANTHENE		2	2	
BENZOIC ACID		2	2	
BENZYL ALCOHOL		2	2	
BERYLLIUM		2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	
BIS(2-ETHYLHEXYL)PHTHALATE		2	2	
BUTYL BENZYL PHTHALATE		2	2	
CADMIUM		2	2	
CHLOROFORM		2	2	
CHROMIUM		2	2	
CHRYSENE		2	2	
COBALT		2	2	
COPPER		2	2	
delta-BHC		2	2	
DI-n-BUTYL PHTHALATE		2	2	
DI-n-OCTYL PHTHALATE		2	2	
DIBENZO(a,h)ANTHRACENE		2	2	
DIBENZOFURAN		2	2	
DIELDRIN		2	2	
ENDOSULFAN SULFATE		2	2	
ENDRIN KETONE		2	2	
FLUORANTHENE		2	2	
FLUORENE		2	2	
gamma-BHC (LINDANE)		2	2	
HEPTACHLOR		2	2	
HEPTACHLOR EPOXIDE		2	2	
INDENO(1,2,3-cd)PYRENE		2	2	
ISOPHORONE		2	2	

Analytes not Included in the Wildlife Ecological Screen for Coyotes in the OU10 Outside Closures Source Area at RFETS

COYOTES OU10 OUTSIDE CLOSURES		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*		
Analyte	PCOC in OU10	Surficial Soil	Surface Water	TRV
LEAD		2	2	
LITHIUM		2	2	
MAGNESIUM		2	2	
MANGANESE		2	2	
MERCURY		2	2	
METHOXYCHLOR		2	2	
METHYLENE CHLORIDE		2	2	
MOLYBDENUM		2	2	
NAPHTHALENE		2	2	
NICKEL		2	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		2	2	
PHENANTHRENE		2	2	
PHENOL		2	2	
PYRENE		2	2	
SELENIUM		2	2	
SILVER		2	2	
STRONTIUM		2	2	
TETRACHLOROETHENE		2	2	
THALLIUM		2	2	
TIN		2	2	
TOLUENE		2	2	
TOTAL XYLENES		2	2	
TRICHLOROETHENE		2	2	
VANADIUM		2	2	
VINYL ACETATE		2	2	
ZINC		2	2	

Note: No data exists for OU10 Outside Closures, therefore, all analytes are listed above.

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU2 903 Pad Source Area at RFETS

MULE DEER OU2 903 PAD		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU2	Surficial Soil	Surface Water	TRV
1,1-DICHLOROETHANE		2	1	
1,2,4-TRICHLOROBENZENE		1	1	
1,2-DICHLOROETHANE		2	1	
2-METHYLNAPHTHALENE		1	1	
4,4'-DDT	X	1	1	
ACENAPHTHYLENE		1	1	
ALDRIN		1	1	
AROCLOR-1260	X	1	1	
BENZENE		2	1	
BENZOIC ACID	X	3	3	4
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
delta-BHC	X	1	1	
DI-n-OCTYL PHTHALATE		1	1	
DIBENZOFURAN		3	1	4
DIELDRIN		1	1	
ENDOSULFAN SULFATE		1	1	
ENDRIN KETONE		1	1	
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
HEPTACHLOR EPOXIDE		1	1	
ISOPHORONE		1	1	
METHOXYCHLOR		1	1	
NAPHTHALENE		1	1	
PENTACHLOROPHENOL		1	1	
PHENOL		1	1	
VINYL ACETATE		2	1	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU1 881 Hillside Source Area at RFETS

MULE DEER OU1 881 HILLSIDE		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC In OU1	Surficial Soil	Surface Water	TRV
1,2,4-TRICHLOROBENZENE		1	1	
2-METHYLNAPHTHALENE		1	1	
4,4'-DDT		1	1	
ACENAPHTHYLENE	X	3	1	4
AROCLOR-1260		1	1	
BENZENE		2	1	
BENZOIC ACID		1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BUTYL BENZYL PHTHALATE		1	1	
delta-BHC		1	1	
DIBENZOFURAN		3	1	4
DIELDRIN		1	1	
ENDOSULFAN SULFATE		1	1	
ENDRIN KETONE		1	1	
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
HEPTACHLOR EPOXIDE		1	1	
ISOPHORONE		1	1	
METHOXYCHLOR		1	1	
PHENOL		1	1	
VINYL ACETATE		2	1	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU2 East Trenches Source Area at RFETS

MULE DEER OU2 EAST TRENCHES		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU2	Surficial Soil	Surface Water	TRV
1,1-DICHLOROETHANE		2	2	
1,2,4-TRICHLOROBENZENE		1	2	
1,2-DICHLOROETHANE		2	2	
ACENAPHTHYLENE		1	2	
ALDRIN		1	2	
ANTIMONY		1	2	
AROCLOR-1248		1	2	
AROCLOR-1260	X	1	2	
BENZO(k)FLUORANTHENE	X	1	2	
BENZOIC ACID	X	3	2	4
BENZYL ALCOHOL		1	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	
BUTYL BENZYL PHTHALATE		1	2	
delta-BHC	X	1	2	
DI-n-OCTYL PHTHALATE		1	2	
DIBENZO(a,h)ANTHRACENE		1	2	
DIBENZOFURAN		1	2	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
gamma-BHC (LINDANE)		1	2	
HEPTACHLOR		1	2	
HEPTACHLOR EPOXIDE		1	2	
ISOPHORONE		1	2	
MERCURY		1	2	
METHOXYCHLOR		1	2	
MOLYBDENUM		1	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		1	2	
PHENOL		1	2	
THALLIUM		1	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU6 Soil Dump Areas Source Area at RFETS

MULE DEER OU6 SOIL DUMP AREAS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE	X	1	2	
1,2-DICHLOROETHANE	X	2	2	
1,2-DICHLOROETHENE	X	2	2	
2-METHYLNAPHTHALENE	X	1	2	
4,4'-DDT		1	2	
ACENAPHTHYLENE		1	2	
ALDRIN	X	1	2	
ANTIMONY	X	1	2	
AROCLOR-1248		1	2	
AROCLOR-1260	X	1	2	
BENZOIC ACID	X	1	2	
BENZYL ALCOHOL	X	1	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	
CHLOROFORM	X	2	2	
delta-BHC		1	2	
DIBENZOFURAN	X	3	2	4
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
gamma-BHC (LINDANE)	X	1	2	
HEPTACHLOR	X	1	2	
HEPTACHLOR EPOXIDE		1	2	
ISOPHORONE		1	2	
METHOXYCHLOR		1	2	
SILVER	X	1	2	
TRICHLOROETHENE	X	2	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU5 Ash Pits Source Area at RFETS

MULE DEER OU5 ASH PITS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	
1,1-DICHLOROETHANE		2	1	
1,1-DICHLOROETHENE		2	1	
1,2,4-TRICHLOROBENZENE		2	1	
1,2-DICHLOROETHENE		2	1	
2-BUTANONE		2	1	
2-METHYLNAPHTHALENE	X	2	1	
4,4'-DDT	X	2	1	
4-METHYL-2-PENTANONE		2	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE	X	1	1	
ALDRIN	X	2	1	
ANTHRACENE	X	1	1	
AROCLOR-1248		2	1	
AROCLOR-1254	X	2	1	
AROCLOR-1260		2	1	
BENZENE		2	1	
BENZO(a)ANTHRACENE	X	2	1	
BENZO(a)PYRENE	X	1	1	
BENZO(b)FLUORANTHENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZO(k)FLUORANTHENE	X	2	1	
BENZOIC ACID	X	2	1	
BENZYL ALCOHOL		2	1	
BIS(2-CHLOROISOPROPYL)ETHER		2	1	
BUTYL BENZYL PHTHALATE	X	2	1	
CHLOROFORM		2	1	
CHRYSENE	X	1	1	
delta-BHC		2	1	
DI-n-BUTYL PHTHALATE	X	2	1	
DI-n-OCTYL PHTHALATE	X	2	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	2	1	
DIELDRIN	X	2	1	
ENDOSULFAN SULFATE	X	2	1	
ENDRIN KETONE	X	2	1	
FLUORANTHENE	X	1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)		2	1	
HEPTACHLOR		2	1	
HEPTACHLOR EPOXIDE	X	2	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE	X	2	1	
METHOXYCHLOR	X	2	1	
NAPHTHALENE	X	1	1	
PENTACHLOROPHENOL	X	2	1	
PHENANTHRENE	X	1	1	
PHENOL	X	2	1	
PYRENE	X	1	1	
TETRACHLOROETHENE		2	1	
TOLUENE	X	2	1	
TOTAL XYLENES		2	1	
TRICHLOROETHENE		2	1	
VINYL ACETATE		2	1	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU5 Old Landfill Source Area at RFETS

MULE DEER OU5 OLD LANDFILL		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Surficial Soil	Surface Water	TRV
1,1-DICHLOROETHANE		1	1	
1,1-DICHLOROETHENE		1	1	
1,2,4-TRICHLOROBENZENE		1	1	
1,2-DICHLOROETHANE		1	1	
1,2-DICHLOROETHENE		1	1	
ACENAPHTHYLENE	X	3	1	4
AROCLOR-1248		1	1	
BENZENE		1	1	
BENZOIC ACID	X	3	1	4
BENZYL ALCOHOL		1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
delta-BHC		1	1	
DIBENZOFURAN	X	3	1	4
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
VINYL ACETATE		1	1	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU6 A-Ponds Source Area at RFETS

MULE DEER OU6 A-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	
1,1-DICHLOROETHANE		2	1	
1,1-DICHLOROETHENE		2	1	
1,2,4-TRICHLOROBENZENE	X	1	1	
1,2-DICHLOROETHANE	X	2	1	
1,2-DICHLOROETHENE	X	2	1	
2-BUTANONE	X	2	1	
2-METHYLNAPHTHALENE	X	1	1	
4-METHYL-2-PENTANONE	X	2	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE		1	1	
ALDRIN	X	1	2	
ANTHRACENE	X	1	1	
AROCLOR-1248		1	2	
AROCLOR-1254	X	1	2	
AROCLOR-1260	X	1	2	
BENZENE	X	2	1	
BENZO(a)ANTHRACENE	X	1	1	
BENZO(a)PYRENE	X	1	1	
BENZO(b)FLUORANTHENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZO(k)FLUORANTHENE	X	1	1	
BENZOIC ACID	X	3	1	4
BENZYL ALCOHOL	X	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	1	
BUTYL BENZYL PHTHALATE	X	1	1	
CHLOROFORM	X	2	1	
CHRYSENE	X	1	1	
DI-n-OCTYL PHTHALATE	X	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	1	1	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
FLUORANTHENE	X	1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)	X	1	2	
HEPTACHLOR	X	1	2	
HEPTACHLOR EPOXIDE		1	2	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE		1	1	
METHOXYCHLOR		1	2	
NAPHTHALENE	X	1	1	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		1	1	
PHENANTHRENE	X	1	1	
PHENOL	X	1	1	
PYRENE	X	1	1	
TETRACHLOROETHENE	X	2	1	
THALLIUM		1	1	
TOTAL XYLENES		2	1	
TRICHLOROETHENE	X	2	1	
VINYL ACETATE		2	1	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU11 West Spray Field Source Area at RFETS

MULE DEER OU11 WEST SPRAY FIELD		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU11	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE		2	2	
1,2-DICHLOROETHANE		2	2	
1,2-DICHLOROETHENE		2	2	
2-METHYLNAPHTHALENE		2	2	
4,4'-DDT		2	2	
4-METHYL-2-PENTANONE		2	2	
ACENAPHTHENE		2	2	
ACENAPHTHYLENE		2	2	
ALDRIN		2	2	
ANTHRACENE		2	2	
AROCLOR-1248		2	2	
AROCLOR-1254		2	2	
AROCLOR-1260		2	2	
BENZENE		2	2	
BENZO(a)ANTHRACENE		2	2	
BENZO(a)PYRENE		2	2	
BENZO(b)FLUORANTHENE		2	2	
BENZO(ghi)PERYLENE		2	2	
BENZO(k)FLUORANTHENE		2	2	
BENZOIC ACID		2	2	
BENZYL ALCOHOL		2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	
BUTYL BENZYL PHTHALATE		2	2	
CHRYSENE		2	2	
delta-BHC		2	2	
DI-n-OCTYL PHTHALATE		2	2	
DIBENZO(a,h)ANTHRACENE		2	2	
DIBENZOFURAN		2	2	
DIELDRIN		2	2	
ENDOSULFAN SULFATE		2	2	
ENDRIN KETONE		2	2	
FLUORANTHENE		2	2	
FLUORENE		2	2	
gamma-BHC (LINDANE)		2	2	
HEPTACHLOR		2	2	
HEPTACHLOR EPOXIDE		2	2	
INDENO(1,2,3-cd)PYRENE		2	2	
ISOPHORONE		2	2	
MERCURY		1	2	
METHOXYCHLOR		2	2	
NAPHTHALENE		2	2	
PENTACHLOROPHENOL		2	2	
PHENANTHRENE		2	2	
PHENOL		2	2	
PYRENE		2	2	
SILVER		1	2	
TETRACHLOROETHENE		2	2	
TOTAL XYLENES		2	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU6 B-Ponds Source Area at RFETS

MULE DEER OU6 B-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	
1,1-DICHLOROETHANE		2	1	
1,1-DICHLOROETHENE		2	1	
1,2,4-TRICHLOROBENZENE	X	1	1	
2-BUTANONE	X	2	1	
2-METHYLNAPHTHALENE	X	1	1	
4,4'-DDT		1	2	
4-METHYL-2-PENTANONE	X	2	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE		1	1	
ALDRIN	X	1	2	
ANTHRACENE	X	1	1	
AROCLOR-1248		1	2	
AROCLOR-1260	X	1	2	
BENZENE	X	2	1	
BENZO(a)ANTHRACENE	X	1	1	
BENZO(a)PYRENE	X	1	1	
BENZO(b)FLUORANTHENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZO(k)FLUORANTHENE	X	1	1	
BENZOIC ACID	X	3	1	4
BENZYL ALCOHOL	X	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	1	
BUTYL BENZYL PHTHALATE	X	1	1	
CHRYSENE	X	1	1	
delta-BHC		1	2	
DI-n-OCTYL PHTHALATE	X	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	1	1	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
FLUORANTHENE	X	1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)	X	1	2	
HEPTACHLOR	X	1	2	
HEPTACHLOR EPOXIDE		1	2	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE		1	1	
METHOXYCHLOR		1	2	
METHYLENE CHLORIDE	X	2	1	
NAPHTHALENE	X	1	1	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		1	1	
PHENANTHRENE	X	1	1	
PHENOL	X	1	1	
PYRENE	X	1	1	
TOTAL XYLENES		2	1	
VINYL ACETATE		2	1	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU4 Downgradient Source Area at RFETS

MULE DEER OU4 DOWNGRADIENT		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU4	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE		1	2	
1,2-DICHLOROETHANE		2	2	
1,2-DICHLOROETHENE		2	2	
2-BUTANONE		2	2	
2-METHYLNAPHTHALENE		1	2	
4,4'-DDT		1	2	
4-METHYL-2-PENTANONE		2	2	
ACENAPHTHENE		1	2	
ACENAPHTHYLENE		1	2	
ALDRIN		1	2	
ANTHRACENE		1	2	
ANTIMONY		1	2	
AROCLOR-1248		1	2	
AROCLOR-1254	X	1	2	
AROCLOR-1260		1	2	
BENZENE		2	2	
BENZOIC ACID		1	2	
BENZYL ALCOHOL		1	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	
CHLOROFORM		2	2	
delta-BHC		1	2	
DIBENZOFURAN		1	2	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
FLUORENE		1	2	
gamma-BHC (LINDANE)		1	2	
HEPTACHLOR		1	2	
HEPTACHLOR EPOXIDE		1	2	
ISOPHORONE		1	2	
METHOXYCHLOR		1	2	
NAPHTHALENE		1	2	
PENTACHLOROPHENOL		1	2	
PHENOL		1	2	
SILVER	X	1	2	
TOTAL XYLENES		2	2	
TRICHLOROETHENE		2	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU6 North Spray Field Source Area at RFETS

MULE DEER OU6 NORTH SPRAY FIELD		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE	X	2	2	
1,2-DICHLOROETHANE	X	2	2	
1,2-DICHLOROETHENE	X	2	2	
2-BUTANONE	X	2	2	
2-METHYLNAPHTHALENE	X	2	2	
4,4'-DDT		2	2	
4-METHYL-2-PENTANONE	X	2	2	
ACENAPHTHENE	X	2	2	
ACENAPHTHYLENE		2	2	
ACETONE	X	2	2	
ALDRIN	X	2	2	
ANTHRACENE	X	2	2	
AROCLOR-1248		2	2	
AROCLOR-1254	X	2	2	
AROCLOR-1260	X	2	2	
BENZENE	X	2	2	
BENZO(a)ANTHRACENE	X	2	2	
BENZO(a)PYRENE	X	2	2	
BENZO(b)FLUORANTHENE	X	2	2	
BENZO(ghi)PERYLENE	X	2	2	
BENZO(k)FLUORANTHENE	X	2	2	
BENZOIC ACID	X	2	2	
BENZYL ALCOHOL	X	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	2	
BUTYL BENZYL PHTHALATE	X	2	2	
CHLOROFORM	X	2	2	
CHRYSENE	X	2	2	
delta-BHC		2	2	
DI-n-BUTYL PHTHALATE	X	2	2	
DI-n-OCTYL PHTHALATE	X	2	2	
DIBENZO(a,h)ANTHRACENE	X	2	2	
DIBENZOFURAN	X	2	2	
DIELDRIN		2	2	
ENDOSULFAN SULFATE		2	2	
ENDRIN KETONE		2	2	
FLUORANTHENE	X	2	2	
FLUORENE	X	2	2	
gamma-BHC (LINDANE)	X	2	2	
HEPTACHLOR	X	2	2	
HEPTACHLOR EPOXIDE		2	2	
INDENO(1,2,3-cd)PYRENE	X	2	2	
ISOPHORONE		2	2	
METHOXYCHLOR		2	2	
METHYLENE CHLORIDE	X	2	2	
MOLYBDENUM	X	1	2	
NAPHTHALENE	X	2	2	
PENTACHLOROPHENOL		2	2	
PHENANTHRENE	X	2	2	
PHENOL	X	2	2	
PYRENE	X	2	2	
SILVER	X	1	2	

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU6 North Spray Field Source Area at RFETS

MULE DEER OU6 NORTH SPRAY FIELD		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*		
Analyte	**PCOC in OU6**	**Surficial Soil**	**Surface Water**	**TRV**
TETRACHLOROETHENE	X	2	2	
TIN		1	2	
TOTAL XYLENES		2	2	
TRICHLOROETHENE	X	2	2	
VINYL ACETATE		2	2	

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU5 C-Ponds Source Area at RFETS

MULE DEER OU5 C-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	
1,1-DICHLOROETHANE		2	1	
1,1-DICHLOROETHENE		2	1	
1,2,4-TRICHLOROBENZENE		1	1	
1,2-DICHLOROETHANE		2	1	
1,2-DICHLOROETHENE		2	1	
2-METHYLNAPHTHALENE	X	1	1	
4,4'-DDT	X	1	1	
4-METHYL-2-PENTANONE		2	1	
ACENAPHTHENE	X	1	1	
ACENAPHTHYLENE	X	1	1	
ALDRIN	X	1	1	
ANTHRACENE	X	1	1	
AROCLOR-1248		1	1	
AROCLOR-1254	X	1	1	
AROCLOR-1260		1	1	
BENZENE		2	1	
BENZO(a)ANTHRACENE	X	1	1	
BENZO(a)PYRENE	X	1	1	
BENZO(b)FLUORANTHENE	X	1	1	
BENZO(ghi)PERYLENE	X	1	1	
BENZO(k)FLUORANTHENE	X	1	1	
BENZOIC ACID	X	3	3	4
BENZYL ALCOHOL		1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	
BUTYL BENZYL PHTHALATE	X	1	1	
CHRYSENE	X	1	1	
delta-BHC		1	1	
DI-n-BUTYL PHTHALATE	X	1	1	
DI-n-OCTYL PHTHALATE	X	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	
DIBENZOFURAN	X	1	1	
DIELDRIN	X	1	1	
ENDOSULFAN SULFATE	X	1	1	
ENDRIN KETONE	X	1	1	
FLUORENE	X	1	1	
gamma-BHC (LINDANE)		1	1	
HEPTACHLOR		1	1	
HEPTACHLOR EPOXIDE	X	1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	
ISOPHORONE	X	1	1	
METHOXYCHLOR	X	1	1	
NAPHTHALENE	X	1	1	
PENTACHLOROPHENOL	X	1	1	
PHENANTHRENE	X	1	1	
PHENOL	X	1	1	
TETRACHLOROETHENE		2	1	
TOTAL XYLENES		2	1	
TRICHLOROETHENE		2	1	
VINYL ACETATE		2	1	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU7 Downgradient Areas Source Area at RFETS

MULE DEER OU7 DOWNGRADIENT AREAS		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU7	Surficial Soil	Surface Water	TRV
1,1-DICHLOROETHANE		2	3	4
1,1-DICHLOROETHENE		2	1	
1,2,4-TRICHLOROBENZENE		2	1	
1,2-DICHLOROETHANE		2	1	
1,2-DICHLOROETHENE		2	1	
2-BUTANONE	X	2	1	
2-METHYLNAPHTHALENE		2	1	
4,4'-DDT		2	1	
ACENAPHTHENE	X	2	1	
ACENAPHTHYLENE		2	1	
ACETONE	X	2	3	4
ALDRIN		2	1	
ANTHRACENE	X	2	1	
ANTIMONY	X	2	3	4
AROCLOR-1248		1	1	
AROCLOR-1254		1	1	
AROCLOR-1260		1	1	
BENZENE		2	3	4
BENZO(a)PYRENE	X	2	1	
BENZO(b)FLUORANTHENE	X	2	1	
BENZO(ghi)PERYLENE	X	2	1	
BENZO(k)FLUORANTHENE	X	2	1	
BENZOIC ACID	X	2	1	
BENZYL ALCOHOL		2	1	
BIS(2-CHLOROISOPROPYL)ETHER	X	2	1	
CHLOROFORM		2	1	
COBALT	X	2	1	
delta-BHC		2	1	
DI-n-BUTYL PHTHALATE	X	2	1	
DI-n-OCTYL PHTHALATE		2	1	
DIBENZO(a,h)ANTHRACENE		2	1	
DIBENZOFURAN		2	1	
DIELDRIN		2	1	
ENDOSULFAN SULFATE		2	1	
ENDRIN KETONE		2	1	
FLUORENE	X	2	1	
gamma-BHC (LINDANE)		2	1	
HEPTACHLOR		2	1	
HEPTACHLOR EPOXIDE		2	1	
INDENO(1,2,3-cd)PYRENE	X	2	1	
ISOPHORONE		2	1	
MERCURY		2	3	4
METHOXYCHLOR		2	1	
METHYLENE CHLORIDE	X	2	3	4
NAPHTHALENE		2	1	
PENTACHLOROPHENOL		2	1	
PHENOL		2	1	
SILVER		2	1	
TETRACHLOROETHENE		2	1	
THALLIUM	X	2	1	
TRICHLOROETHENE		2	1	
VINYL ACETATE	X	2	1	

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Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU6 Burial Trenches Source Area at RFETS

MULE DEER OU6 BURIAL TRENCHES		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU6	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE	X	2	2	
1,2-DICHLOROETHANE	X	2	2	
1,2-DICHLOROETHENE	X	2	2	
2-METHYLNAPHTHALENE	X	2	2	
4,4'-DDT		2	2	
ACENAPHTHENE	X	2	2	
ACENAPHTHYLENE		2	2	
ALDRIN	X	2	2	
ANTHRACENE	X	2	2	
ANTIMONY	X	2	2	
AROCLOR-1248		2	2	
AROCLOR-1254	X	2	2	
AROCLOR-1260	X	2	2	
BENZO(a)ANTHRACENE	X	2	2	
BENZO(a)PYRENE	X	2	2	
BENZO(b)FLUORANTHENE	X	2	2	
BENZO(ghi)PERYLENE	X	2	2	
BENZO(k)FLUORANTHENE	X	2	2	
BENZOIC ACID	X	2	2	
BENZYL ALCOHOL	X	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	2	
BUTYL BENZYL PHTHALATE	X	2	2	
CHRYSENE	X	2	2	
COBALT	X	2	2	
delta-BHC		2	2	
DI-n-BUTYL PHTHALATE	X	2	2	
DI-n-OCTYL PHTHALATE	X	2	2	
DIBENZO(a,h)ANTHRACENE	X	2	2	
DIBENZOFURAN	X	2	2	
DIELDRIN		2	2	
ENDOSULFAN SULFATE		2	2	
ENDRIN KETONE		2	2	
FLUORANTHENE	X	2	2	
FLUORENE	X	2	2	
gamma-BHC (LINDANE)	X	2	2	
HEPTACHLOR	X	2	2	
HEPTACHLOR EPOXIDE		2	2	
INDENO(1,2,3-cd)PYRENE	X	2	2	
ISOPHORONE		2	2	
METHOXYCHLOR		2	2	
NAPHTHALENE	X	2	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		2	2	
PHENANTHRENE	X	2	2	
PHENOL	X	2	2	
PYRENE	X	2	2	
SILVER	X	2	2	
TETRACHLOROETHENE	X	2	2	
THALLIUM		2	2	
TOTAL XYLENES		2	2	
VINYL ACETATE		2	2	

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Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU2 Mound Area Source Area at RFETS

MULE DEER OU2 MOUND AREA		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU2	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE		1	2	
1,2-DICHLOROETHANE		2	2	
1,2-DICHLOROETHENE		2	2	
2-METHYLNAPHTHALENE		1	2	
4,4'-DDT	X	1	2	
ACENAPHTHENE		1	2	
ACENAPHTHYLENE		1	2	
ALDRIN		1	2	
ANTHRACENE		1	2	
ANTIMONY		2	2	
AROCLOR-1248		1	2	
BENZO(k)FLUORANTHENE	X	1	2	
BENZOIC ACID	X	3	2	4
BENZYL ALCOHOL		1	2	
BERYLLIUM		1	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	
BUTYL BENZYL PHTHALATE		1	2	
CADMIUM		1	2	
delta-BHC	X	1	2	
DI-n-OCTYL PHTHALATE		1	2	
DIBENZO(a,h)ANTHRACENE		1	2	
DIBENZOFURAN		1	2	
DIELDRIN		1	2	
ENDOSULFAN SULFATE		1	2	
ENDRIN KETONE		1	2	
FLUORENE		1	2	
gamma-BHC (LINDANE)		1	2	
HEPTACHLOR		1	2	
HEPTACHLOR EPOXIDE		1	2	
ISOPHORONE		1	2	
MERCURY		1	2	
METHOXYCHLOR		1	2	
MOLYBDENUM		1	2	
NAPHTHALENE		1	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		1	2	
PHENOL		1	2	
SELENIUM		1	2	
SILVER		1	2	
TIN		1	2	
TOTAL XYLENES		2	2	
VINYL ACETATE		2	2	

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Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU5 Surface Disturbance Source Area at RFETS

MULE DEER OU5 SURFACE DISTURBANCE		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU5	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE		1	2	
1,2-DICHLOROETHANE		2	2	
1,2-DICHLOROETHENE		2	2	
2-BUTANONE		2	2	
2-METHYLNAPHTHALENE	X	1	2	
4,4'-DDT	X	1	2	
4-METHYL-2-PENTANONE		2	2	
ACENAPHTHENE	X	1	2	
ACENAPHTHYLENE	X	1	2	
ACETONE		2	2	
ALDRIN	X	1	2	
ANTHRACENE	X	1	2	
ANTIMONY	X	1	2	
AROCLOR-1248		1	2	
AROCLOR-1254	X	1	2	
AROCLOR-1260		1	2	
BENZENE		2	2	
BENZO(a)ANTHRACENE	X	1	2	
BENZO(a)PYRENE	X	1	2	
BENZO(b)FLUORANTHENE	X	1	2	
BENZO(ghi)PERYLENE	X	1	2	
BENZO(k)FLUORANTHENE	X	1	2	
BENZOIC ACID	X	1	2	
BENZYL ALCOHOL		1	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	2	
BUTYL BENZYL PHTHALATE	X	1	2	
CADMIUM		1	2	
CHLOROFORM		2	2	
CHRYSENE	X	1	2	
delta-BHC		1	2	
DI-n-BUTYL PHTHALATE	X	1	2	
DI-n-OCTYL PHTHALATE	X	1	2	
DIBENZO(a,h)ANTHRACENE	X	1	2	
DIBENZOFURAN	X	1	2	
DIELDRIN	X	1	2	
ENDOSULFAN SULFATE	X	1	2	
ENDRIN KETONE	X	1	2	
FLUORANTHENE	X	1	2	
FLUORENE	X	1	2	
gamma-BHC (LINDANE)		1	2	
HEPTACHLOR		1	2	
HEPTACHLOR EPOXIDE	X	1	2	
INDENO(1,2,3-cd)PYRENE	X	1	2	
ISOPHORONE	X	1	2	
METHOXYCHLOR	X	1	2	
METHYLENE CHLORIDE	X	2	2	
MOLYBDENUM		1	2	
NAPHTHALENE	X	1	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL	X	1	2	
PHENANTHRENE	X	1	2	

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU5 Surface Disturbance Source Area at RFETS

MULE DEER OU5 SURFACE DISTURBANCE		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*		
Analyte	PCOC in OU5	Surficial Soil	Surface Water	TRV
PHENOL	X	1	2	
PYRENE	X	1	2	
SELENIUM		1	2	
SILVER	X	1	2	
TETRACHLOROETHENE		2	2	
THALLIUM		1	2	
TIN		1	2	
TOLUENE	X	2	2	
TOTAL XYLENES		2	2	
TRICHLOROETHENE		2	2	
VINYL ACETATE		2	2	

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Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU10 Outside Closures Source Area at RFETS

MULE DEER OU10 OUTSIDE CLOSURES		Unable to estimate risk to wildlife for the following reasons: REASON CODE		
Analyte	PCOC in OU10	Surficial Soil	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	
1,1-DICHLOROETHANE		2	2	
1,1-DICHLOROETHENE		2	2	
1,2,4-TRICHLOROBENZENE		2	2	
1,2-DICHLOROETHANE		2	2	
1,2-DICHLOROETHENE		2	2	
2-BUTANONE		2	2	
2-METHYLNAPHTHALENE		2	2	
4,4'-DDT		2	2	
4-METHYL-2-PENTANONE		2	2	
ACENAPHTHENE		2	2	
ACENAPHTHYLENE		2	2	
ACETONE		2	2	
ALDRIN		2	2	
ALUMINUM		2	2	
ANTHRACENE		2	2	
ANTIMONY		2	2	
AROCLOR-1248		2	2	
AROCLOR-1254		2	2	
AROCLOR-1260		2	2	
ARSENIC		2	2	
BARIUM		2	2	
BENZENE		2	2	
BENZO(a)ANTHRACENE		2	2	
BENZO(a)PYRENE		2	2	
BENZO(b)FLUORANTHENE		2	2	
BENZO(ghi)PERYLENE		2	2	
BENZO(k)FLUORANTHENE		2	2	
BENZOIC ACID		2	2	
BENZYL ALCOHOL		2	2	
BERYLLIUM		2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	
BIS(2-ETHYLHEXYL)PHTHALATE		2	2	
BUTYL BENZYL PHTHALATE		2	2	
CADMIUM		2	2	
CHLOROFORM		2	2	
CHROMIUM		2	2	
CHRYSENE		2	2	
COBALT		2	2	
COPPER		2	2	
delta-BHC		2	2	
DI-n-BUTYL PHTHALATE		2	2	
DI-n-OCTYL PHTHALATE		2	2	
DIBENZO(a,h)ANTHRACENE		2	2	
DIBENZOFURAN		2	2	
DIELDRIN		2	2	
ENDOSULFAN SULFATE		2	2	
ENDRIN KETONE		2	2	
FLUORANTHENE		2	2	
FLUORENE		2	2	
gamma-BHC (LINDANE)		2	2	
HEPTACHLOR		2	2	
HEPTACHLOR EPOXIDE		2	2	
INDENO(1,2,3-cd)PYRENE		2	2	
ISOPHORONE		2	2	

Analytes not Included in the Wildlife Ecological Screen for Mule Deer in the OU10 Outside Closures Source Area at RFETS

MULE DEER OU10 OUTSIDE CLOSURES		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*		
Analyte	PCOC in OU10	Surficial Soil	Surface Water	TRV
LEAD		2	2	
LITHIUM		2	2	
MAGNESIUM		2	2	
MANGANESE		2	2	
MERCURY		2	2	
METHOXYCHLOR		2	2	
METHYLENE CHLORIDE		2	2	
MOLYBDENUM		2	2	
NAPHTHALENE		2	2	
NICKEL		2	2	
NITRATE/NITRITE		2	2	
PENTACHLOROPHENOL		2	2	
PHENANTHRENE		2	2	
PHENOL		2	2	
PYRENE		2	2	
SELENIUM		2	2	
SILVER		2	2	
STRONTIUM		2	2	
TETRACHLOROETHENE		2	2	
THALLIUM		2	2	
TIN		2	2	
TOLUENE		2	2	
TOTAL XYLENES		2	2	
TRICHLOROETHENE		2	2	
VANADIUM		2	2	
VINYL ACETATE		2	2	
ZINC		2	2	

Note: No data exists for OU10 Outside Closures, therefore, all analytes are listed above.

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Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU6 B-Ponds Source Area at RFETS

RED-TAILED HAWK OU6 B-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU6	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE	X	1	3	1	4
1,2-DICHLOROETHANE	X	2	1	3	4
1,2-DICHLOROETHENE	X	2	1	3	4
2-BUTANONE	X	2	3	1	4
2-METHYLNAPHTHALENE	X	1	3	1	4
4,4'-DDT		1	1	2	
4-METHYL-2-PENTANONE	X	2	1	1	
ACENAPHTHENE	X	1	3	1	4
ACENAPHTHYLENE		1	1	1	
ACETONE	X	2	3	3	4
ALDRIN	X	1	1	2	
ANTHRACENE	X	1	3	1	4
ANTIMONY	X	1	3	3	4
AROCLOR-1248		1	3	2	4
AROCLOR-1254	X	1	3	2	4
AROCLOR-1260	X	1	3	2	4
BENZENE	X	2	1	1	
BENZO(a)ANTHRACENE	X	1	3	1	4
BENZO(a)PYRENE	X	1	3	1	4
BENZO(b)FLUORANTHENE	X	1	3	1	4
BENZO(ghi)PERYLENE	X	1	3	1	4
BENZO(k)FLUORANTHENE	X	1	3	1	4
BENZOIC ACID	X	3	1	1	4
BENZYL ALCOHOL	X	1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	3	1	4
BUTYL BENZYL PHTHALATE	X	1	3	1	4
CADMIUM		1	3	3	4
CHLOROFORM	X	2	1	3	4
CHRYSENE	X	1	3	1	4
delta-BHC		1	1	2	
DI-n-BUTYL PHTHALATE	X	1	1	3	4
DI-n-OCTYL PHTHALATE	X	1	3	1	4
DIBENZO(a,h)ANTHRACENE	X	1	3	1	4
DIBENZOFURAN	X	1	3	1	4
DIELDRIN		1	1	2	
ENDOSULFAN SULFATE		1	1	2	
ENDRIN KETONE		1	1	2	
FLUORANTHENE	X	1	3	1	4
FLUORENE	X	1	3	1	4
gamma-BHC (LINDANE)	X	1	3	2	4
HEPTACHLOR	X	1	3	2	4
HEPTACHLOR EPOXIDE		1	1	2	
INDENO(1,2,3-cd)PYRENE	X	1	3	1	4
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	2	
METHYLENE CHLORIDE	X	2	3	1	4
MOLYBDENUM	X	1	1	3	4
NAPHTHALENE	X	1	3	1	4
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		1	1	1	
PHENANTHRENE	X	1	3	1	4
PHENOL	X	1	3	1	4
PYRENE	X	1	3	1	4

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU6 B-Ponds Source Area at RFETS

RED-TAILED HAWK OU6 B-PONDS		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU6**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
TETRACHLOROETHENE	X	2	1	3	4
TOLUENE	X	2	3	1	4
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE	X	2	1	3	4
VINYL ACETATE		2	1	1	

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Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU6 A-Ponds Source Area at RFETS

RED-TAILED HAWK OU6 A-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU6	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE	X	1	1	1	
1,2-DICHLOROETHANE	X	2	1	1	
1,2-DICHLOROETHENE	X	2	1	1	
2-BUTANONE	X	2	3	1	4
2-METHYLNAPHTHALENE	X	1	1	1	
4-METHYL-2-PENTANONE	X	2	3	1	4
ACENAPHTHENE	X	1	3	1	4
ACENAPHTHYLENE		1	1	1	
ACETONE	X	2	3	1	4
ALDRIN	X	1	3	2	4
ANTHRACENE	X	1	3	1	4
ANTIMONY	X	1	3	3	4
AROCLOR-1248		1	1	2	
AROCLOR-1254	X	1	3	2	4
AROCLOR-1260	X	1	1	2	
BENZENE	X	2	3	1	4
BENZO(a)ANTHRACENE	X	1	3	1	4
BENZO(a)PYRENE	X	1	3	1	4
BENZO(b)FLUORANTHENE	X	1	3	1	4
BENZO(ghi)PERYLENE	X	1	3	1	4
BENZO(k)FLUORANTHENE	X	1	3	1	4
BENZOIC ACID	X	3	3	1	4
BENZYL ALCOHOL	X	1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	3	1	4
BUTYL BENZYL PHTHALATE	X	1	1	1	
CHLOROFORM	X	2	1	1	
CHRYSENE	X	1	3	1	4
DI-n-BUTYL PHTHALATE	X	1	1	3	4
DI-n-OCTYL PHTHALATE	X	1	3	1	4
DIBENZO(a,h)ANTHRACENE	X	1	1	1	
DIBENZOFURAN	X	1	1	1	
DIELDRIN		1	1	2	
ENDOSULFAN SULFATE		1	1	2	
ENDRIN KETONE		1	1	2	
FLUORANTHENE	X	1	3	1	4
FLUORENE	X	1	1	1	
gamma-BHC (LINDANE)	X	1	1	2	
HEPTACHLOR	X	1	1	2	
HEPTACHLOR EPOXIDE		1	1	2	
INDENO(1,2,3-cd)PYRENE	X	1	3	1	4
ISOPHORONE		1	1	1	
MERCURY	X	1	3	3	4
METHOXYCHLOR		1	1	2	
METHYLENE CHLORIDE	X	2	1	3	4
NAPHTHALENE	X	1	1	1	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		1	1	1	
PHENANTHRENE	X	1	3	1	4
PHENOL	X	1	3	1	4
PYRENE	X	1	3	1	4
SELENIUM		1	3	3	4

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU6 A-Ponds Source Area at RFETS

RED-TAILED HAWK OU6 A-PONDS		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU6**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
TETRACHLOROETHENE	X	2	1	1	
THALLIUM		1	3	1	4
TOLUENE	X	2	3	1	4
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE	X	2	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU6 Soil Dump Areas Source Area at RFETS

RED-TAILED HAWK OU6 SOIL DUMP AREAS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU6.	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE	X	1	2	2	
1,2-DICHLOROETHANE	X	2	2	2	
1,2-DICHLOROETHENE	X	2	2	2	
2-BUTANONE	X	2	2	2	
2-METHYLNAPHTHALENE	X	1	2	2	
4,4'-DDT		1	2	2	
4-METHYL-2-PENTANONE	X	2	2	2	
ACENAPHTHYLENE		1	2	2	
ACETONE	X	2	2	2	
ALDRIN	X	1	2	2	
ANTIMONY	X	1	2	2	
AROCLOR-1248		1	2	2	
AROCLOR-1260	X	1	2	2	
BENZENE	X	2	2	2	
BENZOIC ACID	X	1	2	2	
BENZYL ALCOHOL	X	1	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	2	
CHLOROFORM	X	2	2	2	
delta-BHC		1	2	2	
DIBENZOFURAN	X	3	2	2	4
DIELDRIN		1	2	2	
ENDOSULFAN SULFATE		1	2	2	
ENDRIN KETONE		1	2	2	
gamma-BHC (LINDANE)	X	1	2	2	
HEPTACHLOR	X	1	2	2	
HEPTACHLOR EPOXIDE		1	2	2	
ISOPHORONE		1	2	2	
METHOXYCHLOR		1	2	2	
METHYLENE CHLORIDE	X	2	2	2	
MOLYBDENUM	X	1	2	2	
PENTACHLOROPHENOL		1	2	2	
PHENOL	X	1	2	2	
SELENIUM		1	2	2	
SILVER	X	1	2	2	
TETRACHLOROETHENE	X	2	2	2	
TOLUENE	X	2	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE	X	2	2	2	
VINYL ACETATE		2	2	2	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU2 East Trenches Source Area at RFETS

RED-TAILED HAWK OU2 EAST TRENCHES		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU2	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE		1	2	2	
1,2-DICHLOROETHANE		2	2	2	
1,2-DICHLOROETHENE		2	2	2	
2-BUTANONE		2	2	2	
2-METHYLNAPHTHALENE		1	2	2	
4,4'-DDT	X	1	2	2	
4-METHYL-2-PENTANONE		2	2	2	
ACENAPHTHENE		1	2	2	
ACENAPHTHYLENE		1	2	2	
ACETONE		2	2	2	
ALDRIN		1	2	2	
ANTHRACENE		1	2	2	
ANTIMONY		1	2	2	
AROCLOR-1248		1	2	2	
AROCLOR-1254	X	1	2	2	
AROCLOR-1260	X	1	2	2	
BENZENE		2	2	2	
BENZO(ghi)PERYLENE	X	1	2	2	
BENZO(k)FLUORANTHENE	X	1	2	2	
BENZOIC ACID	X	3	2	2	4
BENZYL ALCOHOL		1	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	2	
BUTYL BENZYL PHTHALATE		1	2	2	
CHLOROFORM		2	2	2	
delta-BHC	X	1	2	2	
DI-n-BUTYL PHTHALATE	X	1	2	2	
DI-n-OCTYL PHTHALATE		1	2	2	
DIBENZO(a,h)ANTHRACENE		1	2	2	
DIBENZOFURAN		1	2	2	
DIELDRIN		1	2	2	
ENDOSULFAN SULFATE		1	2	2	
ENDRIN KETONE		1	2	2	
FLUORENE		1	2	2	
gamma-BHC (LINDANE)		1	2	2	
HEPTACHLOR		1	2	2	
HEPTACHLOR EPOXIDE		1	2	2	
INDENO(1,2,3-cd)PYRENE	X	1	2	2	
ISOPHORONE		1	2	2	
MERCURY		1	2	2	
METHOXYCHLOR		1	2	2	
METHYLENE CHLORIDE		2	2	2	
MOLYBDENUM		1	2	2	
NAPHTHALENE		1	2	2	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		1	2	2	
PHENOL		1	2	2	
TETRACHLOROETHENE		2	2	2	
THALLIUM		1	2	2	
TOLUENE		2	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE		2	2	2	
VINYL ACETATE		2	2	2	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU2 903 Pad Source Area at RFETS

RED-TAILED HAWK OU2 903 PAD		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU2	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHANE		2	1	1	
1,2-DICHLOROETHENE		2	1	3	4
2-BUTANONE		2	3	1	4
2-METHYLNAPHTHALENE		1	1	1	
4,4'-DDT	X	1	3	1	4
4-METHYL-2-PENTANONE		2	3	1	4
ACENAPHTHYLENE		1	1	1	
ACETONE		2	3	3	4
ALDRIN		1	1	1	
ANTIMONY		3	3	3	4
AROCLOR-1260	X	1	1	1	
BENZENE		2	1	1	
BENZOIC ACID	X	3	1	3	4
BENZYL ALCOHOL		1	1	3	4
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
BUTYL BENZYL PHTHALATE		1	1	1	
CHLOROFORM		2	1	3	4
delta-BHC	X	1	1	1	
DI-n-OCTYL PHTHALATE		1	3	1	4
DIBENZOFURAN		3	1	1	4
DIELDRIN		1	1	1	
ENDOSULFAN SULFATE		1	1	1	
ENDRIN KETONE		1	1	1	
gamma-BHC (LINDANE)		1	3	1	4
HEPTACHLOR		1	1	1	
HEPTACHLOR EPOXIDE		1	1	1	
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	1	
METHYLENE CHLORIDE		2	3	3	4
NAPHTHALENE		1	1	1	
PENTACHLOROPHENOL		1	1	1	
PHENOL		1	1	1	
SILVER		1	3	3	4
TETRACHLOROETHENE		2	1	3	4
TOLUENE		2	3	1	4
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE		2	1	3	4
VINYL ACETATE		2	1	1	

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU1 881 Hillside Source Area at RFETS

RED-TAILED HAWK OU1 881 HILLSIDE		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU1	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE	X	2	1	3	4
1,1-DICHLOROETHANE	X	2	1	3	4
1,1-DICHLOROETHENE	X	2	1	3	4
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHANE	X	2	1	3	4
1,2-DICHLOROETHENE	X	2	1	3	4
2-BUTANONE		2	3	3	4
2-METHYLNAPHTHALENE		1	1	1	
4,4'-DDT		1	1	1	
4-METHYL-2-PENTANONE		2	1	1	
ACENAPHTHYLENE	X	3	1	1	4
ACETONE		2	3	3	4
ALDRIN		1	1	3	4
ANTIMONY		1	1	3	4
AROCLOR-1260		1	1	1	
BENZENE		2	1	1	
BENZOIC ACID		1	1	1	
BENZYL ALCOHOL		3	1	1	4
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
BIS(2-ETHYLHEXYL)PHTHALATE		1	3	3	4
BUTYL BENZYL PHTHALATE		1	1	1	
CHLOROFORM		2	1	1	
delta-BHC		1	1	1	
DI-n-BUTYL PHTHALATE		1	1	1	
DI-n-OCTYL PHTHALATE		1	1	1	
DIBENZOFURAN		3	1	1	4
DIELDRIN		1	1	1	
ENDOSULFAN SULFATE		1	1	1	
ENDRIN KETONE		1	1	1	
gamma-BHC (LINDANE)		1	1	1	
HEPTACHLOR		1	1	1	
HEPTACHLOR EPOXIDE		1	1	1	
ISOPHORONE		1	1	1	
METHOXYCHLOR		1	1	1	
METHYLENE CHLORIDE		2	1	3	4
PENTACHLOROPHENOL		1	1	1	
PHENOL		1	1	1	
SILVER		1	1	3	4
TETRACHLOROETHENE	X	2	1	3	4
TOLUENE	X	2	3	3	4
TOTAL XYLENES	X	2	1	3	4
TRICHLOROETHENE	X	2	1	3	4
VINYL ACETATE		2	1	1	

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU5 Old Landfill Source Area at RFETS

RED-TAILED HAWK OU5 OLD LANDFILL		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU5	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		1	1	1	
1,1-DICHLOROETHANE		1	1	1	
1,1-DICHLOROETHENE		1	1	1	
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHANE		1	1	1	
1,2-DICHLOROETHENE		1	1	1	
2-BUTANONE		1	1	3	4
4-METHYL-2-PENTANONE		1	1	1	
ACENAPHTHYLENE	X	3	1	1	4
ACETONE		1	3	3	4
ANTIMONY	X	3	3	3	4
AROCLOR-1248		1	1	1	
AROCLOR-1260		1	1	1	
BENZENE		1	1	1	
BENZOIC ACID	X	3	1	1	4
BENZYL ALCOHOL		1	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
CHLOROFORM		1	1	3	4
delta-BHC		1	1	1	
DIBENZOFURAN	X	3	1	1	4
ENDOSULFAN SULFATE	X	3	1	1	4
ENDRIN KETONE	X	3	1	1	4
gamma-BHC (LINDANE)		1	1	1	
HEPTACHLOR		1	1	1	
ISOPHORONE	X	1	1	1	
METHOXYCHLOR	X	3	1	1	4
METHYLENE CHLORIDE	X	1	1	3	4
NITRATE/NITRITE		2	3	3	4
PENTACHLOROPHENOL	X	1	1	3	4
PHENOL	X	1	1	1	
TETRACHLOROETHENE		1	3	1	4
TOLUENE	X	1	1	1	
TOTAL XYLENES		1	1	1	
TRICHLOROETHENE		1	1	3	4
VINYL ACETATE		1	1	1	

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Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU11 West Spray Field Source Area at RFETS

RED-TAILED HAWK OU11 WEST SPRAY FIELD		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU11	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE		2	2	2	
1,2-DICHLOROETHANE		2	2	2	
1,2-DICHLOROETHENE		2	2	2	
2-BUTANONE		2	2	2	
2-METHYLNAPHTHALENE		2	2	2	
4,4'-DDT		2	2	2	
4-METHYL-2-PENTANONE		2	2	2	
ACENAPHTHENE		2	2	2	
ACENAPHTHYLENE		2	2	2	
ACETONE		2	2	2	
ALDRIN		2	2	2	
ANTHRACENE		2	2	2	
ANTIMONY		3	2	2	4
AROCLOR-1248		2	2	2	
AROCLOR-1254		2	2	2	
AROCLOR-1260		2	2	2	
BENZENE		2	2	2	
BENZO(a)ANTHRACENE		2	2	2	
BENZO(a)PYRENE		2	2	2	
BENZO(b)FLUORANTHENE		2	2	2	
BENZO(ghi)PERYLENE		2	2	2	
BENZO(k)FLUORANTHENE		2	2	2	
BENZOIC ACID		2	2	2	
BENZYL ALCOHOL		2	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	2	
BIS(2-ETHYLHEXYL)PHTHALATE		2	2	2	
BUTYL BENZYL PHTHALATE		2	2	2	
CHLOROFORM		2	2	2	
CHRYSENE		2	2	2	
delta-BHC		2	2	2	
DI-n-BUTYL PHTHALATE		2	2	2	
DI-n-OCTYL PHTHALATE		2	2	2	
DIBENZO(a,h)ANTHRACENE		2	2	2	
DIBENZOFURAN		2	2	2	
DIELDRIN		2	2	2	
ENDOSULFAN SULFATE		2	2	2	
ENDRIN KETONE		2	2	2	
FLUORANTHENE		2	2	2	
FLUORENE		2	2	2	
gamma-BHC (LINDANE)		2	2	2	
HEPTACHLOR		2	2	2	
HEPTACHLOR EPOXIDE		2	2	2	
INDENO(1,2,3-cd)PYRENE		2	2	2	
ISOPHORONE		2	2	2	
MERCURY		1	2	2	
METHOXYCHLOR		2	2	2	
METHYLENE CHLORIDE		2	2	2	
NAPHTHALENE		2	2	2	
PENTACHLOROPHENOL		2	2	2	
PHENANTHRENE		2	2	2	
PHENOL		2	2	2	
PYRENE		2	2	2	

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU11 West Spray Field Source Area at RFETS

RED-TAILED HAWK OU11 WEST SPRAY FIELD		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU11**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
SILVER		1	2	2	
TETRACHLOROETHENE		2	2	2	
TOLUENE		2	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE		2	2	2	
VINYL ACETATE		2	2	2	

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Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU5 Ash Pits Source Area at RFETS

RED-TAILED HAWK OU5 ASH PITS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU5	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE		2	1	1	
1,2-DICHLOROETHANE		2	1	3	4
1,2-DICHLOROETHENE		2	1	1	
2-BUTANONE		2	3	1	4
2-METHYLNAPHTHALENE	X	2	1	1	
4,4'-DDT	X	2	1	1	
4-METHYL-2-PENTANONE		2	1	1	
ACENAPHTHENE	X	1	1	1	
ACENAPHTHYLENE	X	1	1	1	
ACETONE		2	3	3	4
ALDRIN	X	2	1	1	
ANTHRACENE	X	1	1	1	
ANTIMONY	X	1	3	3	4
AROCLOR-1248		2	1	1	
AROCLOR-1254	X	2	1	1	
AROCLOR-1260		2	1	1	
BENZENE		2	1	1	
BENZO(a)ANTHRACENE	X	2	1	1	
BENZO(a)PYRENE	X	1	1	1	
BENZO(b)FLUORANTHENE	X	1	1	1	
BENZO(ghi)PERYLENE	X	1	1	1	
BENZO(k)FLUORANTHENE	X	2	1	1	
BENZOIC ACID	X	2	3	1	4
BENZYL ALCOHOL		2	1	1	
BIS(2-CHLOROISOPROPYL)ETHER		2	1	1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	3	3	4
BUTYL BENZYL PHTHALATE	X	2	1	1	
CHLOROFORM		2	3	1	4
CHRYSENE	X	1	1	1	
delta-BHC		2	1	1	
DI-n-BUTYL PHTHALATE	X	2	1	1	
DI-n-OCTYL PHTHALATE	X	2	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	1	
DIBENZOFURAN	X	2	1	1	
DIELDRIN	X	2	1	1	
ENDOSULFAN SULFATE	X	2	1	1	
ENDRIN KETONE	X	2	1	1	
FLUORANTHENE	X	1	1	1	
FLUORENE	X	1	1	1	
gamma-BHC (LINDANE)		2	1	1	
HEPTACHLOR		2	1	1	
HEPTACHLOR EPOXIDE	X	2	1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	1	
ISOPHORONE	X	2	1	1	
METHOXYCHLOR	X	2	1	1	
METHYLENE CHLORIDE	X	2	3	3	4
NAPHTHALENE	X	1	1	1	
NITRATE/NITRITE		2	3	3	4
PENTACHLOROPHENOL	X	2	1	1	
PHENANTHRENE	X	1	1	1	
PHENOL	X	2	1	1	
PYRENE	X	1	1	1	

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU5 Ash Pits Source Area at RFETS

RED-TAILED HAWK OU5 ASH PITS		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU5**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
TETRACHLOROETHENE		2	1	1	
TOLUENE	X	2	1	1	
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE		2	1	1	
VINYL ACETATE		2	1	1	

Reason Codes:

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2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU5 C-Ponds Source Area at RFETS

RED-TAILED HAWK OU5 C-PONDS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU5	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	3	1	4
1,1-DICHLOROETHANE		2	1	1	
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE		1	1	1	
1,2-DICHLOROETHANE		2	1	1	
1,2-DICHLOROETHENE		2	1	1	
2-BUTANONE		2	3	3	4
2-METHYLNAPHTHALENE	X	1	1	1	
4,4'-DDT	X	1	1	1	
4-METHYL-2-PENTANONE		2	1	1	
ACENAPHTHENE	X	1	1	1	
ACENAPHTHYLENE	X	1	1	1	
ACETONE		2	3	3	4
ALDRIN	X	1	1	1	
ANTHRACENE	X	1	1	1	
ANTIMONY	X	1	1	3	4
AROCLOR-1248		1	1	1	
AROCLOR-1254	X	1	1	1	
AROCLOR-1260		1	1	1	
BENZENE		2	1	1	
BENZO(a)ANTHRACENE	X	1	1	1	
BENZO(a)PYRENE	X	1	1	1	
BENZO(b)FLUORANTHENE	X	1	1	1	
BENZO(ghi)PERYLENE	X	1	1	1	
BENZO(k)FLUORANTHENE	X	1	1	1	
BENZOIC ACID	X	3	3	3	4
BENZYL ALCOHOL		1	1	1	
BERYLLIUM		1	3	3	4
BIS(2-CHLOROISOPROPYL)ETHER		1	1	1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	3	3	4
BUTYL BENZYL PHTHALATE	X	1	3	1	4
CHLOROFORM		2	1	3	4
CHRYSENE	X	1	1	1	
delta-BHC		1	3	1	4
DI-n-BUTYL PHTHALATE	X	1	3	1	4
DI-n-OCTYL PHTHALATE	X	1	1	1	
DIBENZO(a,h)ANTHRACENE	X	1	1	1	
DIBENZOFURAN	X	1	1	1	
DIELDRIN	X	1	1	1	
ENDOSULFAN SULFATE	X	1	1	1	
ENDRIN KETONE	X	1	1	1	
FLUORENE	X	1	1	1	
gamma-BHC (LINDANE)		1	1	1	
HEPTACHLOR		1	1	1	
HEPTACHLOR EPOXIDE	X	1	1	1	
INDENO(1,2,3-cd)PYRENE	X	1	1	1	
ISOPHORONE	X	1	1	1	
MERCURY	X	1	3	3	4
METHOXYCHLOR	X	1	1	1	
METHYLENE CHLORIDE	X	2	3	3	4
MOLYBDENUM		1	3	3	4
NAPHTHALENE	X	1	1	1	
NITRATE/NITRITE		2	3	3	4
PENTACHLOROPHENOL	X	1	1	1	
PHENANTHRENE	X	1	1	1	

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU5 C-Ponds Source Area at RFETS

RED-TAILED HAWK OU5 C-PONDS		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU5**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
PHENOL	X	1	3	1	4
SILVER	X	1	3	3	4
TETRACHLOROETHENE		2	1	1	
THALLIUM		1	3	3	4
TOLUENE	X	2	3	3	4
TOTAL XYLENES		2	1	1	
TRICHLOROETHENE		2	1	1	
VINYL ACETATE		2	1	1	

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU4 Downgradient Source Area at RFETS

RED-TAILED HAWK OU4 DOWNGRADIENT		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU4	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE		1	2	2	
1,2-DICHLOROETHANE		2	2	2	
1,2-DICHLOROETHENE		2	2	2	
2-BUTANONE		2	2	2	
2-METHYLNAPHTHALENE		1	2	2	
4,4'-DDT		1	2	2	
4-METHYL-2-PENTANONE		2	2	2	
ACENAPHTHENE		1	2	2	
ACENAPHTHYLENE		1	2	2	
ACETONE		2	2	2	
ALDRIN		1	2	2	
ANTHRACENE		1	2	2	
ANTIMONY		1	2	2	
AROCLOR-1248		1	2	2	
AROCLOR-1254	X	1	2	2	
AROCLOR-1260		1	2	2	
BENZENE		2	2	2	
BENZOIC ACID		1	2	2	
BENZYL ALCOHOL		1	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	2	
CHLOROFORM		2	2	2	
delta-BHC		1	2	2	
DIBENZOFURAN		1	2	2	
DIELDRIN		1	2	2	
ENDOSULFAN SULFATE		1	2	2	
ENDRIN KETONE		1	2	2	
FLUORENE		1	2	2	
gamma-BHC (LINDANE)		1	2	2	
HEPTACHLOR		1	2	2	
HEPTACHLOR EPOXIDE		1	2	2	
ISOPHORONE		1	2	2	
METHOXYCHLOR		1	2	2	
METHYLENE CHLORIDE		2	2	2	
MOLYBDENUM		1	2	2	
NAPHTHALENE		1	2	2	
PENTACHLOROPHENOL		1	2	2	
PHENOL		1	2	2	
SELENIUM		1	2	2	
SILVER	X	1	2	2	
TETRACHLOROETHENE		2	2	2	
TOLUENE		2	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE		2	2	2	
VINYL ACETATE		2	2	2	

Reason Codes:

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3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU7 Downgradient Areas Source Area at RFETS

RED-TAILED HAWK OU7 DOWNGRADIENT AREAS		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU7	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	1	1	
1,1-DICHLOROETHANE		2	1	3	4
1,1-DICHLOROETHENE		2	1	1	
1,2,4-TRICHLOROBENZENE		2	1	1	
1,2-DICHLOROETHANE		2	1	1	
1,2-DICHLOROETHENE		2	1	1	
2-BUTANONE	X	2	1	1	
2-METHYLNAPHTHALENE		2	1	1	
4,4'-DDT		2	1	1	
4-METHYL-2-PENTANONE		2	1	1	
ACENAPHTHENE	X	2	1	1	
ACENAPHTHYLENE		2	1	1	
ACETONE	X	2	3	3	4
ALDRIN		2	1	1	
ANTHRACENE	X	2	3	1	4
ANTIMONY	X	2	3	3	4
AROCLOR-1248		1	1	1	
AROCLOR-1254		1	1	1	
AROCLOR-1260		1	1	1	
ARSENIC	X	2	3	3	4
BENZENE		2	1	3	4
BENZO(a)ANTHRACENE	X	2	3	1	4
BENZO(a)PYRENE	X	2	3	1	4
BENZO(b)FLUORANTHENE	X	2	3	1	4
BENZO(ghi)PERYLENE	X	2	3	1	4
BENZO(k)FLUORANTHENE	X	2	3	1	4
BENZOIC ACID	X	2	1	1	
BENZYL ALCOHOL		2	1	1	
BERYLLIUM	X	2	3	1	4
BIS(2-CHLOROISOPROPYL)ETHER	X	2	1	1	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	3	3	4
BUTYL BENZYL PHTHALATE		2	1	1	
CHLOROFORM		2	1	1	
CHRYSENE	X	2	3	1	4
COBALT	X	2	3	1	4
delta-BHC		2	1	1	
DI-n-BUTYL PHTHALATE	X	2	1	1	
DI-n-OCTYL PHTHALATE		2	1	1	
DIBENZO(a,h)ANTHRACENE		2	1	1	
DIBENZOFURAN		2	1	1	
DIELDRIN		2	1	1	
ENDOSULFAN SULFATE		2	1	1	
ENDRIN KETONE		2	1	1	
FLUORANTHENE	X	2	3	1	4
FLUORENE	X	2	1	1	
gamma-BHC (LINDANE)		2	1	1	
HEPTACHLOR		2	1	1	
HEPTACHLOR EPOXIDE		2	1	1	
INDENO(1,2,3-cd)PYRENE	X	2	3	1	4
ISOPHORONE		2	1	1	
LITHIUM	X	2	3	3	4
METHOXYCHLOR		2	1	1	
METHYLENE CHLORIDE	X	2	1	3	4
MOLYBDENUM	X	2	3	3	4
NAPHTHALENE		2	1	1	

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU7 Downgradient Areas Source Area at RFETS

RED-TAILED HAWK OU7 DOWNGRADIENT AREAS		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU7**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
NICKEL	X	2	3	3	4
PENTACHLOROPHENOL		2	1	1	
PHENANTHRENE	X	2	3	1	4
PHENOL		2	1	1	
PYRENE	X	2	3	1	4
TETRACHLOROETHENE		2	1	1	
THALLIUM	X	2	3	1	4
TOLUENE	X	2	3	3	4
TOTAL XYLENES		2	1	3	4
TRICHLOROETHENE		2	1	1	
VINYL ACETATE	X	2	1	1	

Reason Codes:

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU6 North Spray Field Source Area at RFETS

RED-TAILED HAWK OU6 NORTH SPRAY FIELD		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU6	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE	X	2	2	2	
1,2-DICHLOROETHANE	X	2	2	2	
1,2-DICHLOROETHENE	X	2	2	2	
2-BUTANONE	X	2	2	2	
2-METHYLNAPHTHALENE	X	2	2	2	
4,4'-DDT		2	2	2	
4-METHYL-2-PENTANONE	X	2	2	2	
ACENAPHTHENE	X	2	2	2	
ACENAPHTHYLENE		2	2	2	
ACETONE	X	2	2	2	
ALDRIN	X	2	2	2	
ANTHRACENE	X	2	2	2	
ANTIMONY	X	3	2	2	4
AROCLOR-1248		2	2	2	
AROCLOR-1254	X	2	2	2	
AROCLOR-1260	X	2	2	2	
BENZENE	X	2	2	2	
BENZO(a)ANTHRACENE	X	2	2	2	
BENZO(a)PYRENE	X	2	2	2	
BENZO(b)FLUORANTHENE	X	2	2	2	
BENZO(ghi)PERYLENE	X	2	2	2	
BENZO(k)FLUORANTHENE	X	2	2	2	
BENZOIC ACID	X	2	2	2	
BENZYL ALCOHOL	X	2	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	2	2	2	
BUTYL BENZYL PHTHALATE	X	2	2	2	
CHLOROFORM	X	2	2	2	
CHRYSENE	X	2	2	2	
delta-BHC		2	2	2	
DI-n-BUTYL PHTHALATE	X	2	2	2	
DI-n-OCTYL PHTHALATE	X	2	2	2	
DIBENZO(a,h)ANTHRACENE	X	2	2	2	
DIBENZOFURAN	X	2	2	2	
DIELDRIN		2	2	2	
ENDOSULFAN SULFATE		2	2	2	
ENDRIN KETONE		2	2	2	
FLUORANTHENE	X	2	2	2	
FLUORENE	X	2	2	2	
gamma-BHC (LINDANE)	X	2	2	2	
HEPTACHLOR	X	2	2	2	
HEPTACHLOR EPOXIDE		2	2	2	
INDENO(1,2,3-cd)PYRENE	X	2	2	2	
ISOPHORONE		2	2	2	
METHOXYCHLOR		2	2	2	
METHYLENE CHLORIDE	X	2	2	2	
MOLYBDENUM	X	1	2	2	
NAPHTHALENE	X	2	2	2	
PENTACHLOROPHENOL		2	2	2	
PHENANTHRENE	X	2	2	2	
PHENOL	X	2	2	2	
PYRENE	X	2	2	2	

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU6 North Spray Field Source Area at RFETS

RED-TAILED HAWK OU6 NORTH SPRAY FIELD		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU6**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
SILVER	X	1	2	2	
TETRACHLOROETHENE	X	2	2	2	
TIN		1	2	2	
TOLUENE	X	2	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE	X	2	2	2	
VINYL ACETATE		2	2	2	

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4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU5 Surface Disturbance Source Area at RFETS

RED-TAILED HAWK OU5 SURFACE DISTURBANCE		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU5	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE		1	2	2	
1,2-DICHLOROETHANE		2	2	2	
1,2-DICHLOROETHENE		2	2	2	
2-BUTANONE		2	2	2	
2-METHYLNAPHTHALENE	X	1	2	2	
4,4'-DDT	X	1	2	2	
4-METHYL-2-PENTANONE		2	2	2	
ACENAPHTHENE	X	1	2	2	
ACENAPHTHYLENE	X	1	2	2	
ACETONE		2	2	2	
ALDRIN	X	1	2	2	
ANTHRACENE	X	1	2	2	
ANTIMONY	X	1	2	2	
AROCLOR-1248		1	2	2	
AROCLOR-1254	X	1	2	2	
AROCLOR-1260		1	2	2	
BENZENE		2	2	2	
BENZO(a)ANTHRACENE	X	1	2	2	
BENZO(a)PYRENE	X	1	2	2	
BENZO(b)FLUORANTHENE	X	1	2	2	
BENZO(ghi)PERYLENE	X	1	2	2	
BENZO(k)FLUORANTHENE	X	1	2	2	
BENZOIC ACID	X	1	2	2	
BENZYL ALCOHOL		1	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	2	
BIS(2-ETHYLHEXYL)PHTHALATE	X	1	2	2	
BUTYL BENZYL PHTHALATE	X	1	2	2	
CADMIUM		1	2	2	
CHLOROFORM		2	2	2	
CHRYSENE	X	1	2	2	
delta-BHC		1	2	2	
DI-n-BUTYL PHTHALATE	X	1	2	2	
DI-n-OCTYL PHTHALATE	X	1	2	2	
DIBENZO(a,h)ANTHRACENE	X	1	2	2	
DIBENZOFURAN	X	1	2	2	
DIELDRIN	X	1	2	2	
ENDOSULFAN SULFATE	X	1	2	2	
ENDRIN KETONE	X	1	2	2	
FLUORANTHENE	X	1	2	2	
FLUORENE	X	1	2	2	
gamma-BHC (LINDANE)		1	2	2	
HEPTACHLOR		1	2	2	
HEPTACHLOR EPOXIDE	X	1	2	2	
INDENO(1,2,3-cd)PYRENE	X	1	2	2	
ISOPHORONE	X	1	2	2	
METHOXYCHLOR	X	1	2	2	
METHYLENE CHLORIDE	X	2	2	2	
MOLYBDENUM		1	2	2	
NAPHTHALENE	X	1	2	2	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL	X	1	2	2	
PHENANTHRENE	X	1	2	2	

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU5 Surface Disturbance Source Area at RFETS

RED-TAILED HAWK OU5 SURFACE DISTURBANCE		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU5**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
PHENOL	X	1	2	2	
PYRENE	X	1	2	2	
SELENIUM		1	2	2	
SILVER	X	1	2	2	
TETRACHLOROETHENE		2	2	2	
THALLIUM		1	2	2	
TIN		1	2	2	
TOLUENE	X	2	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE		2	2	2	
VINYL ACETATE		2	2	2	

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Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU2 Mound Area Source Area at RFETS

RED-TAILED HAWK OU2 MOUND AREA		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU2	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE		1	2	2	
1,2-DICHLOROETHANE		2	2	2	
1,2-DICHLOROETHENE		2	2	2	
2-BUTANONE		2	2	2	
2-METHYLNAPHTHALENE		1	2	2	
4,4'-DDT	X	1	2	2	
4-METHYL-2-PENTANONE		2	2	2	
ACENAPHTHENE		1	2	2	
ACENAPHTHYLENE		1	2	2	
ACETONE		2	2	2	
ALDRIN		1	2	2	
ANTHRACENE		1	2	2	
ANTIMONY		2	2	2	
AROCLOR-1248		1	2	2	
BENZENE		2	2	2	
BENZO(k)FLUORANTHENE	X	1	2	2	
BENZOIC ACID	X	3	2	2	4
BENZYL ALCOHOL		1	2	2	
BERYLLIUM		1	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		1	2	2	
BUTYL BENZYL PHTHALATE		1	2	2	
CADMIUM		1	2	2	
CHLOROFORM		2	2	2	
delta-BHC	X	1	2	2	
DI-n-BUTYL PHTHALATE	X	1	2	2	
DI-n-OCTYL PHTHALATE		1	2	2	
DIBENZO(a,h)ANTHRACENE		1	2	2	
DIBENZOFURAN		1	2	2	
DIELDRIN		1	2	2	
ENDOSULFAN SULFATE		1	2	2	
ENDRIN KETONE		1	2	2	
FLUORENE		1	2	2	
gamma-BHC (LINDANE)		1	2	2	
HEPTACHLOR		1	2	2	
HEPTACHLOR EPOXIDE		1	2	2	
ISOPHORONE		1	2	2	
MERCURY		1	2	2	
METHOXYCHLOR		1	2	2	
METHYLENE CHLORIDE		2	2	2	
MOLYBDENUM		1	2	2	
NAPHTHALENE		1	2	2	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		1	2	2	
PHENOL		1	2	2	
SELENIUM		1	2	2	
SILVER		1	2	2	
TETRACHLOROETHENE		2	2	2	
TIN		1	2	2	
TOLUENE		2	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE		2	2	2	
VINYL ACETATE		2	2	2	

Reason Codes:

1 = Analyte not detected in medium

2 = Analyte not reported/analyzed in medium

3 = Analyte detected in medium but not included in screen for other reasons

4 = No toxicity reference value (TRV) available for this analyte

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU10 Outside Closures Source Area at RFETS

RED-TAILED HAWK OU10 OUTSIDE CLOSURES		Unable to estimate risk to wildlife for the following reasons: REASON CODE			
Analyte	PCOC for OU10	Surficial Soil	Sediment	Surface Water	TRV
1,1,1-TRICHLOROETHANE		2	2	2	
1,2-DICHLOROETHANE		2	2	2	
2-METHYLNAPHTHALENE		2	2	2	
4,4'-DDT		2	2	2	
ACENAPHTHENE		2	2	2	
ACETONE		2	2	2	
ALDRIN		2	2	2	
ALUMINUM		2	2	2	
ANTHRACENE		2	2	2	
AROCLOR-1248		2	2	2	
AROCLOR-1254		2	2	2	
AROCLOR-1260		2	2	2	
ARSENIC		2	2	2	
BARIUM		2	2	2	
BENZENE		2	2	2	
BENZO(a)ANTHRACENE		2	2	2	
BENZO(a)PYRENE		2	2	2	
BENZO(b)FLUORANTHENE		2	2	2	
BENZO(ghi)PERYLENE		2	2	2	
BENZO(k)FLUORANTHENE		2	2	2	
BERYLLIUM		2	2	2	
BIS(2-ETHYLHEXYL)PHTHALATE		2	2	2	
BUTYL BENZYL PHTHALATE		2	2	2	
CADMIUM		2	2	2	
CHROMIUM		2	2	2	
CHRYSENE		2	2	2	
COBALT		2	2	2	
COPPER		2	2	2	
delta-BHC		2	2	2	
DI-n-BUTYL PHTHALATE		2	2	2	
DI-n-OCTYL PHTHALATE		2	2	2	
DIBENZO(a,h)ANTHRACENE		2	2	2	
DIELDRIN		2	2	2	
FLUORANTHENE		2	2	2	
FLUORENE		2	2	2	
gamma-BHC (LINDANE)		2	2	2	
HEPTACHLOR		2	2	2	
HEPTACHLOR EPOXIDE		2	2	2	
INDENO(1,2,3-cd)PYRENE		2	2	2	
LEAD		2	2	2	
LITHIUM		2	2	2	
MAGNESIUM		2	2	2	
MANGANESE		2	2	2	
MERCURY		2	2	2	
METHYLENE CHLORIDE		2	2	2	
MOLYBDENUM		2	2	2	
NAPHTHALENE		2	2	2	
NICKEL		2	2	2	
NITRATE/NITRITE		2	2	2	
PENTACHLOROPHENOL		2	2	2	
PHENANTHRENE		2	2	2	
PHENOL		2	2	2	
PYRENE		2	2	2	
SELENIUM		2	2	2	
SILVER		2	2	2	

Analytes not Included in the Wildlife Ecological Screen for Red-tailed Hawks in the OU10 Outside Closures Source Area at RFETS

RED-TAILED HAWK OU10 OUTSIDE CLOSURES		*Unable to estimate risk to wildlife for the following reasons:* *REASON CODE*			
Analyte	**PCOC for OU10**	**Surficial Soil**	**Sediment**	**Surface Water**	**TRV**
STRONTIUM		2	2	2	
TETRACHLOROETHENE		2	2	2	
THALLIUM		2	2	2	
TIN		2	2	2	
TOLUENE		2	2	2	
TOTAL XYLENES		2	2	2	
TRICHLOROETHENE		2	2	2	
VANADIUM		2	2	2	
ZINC		2	2	2	
1,1-DICHLOROETHANE		2	2	2	
1,1-DICHLOROETHENE		2	2	2	
1,2,4-TRICHLOROBENZENE		2	2	2	
1,2-DICHLOROETHENE		2	2	2	
2-BUTANONE		2	2	2	
4-METHYL-2-PENTANONE		2	2	2	
ACENAPHTHYLENE		2	2	2	
ANTIMONY		2	2	2	
BENZOIC ACID		2	2	2	
BENZYL ALCOHOL		2	2	2	
BIS(2-CHLOROISOPROPYL)ETHER		2	2	2	
CHLOROFORM		2	2	2	
DIBENZOFURAN		2	2	2	
ENDOSULFAN SULFATE		2	2	2	
ENDRIN KETONE		2	2	2	
ISOPHORONE		2	2	2	
METHOXYCHLOR		2	2	2	
VINYL ACETATE		2	2	2	

Note: No data exists for OU10 Outside Closures, therefore, all analytes are listed above.

Reason Codes:

1 = Analyte not detected in medium
2 = Analyte not reported/analyzed in medium
3 = Analyte detected in medium but not included in screen for other reasons
4 = No toxicity reference value (TRV) available for this analyte

Attachment 6
Vegetation, Burrow Air, and Radionuclide Results

Attachment 6
Table 1
Results of Vegetation PCOC Screen—Subsurface Soil

Source Area	Subsurface Soil PCOC	OU PCOC?	Group	Exposure Point Concentration (mg/kg)	Vegetation TRV (mg/kg)	Detection Frequency (%)	Hazard Quotient
Walnut Creek Watershed							
OU2 903 Pad	Zinc	X	M	59	50	100	1.2
	Strontium		M	61	63	95	1.0
	Vanadium		M	32	36	100	0.89
	Antimony		M	6.1	7.1	7.1	0.86
	Aluminum		M	11,000	15,000	100	0.73
	Chromium	X	M	16	23	100	0.69
	Nickel		M	17	30	91	0.56
	Selenium		M	0.73	1.5	9.3	0.50
	Manganese	X	M	250	500	100	0.50
	Cobalt	X	M	9.1	20	89	0.46
	Arsenic	X	M	4.2	10	95	0.42
	Lead	X	M	15	50	100	0.30
	Barium	X	M	140	500	99	0.28
	Mercury	X	M	0.07	0.30	36	0.23
	Cadmium	X	M	0.7	3.0	12	0.23
	Copper	X	M	17	100	97	0.17
	Silver	X	M	1.1	7.4	1.8	0.15
	Nitrate/Nitrite	X	W	2.2	19	42	0.12
	Tetrachloroethene	X	V	0.11	200	7.2	0.00055
OU2 East Trenches	Strontium		M	59	63	100	0.94
	Zinc	X	M	43	50	99	0.86
	Vanadium		M	27	36	99	0.75
	Aluminum		M	11,000	15,000	100	0.73
	Chromium	X	M	16	23	100	0.70
	Mercury	X	M	0.19	0.30	16	0.62
	Tetrachloroethene	X	V	120	200	21	0.60
	Antimony		M	4.3	7.1	4.7	0.60
	Manganese	X	M	280	500	100	0.56
	Silver	X	M	4.1	7.4	32	0.56
	Arsenic	X	M	5.2	10	90	0.52
	Nickel		M	15	30	99	0.49
	Selenium		M	0.58	1.5	14	0.40
	Cobalt	X	M	6.5	20	97	0.32
	Cadmium	X	M	0.86	3.0	14	0.29
	Lead	X	M	12	50	99	0.24
	Barium	X	M	110	500	100	0.22
	Copper	X	M	15	100	99	0.15
OU4 Downgradient	Nitrate/Nitrite	X	W	91	19	100	4.8
	Lithium		M	7.5	2.0	100	3.7
	Zinc	X	M	69	50	100	1.4
	Lead	X	M	67	50	100	1.3
	Strontium		M	70	63	100	1.1
	Vanadium		M	39	36	100	1.1
	Aluminum		M	12,000	15,000	100	0.80
	Manganese	X	M	340	500	100	0.68
	Nickel		M	20	30	100	0.66

Attachment 6
Table 1
Results of Vegetation PCOC Screen—Subsurface Soil

Source Area	Subsurface Soil PCOC	OU PCOC?	Group	Exposure Point Concentration (mg/kg)	Vegetation TRV (mg/kg)	Detection Frequency (%)	Hazard Quotient
OU6 A Ponds	Lithium		M	6.3	2.0	100	3.2
	Zinc	X	M	50	50	100	1.0
OU2 Mound Area	Antimony		M	11	7.1	36	1.6
	Strontium		M	93	63	100	1.5
	Zinc	X	M	70	50	100	1.4
	Nickel		M	24	30	100	0.81
	Arsenic	X	M	8.0	10	100	0.80
	Manganese	X	M	320	500	100	0.64
	Chromium	X	M	12	23	100	0.51
	Cobalt	X	M	10	20	91	0.49
	Mercury	X	M	0.10	0.30	55	0.33
	Lead	X	M	16	50	100	0.33
	Barium	X	M	130	500	100	0.26
	Cadmium	X	M	0.76	3.0	9.1	0.25
	Copper	X	M	20	100	100	0.20
	Silver	X	M	1.4	7.4	36	0.19
	Tetrachloroethene	X	V	0.034	200	45	0.00017
OU6 North Spray Field	Lithium		M	4.4	2.0	18	2.2
	Antimony		M	10	7.1	17	1.3
	Chromium	X	M	29	23	100	1.2
	Zinc	X	M	50	50	100	1.0
	Vanadium	X	M	30	36	100	0.82
	Aluminum		M	11,000	15,000	100	0.73
	Strontium	X	M	36	63	100	0.58
	Nickel		M	16	30	82	0.55
	Barium	X	M	150	500	100	0.30
OU11 West Spray Field	Lithium		M	5.4	2.0	97	2.7
	Chromium		M	49	23	93	2.1
	Mercury		M	0.5	0.3	6.8	1.6
	Molybdenum		M	16	17	26	1.0
	Vanadium		M	22	36	100	0.60
	Aluminum		M	8,600	15,000	100	0.57
	Manganese		M	210	500	100	0.42
	Zinc		M	18	50	90	0.36
	Nickel		M	10	30	80	0.33
	Cobalt		M	7.4	25	100	0.30
	Strontium		M	16	63	100	0.26
	Silver		M	1.2	7.4	3.8	0.17
OU6 Burial Trenches	Lithium		M	4.9	2.0	6.4	2.4
	Strontium	X	M	96	63	98	1.5
	Antimony		M	7.1	7.1	3.8	1.0
	Barium	X	M	340	500	100	0.68
	Manganese		M	330	500	100	0.66
	Zinc	X	M	30	50	100	0.60
	Chromium	X	M	13	23	98	0.58
	Vanadium	X	M	19	36	100	0.52
	Arsenic		M	4.3	10	100	0.43
	Cobalt		M	7.9	25	89	0.32
	Molybdenum		M	3.4	17	5.7	0.20

Attachment 6
Table 1
Results of Vegetation PCOC Screen—Subsurface Soil

Source Area	Subsurface Soil PCOC	OU PCOC?	Group	Exposure Point Concentration (mg/kg)	Vegetation TRV (mg/kg)	Detection Frequency (%)	Hazard Quotient
OU7 Downgradient Area	Nitrate/Nitrite	X	W	3,200	19	18	168
	Lithium		M	8.0	2.0	100	4.0
	Strontium	X	M	100	63	100	1.6
	Zinc	X	M	74	50	100	1.5
	Manganese	X	M	330	500	100	0.66
	Selenium	X	M	1.0	1.5	79	0.66
	Nickel	X	M	20	30	100	0.68
	Barium	X	M	200	500	100	0.40
	Vanadium		M	26	36	100	0.71
	Arsenic	X	M	4.9	10	100	0.49
	Aluminum	X	M	10,000	15,000	100	0.67
OU6 Soil Dump Areas	Lithium		M	7.9	2.0	27	3.9
	Strontium	X	M	100	63	100	1.6
	Antimony		M	8.3	7.1	3.6	1.2
	Zinc	X	M	51	50	100	1.0
	Vanadium	X	M	26	36	100	0.72
	Aluminum		M	8,200	15,000	100	0.55
	Chromium	X	M	8.9	23	97	0.39
	Nickel		M	11	30	66	0.36
	Barium	X	M	170	500	100	0.34
	Manganese		M	140	500	100	0.28
	Lead	X	M	14	50	100	0.28
Woman Creek Watershed							
OU1 881 Hillside	Lithium		M	10	2.0	60	5.2
	Antimony		M	10	7.1	45	1.5
	Strontium		M	89	63	62	1.4
	Zinc		M	59	50	100	1.2
	Vanadium		M	31	36	100	0.85
	Aluminum		M	12,000	15,000	100	0.80
	Chromium		M	16	23	99	0.69
	Nickel		M	17	30	97	0.55
	Manganese		M	260	500	100	0.52
	Selenium		M	0.69	1.5	17	0.48
	Arsenic		M	4.7	10	93	0.47
	Molybdenum		M	7.5	17	26	0.44
	Barium		M	170	500	100	0.34
	Cobalt		M	7.5	25	67	0.30
	Mercury		M	0.085	0.30	19	0.28
	Cadmium		M	0.62	3.0	8.5	0.21
	Toluene	X	V	38	200	97	0.19

Attachment 6
Table 1
Results of Vegetation PCOC Screen—Subsurface Soil

Source Area	Subsurface Soil PCOC	OU PCOC?	Group	Exposure Point Concentration (mg/kg)	Vegetation TRV (mg/kg)	Detection Frequency (%)	Hazard Quotient
OU5 Ash Pits	Chromium	X	M	180	23	99	7.9
	Lithium		M	10	2.0	88	4.9
	Nickel	X	M	110	30	96	3.7
	Zinc	X	M	150	50	100	3.0
	Silver	X	M	15	7.4	13	2.0
	Antimony	X	M	9.5	7.1	15	1.3
	Lead	X	M	56	50	100	1.1
	Copper	X	M	110	100	100	1.1
	Cadmium	X	M	3.1	3.0	13	1.0
	Vanadium		M	35	36	100	1.0
	Aluminum		M	14,000	15,000	100	0.93
	Strontium		M	44	63	100	0.70
	Manganese		M	310	500	100	0.62
	Cobalt	X	M	11	25	100	0.44
	Arsenic		M	4.1	10	100	0.41
	Beryllium	X	M	3.6	10	76	0.36
	Barium	X	M	170	500	100	0.34
	Mercury		M	0.09	0.30	17	0.30
	Molybdenum	X	M	4.5	17	7.2	0.27
OU5 C-Ponds	Lithium		M	6.7	2.0	100	3.4
	Chromium	X	M	62	23	100	2.7
	Zinc	X	M	55	50	100	1.1
	Strontium		M	61	63	100	0.97
OU5 Old Landfill	Lithium		M	7.3	2.0	79	3.6
	Copper	X	M	260	100	100	2.6
	Zinc	X	M	100	50	100	2.0
	Chromium	X	M	20	23	100	0.89
	Vanadium		M	31	36	100	0.85
	Antimony	X	M	5.9	7.1	8.5	0.83
	Nickel	X	M	23	30	94	0.76
	Lead	X	M	35	50	100	0.71
	Aluminum		M	9,400	15,000	100	0.63
	Strontium		M	38	63	100	0.61
	Mercury		M	0.18	0.30	32	0.60
	Manganese		M	300	500	100	0.60
	Arsenic		M	5.1	10	99	0.51
	Molybdenum	X	M	7.5	17	10	0.45
	Silver	X	M	3.2	7.4	18	0.43
	Cobalt	X	M	8.6	25	95	0.34
	Acenaphthene	X	S	1.6	5.0	23	0.32
	Anthracene	X	S	2.3	10	23	0.23

Attachment 6
Table 1
Results of Vegetation PCOC Screen—Subsurface Soil

Source Area	Subsurface Soil PCOC	OU PCOC?	Group	Exposure Point Concentration (mg/kg)	Vegetation TRV (mg/kg)	Detection Frequency (%)	Hazard Quotient
OU2 903 Pad	Zinc	X	M	59	50	100	1.2
	Strontium		M	61	63	95	0.97
	Vanadium		M	32	36	100	0.89
	Antimony		M	6.1	7.1	7.1	0.86
	Aluminum		M	11,000	15,000	100	0.73
	Chromium	X	M	16	23	100	0.69
	Nickel		M	17	30	91	0.56
	Selenium		M	0.73	1.5	9.3	0.50
	Manganese	X	M	250	500	100	0.50
	Cobalt	X	M	9.1	20	89	0.46
	Arsenic	X	M	4.2	10	95	0.42
	Lead	X	M	15	50	100	0.30
	Barium	X	M	140	500	99	0.28
	Mercury	X	M	0.070	0.30	36	0.23
	Cadmium	X	M	0.7	3.0	12	0.23
	Copper	X	M	17	100	97	0.17
	Silver	X	M	1.1	7.4	1.8	0.15
	Nitrate/Nitrite	X	W	2.2	19	42	0.12
	Tetrachloroethene	X	V	0.11	200	7.2	0.00055
OU2 East Trenches	Strontium		M	59	63	100	0.94
	Zinc	X	M	43	50	99	0.86
	Aluminum		M	11,000	15,000	100	0.73
	Vanadium		M	27	36	99	0.75
	Chromium	X	M	16	23	100	0.70
	Mercury	X	M	0.19	0.30	16	0.62
	Antimony		M	4.3	7.1	4.7	0.60
	Tetrachloroethene	X	V	120	200	21	0.60
	Silver	X	M	4.1	7.4	32	0.56
	Manganese	X	M	280	500	100	0.56
	Arsenic	X	M	5.2	10	90	0.52
	Nickel		M	15	30	99	0.49
	Selenium		M	0.58	1.5	14	0.40
	Cobalt	X	M	6.5	20	97	0.32
	Cadmium	X	M	0.86	3.0	14	0.29
	Lead	X	M	12	50	99	0.24
	Barium	X	M	110	500	100	0.22
	Copper	X	M	15	100	99	0.15

Hazard quotients and hazard indices were rounded to present only two significant figures.
OU - operable unit
PCOC - potential chemical of concern
TRV - toxicity reference value. TRV is either the literature benchmark or background concentration, whichever is larger.
UCL_{95} - 95% upper confidence limit of the true mean (based on a 1-tailed test)
The following source areas were not listed due to lack of subsurface soil data:
- OU5 Surface Disturbance Areas
- OU6 B-Ponds
- OU6 Surface Disturbance Areas
- OU7 Landfill
- OU10 Outside Closure Areas

Attachment 6
Table 2
Results of Vegetation PCOC Screen
A-Pond Sediments

Analyte	Group	OU6 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
Pond A-1							
Antimony	M	X	2/5	mg/kg	29	7.7	3.8
Aluminum	M		5/5	mg/kg	13,000	7,000	1.9
Chromium	M	X	5/5	mg/kg	18	9.8	1.9
Strontium	M		5/5	mg/kg	86	50	1.7
Vanadium	M	X	5/5	mg/kg	37	22	1.7
Zinc	M	X	5/5	mg/kg	110	72	1.5
Mercury	M		5/5	mg/kg	0.43	0	1.4
Nickel	M		3/5	mg/kg	25	30	0.84
Cadmium	M		1/5	mg/kg	2.3	3.0	0.77
Lead	M		5/5	mg/kg	38	50	0.76
Arsenic	M		5/5	mg/kg	6.5	10	0.65
Cobalt	M	X	5/5	mg/kg	12	25	0.49
Barium	M		5/5	mg/kg	190	500	0.38
Copper	M	X	5/5	mg/kg	28	100	0.28
Manganese	M	X	5/5	mg/kg	370	1,800	0.20
Beryllium	M		3/5	mg/kg	1.5	10	0.15
Acenaphthene	S	X	1/5	µg/kg	350	5,000	0.070
Anthracene	S	X	2/5	µg/kg	330	10,000	0.033
Aroclor-1254	P	X	10/10	µg/kg	350	40,000	0.0089
Bis(2-ethylhexyl)phthalate	S	X	4/5	µg/kg	360	200,000	0.0018
Di-N-octyl phthalate	S	X	2/5	µg/kg	330	200,000	0.0017
Toluene	V	X	5/5	µg/kg	240	200,000	0.0012
2-Butanone	V	X	4/5	µg/kg	16	NA	NA
4-Methyl-2-pentanone	V	X	1/5	µg/kg	10	NA	NA
Benzo(a)anthracene	S	X	4/5	µg/kg	280	NA	NA
Benzo(a)pyrene	S	X	4/5	µg/kg	300	NA	NA
Benzo(b)fluoranthene	S	X	3/5	µg/kg	370	NA	NA
Benzo(ghi)perylene	S	X	3/5	µg/kg	290	NA	NA
Benzo(k)fluoranthene	S	X	4/5	µg/kg	250	NA	NA
Cesium	M		5/5	mg/kg	4.5	NA	NA
Chrysene	S	X	5/5	µg/kg	320	NA	NA
Fluoranthene	S	X	5/5	µg/kg	740	NA	NA
Indeno(1,2,3-cd)pyrene	S	X	3/5	µg/kg	300	NA	NA
Iron	M	X	5/5	mg/kg	20,000	NA	NA
Magnesium	M	X	5/5	mg/kg	4,200	NA	NA
Phenanthrene	S	X	5/5	µg/kg	500	NA	NA
Pyrene	S	X	5/5	µg/kg	650	NA	NA
						HAZARD INDEX	***18***

Attachment 6
Table 2
Results of Vegetation PCOC Screen
A-Pond Sediments

Analyte	Group	OU6 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
Pond A-2							
Zinc	M	X	5/5	mg/kg	280	72	3.9
Strontium	M		5/5	mg/kg	92	50	1.8
Aluminum	M		5/5	mg/kg	9,800	7,000	1.4
Vanadium	M	X	5/5	mg/kg	30	22	1.4
Chromium	M	X	5/5	mg/kg	10	10	1.0
Lithium	M		5/5	mg/kg	8.0	9	0.93
Nickel	M		3/5	mg/kg	22	30	0.73
Arsenic	M		5/5	mg/kg	6.2	10	0.62
Lead	M		5/5	mg/kg	27	50	0.53
Cobalt	M	X	5/5	mg/kg	10	25	0.42
Barium	M		5/5	mg/kg	160	500	0.33
Manganese	M	X	5/5	mg/kg	420	1,800	0.23
Mercury	M		1/5	mg/kg	0.069	0	0.23
Copper	M	X	5/5	mg/kg	21	100	0.21
Bis(2-ethylhexyl)phthalate	S	X	5/5	µg/kg	5,800	200,000	0.029
Aroclor-1254	P	X	4/9	µg/kg	270	40,000	0.0068
Toluene	V	X	4/5	µg/kg	700	200,000	0.0035
2-Butanone	V	X	2/5	µg/kg	26	NA	NA
Acetone	V	X	2/5	µg/kg	260	NA	NA
Aldrin	P	X	1/5	µg/kg	35	NA	NA
Benzo(a)anthracene	S	X	1/5	µg/kg	58	NA	NA
Benzo(a)pyrene	S	X	1/5	µg/kg	75	NA	NA
Benzoic acid	S	X	4/5	µg/kg	330	NA	NA
Chrysene	S	X	1/5	µg/kg	71	NA	NA
Fluoranthene	S	X	1/5	µg/kg	160	NA	NA
Iron	M	X	5/5	mg/kg	17,000	NA	NA
Magnesium	M	X	5/5	mg/kg	4,100	NA	NA
Phenanthrene	S	X	1/5	µg/kg	120	NA	NA
Pyrene	S	X	3/5	µg/kg	130	NA	NA
						HAZARD INDEX	***14***
Pond A-3							
Aluminum	M		5/5	mg/kg	27,000	7,000	3.8
Antimony	M	X	1/4	mg/kg	23	7.7	3.0
Chromium	M	X	5/5	mg/kg	28	10	2.8
Vanadium	M	X	5/5	mg/kg	61	22	2.8
Zinc	M	X	5/5	mg/kg	150	72	2.1
Lithium	M		5/5	mg/kg	15	8.7	1.8
Strontium	M		5/5	mg/kg	75	50	1.5
Arsenic	M		5/5	mg/kg	7.7	10	0.77
Nickel	M		3/5	mg/kg	23	30	0.76
Cobalt	M	X	5/5	mg/kg	15	25	0.59
Lead	M		5/5	mg/kg	28	50	0.56
Barium	M		5/5	mg/kg	190	500	0.38
Copper	M	X	5/5	mg/kg	24	100	0.24
Manganese	M	X	5/5	mg/kg	390	1,800	0.22
Bis(2-ethylhexyl)phthalate	S	X	2/5	µg/kg	520	200,000	0.0026

Attachment 6
Table 2
Results of Vegetation PCOC Screen
A-Pond Sediments

Analyte	Group	OU6 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
Aroclor-1254	P	X	1/10	µg/kg	45	40,000	0.0011
Toluene	V	X	5/5	µg/kg	58	200,000	0.00029
2-Butanone	V	X	4/5	µg/kg	4.0	NA	NA
Benzo(a)pyrene	S	X	3/5	µg/kg	240	NA	NA
Benzo(b)fluoranthene	S	X	4/5	µg/kg	330	NA	NA
Cesium	M		5/5	mg/kg	4.9	NA	NA
Chrysene	S	X	5/5	µg/kg	230	NA	NA
Fluoranthene	S	X	5/5	µg/kg	500	NA	NA
Iron	M	X	5/5	mg/kg	25,000	NA	NA
Magnesium	M	X	5/5	mg/kg	5,300	NA	NA
Phenanthrene	S	X	4/5	µg/kg	250	NA	NA
Pyrene	S	X	5/5	µg/kg	420	NA	NA
						HAZARD INDEX	***21***
			Pond A-4				
Antimony	M	X	3/4	mg/kg	40	7.7	5.2
Aluminum	M		5/5	mg/kg	20,000	7,000	2.9
Vanadium	M	X	5/5	mg/kg	51	22	2.4
Zinc	M	X	5/5	mg/kg	140	72	1.9
Strontium	M		5/5	mg/kg	96	50	1.9
Chromium	M	X	2/5	mg/kg	16	10	1.6
Selenium	M		1/5	mg/kg	1.4	1.0	1.4
Lithium	M		1/5	mg/kg	9.9	8.7	1.1
Arsenic	M		5/5	mg/kg	9.5	10	0.95
Nickel	M		4/5	mg/kg	26	30	0.85
Cadmium	M		1/5	mg/kg	2.1	3.0	0.71
Lead	M		5/5	mg/kg	32	50	0.63
Cobalt	M	X	5/5	mg/kg	14	25	0.55
Thallium	M		2/5	mg/kg	0.58	1.3	0.46
Barium	M		5/5	mg/kg	180	500	0.37
Copper	M	X	5/5	mg/kg	28	100	0.28
Manganese	M	X	5/5	mg/kg	430	1,800	0.24
Beryllium	M		3/5	mg/kg	0.98	10	0.098
Bis(2-ethylhexyl)phthalate	S	X	2/5	µg/kg	680	200,000	0.0034
Toluene	V	X	3/5	µg/kg	6.6	200,000	0.000033
Benzene	V	X	1/5	µg/kg	3.0	NA	NA
Cesium	M		5/5	mg/kg	5.1	NA	NA
Iron	M	X	5/5	mg/kg	21,000	NA	NA
Magnesium	M	X	5/5	mg/kg	4,700	NA	NA
						HAZARD INDEX	***24***

Attachment 6
Table 2
Results of Vegetation PCOC Screen
A-Pond Sediments

Analyte	Group	OU6 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
			Pond A-5				
Vanadium	M	X	5/5	mg/kg	35	22	1.6
Aluminum	M		5/5	mg/kg	11,000	7,000	1.6
Chromium	M	X	5/5	mg/kg	13	10	1.3
Strontium	M		5/5	mg/kg	65	50	1.3
Zinc	M	X	5/5	mg/kg	72	72	1.0
Lithium	M		5/5	mg/kg	8.1	8.7	0.93
Nickel	M		4/5	mg/kg	18	30	0.60
Thallium	M		3/5	mg/kg	0.69	1.3	0.54
Cobalt	M	X	5/5	mg/kg	12	25	0.50
Arsenic	M		5/5	mg/kg	3.9	10	0.39
Lead	M		5/5	mg/kg	19	50	0.38
Barium	M		5/5	mg/kg	160	500	0.33
Copper	M	X	5/5	mg/kg	18	100	0.18
Manganese	M	X	5/5	mg/kg	280	1,800	0.15
Phenol	S	X	1/5	µg/kg	300	20,000	0.015
Bis(2-ethylhexyl)phthalate	S	X	4/5	µg/kg	200	200,000	0.0010
Toluene	V	X	4/5	µg/kg	19	200,000	0.000096
2-Butanone	V	X	4/5	µg/kg	44	NA	NA
Benzoic acid	S	X	4/5	µg/kg	950	NA	NA
Iron	M	X	5/5	mg/kg	16,000	NA	NA
Magnesium	M	X	5/5	mg/kg	3,100	NA	NA
						HAZARD INDEX	***11***

Attachment 6
Table 3
Results of Vegetation PCOC Screen
B-Pond Sediments

Analyte	Group	OU6 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
			Pond B-1				
Silver	M	X	7/7	mg/kg	240	2.7	88
Zinc	M	X	7/7	mg/kg	730	72	10
Chromium	M	X	7/7	mg/kg	65	9.8	6.6
Mercury	M		6/7	mg/kg	0.99	0.30	3.3
Lead	M		7/7	mg/kg	120	50	2.4
Strontium	M		7/7	mg/kg	110	50	2.2
Cadmium	M		4/7	mg/kg	6.5	3.0	2.2
Aluminum	M		7/7	mg/kg	10,000	7,000	1.4
Vanadium	M	X	7/7	mg/kg	30	22	1.4
Nickel	M		3/7	mg/kg	31	30	1.0
Beryllium	M		5/7	mg/kg	10	10	1.0
Copper	M	X	7/7	mg/kg	89	100	0.89
Arsenic	M		7/7	mg/kg	7.0	10	0.70
Thallium	M		1/7	mg/kg	0.79	1.3	0.62
Barium	M		7/7	mg/kg	220	500	0.45
Cobalt	M	X	7/7	mg/kg	11	25	0.43
Bis(2-ethylhexyl)phthalate	S	X	7/7	µg/kg	51,000	200,000	0.25
Aroclor-1254	P	X	10/12	µg/kg	10,000	40,000	0.25
Manganese	M	X	7/7	mg/kg	250	1,800	0.14
Acenaphthene	S	X	3/7	µg/kg	460	5,000	0.092
Anthracene	S	X	3/7	µg/kg	460	10,000	0.046
Phenol	S	X	1/7	µg/kg	290	20,000	0.015
Naphthalene	S	X	1/7	µg/kg	390	100,000	0.0039
Toluene	V	X	5/5	µg/kg	780	200,000	0.0039
Dibenzofuran	S	X	1/7	µg/kg	180	50,000	0.0036
1,2,4-Trichlorobenzene	S	X	1/7	µg/kg	130	NA	NA
2-Butanone	V	X	1/5	µg/kg	13	NA	NA
2-Methylnaphthalene	S	X	1/7	µg/kg	170	NA	NA
Acetone	V	X	4/5	µg/kg	330	NA	NA
Aroclor-1248	P		5/12	µg/kg	210	NA	NA
Benzo(a)anthracene	S	X	6/7	µg/kg	940	NA	NA
Benzo(a)pyrene	S	X	5/7	µg/kg	610	NA	NA
Benzo(b)fluoranthene	S	X	5/7	µg/kg	2,100	NA	NA
Benzo(k)fluoranthene	S	X	5/7	µg/kg	780	NA	NA
Cesium	M		5/7	mg/kg	2.8	NA	NA
Chrysene	S	X	6/7	µg/kg	1,500	NA	NA
Dibenzo(ah)anthracene	S	X	1/7	µg/kg	150	NA	NA
Fluoranthene	S	X	7/7	µg/kg	3,000	NA	NA
Fluorene	S	X	2/7	µg/kg	460	NA	NA
Heptachlor	P	X	1/7	µg/kg	19	NA	NA
Indeno(1,2,3-cd)pyrene	S	X	2/7	µg/kg	410	NA	NA
Iron	M	X	7/7	mg/kg	14,000	NA	NA
Magnesium	M	X	7/7	mg/kg	3,700	NA	NA
Methylene chloride	V	X	1/5	µg/kg	9.0	NA	NA
Phenanthrene	S	X	6/7	µg/kg	2,000	NA	NA
Pyrene	S	X	7/7	µg/kg	2,500	NA	NA
						HAZARD INDEX	***124***

Attachment 6
Table 3
Results of Vegetation PCOC Screen
B-Pond Sediments

Analyte	Group	OU6 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
Pond B-2							
Silver	M	X	3/3	mg/kg	140	2.7	51
Strontium	M		3/3	mg/kg	310	50	6.2
Chromium	M	X	4/4	mg/kg	19	9.8	2.0
Zinc	M	X	3/3	mg/kg	130	72	1.7
Mercury	M		2/3	mg/kg	0.48	0.30	1.6
Selenium	M		1/3	mg/kg	1.6	1.0	1.6
Cadmium	M		2/3	mg/kg	4.5	3.0	1.5
Aluminum	M		4/4	mg/kg	7,900	7,000	1.1
Vanadium	M	X	3/3	mg/kg	24	22	1.1
Lead	M		4/4	mg/kg	43	50	0.87
Arsenic	M		3/4	mg/kg	7.7	10	0.77
Nickel	M		1/3	mg/kg	16	30	0.53
Barium	M		4/4	mg/kg	250	500	0.50
Cobalt	M	X	4/4	mg/kg	12	25	0.47
Manganese	M	X	4/4	mg/kg	540	1,800	0.30
Aroclor-1254	P	X	9/10	µg/kg	3,300	40,000	0.080
Bis(2-ethylhexyl)phthalate	S	X	4/4	µg/kg	10,000	200,000	0.052
Toluene	V	X	4/4	µg/kg	130	200,000	0.00065
2-Butanone	V	X	3/4	µg/kg	120	NA	NA
Acetone	V	X	3/4	µg/kg	750	NA	NA
Aroclor-1248	P		4/10	µg/kg	590	NA	NA
Benzo(a)anthracene	S	X	3/4	µg/kg	320	NA	NA
Benzo(a)pyrene	S	X	1/4	µg/kg	480	NA	NA
Benzo(k)fluoranthene	S	X	1/4	µg/kg	500	NA	NA
Chrysene	S	X	2/4	µg/kg	420	NA	NA
Fluoranthene	S	X	3/4	µg/kg	410	NA	NA
Iron	M	X	4/4	mg/kg	18,000	NA	NA
Magnesium	M	X	4/4	mg/kg	5,700	NA	NA
Phenanthrene	S	X	3/4	µg/kg	350	NA	NA
Pyrene	S	X	3/4	µg/kg	390	NA	NA
						HAZARD INDEX	**72**
Pond B-3							
Silver	M	X	7/7	mg/kg	170	2.7	63
Antimony	M	X	2/3	mg/kg	69	7.7	8.9
Zinc	M	X	7/7	mg/kg	240	72	3.3
Chromium	M	X	7/7	mg/kg	29	9.8	2.9
Aluminum	M		7/7	mg/kg	12,000	7,000	1.8
Strontium	M		7/7	mg/kg	77	50	1.6
Cadmium	M		4/7	mg/kg	4.6	3.0	1.5
Vanadium	M	X	7/7	mg/kg	31	22	1.4
Mercury	M		6/7	mg/kg	0.35	0.30	1.2
Lead	M		7/7	mg/kg	51	50	1.0
Nickel	M		6/7	mg/kg	25	30	0.82
Copper	M	X	7/7	mg/kg	65	100	0.65
Lithium	M		1/7	mg/kg	5.6	8.7	0.64
Selenium	M		1/7	mg/kg	0.58	1.0	0.58
Arsenic	M		7/7	mg/kg	5.8	10	0.58
Cobalt	M	X	7/7	mg/kg	11	25	0.46

Attachment 6
Table 3
Results of Vegetation PCOC Screen
B-Pond Sediments

Analyte	Group	OU6 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
Barium	M		7/7	mg/kg	180	500	0.36
Thallium	M		1/7	mg/kg	0.42	1.3	0.33
Beryllium	M		4/7	mg/kg	2.5	10	0.25
Manganese	M	X	7/7	mg/kg	230	18,000	0.13
Aroclor-1254	P	X	10/12	µg/kg	1,400	40,000	0.036
Bis(2-ethylhexyl)phthalate	S	X	7/7	µg/kg	6,300	200,000	0.032
Aroclor-1260	P	X	3/10	µg/kg	400	40,000	0.010
Toluene	V	X	5/5	µg/kg	600	200,000	0.0030
2-Butanone	V	X	2/5	µg/kg	25	NA	NA
Benzo(a)anthracene	S	X	1/7	µg/kg	360	NA	NA
Benzo(a)pyrene	S	X	1/7	µg/kg	360	NA	NA
Benzo(b)fluoranthene	S	X	5/7	µg/kg	500	NA	NA
Cesium	M		3/7	mg/kg	2.5	NA	NA
Chrysene	S	X	2/7	µg/kg	380	NA	NA
Fluoranthene	S	X	6/7	µg/kg	690	NA	NA
Iron	M	X	7/7	mg/kg	17,000	NA	NA
Magnesium	M	X	7/7	mg/kg	3,300	NA	NA
Phenanthrene	S	X	3/7	µg/kg	440	NA	NA
Pyrene	S	X	4/7	µg/kg	690	NA	NA
						HAZARD INDEX	***92***
			Pond B-4				
Silver	M	X	3/8	mg/kg	40	2.7	15
Zinc	M	X	8/8	mg/kg	250	72	3.5
Antimony	M	X	2/4	mg/kg	26	7.7	3.3
Aluminum	M		8/8	mg/kg	13,000	7,000	1.9
Vanadium	M	X	8/8	mg/kg	39	22	1.8
Chromium	M	X	8/8	mg/kg	17	9.8	1.8
Strontium	M		8/8	mg/kg	89	50	1.8
Lead	M		8/8	mg/kg	46	50	0.92
Lithium	M		5/8	mg/kg	7.0	8.7	0.81
Arsenic	M		8/8	mg/kg	7.4	10	0.74
Cadmium	M		5/8	mg/kg	2	3.0	0.68
Nickel	M		7/8	mg/kg	2.1	30	0.67
Mercury	M		3/8	mg/kg	0.13	0.30	0.43
Cobalt	M	X	8/8	mg/kg	10	25	0.41
Thallium	M		3/8	mg/kg	0.50	1.3	0.39
Barium	M		8/8	mg/kg	180	500	0.35
Copper	M	X	8/8	mg/kg	32	100	0.31
Manganese	M	X	8/8	mg/kg	290	1,800	0.16
Beryllium	M		1/8	mg/kg	1.1	10	0.11
Anthracene	S	X	5/8	µg/kg	240	10,000	0.024
Bis(2-ethylhexyl)phthalate	S	X	8/8	µg/kg	3,100	200,000	0.015
Aroclor-1254	P	X	10/13	µg/kg	430	40,000	0.011
Di-N-octyl phthalate	S	X	3/8	µg/kg	280	200,000	0.0014
Toluene	V	X	4/5	µg/kg	230	200,000	0.0011
2-Butanone	V	X	3/5	µg/kg	9.8	NA	NA
Acetone	V	X	1/5	µg/kg	48	NA	NA
Benzo(a)anthracene	S	X	6/8	µg/kg	380	NA	NA
Benzo(a)pyrene	S	X	8/8	µg/kg	480	NA	NA

Attachment 6
Table 3
Results of Vegetation PCOC Screen
B-Pond Sediments

Analyte	Group	OU6 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
Benzo(b)fluoranthene	S	X	8/8	µg/kg	1,000	NA	NA
Benzo(ghi)perylene	S	X	2/8	µg/kg	300	NA	NA
Benzo(k)fluoranthene	S	X	8/8	µg/kg	330	NA	NA
Butyl benzyl phthalate	S	X	2/8	µg/kg	310	NA	NA
Cesium	M		7/8	mg/kg	2.9	NA	NA
Chrysene	S	X	8/8	µg/kg	560	NA	NA
Fluoranthene	S	X	8/8	µg/kg	1,200	NA	NA
Gamma-BHC (Lindane)	P	X	1/7	µg/kg	13	NA	NA
Indeno(1,2,3-cd)pyrene	S	X	2/8	µg/kg	310	NA	NA
Iron	M	X	8/8	mg/kg	18,000	NA	NA
Magnesium	M	X	8/8	mg/kg	4,100	NA	NA
Phenanthrene	S	X	8/8	µg/kg	650	NA	NA
Pyrene	S	X	8/8	µg/kg	1,000	NA	NA
						HAZARD INDEX	***35***
			Pond B-5				
Aluminum	M		5/5	mg/kg	19,000	7,000	2.8
Vanadium	M	X	5/5	mg/kg	47	22	2.2
Zinc	M	X	5/5	mg/kg	150	72	2.0
Chromium	M	X	5/5	mg/kg	20	9.8	2.0
Strontium	M		5/5	mg/kg	68	50	1.4
Lithium	M		5/5	mg/kg	11	8.7	1.3
Arsenic	M		5/5	mg/kg	8.3	10	0.83
Nickel	M		5/5	mg/kg	22	30	0.74
Tin	M		1/5	mg/kg	32	50	0.64
Lead	M		5/5	mg/kg	30	50	0.61
Thallium	M		3/5	mg/kg	0.72	1.3	0.57
Cobalt	M	X	5/5	mg/kg	11	25	0.43
Barium	M		5/5	mg/kg	180	500	0.35
Copper	M	X	5/5	mg/kg	26	100	0.26
Manganese	M	X	5/5	mg/kg	310	1,800	0.17
Bis(2-ethylhexyl)phthalate	S	X	2/5	µg/kg	270	200,000	0.0014
Di-N-octyl phthalate	S	X	1/5	µg/kg	240	200,000	0.0012
Toluene	V	X	5/5	µg/kg	37	200,000	0.00019
2-Butanone	V	X	3/5	µg/kg	16	NA	NA
Acetone	V	X	1/5	µg/kg	59	NA	NA
Cesium	M		5/5	mg/kg	3.5	NA	NA
Fluoranthene	S	X	2/5	µg/kg	190	NA	NA
Iron	M	X	5/5	mg/kg	20,000	NA	NA
Magnesium	M	X	5/5	mg/kg	4,500	NA	NA
Pyrene	S	X	1/5	µg/kg	160	NA	NA
						HAZARD INDEX	***16***

Attachment 6
Table 4
Results of Vegetation PCOC Screen
North Walnut Creek and South Walnut Creek Stream Sediments

Analyte	Group	OU6 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
North Walnut Creek							
Antimony	M		2/5	mg/kg	22	7.7	2.9
Zinc	M	X	11/11	mg/kg	96	72	1.3
Vanadium	M	X	11/11	mg/kg	27	22	1.3
Aluminum	M		11/11	mg/kg	8,300	7,000	1.2
Strontium	M	X	11/11	mg/kg	56	50	1.1
Lithium	M		9/11	mg/kg	7.3	8.7	0.84
Chromium	M		11/11	mg/kg	8.2	9.8	0.84
Lead	M		11/11	mg/kg	36	50	0.71
Nickel	M		9/11	mg/kg	14	30	0.48
Arsenic	M	X	10/11	mg/kg	4.1	10	0.41
Cobalt	M	X	11/11	mg/kg	9.8	25	0.39
Selenium	M		2/9	mg/kg	0.39	1.0	0.39
Thallium	M		3/11	mg/kg	0.46	1.3	0.36
Cadmium	M		2/11	mg/kg	0.91	3.0	0.30
Manganese	M	X	11/11	mg/kg	530	1,800	0.30
Mercury	M		3/11	mg/kg	0.077	0.30	0.26
Barium	M	X	11/11	mg/kg	130	500	0.26
Copper	M		9/11	mg/kg	16	100	0.16
Beryllium	M		6/11	mg/kg	0.71	10	0.071
Anthracene	S	X	1/11	µg/kg	230	10,000	0.023
Bis(2-ethylhexyl)phthalate	S	X	4/11	µg/kg	230	200,000	0.0011
Di-n-butyl phthalate	S	X	2/11	µg/kg	230	200,000	0.0011
Acetone	V	X	1/10	µg/kg	51	NA	NA
Benzo(a)anthracene	S	X	2/11	µg/kg	220	NA	NA
Benzo(a)pyrene	S	X	3/11	µg/kg	210	NA	NA
Benzo(b)fluoranthene	S	X	2/11	µg/kg	220	NA	NA
Benzo(k)fluoranthene	S	X	1/11	µg/kg	230	NA	NA
Benzoic acid	S	X	4/11	µg/kg	970	NA	NA
Benzyl alcohol	S	X	1/11	µg/kg	240	NA	NA
Butyl benzyl phthalate	S	X	1/11	µg/kg	230	NA	NA
Chrysene	S	X	3/11	µg/kg	220	NA	NA
Fluoranthene	S	X	5/11	µg/kg	240	NA	NA
Indeno(1,2,3-cd)pyrene	S	X	1/11	µg/kg	230	NA	NA
Iron	M	X	11/11	mg/kg	16,000	NA	NA
Magnesium	M	X	11/11	mg/kg	2,900	NA	NA
Methylene chloride	V	X	1/10	µg/kg	14	NA	NA
Phenanthrene	S	X	3/11	µg/kg	230	NA	NA
Pyrene	S	X	3/11	µg/kg	240	NA	NA
						HAZARD INDEX	***14***

Attachment 6
Table 4
Results of Vegetation PCOC Screen
North Walnut Creek and South Walnut Creek Stream Sediments

Analyte	Group	OU6 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
South Walnut Creek (no metals analysis)							
Acenaphthene	S	X	1/12	µg/kg	270	5,000	0.055
Anthracene	S	X	1/12	µg/kg	280	10,000	0.028
Aroclor-1254	P		7/12	µg/kg	430	40,000	0.011
Naphthalene	S	X	1/12	µg/kg	270	100,000	0.0027
Di-N-butyl phthalate	S	X	5/12	µg/kg	240	200,000	0.0012
Bis(2-ethylhexyl)phthalate	S	X	5/12	µg/kg	210	200,000	0.0010
Tetrachloroethene	V		4/13	µg/kg	6.6	200,000	0.000033
Trichloroethene	V		1/13	µg/kg	3.9	200,000	0.000019
Acetone	V	X	3/13	µg/kg	62	NA	NA
Benzo(a)anthracene	S	X	4/12	µg/kg	270	NA	NA
Benzo(a)pyrene	S	X	2/12	µg/kg	300	NA	NA
Benzo(b)fluoranthene	S	X	3/12	µg/kg	320	NA	NA
Benzo(ghi)perylene	S	X	1/12	µg/kg	280	NA	NA
Benzo(k)fluoranthene	S	X	3/12	µg/kg	270	NA	NA
Benzoic acid	S	X	1/11	µg/kg	1,400	NA	NA
Chloroform	V		1/13	µg/kg	4.1	NA	NA
Chrysene	S	X	4/12	µg/kg	290	NA	NA
Fluoranthene	S	X	6/12	µg/kg	370	NA	NA
Indeno(1,2,3-cd)pyrene	S	X	3/12	µg/kg	260	NA	NA
Methylene chloride	V	X	4/13	µg/kg	17	NA	NA
Phenanthrene	S	X	6/12	µg/kg	310	NA	NA
Pyrene	S	X	6/12	µg/kg	350	NA	NA
						HAZARD INDEX	***0.098***

Attachment 6
Table 5
Results of Vegetation PCOC Screen
C-Pond Sediments

Analyte	Group	OU5 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
Pond C-1							
Mercury	M	X	3/3	mg/kg	1.8	0.30	6.0
Aluminum	M		3/3	mg/kg	16,000	7,000	2.2
Chromium	M		3/3	mg/kg	20	9.8	2.0
Lithium	M		3/3	mg/kg	16	8.7	1.8
Vanadium	M		3/3	mg/kg	36	22	1.7
Selenium	M		2/2	mg/kg	1.5	1.0	1.5
Strontium	M		3/3	mg/kg	74	50	1.5
Zinc	M	X	3/3	mg/kg	110	72	1.5
Nickel	M		3/3	mg/kg	19	30	0.64
Lead	M		3/3	mg/kg	31	50	0.61
Arsenic	M		3/3	mg/kg	5.6	10	0.56
Barium	M		3/3	mg/kg	260	500	0.52
Cobalt	M		3/3	mg/kg	12	25	0.49
Copper	M		3/3	mg/kg	27	100	0.27
Manganese	M		3/3	mg/kg	310	1,800	0.17
Beryllium	M		3/3	mg/kg	1.0	10	0.10
Di-N-butyl phthalate	S	X	1/2	µg/kg	3,000	200,000	0.015
Toluene	V	X	3/3	µg/kg	560	200,000	0.0028
Benzoic acid	S	X	3/3	µg/kg	630	NA	NA
Iron	M		3/3	mg/kg	24,000	NA	NA
Magnesium	M		3/3	mg/kg	4,300	NA	NA
						HAZARD INDEX	***22***
Pond C-2							
Strontium	M		3/3	mg/kg	170	50	3.3
Zinc	M	X	3/3	mg/kg	200	72	2.8
Mercury	M	X	3/3	mg/kg	0.68	0.30	2.3
Vanadium	M		3/3	mg/kg	41	22	1.9
Chromium	M		3/3	mg/kg	18	9.8	1.8
Aluminum	M		3/3	mg/kg	12,000	7,000	1.8
Lithium	M		3/3	mg/kg	9.7	8.7	1.1
Arsenic	M		3/3	mg/kg	9.8	10	0.98
Lead	M		3/3	mg/kg	35	50	0.69
Nickel	M		3/3	mg/kg	18	30	0.60
Cobalt	M		3/3	mg/kg	12	25	0.48
Barium	M		3/3	mg/kg	270	500	0.45
Copper	M		3/3	mg/kg	36	100	0.36
Manganese	M		3/3	mg/kg	600	1,800	0.33
Phenol	S	X	1/2	µg/kg	3,400	20,000	0.17
Beryllium	M		1/2	mg/kg	0.67	10	0.067
Toluene	V	X	3/3	µg/kg	430	200,000	0.0022
Benzoic acid	S	X	1/2	µg/kg	18,000	NA	NA
Fluoranthene	S	X	1/2	µg/kg	3,500	NA	NA
Iron	M		3/3	mg/kg	20,000	NA	NA
Magnesium	M		3/3	mg/kg	4,000	NA	NA
						HAZARD INDEX	***19***

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Table 6
Results of Vegetation PCOC Screen
Woman Creek Watershed Stream Sediments

Analyte	Group	OU5 PCOC	Detection Frequency	Units	Exposure Point Concentration	Vegetation Toxicity Reference Value	Hazard Quotient
Zinc	M	X	45/45	mg/kg	120	72	1.6
Antimony	M		5/41	mg/kg	11	7.7	1.5
Aluminum	M		45/45	mg/kg	9,500	7,000	1.4
Selenium	M		21/43	mg/kg	1.2	1.0	1.2
Vanadium	M		45/45	mg/kg	26	22	1.2
Chromium	M		41/45	mg/kg	10	9.8	1.0
Lithium	M		39/44	mg/kg	7.7	8.7	0.89
Strontium	M		44/45	mg/kg	44	50	0.88
Silver	M		3/42	mg/kg	2.4	2.7	0.88
Thallium	M		8/44	mg/kg	0.70	1.3	0.55
Lead	M		45/45	mg/kg	26	50	0.53
Arsenic	M		44/45	mg/kg	4.4	10	0.44
Nickel	M		35/45	mg/kg	12	30	0.40
Molybdenum	M		13/43	mg/kg	4.0	11	0.37
Cobalt	M		44/45	mg/kg	7.5	25	0.30
Manganese	M		45/45	mg/kg	460	1,800	0.26
Cadmium	M		9/42	mg/kg	0.75	3.0	0.25
Barium	M		45/45	mg/kg	120	500	0.25
Tin	M		16/43	mg/kg	10	50	0.20
Mercury	M	X	1/43	mg/kg	0.060	0.30	0.20
Copper	M	X	39/45	mg/kg	15	100	0.15
Beryllium	M		25/45	mg/kg	0.70	10	0.070
4-Methylphenol	S		3/30	µg/kg	400	20,000	0.020
Aroclor-1254	P		1/33	µg/kg	360	40,000	0.0090
Bis(2-ethylhexyl)phthalate	S		17/31	µg/kg	480	200,000	0.0024
Toluene	V		3/34	µg/kg	10	200,000	0.000052
Tetrachloroethene	V		1/34	µg/kg	4.8	200,000	0.000024
1,1,1-Trichloroethane	V		1/34	µg/kg	4.8	200,000	0.000024
2-Butanone	V		5/33	µg/kg	61	NA	NA
Acetone	V		11/34	µg/kg	250	NA	NA
Benzo(a)anthracene	S		1/30	µg/kg	400	NA	NA
Benzoic acid	S		2/32	µg/kg	1,900	NA	NA
Butyl benzyl phthalate	S		1/30	µg/kg	400	NA	NA
Cesium	M		2/45	mg/kg	4.1	NA	NA
Chloroform	V		1/34	µg/kg	4.8	NA	NA
Chrysene	S		1/30	µg/kg	400	NA	NA
delta-BHC	P		1/33	µg/kg	18	NA	NA
Fluoranthene	S		2/30	µg/kg	400	NA	NA
Heptachlor	P		1/33	µg/kg	18	NA	NA
Iron	M		45/45	mg/kg	14,000	NA	NA
Magnesium	M		45/45	mg/kg	2,200	NA	NA
Methylene chloride	V		6/35	µg/kg	18	NA	NA
Phenanthrene	S		2/30	µg/kg	400	NA	NA
Pyrene	S		2/30	µg/kg	400	NA	NA
Silicon	M		25/25	mg/kg	630	NA	NA
						HAZARD INDEX	***15***

Attachment 6
Table 7
Subsurface Soil PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
881 Hillside					
2-Butanone	V		12/304	4.5	mg/kg
2-Chloroethyl vinyl ether	V		0/170	ND	
2-Methylnaphthalene	S	X	0/181	ND	
4,4'-DDT	P		0/201	ND	
3-Methyl-2-pentanone	V		5/362	3.7	mg/kg
4-Nitroaniline	S		0/164	ND	
Acenaphthylene	S		0/181	ND	
Acetone	V		82/342	5.1	mg/kg
Benzene	V		0/405	ND	
Benzo(a)anthracene	S	X	4/181	0.53	mg/kg
Benzo(a)pyrene	S	X	2/181	0.48	mg/kg
Benzo(b)fluoranthene	S	X	2/179	0.39	mg/kg
Benzo(ghi)perylene	S	X	0/181	ND	
Benzo(k)fluoranthene	S	X	2/179	0.46	mg/kg
Benzoic acid	S		2/176	0.84	mg/kg
Butyl benzyl phthalate	S		0/181	ND	
Carbon disulfide	V		5/399	1.7	mg/kg
Carbon tetrachloride	V	X	2/405	0.018	mg/kg
Chloroform	V	X	3/405	1.9	mg/kg
Chrysene	S	X	4/181	0.56	mg/kg
Ethylbenzene	V		1/405	0.0020	mg/kg
Fluoranthene	S	X	10/181	47	mg/kg
Fluorene	S	X	1/181	0.19	mg/kg
Heptachlor epoxide	P		0/201	ND	
Hexachlorobutadiene	S		0/181	ND	
Indeno(1,2,3-cd)pyrene	S	X	0/181	ND	
Isophorone	S		0/181	ND	
Methylene chloride	V		113/397	2.1	mg/kg
N-Nitrosodiphenylamine	S		2/181	44	mg/kg
Phenanthrene	S	X	9/181	47	mg/kg
Pyrene	S	X	12/180	49	mg/kg
alpha-BHC	P		0/201	ND	
cis-1,3-Dichloropropene	V		0/405	ND	
OU2 903 Pad					
2-Butanone	V	X	4/192	0.10	mg/kg
2-Chloroethyl vinyl ether	V	X	0/17	ND	
2-Methylnaphthalene	S	X	0/118	ND	
4,4'-DDT	P	X	0/116	ND	
3-Methyl-2-pentanone	V	X	2/196	1.9	mg/kg
4-Nitroaniline	S	X	0/110	ND	
Acenaphthylene	S		0/118	ND	
Acetone	V	X	62/223	1.4	mg/kg
Benzene	V	X	0/222	ND	
Benzo(a)anthracene	S	X	1/118	0.25	mg/kg

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Table 7
Subsurface Soil PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
Benzo(a)pyrene	S	X	7/118	0.35	mg/kg
Benzo(b)fluoranthene	S	X	1/118	0.23	mg/kg
Benzo(ghi)perylene	S	X	0/118	ND	
Benzo(k)fluoranthene	S		0/118	ND	
Benzoic acid	S	X	0/83	ND	
Butyl benzyl phthalate	S	X	1/118	0.52	mg/kg
Carbon disulfide	V	X	1/222	0.0040	mg/kg
Carbon tetrachloride	V	X	28/222	0.23	mg/kg
Chloroform	V	X	44/227	1.3	mg/kg
Chrysene	S	X	1/118	0.30	mg/kg
Ethylbenzene	V	X	1/222	0.0020	mg/kg
Fluoranthene	S	X	4/118	7.6	mg/kg
Fluorene	S	X	0/118	ND	
Heptachlor epoxide	P		0/116	ND	
Hexachlorobutadiene	S	X	0/118	ND	
Indeno(1,2,3-cd)pyrene	S	X	0/118	ND	
Isophorone	S		0/118	ND	
Methylene chloride	V	X	61/227	0.81	mg/kg
N-Nitrosodiphenylamine	S	X	0/118	ND	
Phenanthrene	S	X	4/118	7.6	mg/kg
Pyrene	S	X	5/118	7.7	mg/kg
alpha-BHC	P		0/116	ND	
cis-1,3-Dichloropropene	V	X	0/222	ND	
OU6 A-Ponds					
2-Butanone	V	X	0/3	ND	
3-Methyl-2-pentanone	V	X	0/3	ND	
Acetone	V	X	1/3	0.013	mg/kg
Benzene	V	X	0/3	ND	
Carbon disulfide	V		0/3	ND	
Carbon tetrachloride	V		0/3	ND	
Chloroform	V	X	0/3	ND	
Ethylbenzene	V		0/3	ND	
Methylene chloride	V	X	0/3	ND	
cis-1,3-Dichloropropene	V		0/3	ND	
2-Butanone	V	X	25/146	0.081	mg/kg
3-Methyl-2-pentanone	V	X	2/146	0.0020	mg/kg
Acetone	V	X	4/152	0.020	mg/kg
Benzene	V	X	1/152	0.0010	mg/kg
Carbon disulfide	V		0/152	ND	
Carbon tetrachloride	V		0/151	ND	
Chloroform	V	X	1/152	0.0020	mg/kg
Ethylbenzene	V		0/152	ND	
Methylene chloride	V	X	1/152	0.054	mg/kg
cis-1,3-Dichloropropene	V		0/152	ND	

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Table 7
Subsurface Soil PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
OU6 B-Ponds					
2-Butanone	V	X	0/3	ND	
3-Methyl-2-pentanone	V	X	0/3	ND	
Acetone	V	X	0/3	ND	
Benzene	V	X	0/3	ND	
Carbon disulfide	V		0/3	ND	
Carbon tetrachloride	V		0/2	ND	
Chloroform	V	X	0/3	ND	
Ethylbenzene	V		0/3	ND	
Methylene chloride	V	X	0/3	ND	
cis-1,3-Dichloropropene	V		0/3	ND	
OU6 C-Ponds					
2-Butanone	V	X	0/4	ND	
2-Methylnaphthalene	S	X	0/4	ND	
4,4'-DDT	P		0/4	ND	
3-Methyl-2-pentanone	V	X	0/8	ND	
4-Nitroaniline	S		0/4	ND	
Acenaphthylene	S	X	0/4	ND	
Acetone	V	X	2/8	0.0050	mg/kg
Benzene	V		0/8	ND	
Benzo(a)anthracene	S	X	0/4	ND	
Benzo(a)pyrene	S	X	0/4	ND	
Benzo(b)fluoranthene	S	X	0/4	ND	
Benzo(ghi)perylene	S	X	0/4	ND	
Benzo(k)fluoranthene	S	X	0/4	ND	
Benzoic acid	S	X	0/4	ND	
Butyl benzyl phthalate	S	X	0/4	ND	
Carbon disulfide	V		0/8	ND	
Carbon tetrachloride	V		0/8	ND	
Chloroform	V		0/8	ND	
Chrysene	S	X	0/4	ND	
Ethylbenzene	V	X	0/8	ND	
Fluoranthene	S	X	0/4	ND	
Fluorene	S	X	0/4	ND	
Heptachlor epoxide	P	X	0/4	ND	
Hexachlorobutadiene	S		0/4	ND	
Indeno(1,2,3-cd)pyrene	S	X	0/3	ND	
Isophorone	S	X	0/4	ND	
Methylene chloride	V	X	2/8	0.0040	mg/kg
N-Nitrosodiphenylamine	S		0/4	ND	
Phenanthrene	S	X	0/4	ND	
Pyrene	S	X	0/4	ND	
alpha-BHC	P	X	0/4	ND	
cis-1,3-Dichloropropene	V		0/8	ND	

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Table 7
Subsurface Soil PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
OU7 Downgradient Areas					
2-Butanone	V		0/17	ND	
2-Methylnaphthalene	S		0/19	ND	
3-Methyl-2-pentanone	V	X	1/17	0.014	mg/kg
4-Nitroaniline	S		0/19	ND	
Acenaphthylene	S		0/19	ND	
Acetone	V		0/17	ND	
Benzene	V		0/17	ND	
Benzo(a)anthracene	S	X	1/19	0.048	mg/kg
Benzo(a)pyrene	S		0/19	ND	
Benzo(b)fluoranthene	S		0/19	ND	
Benzo(ghi)perylene	S		0/19	ND	
Benzo(k)fluoranthene	S		0/19	ND	
Benzoic acid	S		0/19	ND	
Butyl benzyl phthalate	S	X	1/19	0.29	mg/kg
Carbon disulfide	V		0/17	ND	
Carbon tetrachloride	V		0/17	ND	
Chloroform	V		0/17	ND	
Chrysene	S	X	1/19	0.043	mg/kg
Ethylbenzene	V		0/17	ND	
Fluoranthene	S	X	1/19	0.11	mg/kg
Fluorene	S		0/19	ND	
Hexachlorobutadiene	S		0/19	ND	
Indeno(1,2,3-cd)pyrene	S		0/19	ND	
Isophorone	S		0/19	ND	
Methylene chloride	V	X	0/17	ND	
N-Nitrosodiphenylamine	S		0/19	ND	
Phenanthrene	S	X	1/19	0.10	mg/kg
Pyrene	S	X	1/19	0.11	mg/kg
cis-1,3-Dichloropropene	V		0/17	ND	
OU2 East Trenches					
2-Butanone	V	X	23/277	0.067	mg/kg
2-Chloroethyl vinyl ether	V	X	0/5	ND	
2-Methylnaphthalene	S	X	3/100	0.37	mg/kg
4,4'-DDT	P	X	1/110	0.011	mg/kg
3-Methyl-2-pentanone	V	X	5/306	0.021	mg/kg
4-Nitroaniline	S	X	0/93	ND	
Acenaphthylene	S		0/100	ND	
Acetone	V	X	62/320	1.6	mg/kg
Benzene	V	X	2/318	0.014	mg/kg
Benzo(a)anthracene	S	X	1/100	0.18	mg/kg
Benzo(a)pyrene	S	X	2/100	0.18	mg/kg
Benzo(b)fluoranthene	S	X	1/100	0.18	mg/kg
Benzo(ghi)perylene	S	X	1/100	0.17	mg/kg
Benzo(k)fluoranthene	S		0/100	ND	

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Table 7
Subsurface Soil PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
Benzoic acid	S	X	1/100	0.40	mg/kg
Butyl benzyl phthalate	S	X	0/100	ND	
Carbon disulfide	V	X	0/317	ND	
Carbon tetrachloride	V	X	29/317	7.7	mg/kg
Chloroform	V	X	61/325	0.42	mg/kg
Chrysene	S	X	2/100	0.18	mg/kg
Ethylbenzene	V	X	4/317	0.026	mg/kg
Fluoranthene	S	X	1/100	0.19	mg/kg
Fluorene	S	X	1/100	0.17	mg/kg
Heptachlor epoxide	P		0/110	ND	
Hexachlorobutadiene	S	X	1/100	0.17	mg/kg
Indeno(1,2,3-cd)pyrene	S	X	1/100	0.17	mg/kg
Isophorone	S		0/100	ND	
Methylene chloride	V	X	62/320	0.93	mg/kg
N-Nitrosodiphenylamine	S	X	0/100	ND	
Phenanthrene	S	X	3/100	0.25	mg/kg
Pyrene	S	X	2/100	0.20	mg/kg
alpha-BHC	P		0/110	ND	
cis-1,3-Dichloropropene	V	X	0/317	ND	
OU2 Mound Area					
2-Butanone	V	X	2/39	0.0070	mg/kg
2-Chloroethyl vinyl ether	V	X	0/1	ND	
2-Methylnaphthalene	S	X	0/7	ND	
4,4'-DDT	P	X	0/7	ND	
3-Methyl-2-pentanone	V	X	1/40	0.0030	mg/kg
4-Nitroaniline	S	X	0/3	ND	
Acenaphthylene	S		0/7	ND	
Acetone	V	X	7/53	0.019	mg/kg
Benzene	V	X	1/53	0.0030	mg/kg
Benzo(a)anthracene	S	X	0/7	ND	
Benzo(a)pyrene	S	X	0/7	ND	
Benzo(b)fluoranthene	S	X	0/7	ND	
Benzo(ghi)perylene	S	X	0/7	ND	
Benzo(k)fluoranthene	S		0/7	ND	
Benzoic acid	S	X	0/7	ND	
Butyl benzyl phthalate	S	X	0/7	ND	
Carbon disulfide	V	X	0/53	ND	
Carbon tetrachloride	V	X	3/52	0.0042	mg/kg
Chloroform	V	X	2/53	0.0066	mg/kg
Chrysene	S	X	0/7	ND	
Ethylbenzene	V	X	0/53	ND	
Fluoranthene	S	X	1/7	0.11	mg/kg
Fluorene	S	X	0/7	ND	
Heptachlor epoxide	P		0/7	ND	
Hexachlorobutadiene	S	X	0/7	ND	

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Table 7
Subsurface Soil PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
Indeno(1,2,3-cd)pyrene	S	X	0/7	ND	
Isophorone	S		0/7	ND	
Methylene chloride	V	X	15/53	0.0091	mg/kg
N-Nitrosodiphenylamine	S	X	0/7	ND	
Phenanthrene	S	X	0/7	ND	
Pyrene	S	X	0/7	ND	
alpha-BHC	P		0/7	ND	
cis-1,3-Dichloropropene	V	X	0/53	ND	
OU6 North Spray Field					
2-Butanone	V	X	0/3	ND	
3-Methyl-2-pentanone	V	X	0/3	ND	
Acetone	V	X	0/3	ND	
Benzene	V	X	0/3	ND	
Carbon disulfide	V		0/3	ND	
Carbon tetrachloride	V		0/3	ND	
Chloroform	V	X	0/3	ND	
Ethylbenzene	V		0/3	ND	
Methylene chloride	V	X	0/3	ND	
cis-1,3-Dichloropropene	V		0/3	ND	
OU5 Old Landfill					
2-Butanone	V	X	8/128	0.0088	mg/kg
2-Methylnaphthalene	S	X	9/61	0.87	mg/kg
4,4'-DDT	P		0/61	ND	
3-Methyl-2-pentanone	V	X	1/152	0.0020	mg/kg
4-Nitroaniline	S		0/53	ND	
Acenaphthylene	S	X	2/61	0.084	mg/kg
Acetone	V	X	9/140	0.026	mg/kg
Benzene	V		0/152	ND	
Benzo(a)anthracene	S	X	17/61	2.5	mg/kg
Benzo(a)pyrene	S	X	15/61	2.3	mg/kg
Benzo(b)fluoranthene	S	X	16/61	2.6	mg/kg
Benzo(ghi)perylene	S	X	14/61	0.76	mg/kg
Benzo(k)fluoranthene	S	X	15/61	1.1	mg/kg
Benzoic acid	S	X	12/59	0.48	mg/kg
Butyl benzyl phthalate	S	X	2/61	0.36	mg/kg
Carbon disulfide	V		0/153	ND	
Carbon tetrachloride	V		0/151	ND	
Chloroform	V		0/153	ND	
Chrysene	S	X	17/61	2.7	mg/kg
Ethylbenzene	V	X	1/153	0.0045	mg/kg
Fluoranthene	S	X	20/61	5.6	mg/kg
Fluorene	S	X	14/61	1.8	mg/kg
Heptachlor epoxide	P	X	1/61	0.0043	mg/kg
Hexachlorobutadiene	S		0/61	ND	
Indeno(1,2,3-cd)pyrene	S	X	12/61	0.87	mg/kg

Attachment 6
Table 7
Subsurface Soil PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
Isophorone	S	X	1/61	0.082	mg/kg
Methylene chloride	V	X	16/153	0.0060	mg/kg
N-Nitrosodiphenylamine	S		0/61	ND	
Phenanthrene	S	X	21/61	6.5	mg/kg
Pyrene	S	X	21/61	4.5	mg/kg
alpha-BHC	P	X	1/61	0.0045	mg/kg
cis-1,3-Dichloropropene	V		0/153	ND	
OU4 Downgradient Area					
3-Methyl-2-pentanone	V		0/22	ND	
Acetone	V	X	6/18	0.020	mg/kg
Benzene	V		0/25	ND	
Carbon disulfide	V		0/25	ND	
Carbon tetrachloride	V		0/25	ND	
Chloroform	V	X	0/25	ND	
Ethylbenzene	V		0/25	ND	
Methylene chloride	V	X	23/25	0.011	mg/kg
cis-1,3-Dichloropropene	V		0/25	ND	
OU6 Soil Dump Areas					
2-Butanone	V	X	43/183	0.28	mg/kg
2-Methylnaphthalene	S		0/30	ND	
4,4'-DDT	P		0/5	ND	
3-Methyl-2-pentanone	V	X	1/193	0.0040	mg/kg
4-Nitroaniline	S		0/25	ND	
Acenaphthylene	S		0/30	ND	
Acetone	V	X	30/193	0.22	mg/kg
Benzene	V	X	1/193	0.0030	mg/kg
Benzo(a)anthracene	S	X	1/30	0.10	mg/kg
Benzo(a)pyrene	S	X	2/29	0.13	mg/kg
Benzo(b)fluoranthene	S	X	3/30	0.17	mg/kg
Benzo(ghi)perylene	S		0/30	ND	
Benzo(k)fluoranthene	S	X	1/30	0.06	mg/kg
Benzoic acid	S	X	4/25	0.26	mg/kg
Butyl benzyl phthalate	S		0/30	ND	
Carbon disulfide	V		0/193	ND	
Carbon tetrachloride	V		0/188	ND	
Chloroform	V	X	0/193	ND	
Chrysene	S	X	1/30	0.12	mg/kg
Ethylbenzene	V		0/193	ND	
Fluoranthene	S	X	5/30	0.20	mg/kg
Fluorene	S		0/30	ND	
Heptachlor epoxide	P		0/5	ND	
Hexachlorobutadiene	S		0/30	ND	
Indeno(1,2,3-cd)pyrene	S	X	1/30	0.099	mg/kg
Isophorone	S		0/30	ND	
Methylene chloride	V	X	7/193	0.0030	mg/kg

Attachment 6
Table 7
Subsurface Soil PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
N-Nitrosodiphenylamine	S		0/30	ND	
Phenanthrene	S	X	3/30	0.17	mg/kg
Pyrene	S	X	6/30	0.19	mg/kg
alpha-BHC	P		0/5	ND	
cis-1,3-Dichloropropene	V		0/193	ND	
OU11 West Spray Field					
2-Butanone	V		2/90	0.0040	mg/kg
2-Methylnaphthalene	S		0/127	ND	
3-Methyl-2-pentanone	V		0/98	ND	
4-Nitroaniline	S		0/123	ND	
Acenaphthylene	S		0/127	ND	
Acetone	V		15/82	0.0056	mg/kg
Benzene	V		0/107	ND	
Benzo(a)anthracene	S		0/127	ND	
Benzo(a)pyrene	S		0/127	ND	
Benzo(b)fluoranthene	S		0/127	ND	
Benzo(ghi)perylene	S		0/127	ND	
Benzo(k)fluoranthene	S		0/127	ND	
Benzoic acid	S		0/120	ND	
Butyl benzyl phthalate	S		0/127	ND	
Carbon disulfide	V		0/101	ND	
Carbon tetrachloride	V		0/107	ND	
Chloroform	V		3/108	0.0054	mg/kg
Chrysene	S		0/127	ND	
Ethylbenzene	V		0/107	ND	
Fluoranthene	S		0/127	ND	
Fluorene	S		0/127	ND	
Hexachlorobutadiene	S		0/127	ND	
Indeno(1,2,3-cd)pyrene	S		0/127	ND	
Isophorone	S		0/127	ND	
Methylene chloride	V		39/106	0.0049	mg/kg
N-Nitrosodiphenylamine	S		0/127	ND	
Phenanthrene	S		0/127	ND	
Pyrene	S		0/127	ND	
cis-1,3-Dichloropropene	V		0/107	ND	

ND - analyte not detected

Attachment 6
Table 8
Sediment PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
881 Hillside					
2-Butanone	V		1/3	0.011	mg/kg
2-Methylnaphthalene	S	X	0/3	ND	
4,4'-DDT	P		0/3	ND	
3-Methyl-2-pentanone	V		0/2	ND	
Acenaphthylene	S		0/3	ND	
Acetone	V		1/3	0.036	mg/kg
Benzene	V		0/2	ND	
Benzo(a)anthracene	S	X	0/3	ND	
Benzo(a)pyrene	S	X	0/3	ND	
Benzo(b)fluoranthene	S	X	1/3	0.19	mg/kg
Benzo(ghi)perylene	S	X	0/3	ND	
Benzo(k)fluoranthene	S	X	1/3	0.11	mg/kg
Benzoic acid	S		0/3	ND	
Butyl benzyl phthalate	S		0/3	ND	
Chloroform	V	X	0/2	ND	
Chrysene	S	X	2/3	0.19	mg/kg
Fluoranthene	S	X	2/3	0.38	mg/kg
Fluorene	S	X	0/3	ND	
Heptachlor epoxide	P		0/3	ND	
Indeno(1,2,3-cd)pyrene	S	X	0/3	ND	
Isophorone	S		0/3	ND	
Methylene chloride	V		0/3	ND	
Phenanthrene	S	X	1/3	0.19	mg/kg
Pyrene	S	X	1/3	0.31	mg/kg
OU2 903 Pad					
2-Butanone	V	X	3/15	0.011	mg/kg
2-Methylnaphthalene	S	X	0/13	ND	
4,4'-DDT	P	X	1/15	0.0055	mg/kg
3-Methyl-2-pentanone	V	X	1/17	0.0030	mg/kg
Acenaphthylene	S		0/13	ND	
Acetone	V	X	5/17	0.066	mg/kg
Benzene	V	X	0/17	ND	
Benzo(a)anthracene	S	X	2/13	0.11	mg/kg
Benzo(a)pyrene	S	X	1/13	0.11	mg/kg
Benzo(b)fluoranthene	S	X	2/13	0.12	mg/kg
Benzo(ghi)perylene	S	X	0/13	ND	
Benzo(k)fluoranthene	S		2/13	0.11	mg/kg
Benzoic acid	S	X	0/13	ND	
Butyl benzyl phthalate	S	X	0/13	ND	
Chloroform	V	X	0/17	ND	
Chrysene	S	X	2/13	0.14	mg/kg
Fluoranthene	S	X	3/13	0.23	mg/kg
Fluorene	S	X	0/13	ND	

Attachment 6
Table 8
Sediment PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
Heptachlor epoxide	P		0/15	ND	
Indeno(1,2,3-cd)pyrene	S	X	0/13	ND	
Isophorone	S		0/13	ND	
Methylene chloride	V	X	5/17	0.0091	mg/kg
Phenanthrene	S	X	2/13	0.19	mg/kg
Pyrene	S	X	4/13	0.26	mg/kg
OU5 Ash Pits					
2-Butanone	V	X	1/6	0.30	mg/kg
2-Methylnaphthalene	S	X	0/4	ND	
4,4'-DDT	P		0/5	ND	
3-Methyl-2-pentanone	V	X	0/5	ND	
Acenaphthylene	S	X	0/4	ND	
Acetone	V	X	3/6	1.2	mg/kg
Benzene	V		0/5	ND	
Benzo(a)anthracene	S	X	0/4	ND	
Benzo(a)pyrene	S	X	0/4	ND	
Benzo(b)fluoranthene	S	X	0/4	ND	
Benzo(ghi)perylene	S	X	0/4	ND	
Benzo(k)fluoranthene	S	X	0/4	ND	
Benzoic acid	S	X	1/5	0.27	mg/kg
Butyl benzyl phthalate	S	X	0/4	ND	
Chloroform	V		1/5	0.0030	mg/kg
Chrysene	S	X	0/4	ND	
Fluoranthene	S	X	0/4	ND	
Fluorene	S	X	0/4	ND	
Heptachlor epoxide	P	X	0/5	ND	
Indeno(1,2,3-cd)pyrene	S	X	0/4	ND	
Isophorone	S	X	0/4	ND	
Methylene chloride	V	X	1/6	0.012	mg/kg
Phenanthrene	S	X	0/4	ND	
Pyrene	S	X	0/4	ND	
OU6 A-Ponds					
2-Butanone	V	X	14/25	0.051	mg/kg
2-Methylnaphthalene	S		0/27	ND	
4,4'-DDT	P		0/27	ND	
3-Methyl-2-pentanone	V	X	1/25	0.0060	mg/kg
Acenaphthylene	S		0/27	ND	
Acetone	V	X	3/25	0.23	mg/kg
Benzene	V	X	1/25	0.0030	mg/kg
Benzo(a)anthracene	S	X	7/27	0.27	mg/kg
Benzo(a)pyrene	S	X	9/27	0.28	mg/kg
Benzo(b)fluoranthene	S	X	9/27	0.31	mg/kg
Benzo(ghi)perylene	S		4/27	0.21	mg/kg
Benzo(k)fluoranthene	S	X	5/27	0.20	mg/kg

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Table 8
Sediment PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
Benzoic acid	S	X	8/27	0.50	mg/kg
Butyl benzyl phthalate	S		0/27	ND	
Chloroform	V	X	0/25	ND	
Chrysene	S	X	13/27	0.27	mg/kg
Fluoranthene	S	X	13/27	0.41	mg/kg
Fluorene	S		0/27	ND	
Heptachlor epoxide	P		0/27	ND	
Indeno(1,2,3-cd)pyrene	S	X	4/27	0.20	mg/kg
Isophorone	S		0/27	ND	
Methylene chloride	V	X	0/25	ND	
Phenanthrene	S	X	12/27	0.31	mg/kg
Pyrene	S	X	15/27	0.34	mg/kg
OU6 B-Ponds					
2-Butanone	V	X	12/24	0.029	mg/kg
2-Methylnaphthalene	S		1/33	0.17	mg/kg
4,4'-DDT	P		0/33	ND	
3-Methyl-2-pentanone	V	X	0/24	ND	
Acenaphthylene	S		0/33	ND	
Acetone	V	X	9/24	0.19	mg/kg
Benzene	V	X	0/24	ND	
Benzo(a)anthracene	S	X	16/33	0.43	mg/kg
Benzo(a)pyrene	S	X	15/33	0.40	mg/kg
Benzo(b)fluoranthene	S	X	18/33	0.85	mg/kg
Benzo(ghi)perylene	S		2/33	0.27	mg/kg
Benzo(k)fluoranthene	S	X	14/33	0.41	mg/kg
Benzoic acid	S	X	0/33	ND	
Butyl benzyl phthalate	S		2/33	0.11	mg/kg
Chloroform	V	X	0/24	ND	
Chrysene	S	X	18/33	0.61	mg/kg
Fluoranthene	S	X	26/33	1.1	mg/kg
Fluorene	S		2/33	0.35	mg/kg
Heptachlor epoxide	P		0/34	ND	
Indeno(1,2,3-cd)pyrene	S	X	4/33	0.35	mg/kg
Isophorone	S		0/33	ND	
Methylene chloride	V	X	1/24	0.0090	mg/kg
Phenanthrene	S	X	20/33	0.74	mg/kg
Pyrene	S	X	23/33	0.95	mg/kg
OU5 C-Ponds					
2-Butanone	V	X	5/21	0.027	mg/kg
2-Methylnaphthalene	S	X	0/24	ND	
4,4'-DDT	P		0/28	ND	
3-Methyl-2-pentanone	V	X	0/27	ND	
Acenaphthylene	S	X	0/24	ND	
Acetone	V	X	6/26	0.12	mg/kg

Attachment 6
Table 8
Sediment PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
Benzene	V		0/27	ND	
Benzo(a)anthracene	S	X	0/24	ND	
Benzo(a)pyrene	S	X	0/24	ND	
Benzo(b)fluoranthene	S	X	0/24	ND	
Benzo(ghi)perylene	S	X	0/24	ND	
Benzo(k)fluoranthene	S	X	0/24	ND	
Benzoic acid	S	X	4/25	0.49	mg/kg
Butyl benzyl phthalate	S	X	1/24	0.057	mg/kg
Chloroform	V		0/27	ND	
Chrysene	S	X	0/24	ND	
Fluoranthene	S	X	1/24	0.14	mg/kg
Fluorene	S	X	0/24	ND	
Heptachlor epoxide	P	X	0/28	ND	
Indeno(1,2,3-cd)pyrene	S	X	0/24	ND	
Isophorone	S	X	0/24	ND	
Methylene chloride	V	X	4/27	0.020	mg/kg
Phenanthrene	S	X	0/24	ND	
Pyrene	S	X	0/24	ND	
OU7 Downgradient Areas					
2-Butanone	V		0/5	ND	
2-Methylnaphthalene	S		0/5	ND	
4,4'-DDT	P		0/4	ND	
3-Methyl-2-pentanone	V	X	0/5	ND	
Acenaphthylene	S		0/5	ND	
Acetone	V		1/5	0.038	mg/kg
Benzene	V		0/5	ND	
Benzo(a)anthracene	S	X	2/5	0.29	mg/kg
Benzo(a)pyrene	S		2/5	0.24	mg/kg
Benzo(b)fluoranthene	S		2/5	0.19	mg/kg
Benzo(ghi)perylene	S		1/5	0.089	mg/kg
Benzo(k)fluoranthene	S		2/5	0.27	mg/kg
Benzoic acid	S		0/4	ND	
Butyl benzyl phthalate	S	X	0/5	ND	
Chloroform	V		0/5	ND	
Chrysene	S	X	2/5	0.31	mg/kg
Fluoranthene	S	X	2/5	0.45	mg/kg
Fluorene	S		0/5	ND	
Heptachlor epoxide	P		0/4	ND	
Indeno(1,2,3-cd)pyrene	S		2/5	0.16	mg/kg
Isophorone	S		0/5	ND	
Methylene chloride	V	X	0/4	ND	
Phenanthrene	S	X	2/5	0.31	mg/kg
Pyrene	S	X	2/5	0.43	mg/kg

Attachment 6
Table 8
Sediment PCOCs Without Vegetation TRVs

Analyte	Group	PCOC	Detection Frequency	Exposure Point Concentration	Units
OU5 Old Landfill					
2-Butanone	V	X	0/3	ND	
2-Methylnaphthalene	S	X	0/3	ND	
4,4'-DDT	P		0/3	ND	
3-Methyl-2-pentanone	V	X	0/3	ND	
Acenaphthylene	S	X	0/3	ND	
Acetone	V	X	1/3	0.046	mg/kg
Benzene	V		0/3	ND	
Benzo(a)anthracene	S	X	1/3	0.038	mg/kg
Benzo(a)pyrene	S	X	0/3	ND	
Benzo(b)fluoranthene	S	X	0/3	ND	
Benzo(ghi)perylene	S	X	0/3	ND	
Benzo(k)fluoranthene	S	X	0/3	ND	
Benzoic acid	S	X	0/3	ND	
Butyl benzyl phthalate	S	X	0/3	ND	
Chloroform	V		0/3	ND	
Chrysene	S	X	1/3	0.041	mg/kg
Fluoranthene	S	X	2/3	0.097	mg/kg
Fluorene	S	X	0/3	ND	
Heptachlor epoxide	P	X	0/3	ND	
Indeno(1,2,3-cd)pyrene	S	X	0/3	ND	
Isophorone	S	X	0/3	ND	
Methylene chloride	V	X	0/3	ND	
Phenanthrene	S	X	2/3	0.082	mg/kg
Pyrene	S	X	2/3	0.097	mg/kg

ND - analyte not detected

Attachment 6
Table 9
Small Mammal Burrow Air ECOC Screen

Analyte	OU2 PCOC	Molecular Weight[1] (grams/mole)	Henry's Law Constant[2] (atm m³/mole)	Maximum Detected Concentration in Subsurface Soil[1] (mg/kg)	Molar Concentration in Subsurface Soil[3] (mole/m³)	Partial Pressure (V_p) (atm)	Estimated Concentration in Burrow Air (mg/m³)	Inhalation TRV from IRIS (mg/m³)	Hazard Quotient	Effects Level (atm)	Effects Level in Soil (mole/m³)	Equivalent Effects Level in Soil (mg/kg)
903 Pad												
1,1,1-Trichloroethane	X	133	1.62E-02	1.00E-02	1.50E-04	2.44E-06	1.41E+01	ND[4]	NC	NC	NC	NC
1,1,2,2-Tetrachloroethane	X	168	3.80E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,1-Dichloroethene		97	1.80E-02	3.00E-03	6.19E-05	1.11E-06	4.70E+00	ND	NC	NC	NC	NC
1,2-Dichloroethane	X	99	9.80E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,2-Dichloroethene	X	97	7.20E-03	9.00E-03	1.86E-04	1.34E-06	5.64E+00	ND	NC	NC	NC	NC
1,4-Dichlorobenzene	X	147	3.10E-03	4.30E-02	5.85E-04	1.81E-06	1.16E+01	301	3.85E-02	4.71E-05	1.52E-02	1.12E+00
2-Butanone	X	72	4.66E-05	1.00E-01	2.78E-03	1.29E-07	4.05E-01	2978	1.36E-04	9.51E-04	2.04E+01	7.35E+02
2-Chloroethyl vinyl ether	X	107	2.50E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
2-Chlorophenol		129	8.28E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
2-Methylnaphthalene	X	142	ND	ND	NC	NC	NC	ND	NC	NC	NC	NC
2-Methylphenol	X	108	1.23E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
4,4'-DDT	X	354	4.89E-05	ND	NC	NC	NC	ND	NC	NC	NC	NC
4-Methyl-2-pentanone	X	100	1.49E-05	4.20E+01	8.40E-01	1.25E-05	5.44E+01	ND[4]	NC	NC	NC	NC
4-Methylphenol	X	108	7.92E-07	ND	NC	NC	NC	ND	NC	NC	NC	NC
4-Nitroaniline	X	138	1.14E-08	ND	NC	NC	NC	ND[5]	NC	NC	NC	NC
Acenaphthene	X	154	1.70E-04	6.30E-02	8.18E-04	1.39E-07	9.31E-01	ND	NC	NC	NC	NC
Acenaphthylene		152	2.00E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
Acetone	X	58	3.97E-05	1.30E+01	4.48E-01	1.78E-05	4.49E+01	ND	NC	NC	NC	NC
Anthracene	X	178	6.50E-05	9.10E-02	1.02E-03	6.65E-08	5.14E-01	ND[4]	NC	NC	NC	NC
Aroclor-1254	X	327	2.70E-03	5.90E+00	3.61E-02	9.74E-05	1.39E+03	ND	NC	NC	NC	NC
Aroclor-1260		370	7.10E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
Benzene	X	78	5.40E-03	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Benzo(a)anthracene	X	228	2.30E-06	2.50E-01	2.19E-03	5.04E-09	5.00E-02	ND[4]	NC	NC	NC	NC
Benzo(a)pyrene	X	252	2.40E-06	3.50E-01	2.78E-03	6.67E-09	7.31E-02	ND	NC	NC	NC	NC
Benzo(b)fluoranthene	X	252	1.20E-05	2.30E-01	1.83E-03	2.19E-08	2.40E-01	ND	NC	NC	NC	NC
Benzo(ghi)perylene	X	276	1.40E-07	ND	NC	NC	NC	ND	NC	NC	NC	NC
Benzo(k)fluoranthene		252	1.04E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
Benzoic acid	X	122	7.02E-08	ND	NC	NC	NC	ND	NC	NC	NC	NC
Bis(2-ethylhexyl)phthalate	X	391	1.10E-05	4.50E+00	2.30E-02	2.53E-07	4.31E+00	ND	NC	NC	NC	NC
Butyl benzyl phthalate	X	312	1.30E-06	5.20E-01	3.33E-03	4.33E-09	5.88E-02	ND	NC	NC	NC	NC
Carbon disulfide	X	76	1.33E-02	4.00E-03	1.05E-04	1.40E-06	4.63E+00	ND[4]	NC	NC	NC	NC
Carbon tetrachloride	X	154	2.40E-02	2.30E-01	2.99E-03	7.17E-05	4.80E+02	ND	NC	NC	NC	NC
Chlorobenzene		113	3.93E-03	1.10E-02	1.95E-04	7.65E-07	3.76E+00	ND	NC	NC	NC	NC
Chloroethane	X	65	1.00E-02	ND	NC	NC	NC	4000	NC	1.42E-03	1.42E-01	4.60E+00
Chloroform	X	119	3.23E-03	6.30E+01	1.06E+00	3.42E-03	1.77E+04	ND[4]	NC	NC	NC	NC
Chrysene	X	228	7.26E-02	3.00E-01	2.63E-03	1.91E-04	1.89E+03	ND	NC	NC	NC	NC
Di-N-butyl phthalate	X	278	6.30E-05	6.90E-01	4.96E-03	3.13E-07	3.78E+00	ND	NC	NC	NC	NC
Di-N-octyl phthalate	X	391	1.41E-12	7.50E-02	3.84E-04	5.41E-16	9.20E-09	ND[5]	NC	NC	NC	NC
Dibenzo(ah)anthracene		278	7.33E-09	ND	NC	NC	NC	ND	NC	NC	NC	NC
Dibenzofuran		168	ND	ND	NC	NC	NC	ND	NC	NC	NC	NC
Diethyl phthalate		222	8.46E-07	8.20E-02	7.39E-04	6.25E-10	6.03E-03	ND	NC	NC	NC	NC

Attachment 6
Table 9
Small Mammal Burrow Air ECOC Screen

Analyte	OU2 PCOC	Molecular Weight[1] (grams/mole)	Henry's Law Constant[2] (atm m³/mole)	Maximum Detected Concentration in Subsurface Soil[1] (mg/kg)	Molar Concentration in Subsurface Soil[3] (mole/m³)	Partial Pressure (V_p) (atm)	Estimated Concentration in Burrow Air (mg/m³)	Inhalation TRV from IRIS (mg/m³)	Hazard Quotient	Effects Level (atm)	Effects Level in Soil (mole/m³)	Equivalent Effects Level in Soil (mg/kg)
Ethylbenzene	X	106	6.60E-03	2.00E-03	3.77E-05	2.49E-07	1.15E+00	434	2.65E-03	9.42E-05	1.43E-02	7.56E-01
Fluoranthene	X	202	1.69E-02	4.70E+01	4.65E-01	7.86E-03	6.91E+04	ND[4]	NC	NC	NC	NC
Fluorene	X	166	2.10E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
Heptachlor epoxide		389	3 20E-05	ND	NC	NC	NC	ND	NC	NC	NC	NC
Hexachlorobutadiene	X	261	1 03E-02	ND	NC	NC	NC	ND	NC	NC	NC	NC
Hexachloroethane	X	237	2.50E-03	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	X	276	2.96E-20	ND	NC	NC	NC	ND	NC	NC	NC	NC
Isophorone		138	5.80E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
Methylene chloride	X	85	2.00E-03	9.00E+00	2.12E-01	4.24E-04	1.57E+03	ND[4]	NC	NC	NC	NC
N-Nitrosodiphenylamine	X	198	2.33E-08	ND	NC	NC	NC	ND	NC	NC	NC	NC
Naphthalene	X	128	4.60E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
Pentachlorophenol	X	266	2.10E-06	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Phenanthrene	X	178	3.90E-05	4.20E+01	4.72E-01	1.84E-05	1.42E+02	ND[4]	NC	NC	NC	NC
Phenol		94	2.70E-07	ND	NC	NC	NC	ND	NC	NC	NC	NC
Pyrene	X	202	1.09E-05	5.10E+01	5.05E-01	5.50E-06	4.83E+01	ND[4]	NC	NC	NC	NC
Styrene	X	104	2.61E-03	ND	NC	NC	NC	94	NC	2.08E-05	7.96E-03	4.14E-01
Tetrachloroethene	X	166	1.53E-02	1.10E-01	1.33E-03	2.03E-05	1.46E+02	ND	NC	NC	NC	NC
Toluene	X	92	6.70E-03	7.30E+02	1.59E+01	1.06E-01	4.25E+05	226.1	1.88E+03	5.65E-05	8.44E-03	3.88E-01
Total xylenes	X	106	6.46E-03	8.90E-02	1.68E-03	1.08E-05	5.00E+01	ND[4]	NC	NC	NC	NC
Trichloroethene	X	131	9.10E-03	5.70E+00	8.70E-02	7.92E-04	4.51E+03	ND[4]	NC	NC	NC	NC
alpha-BHC		291	5.30E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
cis-1,3-Dichloropropene	X	111	1.30E-03	ND	NC	NC	NC	20.9	NC	4.33E-06	3.33E-03	1.85E-01
								HAZARD INDEX	***1.88E+03***			
East Trenches												
1,1,1-Trichloroethane	X	133	1.62E-02	2.70E+01	4.06E-01	6.58E-03	3.80E+04	ND[4]	NC	NC	NC	NC
1,1,2,2-Tetrachloroethane	X	168	3.80E-04	1.30E-02	1.55E-04	5.88E-08	4.30E-01	ND	NC	NC	NC	NC
1,1-Dichloroethene		97	1.80E-02	9.00E-03	1.86E-04	3.34E-06	1.41E+01	ND	NC	NC	NC	NC
1,2-Dichloroethane	X	99	9.80E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,2-Dichloroethene	X	97	7.20E-03	9.00E-02	1.86E-03	1.34E-05	5.64E+01	ND	NC	NC	NC	NC
1,4-Dichlorobenzene	X	147	3.10E-03	ND	NC	NC	NC	301	NC	4.71E-05	1.52E-02	1.12E+00
2-Butanone	X	72	4.66E-05	6.70E-02	1.86E-03	8.67E-08	2.72E-01	2978	9.12E-05	9.51E-04	2.04E+01	7.35E+02
2-Chloroethyl Vinyl Ether	X	107	2.50E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
2-Chlorophenol		129	8.28E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
2-Methylnaphthalene	X	142	ND	8.10E+00	1.14E-01	NC	NC	ND	NC	NC	NC	NC
2-Methylphenol	X	108	1.23E-06	4.50E-01	8.33E-03	1.03E-08	4.81E-02	ND	NC	NC	NC	NC
4,4'-DDT	X	354	4.89E-05	1.40E-01	7.91E-04	3.87E-08	5.95E-01	ND	NC	NC	NC	NC
4-Methyl-2-pentanone	X	100	1.49E-05	2.10E-02	4.20E-04	6.26E-09	2.72E-02	ND[4]	NC	NC	NC	NC
4-Methylphenol	X	108	7.92E-07	2.90E+00	5.37E-02	4.25E-08	2.00E-01	ND	NC	NC	NC	NC
4-Nitroaniline	X	138	1.14E-08	ND	NC	NC	NC	ND[5]	NC	NC	NC	NC
Acenaphthene	X	154	1.70E-04	2.80E-01	3.64E-03	6.18E-07	4.14E+00	ND	NC	NC	NC	NC
Acenaphthylene		152	2.00E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
Acetone	X	58	3.97E-05	8.60E+01	2.97E+00	1.18E-04	2.97E+02	ND	NC	NC	NC	NC

Attachment 6
Table 9
Small Mammal Burrow Air ECOC Screen

Analyte	OU2 PCOC	Molecular Weight[1] (grams/mole)	Henry's Law Constant[2] (atm m^3/mole)	Maximum Detected Concentration in Subsurface Soil[1] (mg/kg)	Molar Concentration in Subsurface Soil[3] (mole/m^3)	Partial Pressure (V_p) (atm)	Estimated Concentration in Burrow Air (mg/m^3)	Inhalation TRV from IRIS (mg/m^3)	Hazard Quotient	Effects Level (atm)	Effects Level in Soil (mole/m^3)	Equivalent Effects Level in Soil (mg/kg)
Anthracene	X	178	6.50E-05	2.60E-01	2.92E-03	1.90E-07	1.47E+00	ND[4]	NC	NC	NC	NC
Aroclor-1254	X	327	2.70E-03	8.90E+00	5.44E-02	1.47E-04	2.09E+03	ND	NC	NC	NC	NC
Aroclor-1260		370	7.10E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
Benzene	X	78	5.40E-03	1.40E-02	3.59E-04	1.94E-06	6.57E+00	ND[4]	NC	NC	NC	NC
Benzo(a)anthracene	X	228	2.30E-06	5.30E-01	4.65E-03	1.07E-08	1.06E-01	ND[4]	NC	NC	NC	NC
Benzo(a)pyrene	X	252	2.40E-06	4.80E-01	3.81E-03	9.14E-09	1.00E-01	ND	NC	NC	NC	NC
Benzo(b)fluoranthene	X	252	1.20E-05	8.20E-01	6.51E-03	7.81E-08	8.56E-01	ND	NC	NC	NC	NC
Benzo(ghi)perylene	X	276	1.40E-07	3.60E-01	2.61E-03	3.65E-10	4.38E-03	ND	NC	NC	NC	NC
Benzo(k)fluoranthene		252	1.04E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
Benzoic acid	X	122	7.02E-08	4.00E-01	6.56E-03	4.60E-10	2.44E-03	ND	NC	NC	NC	NC
Bis(2-ethylhexyl)phthalate	X	391	1.10E-05	5.50E+00	2.81E-02	3.09E-07	5.26E+00	ND	NC	NC	NC	NC
Butyl benzyl phthalate	X	312	1.30E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
Carbon disulfide	X	76	1.33E-02	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Carbon tetrachloride	X	154	2.40E-02	7.00E+02	9.09E+00	2.18E-01	1.46E+06	ND	NC	NC	NC	NC
Chlorobenzene		113	3.93E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
Chloroethane	X	65	1.00E-02	ND	NC	NC	NC	4000	NC	1.42E-03	1.42E-01	4.60E+00
Chloroform	X	119	3.23E-03	8.80E+00	1.48E-01	4.78E-04	2.47E+03	ND[4]	NC	NC	NC	NC
Chrysene	X	228	7.26E-02	4.20E-01	3.68E-03	2.67E-04	2.65E+03	ND	NC	NC	NC	NC
Di-N-butyl phthalate	X	278	6.30E-05	1.30E+00	9.35E-03	5.89E-07	7.12E+00	ND	NC	NC	NC	NC
Di-N-octyl phthalate	X	391	1.41E-12	ND	NC	NC	NC	ND[5]	NC	NC	NC	NC
Dibenzo(ah)anthracene		278	7.33E-09	ND	NC	NC	NC	ND	NC	NC	NC	NC
Dibenzofuran		168	ND	ND	NC	NC	NC	ND	NC	NC	NC	NC
Diethyl phthalate		222	8.46E-07	1.60E-01	1.44E-03	1.22E-09	1.18E-02	ND	NC	NC	NC	NC
Ethylbenzene	X	106	6.60E-03	2.60E-02	4.91E-04	3.24E-06	1.49E+01	434	3.44E-02	9.42E-05	1.43E-02	7.56E-01
Fluoranthene	X	202	1.69E-02	1.00E+00	9.90E-03	1.67E-04	1.47E+03	ND[4]	NC	NC	NC	NC
Fluorene	X	166	2.10E-04	1.90E-01	2.29E-03	4.81E-07	3.47E+00	ND	NC	NC	NC	NC
Heptachlor epoxide		389	3.20E-05	ND	NC	NC	NC	ND	NC	NC	NC	NC
Hexachlorobutadiene	X	261	1.03E-02	1.70E-01	1.30E-03	1.34E-05	1.52E+02	ND	NC	NC	NC	NC
Hexachloroethane	X	237	2.50E-03	1.10E+00	9.28E-03	2.32E-05	2.39E+02	ND[4]	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	X	276	2.96E-20	3.30E-01	2.39E-03	7.08E-23	8.50E-16	ND	NC	NC	NC	NC
Isophorone		138	5.80E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
Methylene chloride	X	85	2.00E-03	5.50E+01	1.29E+00	2.59E-03	9.57E+03	ND[4]	NC	NC	NC	NC
N-Nitrosodiphenylamine	X	198	2.33E-08	ND	NC	NC	NC	ND	NC	NC	NC	NC
Naphthalene	X	128	4.60E-04	2.00E+00	3.13E-02	1.44E-05	8.00E+01	ND	NC	NC	NC	NC
Pentachlorophenol	X	266	2.10E-06	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Phenanthrene	X	178	3.90E-05	2.70E+00	3.03E-02	1.18E-06	9.16E+00	ND[4]	NC	NC	NC	NC
Phenol		94	2.70E-07	ND	NC	NC	NC	ND	NC	NC	NC	NC
Pyrene	X	202	1.09E-05	1.30E+00	1.29E-02	1.40E-07	1.23E+00	ND[4]	NC	NC	NC	NC
Styrene	X	104	2.61E-03	ND	NC	NC	NC	94	NC	2.08E-05	7.96E-03	4.14E-01
Tetrachloroethene	X	166	1.53E-02	1.30E+04	1.57E+02	2.40E+00	1.73E+07	ND	NC	NC	NC	NC
Toluene	X	92	6.70E-03	7.60E+00	1.65E-01	1.11E-03	4.43E+03	226.1	1.96E+01	5.65E-05	8.44E-03	3.88E-01
Total xylenes	X	106	6.46E-03	2.30E-01	4.34E-03	2.80E-05	1.29E+02	ND[4]	NC	NC	NC	NC

Attachment 6
Table 9
Small Mammal Burrow Air ECOC Screen

Analyte	OU2 PCOC	Molecular Weight[1] (grams/mole)	Henry's Law Constant[2] (atm m³/mole)	Maximum Detected Concentration in Subsurface Soil[1] (mg/kg)	Molar Concentration in Subsurface Soil[3] (mole/m³)	Partial Pressure (V_p) (atm)	Estimated Concentration in Burrow Air (mg/m³)	Inhalation TRV from IRIS (mg/m³)	Hazard Quotient	Effects Level (atm)	Effects Level in Soil (mole/m³)	Equivalent Effects Level in Soil (mg/kg)
Trichloroethene	X	131	9.10E-03	1.20E+02	1.83E+00	1.67E-02	9.50E+04	ND[4]	NC	NC	NC	NC
alpha-BHC		291	5.30E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
cis-1,3-Dichloropropene	X	111	1.30E-03	ND	NC	NC	NC	20.9	NC	4.33E-06	3.33E-03	1.85E-01
								HAZARD INDEX	***1.96E+01***			
Mound Area												
1,1,1-Trichloroethane	X	133	1.62E-02	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
1,1,2,2-Tetrachloroethane	X	168	3.80E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,1-Dichloroethene		97	1.80E-02	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,2-Dichloroethane	X	99	9.80E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,2-Dichloroethene	X	97	7.20E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,4-Dichlorobenzene	X	147	3.10E-03	ND	NC	NC	NC	301	NC	4.71E-05	1.52E-02	1.12E+00
2-Butanone	X	72	4.66E-05	1.90E-02	5.28E-04	2.46E-08	7.70E-02	2978	2.59E-05	9.51E-04	2.04E+01	7.35E+02
2-Chloroethyl vinyl ether	X	107	2.50E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
2-Chlorophenol		129	8.28E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
2-Methylnaphthalene	X	142	ND	ND	NC	NC	NC	ND	NC	NC	NC	NC
2-Methylphenol	X	108	1.23E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
4,4'-DDT	X	354	4.89E-05	ND	NC	NC	NC	ND	NC	NC	NC	NC
4-Methyl-2-pentanone	X	100	1.49E-05	3.00E-03	6.00E-05	8.94E-10	3.89E-03	ND[4]	NC	NC	NC	NC
4-Methylphenol	X	108	7.92E-07	ND	NC	NC	NC	ND	NC	NC	NC	NC
4-Nitroaniline	X	138	1.14E-08	ND	NC	NC	NC	ND[5]	NC	NC	NC	NC
Acenaphthene	X	154	1.70E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
Acenaphthylene		152	2.00E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
Acetone	X	58	3.97E-05	2.70E-02	9.31E-04	3.70E-08	9.32E-02	ND	NC	NC	NC	NC
Anthracene	X	178	6.50E-05	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Aroclor-1254	X	327	2.70E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
Aroclor-1260		370	7.10E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
Benzene	X	78	5.40E-03	3.00E-03	7.69E-05	4.15E-07	1.41E+00	ND[4]	NC	NC	NC	NC
Benzo(a)anthracene	X	228	2.30E-06	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Benzo(a)pyrene	X	252	2.40E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
Benzo(b)fluoranthene	X	252	1.20E-05	ND	NC	NC	NC	ND	NC	NC	NC	NC
Benzo(ghi)perylene	X	276	1.40E-07	ND	NC	NC	NC	ND	NC	NC	NC	NC
Benzo(k)fluoranthene		252	1.04E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
Benzoic acid	X	122	7.02E-08	ND	NC	NC	NC	ND	NC	NC	NC	NC
Bis(2-ethylhexyl)phthalate	X	391	1.10E-05	4.90E+00	2.51E-02	2.76E-07	4.69E+00	ND	NC	NC	NC	NC
Butyl benzyl phthalate	X	312	1.30E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
Carbon disulfide	X	76	1.33E-02	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Carbon tetrachloride	X	154	2.40E-02	1.50E-02	1.95E-04	4.68E-06	3.13E+01	ND	NC	NC	NC	NC
Chlorobenzene		113	3.93E-03	3.00E-03	5.31E-05	2.09E-07	1.03E+00	ND	NC	NC	NC	NC
Chloroethane	X	65	1.00E-02	ND	NC	NC	NC	4000	NC	1.42E-03	1.42E-01	4.60E+00
Chloroform	X	119	3.23E-03	6.60E-02	1.11E-03	3.58E-06	1.85E+01	ND[4]	NC	NC	NC	NC
Chrysene	X	228	7.26E-02	ND	NC	NC	NC	ND	NC	NC	NC	NC
Di-N-butyl phthalate	X	278	6.30E-05	1.70E-01	1.22E-03	7.71E-08	9.31E-01	ND	NC	NC	NC	NC

Attachment 6
Table 9
Small Mammal Burrow Air ECOC Screen

Analyte	OU2 PCOC	Molecular Weight[1] (grams/mole)	Henry's Law Constant[2] (atm m³/mole)	Maximum Detected Concentration in Subsurface Soil[1] (mg/kg)	Molar Concentration in Subsurface Soil[3] (mole/m³)	Partial Pressure (V_p) (atm)	Estimated Concentration in Burrow Air (mg/m³)	Inhalation TRV from IRIS (mg/m³)	Hazard Quotient	Effects Level (atm)	Effects Level in Soil (mole/m³)	Equivalent Effects Level in Soil (mg/kg)
Di-N-octyl phthalate	X	391	1.41E-12	ND	NC	NC	NC	ND[5]	NC	NC	NC	NC
Dibenzo(ah)anthracene		278	7.33E-09	ND	NC	NC	NC	ND	NC	NC	NC	NC
Dibenzofuran		168	ND	ND	NC	NC	NC	ND	NC	NC	NC	NC
Diethyl phthalate		222	8.46E-07	ND	NC	NC	NC	ND	NC	NC	NC	NC
Ethylbenzene	X	106	6.60E-03	ND	NC	NC	NC	434	NC	9.42E-05	1.43E-02	7.56E-01
Fluoranthene	X	202	1.69E-02	1.10E-01	1.09E-03	1.84E-05	1.62E+02	ND[4]	NC	NC	NC	NC
Fluorene	X	166	2.10E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
Heptachlor epoxide		389	3.20E-05	ND	NC	NC	NC	ND	NC	NC	NC	NC
Hexachlorobutadiene	X	261	1.03E-02	ND	NC	NC	NC	ND	NC	NC	NC	NC
Hexachloroethane	X	237	2.50E-03	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	X	276	2.96E-20	ND	NC	NC	NC	ND	NC	NC	NC	NC
Isophorone		138	5.80E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
Methylene chloride	X	85	2.00E-03	3.00E-02	7.06E-04	1.41E-06	5.22E+00	ND[4]	NC	NC	NC	NC
N-Nitrosodiphenylamine	X	198	2.33E-08	ND	NC	NC	NC	ND	NC	NC	NC	NC
Naphthalene	X	128	4.60E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
Pentachlorophenol	X	266	2.10E-06	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Phenanthrene	X	178	3.90E-05	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Phenol		94	2.70E-07	ND	NC	NC	NC	ND	NC	NC	NC	NC
Pyrene	X	202	1.09E-05	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Styrene	X	104	2.61E-03	ND	NC	NC	NC	94	NC	2.08E-05	7.96E-03	4.14E-01
Tetrachloroethene	X	166	1.53E-02	1.80E-01	2.17E-03	3.32E-05	2.40E+02	ND	NC	NC	NC	NC
Toluene	X	92	6.70E-03	2.20E-01	4.78E-03	3.20E-05	1.28E+02	226.1	5.67E-01	5.65E-05	8.44E-03	3.88E-01
Total xylenes	X	106	6.46E-03	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Trichloroethene	X	131	9.10E-03	6.70E-02	1.02E-03	9.31E-06	5.30E+01	ND[4]	NC	NC	NC	NC
alpha-BHC		291	5.30E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
cis-1,3-Dichloropropene	X	111	1.30E-03	ND	NC	NC	NC	20.9	NC	4.33E-06	3.33E-03	1.85E-01
								HAZARD INDEX	***5.67E-01***			
Old Landfill												
1,1,1-Trichloroethane	X	133	1.62E-02	2.00E-03	3.01E-05	4.87E-07	2.82E+00	ND[4]	NC	NC	NC	NC
1,1,2,2-Tetrachloroethane	X	168	3.80E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,1-Dichloroethene		97	1.80E-02	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,2-Dichloroethane	X	99	9.80E-04	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,2-Dichloroethene	X	97	7.20E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
1,4-Dichlorobenzene	X	147	3.10E-03	ND	NC	NC	NC	301	NC	4.71E-05	1.52E-02	1.12E+00
2-Butanone	X	72	4.66E-05	6.90E-02	1.92E-03	8.93E-08	2.80E-01	2978	9.39E-05	9.51E-04	2.04E+01	7.35E+02
2-Chlorophenol		129	8.28E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
2-Methylnaphthalene	X	142	ND	1.50E+01	2.11E-01	NC	NC	ND	NC	NC	NC	NC
2-Methylphenol	X	108	1.23E-06	ND	NC	NC	NC	ND	NC	NC	NC	NC
4,4'-DDT	X	354	4.89E-05	ND	NC	NC	NC	ND	NC	NC	NC	NC
4-Methyl-2-pentanone	X	100	1.49E-05	2.00E-03	4.00E-05	5.96E-10	2.59E-03	ND[4]	NC	NC	NC	NC
4-Methylphenol	X	108	7.92E-07	ND	NC	NC	NC	ND	NC	NC	NC	NC
4-Nitroaniline	X	138	1.14E-08	ND	NC	NC	NC	ND[5]	NC	NC	NC	NC

Attachment 6
Table 9
Small Mammal Burrow Air ECOC Screen

Analyte	OU2 PCOC	Molecular Weight[1] (grams/mole)	Henry's Law Constant[2] (atm m³/mole)	Maximum Detected Concentration in Subsurface Soil[1] (mg/kg)	Molar Concentration in Subsurface Soil[3] (mole/m³)	Partial Pressure (V_p) (atm)	Estimated Concentration in Burrow Air (mg/m³)	Inhalation TRV from IRIS (mg/m³)	Hazard Quotient	Effects Level (atm)	Effects Level in Soil (mole/m³)	Equivalent Effects Level in Soil (mg/kg)
Acenaphthene	X	154	1.70E-04	3.10E+01	4.03E-01	6.84E-05	4.58E+02	ND	NC	NC	NC	NC
Acenaphthylene		152	2.00E-04	8.40E-02	1.11E-03	2.21E-07	1.46E+00	ND	NC	NC	NC	NC
Acetone	X	58	3.97E-05	2.80E-01	9.66E-03	3.83E-07	9.67E-01	ND	NC	NC	NC	NC
Anthracene	X	178	6.50E-05	4.60E+01	5.17E-01	3.36E-05	2.60E+02	ND[4]	NC	NC	NC	NC
Aroclor-1254	X	327	2.70E-03	9.60E-01	5.87E-03	1.59E-05	2.25E+02	ND	NC	NC	NC	NC
Aroclor-1260		370	7.10E-03	1.30E+00	7.03E-03	4.99E-05	8.03E+02	ND	NC	NC	NC	NC
Benzene	X	78	5.40E-03	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Benzo(a)anthracene	X	228	2.30E-06	4.80E+01	4.21E-01	9.68E-07	9.60E+00	ND[4]	NC	NC	NC	NC
Benzo(a)pyrene	X	252	2.40E-06	4.30E+01	3.41E-01	8.19E-07	8.98E+00	ND	NC	NC	NC	NC
Benzo(b)fluoranthene	X	252	1.20E-05	4.80E+01	3.81E-01	4.57E-06	5.01E+01	ND	NC	NC	NC	NC
Benzo(ghi)perylene	X	276	1.40E-07	1.10E+01	7.97E-02	1.12E-08	1.34E-01	ND	NC	NC	NC	NC
Benzo(k)fluoranthene		252	1.04E-03	1.90E+01	1.51E-01	1.57E-04	1.72E+03	ND	NC	NC	NC	NC
Benzoic acid	X	122	7.02E-08	4.80E-01	7.87E-03	5.52E-10	2.93E-03	ND	NC	NC	NC	NC
Bis(2-ethylhexyl)phthalate	X	391	1.10E-05	2.90E-01	1.48E-03	1.63E-08	2.77E-01	ND	NC	NC	NC	NC
Butyl benzyl phthalate	X	312	1.30E-06	3.60E-01	2.31E-03	3.00E-09	4.07E-02	ND	NC	NC	NC	NC
Carbon disulfide	X	76	1.33E-02	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Carbon tetrachloride	X	154	2.40E-02	ND	NC	NC	NC	ND	NC	NC	NC	NC
Chlorobenzene		113	3.93E-03	ND	NC	NC	NC	ND	NC	NC	NC	NC
Chloroethane	X	65	1.00E-02	ND	NC	NC	NC	4000	NC	1.42E-03	1.42E-01	4.60E+00
Chloroform	X	119	3.23E-03	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Chrysene	X	228	7.26E-02	5.30E+01	4.65E-01	3.38E-02	3.35E+05	ND	NC	NC	NC	NC
Di-N-butyl Phthalate	X	278	6.30E-05	3.00E-01	2.16E-03	1.36E-07	1.64E+00	ND	NC	NC	NC	NC
Di-N-octyl Phthalate	X	391	1.41E-12	ND	NC	NC	NC	ND[5]	NC	NC	NC	NC
Dibenzo(ah)anthracene		278	7.33E-09	5.90E-01	4.24E-03	3.11E-11	3.76E-04	ND	NC	NC	NC	NC
Dibenzofuran		168	ND	2.00E+01	2.38E-01	NC	NC	ND	NC	NC	NC	NC
Diethyl phthalate		222	8.46E-07	ND	NC	NC	NC	ND	NC	NC	NC	NC
Ethylbenzene	X	106	6.60E-03	6.60E-02	1.25E-03	8.22E-06	3.79E+01	434	8.73E-02	9.42E-05	1.43E-02	7.56E-01
Fluoranthene	X	202	1.69E-02	1.10E+02	1.09E+00	1.84E-02	1.62E+05	ND[4]	NC	NC	NC	NC
Fluorene	X	166	2.10E-04	3.50E+01	4.22E-01	8.86E-05	6.39E+02	ND	NC	NC	NC	NC
Heptachlor epoxide		389	3.20E-05	1.10E-02	5.66E-05	1.81E-09	3.06E-02	ND	NC	NC	NC	NC
Hexachlorobutadiene	X	261	1.03E-02	ND	NC	NC	NC	ND	NC	NC	NC	NC
Hexachloroethane	X	237	2.50E-03	ND	NC	NC	NC	ND[4]	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	X	276	2.96E-20	1.30E+01	9.42E-02	2.79E-21	3.35E-14	ND	NC	NC	NC	NC
Isophorone		138	5.80E-06	8.20E-02	1.19E-03	6.89E-09	4.14E-02	ND	NC	NC	NC	NC
Methylene chloride	X	85	2.00E-03	3.80E-02	8.94E-04	1.79E-06	6.61E+00	ND[4]	NC	NC	NC	NC
N-Nitrosodiphenylamine	X	198	2.33E-08	ND	NC	NC	NC	ND	NC	NC	NC	NC
Naphthalene	X	128	4.60E-04	6.10E+01	9.53E-01	4.38E-04	2.44E+03	ND	NC	NC	NC	NC
Pentachlorophenol	X	266	2.10E-06	1.60E-01	1.20E-03	2.53E-09	2.92E-02	ND[4]	NC	NC	NC	NC
Phenanthrene	X	178	3.90E-05	1.30E+02	1.46E+00	5.70E-05	4.41E+02	ND[4]	NC	NC	NC	NC
Phenol		94	2.70E-07	1.40E-01	2.98E-03	8.04E-10	3.29E-03	ND	NC	NC	NC	NC
Pyrene	X	202	1.09E-05	8.90E+01	8.81E-01	9.60E-06	8.44E+01	ND[4]	NC	NC	NC	NC
Styrene	X	104	2.61E-03	ND	NC	NC	NC	94	NC	2.08E-05	7.96E-03	4.14E-01

Attachment 6
Table 9
Small Mammal Burrow Air ECOC Screen

Analyte	OU2 PCOC	Molecular Weight[1] (grams/mole)	Henry's Law Constant[2] (atm m^3/mole)	Maximum Detected Concentration in Subsurface Soil[1] (mg/kg)	Molar Concentration in Subsurface Soil[3] (mole/m^3)	Partial Pressure (V_p) (atm)	Estimated Concentration in Burrow Air (mg/m^3)	Inhalation TRV from IRIS (mg/m^3)	Hazard Quotient	Effects Level (atm)	Effects Level in Soil (mole/m^3)	Equivalent Effects Level in Soil (mg/kg)
Tetrachloroethene	X	166	1.53E-02	9.00E-01	1.08E-02	1.66E-04	1.20E+03	ND	NC	NC	NC	NC
Toluene	X	92	6.70E-03	3.10E-01	6.74E-03	4.52E-05	1.81E+02	226.1	7.99E-01	5.65E-05	8.44E-03	3.88E-01
Total xylenes	X	106	6.46E-03	1.50E-01	2.83E-03	1.83E-05	8.43E+01	ND[4]	NC	NC	NC	NC
Trichloroethene	X	131	9.10E-03	3.90E-01	5.95E-03	5.42E-05	3.09E+02	ND[4]	NC	NC	NC	NC
alpha-BHC		291	5.30E-06	1.50E-02	1.03E-04	5.46E-10	6.91E-03	ND	NC	NC	NC	NC
cis-1,3-Dichloropropene	X	111	1.30E-03	ND	NC	NC	NC	20.9	NC	4.33E-06	3.33E-03	1.85E-01
								HAZARD INDEX	***4.13E+01***			

[1]Source Draft Final Technical Memorandum No 9, Chemicals of Concern, Human Health Risk Assessment, 903 Pad, Mound, and East Trenches Areas, Operable Unit No 2, Rocky Flats Environmental Technology Site, August 1994

[2]Source Knox *et al* 1993 Subsurface Transport and Fate Processes Lewis Publishers

[3]Soil density assumed to be 2000 kg/m^3

[4]EPA suggested reference concentration is pending

[5]Data under review by EPA

NC - not calculated

ND - no data available

Attachment 6
Table 10
Surface Soil Volatile PCOCs without TRVs

Analyte	Group	OU2 PCOC	Estimated Concentration in Burrow Air (mg/m^3)	Inhalation TRV (mg/m^3)
903 Pad				
1,1,1-Trichloroethane	V	X	1.41E+01	ND[2]
1,1,2,2-Tetrachloroethane	V	X	NC	ND
1,1-Dichloroethene	V		4.70E+00	ND
1,2-Dichloroethane	V	X	NC	ND
1,2-Dichloroethene	V	X	5.64E+00	ND
2-Chloroethyl vinyl ether	V	X	NC	ND
2-Chlorophenol	S		NC	ND
2-Methylnaphthalene	S	X	NC	ND
2-Methylphenol	S	X	NC	ND
4,4'-DDT	P	X	NC	ND
4-Methyl-2-pentanone	V	X	5.44E+01	ND[2]
4-Methylphenol	S	X	NC	ND
4-Nitroaniline	S	X	NC	ND[1]
Acenaphthene	S	X	9.31E-01	ND
Acenaphthylene	S		NC	ND
Acetone	V	X	4.49E+01	ND
Anthracene	S	X	5.14E-01	ND[2]
Aroclor-1254	P	X	1.39E+03	ND
Aroclor-1260	P		NC	ND
Benzene	V	X	NC	ND[2]
Benzo(a)anthracene	S	X	5.00E-02	ND[2]
Benzo(a)pyrene	S	X	7.31E-02	ND
Benzo(b)fluoranthene	S	X	2.40E-01	ND
Benzo(ghi)perylene	S	X	NC	ND
Benzo(k)fluoranthene	S		NC	ND
Benzoic acid	S	X	NC	ND
Bis(2-ethylhexyl)phthalate	S	X	4.31E+00	ND
Butyl benzyl phthalate	S	X	5.88E-02	ND
Carbon disulfide	V	X	4.63E+00	ND[2]
Carbon tetrachloride	V	X	4.80E+02	ND
Chlorobenzene	V		3.76E+00	ND
Chloroform	V	X	1.77E+04	ND[2]
Chrysene	S	X	1.89E+03	ND
Di-N-butyl phthalate	S	X	3.78E+00	ND
Di-N-octyl phthalate	S	X	9.20E-09	ND[1]
Dibenzo(ah)anthracene	S		NC	ND
Dibenzofuran	S		NC	ND
Diethyl phthalate	S		6.03E-03	ND
Fluoranthene	S	X	6.91E+04	ND[2]
Fluorene	S	X	NC	ND
Heptachlor epoxide	P		NC	ND
Hexachlorobutadiene	S	X	NC	ND

Attachment 6
Table 10
Surface Soil Volatile PCOCs without TRVs

Analyte	Group	OU2 PCOC	Estimated Concentration in Burrow Air (mg/m^3)	Inhalation TRV (mg/m^3)
Hexachloroethane	S	X	NC	ND[2]
Indeno(1,2,3-cd)pyrene	S	X	NC	ND
Isophorone	S		NC	ND
Methylene chloride	V	X	1.57E+03	ND[2]
N-Nitrosodiphenylamine	S	X	NC	ND
Naphthalene	S	X	NC	ND
Pentachlorophenol	S	X	NC	ND[2]
Phenanthrene	S	X	1.42E+02	ND[2]
Phenol	S		NC	ND
Pyrene	S	X	4.83E+01	ND[2]
Tetrachloroethene	V	X	1.46E+02	ND
Total xylenes	V	X	5.00E+01	ND[2]
Trichloroethene	V	X	4.51E+03	ND[2]
alpha-BHC	P		NC	ND
East Trenches				
1,1,1-Trichloroethane	V	X	3.80E+04	ND[2]
1,1,2,2-Tetrachloroethane	V	X	4.30E-01	ND
1,1-Dichloroethene	V		1.41E+01	ND
1,2-Dichloroethane	V	X	NC	ND
1,2-Dichloroethene	V	X	5.64E+01	ND
2-Chloroethyl Vinyl Ether	V	X	NC	ND
2-Chlorophenol	S		NC	ND
2-Methylnaphthalene	S	X	NC	ND
2-Methylphenol	S	X	4.81E-02	ND
4,4'-DDT	P	X	5.95E-01	ND
4-Methyl-2-pentanone	V	X	2.72E-02	ND[2]
4-Methylphenol	S	X	2.00E-01	ND
4-Nitroaniline	S	X	NC	ND[1]
Acenaphthene	S	X	4.14E+00	ND
Acenaphthylene	S		NC	ND
Acetone	V	X	2.97E+02	ND
Anthracene	S	X	1.47E+00	ND[2]
Aroclor-1254	P	X	2.09E+03	ND
Aroclor-1260	P		NC	ND
Benzene	V	X	6.57E+00	ND[2]
Benzo(a)anthracene	S	X	1.06E-01	ND[2]
Benzo(a)pyrene	S	X	1.00E-01	ND
Benzo(b)fluoranthene	S	X	8.56E-01	ND
Benzo(ghi)perylene	S	X	4.38E-03	ND
Benzo(k)fluoranthene	S		NC	ND
Benzoic acid	S	X	2.44E-03	ND
Bis(2-ethylhexyl)phthalate	S	X	5.26E+00	ND

Attachment 6
Table 10
Surface Soil Volatile PCOCs without TRVs

Analyte	Group	OU2 PCOC	Estimated Concentration in Burrow Air (mg/m^3)	Inhalation TRV (mg/m^3)
Butyl benzyl phthalate	S	X	NC	ND
Carbon disulfide	V	X	NC	ND[2]
Carbon tetrachloride	V	X	1.46E+06	ND
Chlorobenzene	V		NC	ND
Chloroform	V	X	2.47E+03	ND[2]
Chrysene	S	X	2.65E+03	ND
Di-N-butyl phthalate	S	X	7.12E+00	ND
Di-N-octyl phthalate	S	X	NC	ND[1]
Dibenzo(ah)anthracene	S		NC	ND
Dibenzofuran	S		NC	ND
Diethyl phthalate	S		1.18E-02	ND
Fluoranthene	S	X	1.47E+03	ND[2]
Fluorene	S	X	3.47E+00	ND
Heptachlor epoxide	P		NC	ND
Hexachlorobutadiene	S	X	1.52E+02	ND
Hexachloroethane	S	X	2.39E+02	ND[2]
Indeno(1,2,3-cd)pyrene	S	X	8.50E-16	ND
Isophorone	S		NC	ND
Methylene chloride	V	X	9.57E+03	ND[2]
N-Nitrosodiphenylamine	S	X	NC	ND
Naphthalene	S	X	8.00E+01	ND
Pentachlorophenol	S	X	NC	ND[2]
Phenanthrene	S	X	9.16E+00	ND[2]
Phenol	S		NC	ND
Pyrene	S	X	1.23E+00	ND[2]
Tetrachloroethene	V	X	1.73E+07	ND
Total xylenes	V	X	1.29E+02	ND[2]
Trichloroethene	V	X	9.50E+04	ND[2]
alpha-BHC	P		NC	ND
Mound Area				
1,1,1-Trichloroethane	V	X	NC	ND[2]
1,1,2,2-Tetrachloroethane	V	X	NC	ND
1,1-Dichloroethene	V		NC	ND
1,2-Dichloroethane	V	X	NC	ND
1,2-Dichloroethene	V	X	NC	ND
2-Chloroethyl vinyl ether	V	X	NC	ND
2-Chlorophenol	S		NC	ND
2-Methylnaphthalene	S	X	NC	ND
2-Methylphenol	S	X	NC	ND
4,4'-DDT	P	X	NC	ND
4-Methyl-2-pentanone	V	X	3.89E-03	ND[2]
4-Methylphenol	S	X	NC	ND

Attachment 6
Table 10
Surface Soil Volatile PCOCs without TRVs

Analyte	Group	OU2 PCOC	Estimated Concentration in Burrow Air (mg/m^3)	Inhalation TRV (mg/m^3)
4-Nitroaniline	S	X	NC	ND[1]
Acenaphthene	S	X	NC	ND
Acenaphthylene	S		NC	ND
Acetone	V	X	9.32E-02	ND
Anthracene	S	X	NC	ND[2]
Aroclor-1254	P	X	NC	ND
Aroclor-1260	P		NC	ND
Benzene	V	X	1.41E+00	ND[2]
Benzo(a)anthracene	S	X	NC	ND[2]
Benzo(a)pyrene	S	X	NC	ND
Benzo(b)fluoranthene	S	X	NC	ND
Benzo(ghi)perylene	S	X	NC	ND
Benzo(k)fluoranthene	S		NC	ND
Benzoic acid	S	X	NC	ND
Bis(2-ethylhexyl)phthalate	S	X	4.69E+00	ND
Butyl benzyl phthalate	S	X	NC	ND
Carbon disulfide	V	X	NC	ND[2]
Carbon tetrachloride	V	X	3.13E+01	ND
Chlorobenzene	V		1.03E+00	ND
Chloroform	V	X	1.85E+01	ND[2]
Chrysene	S	X	NC	ND
Di-N-butyl phthalate	S	X	9.31E-01	ND
Di-N-octyl phthalate	S	X	NC	ND[1]
Dibenzo(ah)anthracene	S		NC	ND
Dibenzofuran	S		NC	ND
Diethyl phthalate	S		NC	ND
Fluoranthene	S	X	1.62E+02	ND[2]
Fluorene	S	X	NC	ND
Heptachlor epoxide	P		NC	ND
Hexachlorobutadiene	S	X	NC	ND
Hexachloroethane	S	X	NC	ND[2]
Indeno(1,2,3-cd)pyrene	S	X	NC	ND
Isophorone	S		NC	ND
Methylene chloride	V	X	5.22E+00	ND[2]
N-Nitrosodiphenylamine	S	X	NC	ND
Naphthalene	S	X	NC	ND
Pentachlorophenol	S	X	NC	ND[2]
Phenanthrene	S	X	NC	ND[2]
Phenol	S		NC	ND
Pyrene	S	X	NC	ND[2]
Tetrachloroethene	V	X	2.40E+02	ND
Total xylenes	V	X	NC	ND[2]

Attachment 6
Table 10
Surface Soil Volatile PCOCs without TRVs

Analyte	Group	OU2 PCOC	Estimated Concentration in Burrow Air (mg/m^3)	Inhalation TRV (mg/m^3)
Trichloroethene	V	X	5.30E+01	ND[2]
alpha-BHC	P		NC	ND
Old Landfill				
1,1,1-Trichloroethane	V	X	2.82E+00	ND[2]
1,1,2,2-Tetrachloroethane	V	X	NC	ND
1,1-Dichloroethene	V		NC	ND
1,2-Dichloroethane	V	X	NC	ND
1,2-Dichloroethene	V	X	NC	ND
2-Chlorophenol	S		NC	ND
2-Methylnaphthalene	S	X	NC	ND
2-Methylphenol	S	X	NC	ND
4,4'-DDT	P	X	NC	ND
4-Methyl-2-pentanone	V	X	2.59E-03	ND[2]
4-Methylphenol	S	X	NC	ND
4-Nitroaniline	S	X	NC	ND[1]
Acenaphthene	S	X	4.58E+02	ND
Acenaphthylene	S		1.46E+00	ND
Acetone	V	X	9.67E-01	ND
Anthracene	S	X	2.60E+02	ND[2]
Aroclor-1254	P	X	2.25E+02	ND
Aroclor-1260	P		8.03E+02	ND
Benzene	V	X	NC	ND[2]
Benzo(a)anthracene	S	X	9.60E+00	ND[2]
Benzo(a)pyrene	S	X	8.98E+00	ND
Benzo(b)fluoranthene	S	X	5.01E+01	ND
Benzo(ghi)perylene	S	X	1.34E-01	ND
Benzo(k)fluoranthene	S		1.72E+03	ND
Benzoic acid	S	X	2.93E-03	ND
Bis(2-ethylhexyl)phthalate	S	X	2.77E-01	ND
Butyl benzyl phthalate	S	X	4.07E-02	ND
Carbon disulfide	V	X	NC	ND[2]
Carbon tetrachloride	V	X	NC	ND
Chlorobenzene	V		NC	ND
Chloroform	V	X	NC	ND[2]
Chrysene	S	X	3.35E+05	ND
Di-N-butyl phthalate	S	X	1.64E+00	ND
Di-N-octyl phthalate	S	X	NC	ND[1]
Dibenzo(ah)anthracene	S		3.76E-04	ND
Dibenzofuran	S		NC	ND
Diethyl phthalate	S		NC	ND
Fluoranthene	S	X	1.62E+05	ND[2]
Fluorene	S	X	6.39E+02	ND
Heptachlor epoxide	P		3.06E-02	ND

Attachment 6
Table 10
Surface Soil Volatile PCOCs without TRVs

Analyte	Group	OU2 PCOC	Estimated Concentration in Burrow Air (mg/m^3)	Inhalation TRV (mg/m^3)
Hexachlorobutadiene	S	X	NC	ND
Hexachloroethane	S	X	NC	ND[2]
Indeno(1,2,3-cd)pyrene	S	X	3.35E-14	ND
Isophorone	S		4.14E-02	ND
Methylene chloride	V	X	6.61E+00	ND[2]
N-Nitrosodiphenylamine	S	X	NC	ND
Naphthalene	S	X	2.44E+03	ND
Pentachlorophenol	S	X	2.92E-02	ND[2]
Phenanthrene	S	X	4.41E+02	ND[2]
Phenol	S		3.29E-03	ND
Pyrene	S	X	8.44E+01	ND[2]
Tetrachloroethene	V	X	1.20E+03	ND
Total xylenes	V	X	8.43E+01	ND[2]
Trichloroethene	V	X	3.09E+02	ND[2]
alpha-BHC	P		6.91E-03	ND

[1]Data under review by EPA
[2]EPA suggested reference concentration is pending
NC - not calculated
ND - no data available

Attachment 6
Table 11
Comparison of Sitewide Maximum Radionuclide Concentrations in Surface Soil to TRVs

Radionuclide PCOC	Sitewide Radionuclide PCOC for Surface Soil	Sitewide Maximum Detected Concentration (pCi/g)	Sitewide Maximum Source Area	Toxicity Reference Value[1] (pCi/g)	Sitewide Maximum Hazard Quotient
Americium-241	X	270	903 Pad	1,900	1.42E-01
Cesium-134	X	0.0880	OU4 Downgradient	84	1.05E-03
Plutonium-239/240	X	7300	903 Pad	3,800	1.92E+00
Radium-226	X	1.34	903 Pad	5.4	2.48E-01
Strontium-89/90	X	1.24	East Trenches	120	1.03E-02
Tritium[2]	X	227	OU4 Downgradient	350,000	6.49E-04
Uranium-233/234	X	2800	Old Landfill	1,800	1.56E+00
Uranium-235	X	670	Old Landfill	1,900	3.53E-01
Uranium-238	X	38000	Old Landfill	1,600	2.38E+01
				HAZARD INDEX	***2.80E+01***

[1]With the exception of Cs-134, benchmarks are from Higley and Kuperman (1995), *Radiological Benchmarks for Wildlife at Rocky Flats Environmental Technology Site*. Toxicity reference value is the ecotoxicological benchmark for small mammals, which represents bounding exposure based on their sensitivity, small home ranges, and continuous contact with soil. Toxicity reference value for Cs-134 is estimated from Cs-137.
[2]Tritium was measured in pCi/L; this screen assumes 1 kg tritium is equivalent to 1 L tritium.
No background comparison was performed because the TRVs are RFETS-specific.
Hazard quotients and hazard indices were rounded to present only three significant figures.

Attachment 6
Table 12
Comparison of Sitewide Maximum Radionuclide Concentrations in Surface Water to TRVs

Radionuclide PCOC	Sitewide Radionuclide PCOC for Surface Water	Sitewide Maximum Detected Concentration[1] (pCi/L)	Sitewide Maximum Source Area	Toxicity Reference Value[1] (pCi/L)	Sitewide Maximum Hazard Quotient
Americium-241	X	15.0	C-Ponds	1,300	1.15E-02
Cesium-137	X	2.00	881 Hillside	8,200	2.44E-04
Plutonium-239/240	X	42.3	903 Pad	100	4.23E-01
Strontium-89/90	X	3.08	881 Hillside	270,000	1.14E-05
Tritium	X	3600	903 Pad	190,000,000	1.89E-05
Uranium-233/234	X	20.0	903 Pad	4,300	4.65E-03
Uranium-235	X	3.03	C-Ponds	4,300	7.05E-04
Uranium-238	X	74.0	Old Landfill	4,400	1.68E-02
				HAZARD INDEX	***4.56E-01***

[1]Total (unfiltered) concentration.
[2]Benchmarks are from Higley and Kuperman (1995), *Radiological Benchmarks for Wildlife at Rocky Flats Environmental Technology Site.*
Toxicity reference value is the ecotoxicological benchmark for aquatic species, which represents bounding exposure based on their sensitivity, and contact with surface water.
No background comparison was performed because the TRVs are RFETS-specific.
Hazard quotients and hazard indices were rounded to present only three significant figures.

Attachment 6
Table 13
Comparison of Sitewide Maximum Radionuclide Concentrations in Sediment to TRVs

Radionuclide PCOC	Sitewide Radionuclide PCOC for Sediment	Sitewide Maximum Detected Concentration (pCi/g)	Sitewide Maximum Source Area	Toxicity Reference Value[1] (pCi/g)	Sitewide Maximum Hazard Quotient
Americium-241	X	389	B-Ponds	46,000	8.47E-03
Cesium-137	X	2.81	B-Ponds	4,800	5.85E-04
Plutonium-239/240	X	643	B-Ponds	520,000	1.24E-03
Radium-226	X	5.64	B-Ponds	380,000	1.48E-05
Radium-228	X	3.41	C-Ponds	250,000	1.36E-05
Strontium-89/90	X	3.94	903 Pad	3,500	1.13E-03
Tritium[2]	X	3.10	Old Landfill	350,000	8.86E-06
Uranium-233/234	X	25.2	B-Ponds	10,000	2.52E-03
Uranium-235	X	1.30	B-Ponds	10,000	1.30E-04
Uranium-238	X	43.1	B-Ponds	4,200	1.03E-02
				HAZARD INDEX	***2.44E-02***

[1]Benchmarks are from Higley and Kuperman (1995), *Radiological Benchmarks for Wildlife at Rocky Flats Environmental Technology Site.* Toxicity reference value is the ecotoxicological benchmark for aquatic species, which represents bounding exposure based on their sensitivity and contact with sediment.
[2]Tritium was measured in pCi/L; this screen assumes 1 kg tritium is equivalent to 1 L tritium.
No background comparison was performed because the TRVs are RFETS-specific.
Hazard quotients and hazard indices were rounded to present only three significant figures.

Attachment 7
June 5, 1995, Meeting Notes

Meeting Minutes
ECOC Selection for the Sitewide Ecological Risk Assessment
June 5, 1995
10:00 am

Attendees: Bonnie Lavelle (EPA), Mark Wickstrom (EPA), Mark Lewis, Ph.D. (Stoller), Katharine Misken, M.S. (Stoller), Frank Vertucci, Ph.D. (EG&G), and Anne Doud White, M.S. (Stoller).

Handouts: 1) background and source area specific summary statistics for abiotic and biotic media, 2) tables of analytes not included in the risk screen, and 3) sitewide risk screen using source area mean HQ for wide-ranging species.

Frank V. opened the meeting by asking that we establish goals and define a process for the ECOC selection.

Goals: Identify ecological contaminants of concern (ECOCs) based on review of preliminary toxicity screening results to determine which potential contaminants of concern (PCOCs) are present at potentially ecotoxic concentrations.

Results for the wide ranging species were reviewed first, then those for the four limiting species: Preble's meadow jumping mouse, great blue heron, American kestrel, and mallard.

For each species:

- Evaluate PCOCs for which risks were calculated
- Evaluate PCOCs for which risks were not calculated
  - Not detected
  - No benchmarks
  - Other data gaps

Based on risk and uncertainty , each of the PCOCs received one of the following designations:

N Chemicals that can be eliminated immediately
Y Chemicals that will be analyzed in the risk assessment as ECOCs
M Chemicals that need further study

Discussion: Those chemicals receiving a (Y) will have risk estimates further defined, possibly using Monte Carlo methods to model exposures. Mark W. requested single point estimates using the UCL_{95} and refined exposure estimates, including factors such as migration. Frank suggested looking at wildlife data, such as bird surveys, for seasonal use and migration information.

*Mark W. said the UCL_{95} is the preferred measure with adequate data. However, if the UCL_{95} is greater than the maximum detected concentration, the maximum detect should be used as the exposure point concentration. He and Bonnie agreed that screening level exposure analysis should be redone adopting this policy. He suggested that we need new tables for all 7 receptors, but only new graphs for the ECOCs.

*Mark W. and Bonnie will each need one complete set of all tables and figures.

Frank asked whether decisions made during the meeting would be final. Mark W. and Bonnie replied that decisions made would be final unless further evidence was introduced.

It was agreed that Frank and Bonnie will speak with U.S. Fish and Wildlife Service (USFWS) to update them on the RFETS Sitewide ERA. Mark W. suggested a meeting with F&W after July 1 to bring them on board.

Mark W. stated that EPA regards the receptors used in the screen as adequate representatives of functional groups at RFETS.

Mark W. wanted to confirm that Stoller followed the site conceptual model from TM2 in exposure calculations. Stoller responded that the conceptual model and exposure parameters were taken from TM2. The species used in the risk screen were agreed upon during informal discussions among EPA, DOE, and EG&G.

Mark W. asked if benchmark development was complete. Mark L. explained that Stoller is still waiting on many vegetation benchmarks, but wildlife benchmarks are as complete as possible. Mark L. explained that Clemson graduate students have conducted a thorough search for vegetation benchmarks, but the body of toxicological research on vegetation is not as complete as that for wildlife and humans.

Mark W. asked how Stoller handled incidental sediment ingestion while drinking. He thought Stoller's method of splitting the ingestion rate evenly between soil and sediment was very conservative but appropriate for this effort.

Mark W. asked if chemicals were grouped where toxicity information was not available. Stoller responded that TEFs (toxicity equivalency factors, Nisbet and Lagoy, 1992) were used for polycyclic aromatic hydrocarbons (PAHs) when no NOAEL was available. For polychlorinated biphenyls (PCBs), benchmark values from the most toxic forms were used when specific information for a given congener was not available.

*Stoller will calculate inhalation risk for Preble's meadow jumping mouse from OU1 881 Hillside, OU5 Old Landfill, and the three OU2 source areas. Stoller will also estimate radiological dose rates and associated risks to small mammals and fish using whole-body tissue data from the site. This information will supplement the benchmark-based risk screen conducted for the watershed ERAs. Mark W. asked if the inhalation pathway would be considered further.

Bonnie does not expect human health risks to drive clean up of the detention ponds at RFETS. Therefore, it will be important to define ecological risks from chemical and physical effects of management practices.

*Frank requested a summary table of why PCOCs are not ECOCs. PCOCs with hazard quotient (HQ) <1 are automatically not ECOCs. PCOCs with HQs >1 are addressed for wildlife in the following text.

*Toxic chemicals without NOAELs will need to be investigated further. Those chemicals requiring more consideration will be determined during this meeting and from EPA review of draft screening results.

I. Evaluation of Wide Ranging Species

Null Hypothesis: Chemicals on site are not in sufficient concentration to affect these species (if there is risk to the wide ranging species there will also be risk to the limiting species, i.e. those with restricted home ranges).

A. Chemicals for which risks were calculated

1. Red-tailed hawk

There are no ECOCs for red-tailed hawk, as there is no significant risk to red-tailed hawks sitewide, or within any source area.

Beryllium is not an issue since the HQ>1 (in the Soil Dump Areas) is an artifact of the data situation (the UCL_{95} is greater than the maximum detect). The final document should include a brief summary and table of risk calculations.

2. Mule Deer

There are no mule deer ECOCs, as there is no significant risk to mule deer sitewide, or within any source area.

The maximum HQ is 0.04 (cadmium in the A-Ponds). Vegetation concentrations were estimated using the Travis and Arms equation where necessary and appropriate. The final document should include a brief summary and table of risk calculations.

3. Coyote

There are no ECOCs for coyotes, as there is no significant risk to coyotes sitewide, or within any source area.

Antimony has HQs of 1.91 and 1.81 in A- and B-Ponds, respectively, from 1 hit each of 9 samples. All other analytes' HQ are < 1. The mean antimony HQ is 0.34. Mark W. decided that because the mean HQ_{site} is <1, the frequency of detects is low, the B-Ponds area is only a fraction of the coyotes' home range, and antimony does not biomagnify, this is not an ECOC. The final document should include a brief summary and table of risk calculations.

II. Evaluation of the Four Limiting Species

The following tables present the discussion 6/5/95. Added information in [] brackets was not discussed, but is relevant.

Preble's Meadow Jumping Mouse

The HI is greater than 1 for all source areas except the C-Ponds. Because this is a species of concern, all contaminants with an HQ >1 will be retained for further study.

1. OU6 A-Ponds

This is the highest risk source area.

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU5 PCOC	ECOC	Comments
Vanadium	Yes (veg)	—	—	[Yes]	No	
Magnesium	No (veg)	—	Background	[No]	Maybe	look at dietary requirements for rodents from NRC handbook
Selenium*	No (veg)	—	Background	No	No	look at seed conc. if possible
Molybdenum	Yes (veg)	4/18	—	[Yes]	No	
Arsenic	Yes (veg)	—	—	[Yes]	No	
Mercury	Yes (veg)	5/18	NOAEL	[Yes]	No	TRV is for methyl mercury chloride. Mark W. thought a less bioavailable form would be present on site
Cadmium	Yes (veg)	4/18	—	[No]	No	

*Based on vegetation species selected for site availability and importance as forage for herbivores.
Sediment data is for dry sediments from the pond margins.

2. OU6 B-Ponds

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU6 PCOC	ECOC	Comments
Vanadium	Yes (veg)	5/30	—	[Yes]	No	
Selenium	No (veg)	5/22	—	No	No	
Aluminum	No (soil)	30/30	Background	No	No	from clays
Magnesium	No (veg)	30/30	—	[No]	Maybe	compare to nutritional requirements and bioavailability
Arsenic	Yes (veg)	7/22	—	[Yes]	No	
Molybdenum	Yes (veg)	10/30	—	[Yes]	No	
Mercury	Yes (veg)	—	—	[Yes]	No	
Cadmium	No (veg)	15/30	—	[No]	No	

3. OU7 Downgradient Areas

The absence of surface soil, terrestrial arthropod, and surface water data overestimates the importance of vegetation in the diet, and so should be presented as a point of uncertainty.

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU7 PCOC	ECOC	Comments
Selenium	No (veg)	—	—	Yes	Maybe	look at seed storage of Se and plant species collected
Vanadium	Yes (veg)	—	—	Yes	No	
Magnesium	No (veg)	—	—	Yes	Maybe	look at dietary requirements
Molybdenum	Yes (veg)	—	—	[Yes]	No	
Arsenic	Yes (veg)	—	—	[Yes]	No	
Cadmium	Yes (veg)	—	—	[No]	No	

4. OU6 Soil Dump Areas

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU6 PCOC	ECOC	Comments
Selenium	No (veg)	7/12	—	No	No	
Vanadium	Yes (veg)	—	—	[Yes]	No	
Magnesium	No (veg)	—	—	Yes	Maybe	look at dietary requirements
Mercury	approx. equal	1/12	—	Yes	No	look at bioavailability
Cadmium	Yes (veg)	—	—	[No]	No	

5. OU6 Burial Trenches

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU6 PCOC	ECOC	Comments
Vanadium	Yes (veg)	—	—	[Yes]	No	
Selenium	— [(veg]))	—	—	No	No	
Molybdenum	Yes (veg)	—	—	[Yes]	No	
Arsenic	Yes (veg)	—	—	[Yes]	No	
Magnesium	— [(veg)]	—	—	[Yes]	Maybe	look at dietary requirements
Mercury	Yes (veg)	—	—	[Yes]	No	
Cadmium	Yes (veg)	—	—	[No]	No	

6. **OU5 Old Landfill**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU5 PCOC	ECOC	Comments
Magnesium	— [(veg)]	—	—	No	No	
Arsenic	Yes (veg)	—	—	[No]	No	
Selenium	Yes [(veg)]	—	—	No	No	
Molybdenum	— [(veg)]	—	—	No	No	
Vanadium	— [(veg)]	—	—	No	No	
Cadmium	— [(veg)]	—	—	No	No	

7. **OU6 North Spray Area**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU6 PCOC	ECOC	Comments
Magnesium	— [(veg)]	6/6	—	[Yes]	Maybe	
Thallium	Yes (veg)	—	—	[No]	No	
Vanadium	Yes (veg)	—	—	[Yes]	No	
Aluminum	—[(veg/soil)]	—	—	No	No	
Barium	— [(veg)]	—	—	[Yes]	Maybe	look at further. bioavailability
Cadmium	Yes (veg)	—	—	No	No	

8. **OU5 Ash Pits**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU5 PCOC	ECOC	Comments
Vanadium	Yes (veg)	—	—	No	No	
Arsenic	Yes (veg)	—	—	[No]	No	
Magnesium	Yes (veg)	—	—	[No]	No	
Aluminum	—[(veg/soil)]	—	—	No	No	
Mercury	Yes (veg)	—	—	[Yes]	No	

9. **OU2 903 Pad**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU2 PCOC	ECOC	Comments
Vanadium	Yes (veg)	—	—	[No]	No	

10. **OU2 East Trenches**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU2 PCOC	ECOC	Comments
Copper	— [(TA)]	—	—	No	No	
Cadmium	— [(TA)]	—	—	No	No	

11. **OU11 881 Hillside**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU11 PCOC	ECOC	Comments
Selenium	Yes (veg)	3/32	—	[No]	No	
Cadmium	—[(veg/soil)]	—	—	No	No	

12. **OU2 Mound Area**

There were no HQ >1, and HI <1.

B. American Kestrel

1. **OU6 Soil Dump Area**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU6 PCOC	ECOC	Comments
Beryllium	Yes (SM)	2/6	—	No	No	
Mercury	No (SM)	3/6	NOAEL	Yes	Maybe	TRV from methyl mercury dicyanimide

2. **OU2 East Trenches**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU2 PCOC	ECOC	Comments
Copper	— [(TA)]	—	—	No	No	
Chromium	No (TA)	—	—	[Yes]	Yes	could be present from cooling tower blowdown
Zinc	— [(TA/SM)]	—	—	No	No	
Lithium	—[(soil)]	—	—	No	No	

3. **OU6 B-Ponds**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU6 PCOC	ECOC	Comments
Selenium	No (SM)	—	—	No	No	
Vanadium	No (SM)	1/9	—	Yes	Maybe	research detection limits
Magnesium	— (SM)	—	—	Yes	Maybe	Research NRC nutritional guidelines
Aluminum	No (SM)	—	—	No	No	
Lead	No (SM)	5/9	NOAEL	Yes	Yes	TRV based on kestrel
Mercury	No (SM)	2/9	—	Yes	No	background is detection limit. all background are non-detects
Zinc	No (SM)	9/9	background	Yes	No	not an ECOC by BPJ. no biomagnification. essential nutrient per MW

4. **OU2 903 Pad**

May want to think about field work to reduce uncertainty for chromium (903 Pad) and others.

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU2 PCOC	ECOC	Comments
Chromium	-- [(TA)]	1/1	—	Yes	Yes	ECOC due to lack of data

5. **OU6 A-Ponds**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU6 PCOC	ECOC	Comments
Vanadium	Yes (SM)	1/3	—	Yes	No	
Magnesium	—	—	—	Yes	Maybe	study more, same as above
Lead	No (SM)	—	—	Yes	Yes	
Zinc	No (SM)	9/9	— [background]	Yes	No	BPJ - essential nutrient
Chromium	No (SM)	3/9	—	Yes	Yes	more information

6. **OU1 881 Hillside**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU1 PCOC	ECOC	Comments
Zinc	— [(TA/SM)]	—	—	No	No	BPJ - essential nutrient

7. **OU7 Downgradient Areas**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU7 PCOC	ECOC	Comments
Vanadium	Yes (SM)	1/3	—	Yes	No	

8. **OU5 Ash Pits**

This source area has no chemicals with HQ >1.

9. **OU5 Old Landfill**

This source area has no chemicals with HQ >1.

10. **OU2 Mound Area**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU2 PCOC	ECOC	Comments
Chromium	— ([TA)]	—	—	Yes	Maybe	

11. **OU6 Burial Trenches**

This source area has no chemicals with HQ >1.

12. **OU5 C-Ponds**

This source area has no chemicals with HQ >1.

13. **OU6 North Spray Field**

This source area has no chemicals with HQ >1, and HI <1.

C. Great Blue Heron

1. OU1 881 Hillside

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU1 PCOC	ECOC	Comments
Bis(2-ethylhexyl)phthalate	— [(FI)]	~10%	—	No	Maybe	where was it detected? look at further
Magnesium	— [(FI)]	—	—	No	No	
Aldrin	— [(Sed)]	1/40	—	[No]	No	
Copper	— [(FI)]	—	—	No	No	
Aluminum	— [(Sed)]	—	—	No	No	

2. OU5 C-Ponds

Data on the metabolism of phthalates in fish and birds was requested, if available, to further refine the risk from the phthalates.

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU5 PCOC	ECOC	Comments
Bis(2-ethylhexyl)phthalate	— [(FI)]	2/15	—	[Yes]	Yes	study further
Mercury	No [(FI)]	3/31	—	[Yes]	Yes	
Selenium	—	—	—	No	No	
Copper	No (FI)	24/31	—	Yes	No	realistic exposure factors, no bioaccumulation (BPJ)
Aluminum	— [(Sed)]	—	—	No	No	
Magnesium	— [(Sed)]	—	—	No	No	
Tin	— [(FI)]	—	—	No	No	
Chromium	— [(FI)]	—	—	No	No	

3. OU6 B-Ponds

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU6 PCOC	ECOC	Comments
Di-n-butylphthalate	— [(FI)]	—	—	[Yes]	Maybe	study further
Mercury	— [(FI)]	—	—	Yes	Yes	
Magnesium	— [(Sed)]	—	—	Yes	No	will be removed with realistic exposure factors

4. OU6 A-Ponds

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU6 PCOC	ECOC	Comments
Di-n-butylphthalate	— [(FI)]	—	—	[Yes]	Maybe	study further
Magnesium	— [(Sed)]	—	—	Yes	No	will be removed with realistic exposure factors
Aluminum	— [(Sed)]	—	—	No	No	

D. Mallard

1. OU6 A-Ponds

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU6 PCOC	ECOC	Comments
Di-n-butylphthalate	— [(BeM)]	—	—	[Yes]	Maybe	study further

2. **OU5 C-Ponds**

Chemical	UCL_{95}>max (primary exposure point media)	Det. Freq.	Basis for TRV	OU5 PCOC	ECOC	Comments
Zinc	—	—	—	[Yes]	No	assumed year round residence, exposure factor is too conservative

3. **OU6 B-Ponds**

This source area has no chemicals with HQ >1.

The importance of the chemicals for which risks were not calculated must be evaluated. The three reasons chemicals were not analyzed are:

- not detected
- no benchmark
- other data gaps

EPA will review information for these ECOCs and advise DOE of chemicals that need to be included.

III. Evaluation of Surface Water Aquatics

Barium was identified as an (M) ECOC throughout the site. However, the (barium) water quality benchmark may be an artifact of a low literature value.

Stoller will analyze the most recent surface water data (from the last 2 or 3 years) only and identify seasonality and changes in flow regimes if possible. The purpose will be to assess the concentration of physical stressors to effluent or the aquatic community.

IV. Evaluation of Sediments

PAHs appear to be driving risk in sediments. Both PAHs and PCBs require further analysis. Aldrin was identified as a possible (M) ECOC in the A-Ponds. Silver was identified as a (Y) ECOC in the B-Ponds.

*The depth interval of samples used in screening should be investigated. Stoller should identify the spatial distribution of ECOCs both vertically and horizontally if necessary.

Mark W. stated that if the lipophillic chemicals are not detected in the tissue of predators (e.g. bass) then they can be presumed to not be bioaccumulating, and can be eliminated from further consideration. Mark W. asked if there is no AVS (acid volatile sulfide) information available with which to address metal bioavailability. Mark L. answered that there was not.

Mark L. wanted clarification on assessment endpoints. Mark W. suggested top predators or fish-eating birds be a primary basis. Protected and/or sensitive species should also be included. Assessment endpoints will be proposed later in the Problem Formulation.

Data Gaps: An in-situ bioaccumulation study was discussed as a possible way to close data gaps or tissue sampling - possibly with *Chironomus* toxicity tests for benthic macroinvertebrates and fish uptake studies.

*Stoller will perform a literature search for information on toxicity of PCBs and PAHs. PCBs can probably be modeled for fish with existing data.

Benthic invertebrates: PAHs are ECOCs (Y) while aldrin and silver (M) will be studied further and metals will be discussed qualitatively.

Possible sediment endpoints to be used in evaluating effects to aquatic communities or receptors:

- benthic community
- fish
- great blue heron

V. Radionuclides

Bonnie said she had some comments on Higley and Kuperman's (1995) benchmark paper, which she will send over.

Surface soil was the only medium with an HI >1.

ECOCs: None. In the final document Stoller should include the radionuclide screening tables and a paragraph stating there is no risk.

Note: Bonnie sent her list of ECOCs (6/6/95). Listed under rads as (Y) ECOCs were plutonium-239/240, uranium 233/234, and uranium-238.

VI. Phytotoxicity

Mark W. suggested that if there is no obvious toxic impact to vegetation at RFETS, there is no reason to gather site-specific data on phytotoxicity. Vegetation toxicity and effects on communities will be discussed further in the ERA report.

*Review community data and look at wetland areas to further investigate risk to vegetation.

*Indicates action items

Attachment 8
Risk Characterization Results

Attachment 8
Table 1
Benthos Taxonomic List
(organism density in number/m^3)

Order	Class	Genus	Species Code	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	Pond C-1	Pond C-2	Pond D-1	Pond D-2
Araneae	Arachnida		A1	13													
Coleoptera	Insecta	*Agabinus*	AGA1	13													13
Odonata	Insecta	*Archilestes*	ARC2						13								
Ephemeroptera	Insecta		BA1	143	26				338	13		78					39
Ephemeroptera	Insecta	*Baetis*	BAE1	13					559	39	13	26					
Coleoptera	Insecta		C1						26		13		13				
Copepoda	Crustacea		C2	130		26				52			91				130
Copepoda	Crustacea		C3						91	13			91				
Cladocera	Crustacea		C6	39	130	39			377	299		13	1962				234
Ephemeroptera	Insecta	*Caenis*	CAE1	26	13	13			221	13							251
Diptera	Insecta		CE1	13	13			80	546	195		52					
Diptera	Insecta	Chironomidae	CH1	13				96	13		13					26	52
Diptera	Insecta		CH2	13	299	26	26		26	13		403	117			13	13
Diptera	Insecta	*Orthocladius/Cricoto*	CH3	13									13		1		
Diptera	Insecta		CH5	13					26								52
Diptera	Insecta		CH7	13					13	65							
Diptera	Insecta		CH8	13						13							
Diptera	Insecta	*Chaoborus*	CHA2	104	598	26			130	559	26				7	65	
Diptera	Insecta	*Chironomus*	CHI1	286	6548	3534	1806	704	13	2365	403	11562	4625	2	33	2949	1104
Hemiptera	Insecta	Corixiae G.	CO1	117	13				13	26		13			6	52	
Odonata	Insecta		CO2	104					1351	533							91
Odonata	Insecta	*Coenagrion/Enallagma*	COE1	845	26				195	26							286
Diptera	Insecta	*Corynoneura*	COR1	26					117								26
Diptera	Insecta	*Cricotopus*	CRI1	39				32			130	26					
Diptera	Insecta	*Cryptochironomus*	CRY1				26	272					26	2	2	13	
Diptera	Insecta	*Cryptotendipies*	CRY2	39		13											
Cladocera	Crustacea		DA1								260		13				
Diptera	Insecta	*Dicrotendipes*	DIC1	13	26			32	13	26		13			1		377
Diptera	Insecta	*Endochironomus*	END1			13									1		
Diptera	Insecta	*Glyptotenddipes*	GLY1		52	130									2		156
Limnophila	Gastropoda	*Gyraulus*	GYR1	13					221	13							312
Hirudinea	Oligochaeta		H1	26				56	13	90	13	13					
"Hydracarina"	Arachnoidea		H2	26	26				156	65							
Hemiptera	Insecta	*Trichocorixa*	H3	13											2		
Coleoptera	Insecta	*Haliplus*	HAL1	65					507	234							
Coleoptera	Insecta	*Haliplus*	HAL2	26													
Hemiptera	Insecta	*Hesperocorixa*	HES2								39						
			HYAZ1	195					780	1117	13	91					117
Coleoptera	Insecta	*Hygrotus*	HYG1	13													

Attachment 8
Table 1
Benthos Taxonomic List
(organism density in number/m^3)

Order	Class	Genus	Species Code	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	Pond C-1	Pond C-2	Pond D-1	Pond D-2
	Insecta		I1	13					52				13			13	39
Diptera	Insecta	*Labrundinia*	LAB1	13													104
Diptera	Insecta	*Larsia*	LAR1	104	13				78								65
			LWN1			13											
Trichoptera	Insecta		LI1														26
Diptera	Insecta	*Micropsectra*	MIC1	13	52					13		104	52				13
Diptera	Insecta	*Microtendipes*	MIC2	13											1	13	13
			N1	26		26	377		13	13		78					
			NAN1		78												
Diptera	Insecta		NIM1	13					26								
	Oligochaeta		O1	20241	1676	26257	6145	1720	5014	194	4586	17955	16837	42	42	21255	78
Ostracoda	Crustacea		O2	233	13	129	13		2078	2546	49538	1870	2793			26	
Coleoptera	Insecta	*Oreodytes*	ORE1	26	39												
Diptera	Insecta	*Paratanytarsus*	PAR1	26	65				52	39					1		130
Diptera	Insecta	*Parachironomus*	PAR3		13										1		
Diptera	Insecta	*Paratendipes*	PAR6									26					
			PAE7										13				
Coleoptera	Insecta	*Peltodytes*	PEL3							13							
Diptera	Insecta	*Phaenopsectra*	PHA1					48					13				
Limnophila	Gastropoda	*Physelia*	PHY1	468	26			8	3820	2326							507
Mollusca	Bivalvia	*Pisidium*	PIS1	91					13	52		13				13	
Limnophila	Gastropoda		PL1						494	104							
Diptera	Insecta	*Polypedilum*	POL1							13					2		13
Diptera	Insecta	*Procladius*	PRO1	91	299	130	117	56				26	234	13	6	78	78
Diptera	Insecta	*Pseudochironomus*	PSE2	273						13							195
Diptera	Insecta	*Psectrocladius*	PSE3	832	299	13			182	13							598
Diptera	Insecta	*Psectrotanypus*	PSE4		13							13					
Diptera	Insecta	*Strictochironomus*	STI1			143		32									
Odonata	Insecta	*Sympetrum*	SYM1	13													
Diptera	Insecta	*Tanypus*	TAN2			26		8				39	13	7		247	26
Diptera	Insecta	*Thienemannimyia grou*	THI1	13						13							13
Ephemeroptera	Insecta	*Tricorythodes*	TRI1							13							
Coleoptera	Insecta	*Tropisternus*	TRO2						13								
Diptera	Insecta	*Tanytarsus*	TAN3					40									
Diptera	Insecta	*Odontomesa*	ODO1					16									
Diptera	Insecta	*Culicoides*	CUL1					8									
Diptera	Insecta	*Cladotanytarsus*	CLA1					816							2		
Diptera	Insecta	*Cladopelma*	CLA2					312									
Mollusca	Bivalvia	*Sphaerium*	SPH1					624									

Attachment 8
Table 1
Benthos Taxonomic List
(organism density in number/m^3)

Order	Class	Genus	Species Code	Pond A-1	Pond A-2	Pond A-3	Pond A-4	Pond A-5	Pond B-1	Pond B-2	Pond B-3	Pond B-4	Pond B-5	Pond C-1	Pond C-2	Pond D-1	Pond D-2
Diptera	Insecta	*Tanytarsus*	TAO1											1			
Diptera	Insecta	Chironomidae	CHPU												1		
Diptera	Insecta	*Tanypus*	TAN1												10		
			Total	**24917**	**10355**	**30557**	**8510**	**4960**	**17590**	**11132**	**55047**	**32414**	**26919**	**66**	**118**	**24763**	**5150**

Attachment 8

Table 2
Bray-Curtis Percent Dissimilarity Matrix for Sample Site Bethos Species Abundance

A1	**A1**											
A2	0.96	**A2**										
A3	0.96	0.94	**A3**									
A4	0.98	0.84	0.98	**A4**								
B1	0.83	0.94	0.95	0.95	**B1**							
B2	0.98	0.81	0.96	0.88	0.99	**B2**						
B3	0.91	0.93	0.98	0.98	0.89	0.96	**B3**					
B4	0.99	0.95	1.00	0.99	0.99	1.00	1.00	**B4**				
B5	0.88	0.99	0.88	0.99	0.96	1.00	0.97	1.00	**B5**			
C1	0.92	0.81	0.98	0.94	0.93	0.89	0.96	0.89	0.99	**C1**		
C2	0.99	0.98	0.99	0.99	0.99	0.99	0.96	1.00	1.00	0.97	**C2**	
D2	1.00	0.94	0.99	0.95	1.00	0.98	0.93	1.00	1.00	1.00	1.00	**D2**

Table 3
Euclidean Distance Matrix for Sample Site Sediment Hazard Index

A1	**A1**											
A2	138.0	**A2**										
A3	96.0	42.0	**A3**									
A4	142.0	4.0	46.0	**A4**								
A5	139.0	1.0	43.0	3.0	**A5**							
B1	1841.0	1979.0	1937.0	1983.0	1980.0	**B1**						
B2	81.0	57.0	15.0	61.0	58.0	1922.0	**B2**					
B3	21.0	117.0	75.0	121.0	118.0	1862.0	60.0	**B3**				
B4	96.0	234.0	192.0	238.0	235.0	1745.0	177.0	117.0	**B4**			
B5	146.9	8.9	50.9	4.9	7.9	1987.9	65.9	125.9	242.9	**B5**		
C1	152.4	14.4	56.4	10.4	13.4	1993.4	71.4	131.4	248.4	5.5	**C1**	
C2	152.0	14.0	56.0	10.0	13.0	1993.0	71.0	131.0	248.0	5.1	0.4	**C2**

Attachment 8

Table 4
Euclidean Distance Matrix
Sample Site Benthos Richness

A1	**A1**											
A2	24.0	**A2**										
A3	21.0	3.0	**A3**									
A4	41.0	17.0	20.0	**A4**								
A5	29.0	5.0	8.0	12.0	**A5**							
B1	12.0	12.0	9.0	29.0	17.0	**B1**						
B2	13.0	11.0	8.0	28.0	16.0	1.0	**B2**					
B3	36.0	12.0	15.0	5.0	7.0	24.0	23.0	**B3**				
B4	28.0	4.0	7.0	13.0	1.0	16.0	15.0	8.0	**B4**			
B5	31.0	7.0	10.0	10.0	2.0	19.0	18.0	5.0	3.0	**B5**		
C1	42.0	18.0	21.0	1.0	13.0	30.0	29.0	6.0	14.0	11.0	**C1**	
C2	30.0	6.0	9.0	11.0	1.0	18.0	17.0	6.0	2.0	1.0	12.0	**C2**

Table 5
Euclidean Distance Matrix
Sample Site Benthos Density

A1	**A1**											
A2	149.0	**A2**										
A3	53.0	202.0	**A3**									
A4	167.0	18.0	220.0	**A4**								
A5	203.0	54.0	256.0	36.0	**A5**							
B1	77.0	72.0	130.0	90.0	126.0	**B1**						
B2	141.0	8.0	194.0	26.0	62.0	64.0	**B2**					
B3	298.0	447.0	245.0	465.0	501.0	375.0	439.0	**B3**				
B4	72.0	221.0	19.0	239.0	275.0	149.0	213.0	226.0	**B4**			
B5	17.0	166.0	36.0	184.0	220.0	94.0	158.0	281.0	55.0	**B5**		
C1	251.4	102.0	304.0	84.4	48.4	174.4	110.4	549.4	323.4	268.4	**C1**	
C2	250.8	101.8	303.8	83.8	47.8	173.8	109.8	548.8	322.8	267.8	0.6	**C2**

Attachment 8

Table 6
Euclidean Distance Matrix
Sample Site Benthos Diversity

A1	**A1**											
A2	0.30	**A2**										
A3	0.57	0.87	**A3**									
A4	0.29	0.59	0.28	**A4**								
A5	1.00	0.70	1.57	1.29	**A5**							
B1	1.20	0.90	1.77	1.49	0.20	**B1**						
B2	1.10	0.80	1.67	1.39	0.10	0.10	**B2**					
B3	0.78	1.08	0.21	0.49	1.78	1.98	1.88	**B3**				
B4	0.10	0.40	0.47	0.19	1.10	1.30	1.20	0.68	**B4**			
B5	0.10	0.20	0.67	0.39	0.90	1.10	1.00	0.88	0.20	**B5**		
C1	0.00	0.30	0.57	0.29	1.00	1.20	1.10	0.78	0.10	0.10	**C1**	
C2	0.90	0.60	1.47	1.19	0.10	0.30	0.20	1.68	1.00	0.80	0.90	**C2**

Table 7
Euclidean Distance Matrix
Sample Site Benthic Assemblage Tolerance Value

A1	**A1**											
A2	3.66	**A2**										
A3	0.40	3.26	**A3**									
A4	0.95	2.71	0.55	**A4**								
A5	1.69	1.97	1.29	0.74	**A5**							
B1	1.73	1.93	1.33	0.78	0.04	**B1**						
B2	3.19	0.47	2.79	2.24	1.50	1.46	**B2**					
B3	2.81	0.85	2.41	1.86	1.12	1.08	0.38	**B3**				
B4	1.83	1.83	1.43	0.88	0.14	0.10	1.36	0.98	**B4**			
B5	0.47	3.19	0.07	0.48	1.22	1.26	2.72	2.34	1.36	**B5**		
C1	0.87	2.79	0.47	0.08	0.82	0.86	2.32	1.94	0.96	0.40	**C1**	
C2	1.75	1.91	1.35	0.80	0.06	0.02	1.44	1.06	0.08	1.28	0.88	**C2**

Attachment 9
Sampling Matrices

Attachment 9
Measurement Endpoints Collected During Field Sampling Operations

Environmental Media	Assessment Method	Measurement Endpoint	OU1	OU2	OU3	OU4	OU5	OU6	OU7	IAOU	OU11	EcMP	NRPCP	Baseline	NRDA
	Fish Surveys	species presence/absence	X	X	X		X	X	X					X	
		species richness	X	X	X		X	X	X					X	
		relative abundance												X	
		tissue contaminant concentrations	X	X	X		X	X	X						
	Toxicity Testing: Water	*Ceriodaphnia* reproduction, survivorship	X	X	X		X	X	X						
		Fathead minnow survivorship	X	X	X		X	X	X						
	Toxicity Testing: Sediment	*Hyallela azteca* growth, survivorship			X		X	X	X						
		Chironomus riparans growth, survivorship					X	X	X						
General Observations															
	Plant Habitat Characterization	mapping	X	X	X	X	X	X	X	X	X			X	
		planimetering	X	X	X	X	X	X	X	X	X			X	
	Featured Species	species presence/absence	X	X	X	X	X	X	X	X	X		X	X	
		habitat use	X	X	X	X	X	X	X	X	X		X	X	
		activities	X	X	X	X	X	X	X	X	X		X	X	
		relative abundance/time	X	X	X	X	X	X	X	X	X		X	X	
	Ecosystem Function	extracted soil nitrate									X	X			
		extracted soil ammonium									X	X			
		total soil nitrogen									X	X			
		soil particulate organic matter									X	X			
		microbial nitrogen									X	X			
		microbial carbon									X	X			
		potential mineralizable nitrogen									X	X			
		potential respirable carbon									X	X			
		nitrogen fixation rate									X	X			
		denitrification rate									X	X			
		soil nutrients									X	X			
		soil metals									X	X			
	EcMP Plant Tissue Concentrations	ash									X	X			
		aluminum									X	X			
		cadmium									X	X			
		calcium									X	X			
		chromium									X	X			
		copper									X	X			
		iron									X	X			
		lead									X	X			
		magnesium									X	X			

Attachment 9
Measurement Endpoints Collected During Field Sampling Operations

Environmental Media	Assessment Method	Measurement Endpoint	OU1	OU2	OU3	OU4	OU5	OU6	OU7	IAOU	OU14	EcMP	NRPCP	Baseline	NRDA
		manganese									X	X			
		molybdenum									X	X			
		phosphorus									X	X			
		potassium									X	X			
		sodium									X	X			
		sulfur									X	X			
		zinc									X	X			

[1]Limited data available.

[2]"Featured species" or "significant species" include large mammals, carnivores, lagomorphs, raptors, muskrats, reptiles, prairie dogs, game birds, threatened, endangered, and special concern species, specific surveys are done for these species, and continuous sightings are recorded.

Attachment 9
Measurement Endpoints Collected During Field Sampling Operations

Environmental Media	Assessment Method	Measurement Endpoint	OU1	OU2	OU3	OU4	OU5	OU6	OU7	IAOU	OU11	EcMP	NRPCP	Baseline	NRDA
	Amphibian and Reptile Surveys	species presence/absence	X	X	X		X	X	X		X		X	X	
		species richness											X		
		relative abundance											X	X	
		tissue contaminant concentrations													
Aquatic Biota															
	Phytoplankton Surveys	species presence/absence	X	X			X	X	X		X	X		X	
		species richness	X	X			X	X	X		X	X		X	
		relative abundance	X	X			X	X	X		X	X		X	
		relative density/mL									X	X		X	
		biomass													
		biovolume													
	Zooplankton Surveys	species presence/absence						X			X	X		X	
		species richness						X			X	X			
		relative abundance						X			X	X			
		relative density/mL	X					X			X	X			
		biomass	X												
	Periphyton Surveys	species presence/absence	X	X	X		X	X	X			X		X	
		species richness	X	X	X		X	X	X			X		X	
		relative abundance	X	X	X		X	X	X			X		X	
		relative density/mm^2	X	X	X		X	X	X			X		X	
		pigment concentration													
		tissue contaminant concentrations													
	Benthic Macroinvertebrate Surveys	species presence/absence	X	X	X		X	X	X		X	X		X	
		species richness	X	X	X		X	X	X		X	X		X	
		relative abundance	X	X	X		X	X	X		X	X		X	
		relative density/m^2	X	X	X		X	X	X		X	X		X	
		biomass	X	X			X	X	X						
		tissue contaminant concentrations	X	X				X							
	Emergent Insect Surveys	species presence/absence						X			X	X			
		species richness						X			X	X			
		relative abundance						X			X	X			
		relative density/m^2/day						X			X	X			
		tissue contaminant concentrations						X							

Attachment 9
Measurement Endpoints Collected During Field Sampling Operations

Environmental Media	Assessment Method	Measurement Endpoint	OU1	OU2	OU3	OU4	OU5	OU6	OU7	IAOU	OU11	EcMP	NRPCP	Baseline	NRDA
Vegetation															
	Plant Cover Transects	species presence/absence	X	X	X	X	X	X	X	X	X	X		X	
		species richness	X	X	X		X	X	X		X	X		X	
		herbaceous cover	X	X	X	X	X	X	X	X	X	X		X	
		herbaceous production	X	X	X		X	X	X		X	X			
		low shrub production	X	X	X		X	X	X		X	X			
		tree and shrub density	X	X	X		X	X	X		X	X		X	
		canopy cover	X	X	X		X	X	X		X	X		X	
		tissue contaminant concentrations	X	X	X		X	X	X		X	X			
Terrestrial Animals															
	Arthropod Sweep Transects	species presence/absence	X	X			X				X	X		X	
		species richness	X	X			X				X	X		X	
		relative abundance	X	X			X				X	X			
		tissue contaminant concentrations	X												
	Soil Invertebrate Surveys	arthropod id & number									X	X			
		nematode id & number									X	X			
		protozoan id & number									X	X			
		mycorrhyzal inoculation potential									X	X			
	Bird Surveys	species presence/absence	X	X	X	X	X	X	X	X	X	X[1]	X	X	
		species richness	X	X	X	X	X	X	X	X	X	X[1]	X	X	
		relative abundance	X		X						X	X[1]	X	X	
		relative density/ha	X	X	X		X	X	X			X[1]	X	X	
		tissue contaminant concentrations													
	Small Mammal Surveys	species presence/absence	X	X	X	X	X	X	X	X	X	X		X	
		species richness	X	X	X	X	X	X	X	X	X	X		X	
		relative abundance	X	X	X	X	X	X	X	X	X	X		X	
		relative density/ha										X			
		tissue contaminant concentrations	X	X	X		X	X	X						
		habitat evaluation										X			
	Large Mammal Surveys	species presence/absence	X	X	X	X	X	X	X	X	X		X	X	
		species richness	X	X		X	X	X	X	X	X		X	X	
		relative abundance	X	X			X	X	X		X		X	X	
		pellets/ha	X	X			X	X	X		X			X	
		tissue contaminant concentrations													

Appendix O

Evaluation of Data Usability

Appendix O

Evaluation of Data Usability

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O1.0 INTRODUCTION

Data quality objectives (DQOs) were established in the OU 5 Work Plan (DOE, 1992a) for each analyte group and medium sampled. DQOs are expressed in quantitative and qualitative terms of precision, accuracy, representativeness, completeness, and comparability. These parameters are routinely referred to as the PARCC parameters.

This appendix presents a data quality and usability summary for the OU 5 RFI/RI. The data usability summary evaluates how data quality supports or limits the achievement of the prescribed DQOs, and how it affects data usability for the RFI/RI. Achievement of individual PARCC parameters is described, along with the resulting broad impacts to the data sets used. This discussion of data usability is limited to the data collected during the investigation outlined in the OU 5 Work Plan (DOE, 1992a). These are the data used for the identification of COCs and the risk calculations for the HHRA (Chapter 6.0).

O2.0 DATA USABILITY

O2.1 DATA VALIDATION

Analytical data were generated using EPA and other well-established methods identified in the *General Radiochemistry and Routine Analytical Services Protocol* (GRRASP; EG&G, 1991). EPA Contract Laboratory Program (CLP) methods and protocols were used in the analysis of target analyte list (TAL) metal parameters and toxic compound list (TCL) organic parameters. Methods for non-CLP analytes, for example, major ions and radionuclides, are based on EPA and other published references. Analytical data were reviewed and validated independently of the laboratory, and the results were documented in data validation reports. EPA functional guidelines for data validation were used for validating organics and metals data for CLP analytes. Non-CLP analytical data were validated using data validation guidelines developed by the Site Environmental Management Department because such guidelines have not been established by EPA. These non-CLP guidelines are based on EPA validation concepts and tailored to non-CLP analytical methods.

Three classes of data quality are used at the Site: 1) V—Valid and usable without qualification; 2) A—Acceptable for use with qualification(s); and 3) R—Rejected (unacceptable). Valid data meet the following objective standards, where applicable:

*1. analytical methods followed

2. acceptance criteria achieved

3. sufficient number and type of QC samples analyzed

*4. QC limits achieved

*5. compounds and analytes correctly identified

*6. equipment/instrumentation calibration criteria achieved

7. sample holding times met

* primary validation criteria

Data that are acceptable with qualifications meet most, but not all, of the above standards. At the minimum, all of the primary validation criteria are achieved within acceptable limits. Rejected data fail to meet primary validation criteria. As shown in Appendix E for data collected during the TM15 field investigation, analytical results are coded with the appropriate validation code (V, A, or R) based on the results of the data validation. (Data collected during the original OU 5 Work Plan investigation are presented in Appendix B of TM15 [DOE, 1994a].) For the purposes of the OU 5 Phase I RFI/RI, valid and acceptable data were considered of equal utility. Rejected data have not been used in any statistical computations or in the HHRA.

At the time TM15 was prepared, all of the data collected under the original OU 5 Work Plan investigation had not been validated (Table 2.3-8 of DOE, 1994a). Data presented in TM15 (DOE, 1994a) are also those that were used for the identification of COCs and risk calculations for the HHRA. Data that had not been validated were used for the HHRA to provide an adequate quantity of data for conceptual and statistical analysis with an acceptable level of confidence. Subsequent to the preparation of TM15 and the HHRA activities, all of the data collected under the original OU 5 Work Plan investigation were validated. The following paragraphs discuss results of the validation of these data and possible impacts to conclusions based on these data.

Table O-1 summarizes changes to the data used for the OU 5 HHRA that resulted from the validation process. Only those data points that changed during validation are given on this table. As indicated on Table O-1, the changes in results and/or data quality that resulted from the validation process will not impact the results of the OU 5 HHRA.

Data collected during the TM15 field investigation are used in this chapter, along with data collected under the original OU 5 Work Plan investigation, to evaluate the nature and extent of the COCs. Data from the TM15 investigation, however, were not used for the background comparisons discussed in Section 4.2 or the HHRA Chapter of this report. As of July 11, 1995, approximately 99 percent of the samples collected under the TM15 investigation had been analyzed and 94 percent had been validated.

O2.2 PRECISION

Precision is a measure of mutual agreement among individual measurements of the same property, under identical conditions. Precision is assessed by means of laboratory duplicate/field replicate sample analysis. The objective of calculating sampling and analytical precision is to demonstrate that reproducibility of measurements between similar samples is acceptable.

Precision is quantified by calculating the relative percent difference (RPD), i.e., the quotient of the difference between the duplicate analytical results and the average of those results for the given analyte expressed as a percentage according to the following equation:

$$\% \text{ RPD} = 100(C1 - C2)/((C1 + C2)/2)$$

Where: RPD = Relative percent difference

C1 = Concentration or activity of analyte in the sample

C2 = Concentration or activity of analyte in the duplicate.

Field Precision - Procedures for collection of field duplicates are dependent on the medium being sampled. With respect to groundwater and surface-water samples, field duplicates are collected following the actual sample collection using the same sampling technique. For soil samples, it is necessary to obtain splits of the interval being sampled, with the sample and duplicate being collected using the same technique.

As mentioned above, data from sample field duplicates provide a measure of sampling precision and sample homogeneity, i.e., the amount of error in the data attributed to the sampling technique, or to variability in the analyte concentration in the medium being sampled. The field precision objective specified in the Quality Assurance Addendum (QAA) in the OU 5 Work Plan (DOE, 1992a) is to obtain a RPD of ≤30 for aqueous samples and ≤40 for homogenous, nonaqueous samples. Summaries of the degree to which field precision goals were met for each medium and analyte group are provided in Tables O-2 through O-25.

Tables O-2 through O-5 present summaries of the calculations of field precision for subsurface-soil samples. The percentage of samples that achieved the RPD goal for metals in these samples ranges from 54.2 to 100 percent (Table O-2). Reproducibility of metal concentrations between field duplicates is often difficult to achieve in solid matrices because of the inherent heterogeneous nature of the sampled medium. Similarly, the reproducibility for radionuclides in subsurface-soil samples varied widely (Table O-3). Field precision goals were generally obtained for those radionuclides that are present in relatively high activities (e.g., uranium-233/234 and uranium-238) but were not obtained for those present at lower activities (e.g., americium-241 and plutonium-239/240). Additionally, all results for radionuclides are used regardless of the data qualifier (i.e., there are no nondetects for radionuclides). Therefore, no substitution of radionuclide results with the detection limit or other value is performed. The relatively large variability in low activities leads to low precision for these results.

Due to the very low frequency of detection of organic compounds in subsurface-soil samples (Tables O-4 and O-5), the RPD values for these compounds are greatly affected by the near-detection-limit observations and varying reporting limits presented in RFEDS. Overall, for these compounds, the RPD goal was met for most samples.

The quality of the results for surface-soil samples is similar to that reported for subsurface-soil samples (Tables O-6 through O-10). The frequency with which the RPD goal was met for metals in surface-soil samples varied widely, presumably due to the heterogeneity of the sampled medium (Table O-6). The frequency with which the RPD goal was met for radionuclides in surface-soil samples also varied, and, as was the case with subsurface-soil samples, those radionuclides detected at low activities did not achieve the precision goal as frequently as those present at higher activities (Table O-7). As with subsurface soils, organic compounds were detected infrequently in surface-soil samples, therefore, the RPDs for these compounds were adversely affected by the near-detection-limit concentrations (Tables O-8 through O-10).

Precision results for pond-sediment samples (Tables O-11 through O-15) display the same general trends as those discussed above for other nonaqueous media. The low number (one or two) of field duplicates for pond-sediment samples limits the usefulness of these calculations.

The precision of measurements for aqueous samples (groundwater and surface water) was generally higher than that for nonaqueous samples. This increased precision is expected due to the more homogeneous nature of these media. Tables O-16A through O-20 provide summaries of the precision calculations for groundwater. Summaries of these calculations are provided in Tables O-21A through O-25 for surface-water samples. For both aqueous media, precision for unfiltered (total) samples is generally lower than that reported for filtered (dissolved) samples. The presence of suspended sediment in the unfiltered samples contributes greatly to the variability of concentrations of metals and radionuclides in these samples. As was the case for the nonaqueous samples, the low frequency of detection for organic compounds greatly affected the precision reported for these compounds and the low activities of radionuclides detected in these samples resulted in low precision.

Laboratory Precision - Laboratory precision is evaluated through the use of laboratory duplicates for inorganic analyses and matrix spikes (MS) and matrix spike duplicates (MSD) for organic analyses. Duplicate precision is calculated as RPD; MS/MSD precision is assessed by calculating an RPD between the percent recoveries for the method-specific spiked compounds. Laboratory precision goals are mandated by the analytical method for each analyte group and assessed for achievement during data validation. Data not meeting the precision goals are normally rejected.

A review of data validation results for data used for the OU 5 HHRA indicates that poor analytical precision was not a recurring problem that resulted in data rejection. With the exception of the radiological analyses, data were not rejected due to precision problems; i.e., replicate precision was routinely achieved. Approximately 13 percent of the radiological analyses that were rejected during validation were rejected due to precision-related problems.

In conclusion, inadequate precision was not a factor compromising usability of the RFI/RI data.

O2.3 ACCURACY

Accuracy of data obtained in an investigation is a function of the sampling technique, potential for sample contamination, and analytical capabilities of the laboratory. Accuracy means the nearness of a result, or the mean of a set of results, to the true value. Accuracy is assessed by analysis of reference samples of known concentration or activity, percent recoveries for spiked samples, and by review of blank data (i.e., field blanks, trip blanks, method blanks, etc.) that may affect measurement accuracy.

Field Accuracy - Field accuracy is assessed by comparing sample analyte concentrations to those present in associated field quality control (QC) blanks, which include trip blanks, field blanks, and equipment rinsate blanks. Field QC blanks are collected to quantify the analyte concentration in a sample that may be attributable to sampling procedures. The purpose of these field blanks is to detect false positive results in the real sample. During the implementation of the OU 5 Work Plan field investigation, trip blanks and field blanks were not used. Volatile organics, particularly those commonly associated with field or laboratory contamination, such as acetone and methylene chloride, were detected in several samples collected during this investigation. However, with the exception of for seep water, volatile organics were not identified as COCs for any media within OU 5 (see Section 6.0). Additionally, the volatile organics detected in seep water are not significant contributors to risk. Because so few volatile organics were detected in real samples, false positives are not a serious concern to this investigation. Therefore, this deficiency in achieving a DQO does not impact the ultimate conclusions based on these data.

Field and trip blanks were used during the TM15 field investigation (Table O-26 summarizes the samples, including all field QC samples collected under the TM15 program). However, because the data collected under the TM15 investigation were not used for the HHRA and are being used to only a limited extent in the RFI/RI, an analysis of the data for these blanks is not included here.

Equipment rinsate blanks were collected throughout all phases of the OU 5 RFI/RI. A few volatile and semi-volatile organic compounds—most commonly acetone, methylene chloride, and phthalates—were detected in some of these samples. The concentrations detected, however, were relatively low (maximum concentration of 10 μg/l). In addition, the fact that these compounds were not identified as COCs for most environmental media within OU 5 suggests that they are not site contaminants.

Comparisons of contract-required quantitation limits (CRQLs) and the concentrations of metals, radionuclides, and water-quality parameters in the equipment rinsate blanks indicate that, with few exceptions, concentrations in these blanks are below the CRQL, indicating the field sample data are not biased due to laboratory- or sampling-introduced contamination. The primary exception is for one rinsate associated with subsurface-soil samples from borehole 57493. This rinsate contained relatively high concentrations of several metals, uranium-233/234, and uranium-238. A comparison of the concentrations of the metals and radionuclides detected in the subsurface-soil samples associated with this rinsate with the range of concentrations detected in subsurface-soil samples from other locations within OU 5 indicates that the concentrations in the samples from borehole 57493 are within the range of OU 5 concentrations. In fact, the concentrations in the samples from borehole 57493 are generally within the range of background concentrations for subsurface soil.

In conclusion, with the few exceptions noted above, the magnitude of concentrations observed in the equipment rinsate blanks are inconsequential in relation to the analyte concentrations in the field samples. Additionally, the absence of volatile organic compounds as COCs for OU 5 supports the conclusion that their detection in field samples is not attributable to site contamination. Therefore, inadequate field accuracy was not a factor compromising the usability of the RFI/RI data.

Laboratory Accuracy - Accuracy of chemical laboratory data is assessed using data from MS samples for inorganic analytes, MS/MSD samples for organic analytes, and any in-house or blind certified standards that the laboratory analyzes as part of its ongoing quality assurance/quality control (QA/QC) program. Acceptable recovery for the inorganic MS samples is routinely 75 to 125 percent. Accuracy for organic MS/MSD analyses is mandated by the analytical method for the specific spiked compounds. Use of method blank analyses in the laboratory also assists in assessing analytical accuracy. All of these measures of analytical accuracy are evaluated during the data validation process. When analytical accuracy goals are not achieved, data are normally rejected.

A review of the validation results for the data used for the OU 5 HHRA indicates that rejection of data due to accuracy problems is generally restricted to volatile and semi-volatile organics, pesticides, PCBs, and radionuclides. However, as shown below, only 2.3 percent of the validated data have been rejected for any reason. Therefore, inadequate laboratory accuracy was not a factor compromising the usability of the RFI/RI data.

Analytical Group	Percent Records Rejected
Metals	1.8
Radionuclides	2.7
Organics	2.5
Pesticides/PCBs	3.0
Misc. Analyses	0.1
TOTAL	2.3

O2.4 REPRESENTATIVENESS

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter that is most concerned with proper network design, sampling locations, and the sampling methods.

Representativeness of the extent of contamination in OU 5 media is supported by the extensiveness of the phased sampling efforts to characterize the OU. TM15 (DOE, 1994a) was designed based on the data needs identified from prior work related to the Work Plan (DOE, 1992a). Representativeness is considered in project planning and supported by the Work Plan (DOE, 1992a), subsequent TMs, and associated operating procedures. The plans and procedures are reviewed and approved by the appropriate technical and agency representatives. As a result, the network and sampling design for the Phase I RFI/RI are considered to be representative of site conditions.

Table 1-1 of this report (OU 5 RFI/RI) provides a comparison of the field investigation defined by the IAG and the OU 5 Work Plan, as amended by various TMs, with the actual implementation of the OU 5 RFI/RI. The results on this table indicate that the field investigation generally followed the specifications outlined in the OU 5 Work Plan and the TMs. As discussed in Section 2.6, below, a comparison of the number of sampling locations planned and sampled during this investigation indicates that the field investigation fulfilled the goals of the OU 5 RFI/RI.

O2.5 COMPARABILITY

Comparability is used to express the confidence with which one set of data can be compared to another set. Comparability is promoted by using similar sampling and analytical methods and reporting data in uniform units. To achieve comparability of data, all analyses prescribed in the Work Plan and subsequent

TMs and performed in support of the Phase I RFI/RI use EPA-accepted or equivalent methods (i.e., all analyses were performed in accordance with the GRRASP [EG&G, 1991]). Comparability of the data supporting the Phase I RFI/RI has also been promoted by using approved and standardized sampling techniques (i.e., Site SOPs were followed for all field investigations).

O2.6 COMPLETENESS

The objective for completeness is that the investigation provides enough planned data so that the objectives of the project are met. Completeness for the Phase I RFI/RI is evaluated by comparing the planned to the actual number of samples collected and analyzed. The analytical results should be validated and deemed valid or acceptable to be considered in an assessment of completeness. The overall completeness goal for the project was 90 percent.

It is difficult to quantify completeness in strict accordance with the above-noted guidelines. For example, the frequency of groundwater and surface-water sampling was not specified, the number of samples collected from boreholes is based on the conditions encountered. Therefore, a simpler, albeit less accurate, approach to quantifying completeness has been taken to perform the assessment. Table O-27 summarizes the number of planned sampling locations and the number of locations actually sampled for the investigation defined in the OU 5 Work Plan (DOE, 1992a), as modified by TMs 1 through 10. For the most part, the number of samples collected and types of analyses performed at each sampling location were as specified in the Work Plan and TMs. Samples not collected (or sampling stations not installed) were due to extenuating circumstances such as unexpected hydrogeologic conditions (e.g., insufficient saturated thickness to install a well) and weather (e.g., frozen surface water). As shown on Table O-27, it is estimated that the RFI/RI data are 103 percent complete. This completion rate is greater than 100 percent because several additional sampling locations were added to the OU 5 field program as conditions warranted.

The completeness of the RFI/RI data can also be measured by the percentage of data validated and the percentage rejected during validation. As discussed in Section 2.1 of this appendix, 100 percent of the data used collected under the investigation defined by the OU 5 Work Plan (DOE, 1992a), as modified by TMs 1 through 10, have been validated. The percentage of data rejected during validation was 2.3 percent (see Section 2.3 of this Appendix).

Tables O-1 through O-27

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Table O-1
Summary of Changes Resulting from Validation Process

ANALYTE GROUP	SAMPLE NUMBER	ANALYTE	CHANGE	SUMMARY OF IMPACT
Metals	NA	NA	No changes.	NA
Radionuclides	GW01476WC	Total Gross Alpha	Result changed from 9.50 to 10.20 pCi/l	No impact. Gross alpha used as indicator only. Activity within range for other OU5 samples.
	GW01476WC	Total Gross Beta	Result changed from 5.50 to 5.90 pCi/l	No impact. Gross beta used as indicator only. Activity within range for other OU5 samples.
	SS50122AS, SS50123AS	Uranium-233,234; Uranium-235; and Uranium-238	All records were rejected during validation.	No impact. The activities for these samples were well within the range for other OU5 samples. The deletion of these results may change the 95% UCL for these analytes slightly but would not result in a change in the PCOC/COC identification.
	BH50444AS, BH50540AS, BH50636AS, BH50637AS, BH50643AS, BH50647AS, BH50648AS, BH50585AS	Americium-241	All records rejected during validation.	No impact. Due to very low activities reported (-0.01 to 0.01 pCi/g), the deletion of this result would not affect PCOC/COC identification.
Semi-Volatile Organics	GW01480WC	Bis(2-ethylhexyl)phthalate	Result changed from 3.00 to 10.00 μg/l and result qualifier changed from "JB" to "U".	No impact. The change in result coupled with the change in qualifier results in the result being replaced with 5.0 (1/2 the detection limit) for statistical evaluations and background comparisons. The maximum detected value for this compound used for the COC-screening process was the 3.0 μg/l reported for this sample previously. Because this sample is now classified as a nondetect, the next highest detected concentration would now be less than 3.0 μg/l. Because this compound was not identified as a COC previously, it would not be using the lower concentration.
	GW01480WC	Bis(2-ethylhexyl)phthalate	Result changed from 1.00 to 10.00 μg/l and result qualifier changed from "JB" to "U".	No impact. As discussed above, this change will not impact the conclusions of the HHRA.
Volatile Organics	NA	NA	No changes.	NA
Pesticides/PCBs	GW01476WC	Aroclor-1254	Result changed from 0.70 to 0.71μg/l.	No impact. Because of the insignificant change in concentrations, no impact to the HHRA results.

Table O-2
Summary of Precision Calculations for Metals in Subsurface-Soil Samples

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
Aluminum	24	19	79.2%	100.0%	100.0%
Antimony	17	13	76.5%	11.8%	23.5%
Arsenic	24	15	62.5%	95.8%	100.0%
Barium	24	16	66.7%	100.0%	100.0%
Beryllium	24	23	95.8%	37.5%	33.3%
Cadmium	24	19	79.2%	12.5%	58.3%
Calcium	24	17	70.8%	100.0%	100.0%
Cesium	24	24	100.0%	0.0%	0.0%
Chromium	24	16	66.7%	95.8%	87.5%
Cobalt	23	13	56.5%	100.0%	60.9%
Copper	24	17	70.8%	95.8%	95.8%
Iron	24	17	70.8%	100.0%	100.0%
Lead	24	16	66.7%	100.0%	100.0%
Lithium	23	22	95.7%	95.7%	95.7%
Magnesium	24	21	87.5%	100.0%	100.0%
Manganese	24	13	54.2%	100.0%	100.0%
Mercury	12	12	100.0%	25.0%	16.7%
Molybdenum	23	20	87.0%	13.0%	8.7%
Nickel	24	14	58.3%	100.0%	100.0%
Potassium	24	20	83.3%	79.2%	91.7%
Selenium	23	19	82.6%	8.7%	13.0%
Silver	21	20	95.2%	14.3%	4.8%
Sodium	24	22	91.7%	87.5%	87.5%
Strontium	24	20	83.3%	100.0%	100.0%
Thallium	24	20	83.3%	16.7%	25.0%
Tin	24	13	54.2%	0.0%	45.8%
Vanadium	24	17	70.8%	100.0%	100.0%
Zinc	24	18	75.0%	100.0%	100.0%

Table O-3
Summary of Precision Calculations for Radionuclides in Subsurface-Soil Samples

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%
Americium-241	24	10	41.7%
Gross Alpha	24	16	66.7%
Gross Beta	24	21	87.5%
Plutonium-239/240	24	7	29.2%
Uranium-233/234	24	22	91.7%
Uranium-235	24	14	58.3%
Uranium-238	24	22	91.7%

Table O-4
Summary of Precision Calculations for Semi-Volatile Organic Compounds in Subsurface-Soil Samples

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
1,2,4-TRICHLOROBENZENE	6	6	100.0%	0.0%	0.0%
1,2-DICHLOROBENZENE	6	6	100.0%	0.0%	0.0%
1,3-DICHLOROBENZENE	6	6	100.0%	0.0%	0.0%
1,4-DICHLOROBENZENE	6	6	100.0%	0.0%	0.0%
2,4,5-TRICHLOROPHENOL	6	6	100.0%	0.0%	0.0%
2,4,6-TRICHLOROPHENOL	6	6	100.0%	0.0%	0.0%
2,4-DICHLOROPHENOL	6	6	100.0%	0.0%	0.0%
2,4-DIMETHYLPHENOL	6	6	100.0%	0.0%	0.0%
2,4-DINITROPHENOL	5	5	100.0%	0.0%	0.0%
2,4-DINITROTOLUENE	6	6	100.0%	0.0%	0.0%
2,6-DINITROTOLUENE	6	6	100.0%	0.0%	0.0%
2-CHLORONAPHTHALENE	6	6	100.0%	0.0%	0.0%
2-CHLOROPHENOL	6	6	100.0%	0.0%	0.0%
2-METHYLNAPHTHALENE	6	6	100.0%	16.7%	0.0%
2-METHYLPHENOL	6	6	100.0%	0.0%	0.0%
2-NITROANILINE	6	6	100.0%	0.0%	0.0%
2-NITROPHENOL	6	6	100.0%	0.0%	0.0%
3,3'-DICHLOROBENZIDINE	6	6	100.0%	0.0%	0.0%
3-NITROANILINE	6	6	100.0%	0.0%	0.0%
4,6-DINITRO-2-METHYLPHENOL	6	6	100.0%	0.0%	0.0%
4-CHLORO-3-METHYLPHENOL	6	6	100.0%	0.0%	0.0%
4-CHLOROANILINE	6	6	100.0%	0.0%	0.0%
4-CHLOROPHENYL PHENYL ETHI	6	6	100.0%	0.0%	0.0%
4-METHYLPHENOL	6	6	100.0%	0.0%	0.0%
4-NITROANILINE	6	6	100.0%	0.0%	0.0%
4-NITROPHENOL	6	6	100.0%	0.0%	0.0%
ACENAPHTHENE	6	5	83.3%	16.7%	16.7%
ACENAPHTHYLENE	6	6	100.0%	0.0%	0.0%
ANTHRACENE	6	5	83.3%	16.7%	16.7%
BENZO(a)ANTHRACENE	6	5	83.3%	16.7%	16.7%
BENZO(a)PYRENE	6	5	83.3%	16.7%	16.7%
BENZO(b)FLUORANTHENE	6	4	66.7%	16.7%	33.3%
BENZO(ghi)PERYLENE	6	5	83.3%	16.7%	16.7%
BENZO(k)FLUORANTHENE	6	4	66.7%	16.7%	33.3%

Table O-4 (Continued)

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
BENZYL ALCOHOL	5	5	100.0%	0.0%	0.0%
BIS(2-CHLOROETHOXY)METHAN	6	6	100.0%	0.0%	0.0%
BIS(2-CHLOROETHYL)ETHER	6	6	100.0%	0.0%	0.0%
BIS(2-CHLOROISOPROPYL)ETHEI	6	6	100.0%	0.0%	0.0%
BIS(2-ETHYLHEXYL)PHTHALATE	6	4	66.7%	16.7%	16.7%
BUTYL BENZYL PHTHALATE	6	6	100.0%	0.0%	0.0%
CHRYSENE	6	5	83.3%	16.7%	16.7%
DI-n-BUTYL PHTHALATE	6	6	100.0%	0.0%	0.0%
DI-n-OCTYL PHTHALATE	6	6	100.0%	0.0%	0.0%
DIBENZO(a,h)ANTHRACENE	6	5	83.3%	16.7%	0.0%
DIBENZOFURAN	6	6	100.0%	16.7%	16.7%
DIETHYL PHTHALATE	6	6	100.0%	0.0%	0.0%
DIMETHYL PHTHALATE	6	6	100.0%	0.0%	0.0%
FLUORANTHENE	6	4	66.7%	50.0%	33.3%
FLUORENE	6	5	83.3%	16.7%	16.7%
HEXACHLOROBENZENE	6	6	100.0%	0.0%	0.0%
HEXACHLOROBUTADIENE	6	6	100.0%	0.0%	0.0%
HEXACHLOROCYCLOPENTADIEN	5	5	100.0%	0.0%	0.0%
HEXACHLOROETHANE	6	6	100.0%	0.0%	0.0%
INDENO(1,2,3-cd)PYRENE	6	5	83.3%	16.7%	16.7%
ISOPHORONE	6	6	100.0%	0.0%	0.0%
N-NITROSO-DI-n-PROPYLAMINE	6	6	100.0%	0.0%	0.0%
N-NITROSODIPHENYLAMINE	6	6	100.0%	0.0%	0.0%
NAPHTHALENE	6	5	83.3%	16.7%	0.0%
NITROBENZENE	6	6	100.0%	0.0%	0.0%
p-BROMODIPHENYL ETHER	6	6	100.0%	0.0%	0.0%
PENTACHLOROPHENOL	6	6	100.0%	0.0%	0.0%
PHENANTHRENE	6	3	50.0%	50.0%	33.3%
PHENOL	6	6	100.0%	0.0%	0.0%
PYRENE	6	4	66.7%	50.0%	33.3%

Table O-5
Summary of Precision Calculations for Pesticides and PCBs in Subsurface-Soil Samples

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
4,4'-DDD	6	6	100.0%	0.0%	0.0%
4,4'-DDE	6	6	100.0%	0.0%	0.0%
4,4'-DDT	6	6	100.0%	0.0%	0.0%
ALDRIN	6	6	100.0%	0.0%	0.0%
alpha-BHC	6	6	100.0%	0.0%	0.0%
alpha-CHLORDANE	6	6	100.0%	0.0%	0.0%
AROCLOR-1016	6	6	100.0%	0.0%	0.0%
AROCLOR-1221	6	6	100.0%	0.0%	0.0%
AROCLOR-1232	5	5	100.0%	0.0%	0.0%
AROCLOR-1242	6	6	100.0%	0.0%	0.0%
AROCLOR-1248	6	6	100.0%	0.0%	0.0%
AROCLOR-1254	6	6	100.0%	0.0%	0.0%
AROCLOR-1260	6	6	100.0%	0.0%	0.0%
beta-BHC	6	6	100.0%	0.0%	0.0%
delta-BHC	6	6	100.0%	0.0%	0.0%
DIELDRIN	6	6	100.0%	0.0%	0.0%
ENDOSULFAN I	6	6	100.0%	0.0%	0.0%
ENDOSULFAN II	6	6	100.0%	0.0%	0.0%
ENDOSULFAN SULFATE	6	6	100.0%	0.0%	0.0%
ENDRIN	6	6	100.0%	0.0%	0.0%
ENDRIN KETONE	6	6	100.0%	0.0%	0.0%
gamma-BHC (LINDANE)	6	6	100.0%	0.0%	0.0%
gamma-CHLORDANE	6	6	100.0%	0.0%	0.0%
HEPTACHLOR	6	6	100.0%	0.0%	0.0%
HEPTACHLOR EPOXIDE	6	6	100.0%	0.0%	0.0%
METHOXYCHLOR	6	6	100.0%	0.0%	0.0%
TOXAPHENE	6	6	100.0%	0.0%	0.0%

Table O-6
Summary of Precision Calculations for Metals in Subsurface-Soil Samples

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
Aluminum	9	9	100.0%	100.0%	100.0%
Antimony	8	8	100.0%	37.5%	37.5%
Arsenic	9	9	100.0%	100.0%	100.0%
Barium	9	9	100.0%	100.0%	100.0%
Beryllium	9	9	100.0%	77.8%	77.8%
Cadmium	9	9	100.0%	22.2%	33.3%
Calcium	9	9	100.0%	100.0%	100.0%
Cesium	6	6	100.0%	0.0%	0.0%
Chromium	9	9	100.0%	100.0%	100.0%
Cobalt	9	8	88.9%	66.7%	55.6%
Copper	9	8	88.9%	88.9%	88.9%
Iron	9	9	100.0%	100.0%	100.0%
Lead	9	9	100.0%	100.0%	100.0%
Lithium	9	9	100.0%	88.9%	88.9%
Magnesium	9	9	100.0%	100.0%	100.0%
Manganese	9	6	66.7%	100.0%	100.0%
Mercury	9	7	77.8%	44.4%	44.4%
Molybdenum	9	9	100.0%	0.0%	0.0%
Nickel	9	9	100.0%	88.9%	100.0%
Potassium	9	8	88.9%	100.0%	88.9%
Selenium	7	6	85.7%	71.4%	71.4%
Silver	7	7	100.0%	0.0%	0.0%
Sodium	9	8	88.9%	100.0%	88.9%
Strontium	9	9	100.0%	100.0%	100.0%
Thallium	9	8	88.9%	11.1%	22.2%
Tin	9	9	100.0%	0.0%	0.0%
Vanadium	9	9	100.0%	100.0%	100.0%
Zinc	9	9	100.0%	100.0%	100.0%

Table O-7
Summary of Precision Calculations for Radionuclides in Subsurface-Soil Samples

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%
Americium-241	9	4	44.4%
Gross Alpha	8	5	62.5%
Gross Beta	8	7	87.5%
Plutonium-238	1	1	100.0%
Plutonium-239/240	10	4	40.0%
Uranium-233/234	10	8	80.0%
Uranium-235	10	5	50.0%
Uranium-238	10	10	100.0%

Table O-8
Summary of Precision Calculations for Semi-Volatile Organic Compounds in Subsurface-Soil Samples

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
1,2,4-TRICHLOROBENZENE	7	7	100.0%	0.0%	0.0%
1,2-DICHLOROBENZENE	7	7	100.0%	0.0%	0.0%
1,3-DICHLOROBENZENE	7	7	100.0%	0.0%	0.0%
1,4-DICHLOROBENZENE	7	7	100.0%	0.0%	0.0%
2,4,6-TRICHLOROPHENOL	8	8	100.0%	0.0%	0.0%
2,4-DICHLOROPHENOL	4	4	100.0%	0.0%	0.0%
2,4-DIMETHYLPHENOL	4	4	100.0%	0.0%	0.0%
2,4-DINITROPHENOL	4	4	100.0%	0.0%	0.0%
2,4-DINITROTOLUENE	7	7	100.0%	0.0%	0.0%
2,6-DINITROTOLUENE	7	7	100.0%	0.0%	0.0%
2-CHLORONAPHTHALENE	7	7	100.0%	0.0%	0.0%
2-CHLOROPHENOL	4	4	100.0%	0.0%	0.0%
2-METHYLNAPHTHALENE	7	6	85.7%	16.7%	0.0%
2-METHYLPHENOL	4	4	100.0%	0.0%	0.0%
2-NITROANILINE	6	6	100.0%	0.0%	0.0%
2-NITROPHENOL	4	4	100.0%	0.0%	0.0%
3,3'-DICHLOROBENZIDINE	5	5	100.0%	0.0%	0.0%
3-NITROANILINE	4	4	100.0%	0.0%	0.0%
4,6-DINITRO-2-METHYLPHENOL	4	4	100.0%	0.0%	0.0%
4-CHLORO-3-METHYLPHENOL	4	4	100.0%	0.0%	0.0%
4-CHLOROANILINE	6	6	100.0%	0.0%	0.0%
4-CHLOROPHENYL PHENYL ETHER	7	7	100.0%	0.0%	0.0%
4-METHYLPHENOL	4	4	100.0%	0.0%	0.0%
4-NITROANILINE	6	6	100.0%	0.0%	0.0%
4-NITROPHENOL	4	4	100.0%	0.0%	0.0%
ACENAPHTHENE	7	5	71.4%	40.0%	20.0%
ACENAPHTHYLENE	7	7	100.0%	0.0%	0.0%
ANTHRACENE	7	6	85.7%	33.3%	16.7%
BENZO(a)ANTHRACENE	7	4	57.1%	75.0%	75.0%
BENZO(a)PYRENE	7	7	100.0%	42.9%	28.6%
BENZO(b)FLUORANTHENE	7	4	57.1%	75.0%	75.0%
BENZO(ghi)PERYLENE	5	4	80.0%	25.0%	25.0%
BENZO(k)FLUORANTHENE	7	7	100.0%	28.6%	28.6%
BENZOIC ACID	4	4	100.0%	25.0%	25.0%
BENZYL ALCOHOL	4	4	100.0%	0.0%	0.0%

Table O-8 (Continued)

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
1,2,4-TRICHLOROBENZENE	7	7	100.0%	0.0%	0.0%
BIS(2-CHLOROETHYL)ETHER	7	7	100.0%	0.0%	0.0%
BIS(2-CHLOROISOPROPYL)ETHER	4	4	100.0%	0.0%	0.0%
BIS(2-ETHYLHEXYL)PHTHALATE	7	6	85.7%	16.7%	16.7%
BUTYL BENZYL PHTHALATE	7	7	100.0%	0.0%	0.0%
CHRYSENE	7	4	57.1%	100.0%	100.0%
DI-n-BUTYL PHTHALATE	7	6	85.7%	16.7%	0.0%
DI-n-OCTYL PHTHALATE	7	7	100.0%	0.0%	0.0%
DIBENZO(a,h)ANTHRACENE	6	6	100.0%	16.7%	16.7%
DIBENZOFURAN	7	6	85.7%	16.7%	0.0%
DIETHYL PHTHALATE	7	7	100.0%	0.0%	0.0%
DIMETHYL PHTHALATE	7	7	100.0%	0.0%	0.0%
FLUORANTHENE	7	6	85.7%	83.3%	66.7%
FLUORENE	7	5	71.4%	40.0%	20.0%
HEXACHLOROBENZENE	6	6	100.0%	0.0%	0.0%
HEXACHLOROBUTADIENE	7	7	100.0%	0.0%	0.0%
HEXACHLOROCYCLOPENTADIENE	7	7	100.0%	0.0%	0.0%
HEXACHLOROETHANE	7	7	100.0%	0.0%	0.0%
INDENO(1,2,3-cd)PYRENE	6	5	83.3%	40.0%	40.0%
ISOPHORONE	7	7	100.0%	0.0%	0.0%
N-NITROSO-DI-n-PROPYLAMINE	7	7	100.0%	0.0%	0.0%
N-NITROSODIPHENYLAMINE	7	7	100.0%	0.0%	0.0%
NAPHTHALENE	7	6	85.7%	16.7%	16.7%
NITROBENZENE	6	6	100.0%	0.0%	0.0%
PENTACHLOROPHENOL	4	4	100.0%	0.0%	0.0%
PHENANTHRENE	7	3	42.9%	57.0%	57.0%
PHENOL	4	4	100.0%	0.0%	0.0%
PYRENE	7	3	42.9%	71.0%	57.0%
p-BROMODIPHENYL ETHER	7	7	100.0%	0.0%	0.0%

Table O-9
Summary of Precision Calculations for PAHs in Subsurface-Soil Samples

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
ACENAPHTHYLENE	2	2	100.0%	0.0%	0.0%
ANTHRACENE	2	2	100.0%	0.0%	0.0%
BENZO(a)PYRENE	1	1	100.0%	0.0%	0.0%
BENZO(ghi)PERYLENE	1	1	100.0%	0.0%	0.0%
CHRYSENE	2	2	100.0%	0.0%	0.0%
FLUORENE	1	1	100.0%	0.0%	0.0%
NAPHTHALENE	2	2	100.0%	0.0%	0.0%
PHENANTHRENE	2	2	100.0%	0.0%	0.0%
PYRENE	2	2	100.0%	0.0%	0.0%

Table O-10
Summary of Precision Calculations for Pesticides and PCBs in Subsurface-Soil Samples

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
4,4'-DDD	7	7	100.0%	0.0%	0.0%
4,4'-DDE	7	7	100.0%	0.0%	0.0%
4,4'-DDT	7	7	100.0%	0.0%	0.0%
ALDRIN	7	7	100.0%	0.0%	0.0%
AROCLOR-1016	7	7	100.0%	0.0%	0.0%
AROCLOR-1221	7	7	100.0%	0.0%	0.0%
AROCLOR-1232	7	7	100.0%	0.0%	0.0%
AROCLOR-1242	7	7	100.0%	0.0%	0.0%
AROCLOR-1248	7	7	100.0%	0.0%	0.0%
AROCLOR-1254	7	6	85.7%	28.6%	28.6%
AROCLOR-1260	7	7	100.0%	0.0%	0.0%
DIELDRIN	7	7	100.0%	0.0%	0.0%
ENDOSULFAN I	7	7	100.0%	0.0%	0.0%
ENDOSULFAN II	7	7	100.0%	0.0%	0.0%
ENDOSULFAN SULFATE	7	7	100.0%	0.0%	0.0%
ENDRIN	7	7	100.0%	0.0%	0.0%
ENDRIN KETONE	7	7	100.0%	0.0%	0.0%
HEPTACHLOR	7	7	100.0%	0.0%	0.0%
HEPTACHLOR EPOXIDE	7	7	100.0%	0.0%	0.0%
METHOXYCHLOR	7	7	100.0%	0.0%	0.0%
TOXAPHENE	7	7	100.0%	0.0%	0.0%
alpha-BHC	7	7	100.0%	0.0%	0.0%
alpha-CHLORDANE	6	6	100.0%	0.0%	0.0%
beta-BHC	7	7	100.0%	0.0%	0.0%
delta-BHC	7	7	100.0%	0.0%	0.0%
gamma-BHC (LINDANE)	7	7	100.0%	0.0%	0.0%
gamma-CHLORDANE	7	7	100.0%	0.0%	0.0%

Table O-11
Summary of Precision Calculations for Metals in Pond-Sediments

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
Aluminum	2	1	50.0%	100.0%	100.0%
Antimony	1	1	100.0%	0.0%	0.0%
Arsenic	2	1	50.0%	100.0%	100.0%
Barium	2	1	50.0%	100.0%	100.0%
Beryllium	1	0	0.0%	100.0%	0.0%
Cadmium	1	1	100.0%	0.0%	0.0%
Calcium	2	1	50.0%	100.0%	100.0%
Chromium	2	1	50.0%	100.0%	100.0%
Cobalt	1	0	0.0%	100.0%	100.0%
Copper	2	1	50.0%	100.0%	100.0%
Iron	2	1	50.0%	100.0%	100.0%
Lead	2	0	0.0%	100.0%	100.0%
Lithium	1	0	0.0%	100.0%	100.0%
Magnesium	2	1	50.0%	100.0%	100.0%
Manganese	2	1	50.0%	100.0%	100.0%
Mercury	2	0	0.0%	100.0%	100.0%
Molybdenum	1	1	100.0%	0.0%	0.0%
Nickel	2	1	50.0%	50.0%	50.0%
Potassium	2	1	50.0%	100.0%	100.0%
Selenium	1	1	100.0%	100.0%	100.0%
Silver	2	2	100.0%	50.0%	50.0%
Sodium	2	1	50.0%	100.0%	100.0%
Strontium	2	1	50.0%	100.0%	100.0%
Thallium	1	1	100.0%	0.0%	0.0%
Tin	2	2	100.0%	0.0%	0.0%
Vanadium	2	1	50.0%	100.0%	100.0%
Zinc	1	0	0.0%	100.0%	100.0%

TABLE O-12
Summary of Precision Calculations for Radionuclides in Pond-Sediments

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%
Americium-241	3	3	100.0%
Gross Alpha	3	2	66.7%
Gross Beta	3	3	100.0%
Plutonium-239/240	3	3	100.0%
Tritium	3	1	33.3%
Uranium-233/234	2	2	100.0%
Uranium-235	2	1	50.0%
Uranium-238	2	2	100.0%

Table O-13
Summary of Precision Calculations for Semi-Volatile Organics in Pond-Sediments

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
1,2,4-TRICHLOROBENZENE	1	1	100.0%	0.0%	0.0%
1,2-DICHLOROBENZENE	1	1	100.0%	0.0%	0.0%
1,3-DICHLOROBENZENE	1	1	100.0%	0.0%	0.0%
1,4-DICHLOROBENZENE	1	1	100.0%	0.0%	0.0%
2,4,5-TRICHLOROPHENOL	1	1	100.0%	0.0%	0.0%
2,4,6-TRICHLOROPHENOL	1	1	100.0%	0.0%	0.0%
2,4-DICHLOROPHENOL	1	1	100.0%	0.0%	0.0%
2,4-DIMETHYLPHENOL	1	1	100.0%	0.0%	0.0%
2,4-DINITROPHENOL	1	1	100.0%	0.0%	0.0%
2,4-DINITROTOLUENE	1	1	100.0%	0.0%	0.0%
2,6-DINITROTOLUENE	1	1	100.0%	0.0%	0.0%
2-CHLORONAPHTHALENE	1	1	100.0%	0.0%	0.0%
2-CHLOROPHENOL	1	1	100.0%	0.0%	0.0%
2-METHYLNAPHTHALENE	1	1	100.0%	0.0%	0.0%
2-METHYLPHENOL	1	1	100.0%	0.0%	0.0%
2-NITROANILINE	1	1	100.0%	0.0%	0.0%
2-NITROPHENOL	1	1	100.0%	0.0%	0.0%
3,3'-DICHLOROBENZIDINE	1	1	100.0%	0.0%	0.0%
3-NITROANILINE	1	1	100.0%	0.0%	0.0%
4,6-DINITRO-2-METHYLPHENOL	1	1	100.0%	0.0%	0.0%
4-CHLORO-3-METHYLPHENOL	1	1	100.0%	0.0%	0.0%
4-CHLOROANILINE	1	1	100.0%	0.0%	0.0%
4-CHLOROPHENYL PHENYL ETHER	1	1	100.0%	0.0%	0.0%
4-METHYLPHENOL	1	1	100.0%	0.0%	0.0%
4-NITROANILINE	1	1	100.0%	0.0%	0.0%
4-NITROPHENOL	1	1	100.0%	0.0%	0.0%
ACENAPHTHENE	1	1	100.0%	0.0%	0.0%
ACENAPHTHYLENE	1	1	100.0%	0.0%	0.0%
ANTHRACENE	1	1	100.0%	0.0%	0.0%
BENZO(a)ANTHRACENE	1	1	100.0%	0.0%	0.0%
BENZO(a)PYRENE	1	1	100.0%	0.0%	0.0%
BENZO(b)FLUORANTHENE	1	1	100.0%	0.0%	0.0%
BENZO(ghi)PERYLENE	1	1	100.0%	0.0%	0.0%

Table O-13 (Continued)

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
BENZOIC ACID	1	1	100.0%	100.0%	100.0%
BENZYL ALCOHOL	1	1	100.0%	0.0%	0.0%
BIS(2-CHLOROETHOXY)METHANE	1	1	100.0%	0.0%	0.0%
BIS(2-CHLOROETHYL)ETHER	1	1	100.0%	0.0%	0.0%
BIS(2-CHLOROISOPROPYL)ETHER	1	1	100.0%	0.0%	0.0%
BIS(2-ETHYLHEXYL)PHTHALATE	1	1	100.0%	0.0%	0.0%
BUTYL BENZYL PHTHALATE	1	1	100.0%	0.0%	0.0%
CHRYSENE	1	1	100.0%	0.0%	0.0%
DI-n-BUTYL PHTHALATE	1	1	100.0%	0.0%	0.0%
DI-n-OCTYL PHTHALATE	1	1	100.0%	0.0%	0.0%
DIBENZO(a,h)ANTHRACENE	1	1	100.0%	0.0%	0.0%
DIBENZOFURAN	1	1	100.0%	0.0%	0.0%
DIETHYL PHTHALATE	1	1	100.0%	0.0%	0.0%
DIMETHYL PHTHALATE	1	1	100.0%	0.0%	0.0%
FLUORANTHENE	1	1	100.0%	0.0%	100.0%
FLUORENE	1	1	100.0%	0.0%	0.0%
HEXACHLOROBENZENE	1	1	100.0%	0.0%	0.0%
HEXACHLOROBUTADIENE	1	1	100.0%	0.0%	0.0%
HEXACHLOROCYCLOPENTADIENE	1	1	100.0%	0.0%	0.0%
HEXACHLOROETHANE	1	1	100.0%	0.0%	0.0%
INDENO(1,2,3-cd)PYRENE	1	1	100.0%	0.0%	0.0%
ISOPHORONE	1	1	100.0%	0.0%	0.0%
N-NITROSO-DI-n-PROPYLAMINE	1	1	100.0%	0.0%	0.0%
N-NITROSODIPHENYLAMINE	1	1	100.0%	0.0%	0.0%
NAPHTHALENE	1	1	100.0%	0.0%	0.0%
NITROBENZENE	1	1	100.0%	0.0%	0.0%
p-BROMODIPHENYL ETHER	1	1	100.0%	0.0%	0.0%
PENTACHLOROPHENOL	1	1	100.0%	0.0%	0.0%
PHENANTHRENE	1	0	0.0%	0.0%	100.0%
PHENOL	1	1	100.0%	0.0%	0.0%
PYRENE	1	0	0.0%	0.0%	100.0%

Table O-14
Summary of Precision Calculations for Volatile Organics in Pond-Sediments

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
1,1,1-TRICHLOROETHANE	1	1	100.0%	0.0%	0.0%
1,1,2,2-TETRACHLOROETHANE	1	1	100.0%	0.0%	0.0%
1,1,2-TRICHLOROETHANE	1	1	100.0%	0.0%	0.0%
1,1-DICHLOROETHANE	1	1	100.0%	0.0%	0.0%
1,1-DICHLOROETHENE	1	1	100.0%	0.0%	0.0%
1,2-DICHLOROETHANE	1	1	100.0%	0.0%	0.0%
1,2-DICHLOROETHENE	1	1	100.0%	0.0%	0.0%
1,2-DICHLOROPROPANE	1	1	100.0%	0.0%	0.0%
2-HEXANONE	1	1	100.0%	0.0%	0.0%
4-METHYL-2-PENTANONE	1	1	100.0%	0.0%	0.0%
ACETONE	1	1	100.0%	0.0%	0.0%
BENZENE	1	1	100.0%	0.0%	0.0%
BROMODICHLOROMETHANE	1	1	100.0%	0.0%	0.0%
BROMOFORM	1	1	100.0%	0.0%	0.0%
BROMOMETHANE	1	1	100.0%	0.0%	0.0%
CARBON DISULFIDE	1	1	100.0%	0.0%	0.0%
CARBON TETRACHLORIDE	1	1	100.0%	0.0%	0.0%
CHLOROBENZENE	1	1	100.0%	0.0%	0.0%
CHLOROETHANE	1	1	100.0%	0.0%	0.0%
CHLOROFORM	1	1	100.0%	0.0%	0.0%
CHLOROMETHANE	1	1	100.0%	0.0%	0.0%
DIBROMOCHLOROMETHANE	1	1	100.0%	0.0%	0.0%
ETHYLBENZENE	1	1	100.0%	0.0%	0.0%
METHYLENE CHLORIDE	1	1	100.0%	0.0%	0.0%
STYRENE	1	1	100.0%	0.0%	0.0%
TETRACHLOROETHENE	1	1	100.0%	0.0%	0.0%
TOLUENE	1	1	100.0%	100.0%	100.0%
TOTAL XYLENES	1	1	100.0%	0.0%	0.0%
TRICHLOROETHENE	1	1	100.0%	0.0%	0.0%
VINYL ACETATE	1	1	100.0%	0.0%	0.0%
VINYL CHLORIDE	1	1	100.0%	0.0%	0.0%
cis-1,3-DICHLOROPROPENE	1	1	100.0%	0.0%	0.0%
trans-1,3-DICHLOROPROPENE	1	1	100.0%	0.0%	0.0%

Table O-15
Summary of Precision Calculations for Pesticides and PCBs in Pond-Sediments

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 40%	PERCENTAGE WITH RPD <40%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
4,4'-DDD	1	1	100.0%	0.0%	0.0%
4,4'-DDE	1	1	100.0%	0.0%	0.0%
4,4'-DDT	1	1	100.0%	0.0%	0.0%
ALDRIN	1	1	100.0%	0.0%	0.0%
AROCLOR-1016	1	1	100.0%	0.0%	0.0%
AROCLOR-1221	1	1	100.0%	0.0%	0.0%
AROCLOR-1232	1	1	100.0%	0.0%	0.0%
AROCLOR-1242	1	1	100.0%	0.0%	0.0%
AROCLOR-1248	1	1	100.0%	0.0%	0.0%
AROCLOR-1254	1	1	100.0%	0.0%	0.0%
AROCLOR-1260	1	1	100.0%	0.0%	0.0%
DIELDRIN	1	1	100.0%	0.0%	0.0%
ENDOSULFAN I	1	1	100.0%	0.0%	0.0%
ENDOSULFAN II	1	1	100.0%	0.0%	0.0%
ENDOSULFAN SULFATE	1	1	100.0%	0.0%	0.0%
ENDRIN	1	1	100.0%	0.0%	0.0%
ENDRIN KETONE	1	1	100.0%	0.0%	0.0%
HEPTACHLOR	1	1	100.0%	0.0%	0.0%
HEPTACHLOR EPOXIDE	1	1	100.0%	0.0%	0.0%
METHOXYCHLOR	1	1	100.0%	0.0%	0.0%
TOXAPHENE	1	1	100.0%	0.0%	0.0%
alpha-BHC	1	1	100.0%	0.0%	0.0%
alpha-CHLORDANE	1	1	100.0%	0.0%	0.0%
beta-BHC	1	1	100.0%	0.0%	0.0%
delta-BHC	1	1	100.0%	0.0%	0.0%
gamma-BHC (LINDANE)	1	1	100.0%	0.0%	0.0%
gamma-CHLORDANE	1	1	100.0%	0.0%	0.0%

Table O-16A
Summary of Precision Calculations for Total Metals in Groundwater

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
Aluminum	10	5	50.0%	90.0%	90.0%
Antimony	10	10	100.0%	0.0%	0.0%
Arsenic	10	8	80.0%	70.0%	80.0%
Barium	10	8	80.0%	100.0%	100.0%
Beryllium	10	9	90.0%	10.0%	20.0%
Cadmium	10	10	100.0%	0.0%	0.0%
Calcium	10	9	90.0%	100.0%	100.0%
Cesium	10	10	100.0%	10.0%	10.0%
Chromium	10	8	80.0%	30.0%	30.0%
Cobalt	10	9	90.0%	20.0%	20.0%
Copper	10	9	90.0%	60.0%	60.0%
Iron	10	7	70.0%	90.0%	90.0%
Lead	10	7	70.0%	50.0%	60.0%
Lithium	10	10	100.0%	30.0%	30.0%
Magnesium	10	9	90.0%	100.0%	100.0%
Manganese	10	9	90.0%	100.0%	100.0%
Mercury	10	10	100.0%	10.0%	10.0%
Molybdenum	10	10	100.0%	0.0%	0.0%
Nickel	10	8	80.0%	40.0%	50.0%
Potassium	10	9	90.0%	60.0%	60.0%
Selenium	10	9	90.0%	40.0%	20.0%
Silicon	10	9	90.0%	100.0%	100.0%
Silver	10	10	100.0%	0.0%	0.0%
Sodium	10	9	90.0%	100.0%	100.0%
Strontium	10	9	90.0%	100.0%	100.0%
Thallium	10	9	90.0%	10.0%	10.0%
Tin	10	10	100.0%	0.0%	0.0%
Vanadium	10	8	80.0%	50.0%	50.0%
Zinc	10	5	50.0%	70.0%	70.0%

Table O-16B
Summary of Precision Calculations for Dissolved Metals in Groundwater

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
Aluminum	11	10	90.9%	18.2%	9.1%
Antimony	11	11	100.0%	0.0%	0.0%
Arsenic	11	10	90.9%	72.7%	72.7%
Barium	11	11	100.0%	100.0%	100.0%
Beryllium	11	11	100.0%	0.0%	0.0%
Cadmium	11	11	100.0%	0.0%	0.0%
Calcium	11	11	100.0%	100.0%	100.0%
Cesium	11	11	100.0%	9.1%	18.2%
Chromium	11	11	100.0%	0.0%	0.0%
Cobalt	11	11	100.0%	0.0%	0.0%
Copper	11	11	100.0%	0.0%	0.0%
Iron	11	7	63.6%	100.0%	100.0%
Lead	11	10	90.9%	0.0%	9.1%
Lithium	11	11	100.0%	27.3%	27.3%
Magnesium	11	11	100.0%	100.0%	100.0%
Manganese	11	11	100.0%	100.0%	100.0%
Mercury	11	11	100.0%	0.0%	0.0%
Molybdenum	11	11	100.0%	0.0%	0.0%
Nickel	11	11	100.0%	9.1%	9.1%
Potassium	11	11	100.0%	63.6%	63.6%
Selenium	11	11	100.0%	18.2%	9.1%
Silicon	11	11	100.0%	100.0%	100.0%
Silver	11	10	90.9%	0.0%	9.1%
Sodium	11	11	100.0%	100.0%	100.0%
Strontium	11	11	100.0%	100.0%	100.0%
Thallium	11	11	100.0%	0.0%	9.1%
Tin	11	11	100.0%	9.1%	9.1%
Vanadium	11	11	100.0%	0.0%	0.0%
Zinc	11	9	81.8%	36.4%	36.4%

Table O-17A
Summary of Precision Calculations for Total Radionuclides in Groundwater

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%
Americium-241	13	2	15.4%
Cesium-134	1	1	100.0%
Cesium-137	1	0	0.0%
Gross Alpha	9	4	44.4%
Gross Beta	9	6	66.7%
Plutonium-238	4	0	0.0%
Plutonium-239/240	10	2	20.0%
Radium-226	2	2	100.0%
Strontium-89/90	7	4	57.1%
Total Radiocesium	6	1	16.7%
Tritium	1	0	0.0%
Uranium-233/234	11	6	54.5%
Uranium-235	11	0	0.0%
Uranium-238	11	5	45.5%

Table O-17B
Summary of Precision Calculations for Dissolved Radionuclides in Groundwater

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%
Americium-241	5	0	0.0%
Cesium-134	4	0	0.0%
Cesium-137	4	1	25.0%
Gross Alpha	12	6	50.0%
Gross Beta	12	9	75.0%
Plutonium-239/240	5	0	0.0%
Radium-226	1	0	0.0%
Strontium-89/90	12	6	50.0%
Total Radiocesium	7	2	28.6%
Uranium-233/234	13	10	76.9%
Uranium-235	13	3	23.1%
Uranium-238	13	6	46.2%

Table O-18
Summary of Precision Calculations for Semi-Volatile Organics in Groundwater

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
1,2-DICHLOROBENZENE	9	5	55.6%	44.4%	0.0%
1,3-DICHLOROBENZENE	9	9	100.0%	0.0%	0.0%
1,4-DICHLOROBENZENE	9	9	100.0%	0.0%	0.0%
2,4,5-TRICHLOROPHENOL	9	9	100.0%	0.0%	0.0%
2,4,6-TRICHLOROPHENOL	9	9	100.0%	0.0%	0.0%
2,4-DICHLOROPHENOL	9	9	100.0%	0.0%	0.0%
2,4-DIMETHYLPHENOL	9	9	100.0%	0.0%	0.0%
2,4-DINITROPHENOL	9	9	100.0%	0.0%	0.0%
2,4-DINITROTOLUENE	9	9	100.0%	0.0%	0.0%
2,6-DINITROTOLUENE	9	9	100.0%	0.0%	0.0%
2-CHLORONAPHTHALENE	9	9	100.0%	0.0%	0.0%
2-CHLOROPHENOL	9	9	100.0%	0.0%	0.0%
2-METHYLNAPHTHALENE	9	9	100.0%	0.0%	0.0%
2-METHYLPHENOL	9	9	100.0%	0.0%	0.0%
2-NITROANILINE	9	9	100.0%	0.0%	0.0%
2-NITROPHENOL	9	9	100.0%	0.0%	0.0%
3,3'-DICHLOROBENZIDINE	8	8	100.0%	0.0%	0.0%
3-NITROANILINE	7	7	100.0%	0.0%	0.0%
4,6-DINITRO-2-METHYLPHENOL	9	9	100.0%	0.0%	0.0%
4-CHLORO-3-METHYLPHENOL	9	9	100.0%	0.0%	0.0%
4-CHLOROANILINE	8	8	100.0%	0.0%	0.0%
4-CHLOROPHENYL PHENYL ETHER	9	9	100.0%	0.0%	0.0%
4-METHYLPHENOL	9	9	100.0%	0.0%	0.0%
4-NITROANILINE	9	9	100.0%	0.0%	0.0%
4-NITROPHENOL	9	9	100.0%	0.0%	0.0%
ACENAPHTHENE	9	9	100.0%	0.0%	0.0%
ACENAPHTHYLENE	9	9	100.0%	0.0%	0.0%
ANTHRACENE	9	9	100.0%	0.0%	0.0%
BENZO(a)ANTHRACENE	9	8	88.9%	11.1%	0.0%
BENZO(a)PYRENE	9	9	100.0%	0.0%	0.0%
BENZO(b)FLUORANTHENE	9	9	100.0%	0.0%	0.0%
BENZO(ghi)PERYLENE	9	9	100.0%	0.0%	0.0%

Table O-18 (Continued)

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
BENZOIC ACID	4	4	100.0%	0.0%	0.0%
BENZYL ALCOHOL	4	4	100.0%	0.0%	0.0%
BIS(2-CHLOROETHOXY)METHANE	9	9	100.0%	0.0%	0.0%
BIS(2-CHLOROETHYL)ETHER	9	9	100.0%	0.0%	0.0%
BIS(2-CHLOROISOPROPYL)ETHER	9	9	100.0%	0.0%	0.0%
BIS(2-ETHYLHEXYL)PHTHALATE	8	6	75.0%	37.5%	37.5%
BUTYL BENZYL PHTHALATE	9	9	100.0%	0.0%	0.0%
CARBAZOLE	5	5	100.0%	0.0%	0.0%
DI-n-BUTYL PHTHALATE	9	9	100.0%	0.0%	0.0%
DI-n-OCTYL PHTHALATE	9	9	100.0%	0.0%	0.0%
DIBENZO(a,h)ANTHRACENE	9	9	100.0%	0.0%	0.0%
DIBENZOFURAN	9	9	100.0%	0.0%	0.0%
DIETHYL PHTHALATE	9	9	100.0%	0.0%	0.0%
DIMETHYL PHTHALATE	9	9	100.0%	0.0%	0.0%
FLUORANTHENE	9	9	100.0%	0.0%	0.0%
FLUORENE	9	9	100.0%	0.0%	0.0%
HEXACHLOROBENZENE	9	9	100.0%	0.0%	0.0%
HEXACHLOROBUTADIENE	9	9	100.0%	0.0%	0.0%
HEXACHLOROCYCLOPENTADIENE	9	9	100.0%	0.0%	0.0%
HEXACHLOROETHANE	9	9	100.0%	0.0%	0.0%
INDENO(1,2,3-cd)PYRENE	9	9	100.0%	0.0%	0.0%
ISOPHORONE	9	9	100.0%	0.0%	0.0%
N-NITROSO-DI-n-PROPYLAMINE	9	9	100.0%	0.0%	0.0%
N-NITROSODIPHENYLAMINE	9	9	100.0%	0.0%	0.0%
NAPHTHALENE	9	9	100.0%	0.0%	0.0%
NITROBENZENE	9	9	100.0%	0.0%	0.0%
Octadecanoic Acid	1	1	100.0%	100.0%	100.0%
PENTACHLOROPHENOL	9	9	100.0%	0.0%	0.0%
PHENANTHRENE	9	9	100.0%	0.0%	0.0%
PHENOL	9	9	100.0%	0.0%	0.0%
PYRENE	9	8	88.9%	11.1%	0.0%
p-BROMODIPHENYL ETHER	9	9	100.0%	0.0%	0.0%

Table O-19
Summary of Precision Calculations for Volatile Organics in Groundwater

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
1,1,1-TRICHLOROETHANE	13	13	100.0%	15.4%	15.4%
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
1,1,2-TRICHLOROETHANE	13	13	100.0%	0.0%	0.0%
1,1-DICHLOROETHANE	13	13	100.0%	0.0%	0.0%
1,1-DICHLOROETHENE	13	13	100.0%	15.4%	15.4%
1,2-DICHLOROETHANE	13	13	100.0%	0.0%	0.0%
1,2-DICHLOROETHENE	13	11	84.6%	15.4%	23.1%
1,2-DICHLOROPROPANE	13	13	100.0%	0.0%	0.0%
2-BUTANONE	11	11	100.0%	0.0%	0.0%
2-HEXANONE	13	13	100.0%	0.0%	0.0%
4-METHYL-2-PENTANONE	13	13	100.0%	0.0%	0.0%
ACETONE	11	10	90.9%	9.1%	0.0%
BENZENE	13	13	100.0%	0.0%	0.0%
BROMODICHLOROMETHANE	13	13	100.0%	0.0%	0.0%
BROMOFORM	13	13	100.0%	0.0%	0.0%
BROMOMETHANE	13	13	100.0%	0.0%	0.0%
CARBON DISULFIDE	13	13	100.0%	0.0%	0.0%
CARBON TETRACHLORIDE	13	13	100.0%	0.0%	0.0%
CHLOROBENZENE	13	13	100.0%	0.0%	0.0%
CHLOROETHANE	13	13	100.0%	0.0%	0.0%
CHLOROFORM	12	12	100.0%	0.0%	0.0%
CHLOROMETHANE	13	13	100.0%	0.0%	0.0%
cis-1,3-DICHLOROPROPENE	13	13	100.0%	0.0%	0.0%
DIBROMOCHLOROMETHANE	13	13	100.0%	0.0%	0.0%
ETHYLBENZENE	13	12	92.3%	0.0%	7.7%
METHYLENE CHLORIDE	13	13	100.0%	0.0%	0.0%
STYRENE	13	12	92.3%	23.1%	23.1%
TETRACHLOROETHENE	13	13	100.0%	0.0%	0.0%
TOLUENE	13	13	100.0%	0.0%	0.0%
TOTAL XYLENES	13	13	100.0%	23.1%	23.1%
trans-1,3-DICHLOROPROPENE	13	5	38.5%	0.0%	0.0%
TRICHLOROETHENE	13	13	100.0%	0.0%	0.0%
VINYL ACETATE	5	13	260.0%	0.0%	0.0%
VINYL CHLORIDE	13	13	100.0%	0.0%	0.0%

Table O-20
Summary of Precision Calculations for Pesticides and PCBs in Groundwater

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
4,4'-DDD	7	7	100.0%	0.0%	0.0%
4,4'-DDE	7	7	100.0%	0.0%	0.0%
4,4'-DDT	8	8	100.0%	0.0%	0.0%
ALDRIN	8	8	100.0%	0.0%	0.0%
alpha-BHC	8	8	100.0%	0.0%	0.0%
alpha-CHLORDANE	8	8	100.0%	0.0%	0.0%
AROCLOR-1016	8	8	100.0%	0.0%	0.0%
AROCLOR-1221	8	8	100.0%	0.0%	0.0%
AROCLOR-1232	8	8	100.0%	0.0%	0.0%
AROCLOR-1242	8	8	100.0%	0.0%	0.0%
AROCLOR-1248	8	8	100.0%	0.0%	0.0%
AROCLOR-1254	8	8	100.0%	0.0%	0.0%
AROCLOR-1260	8	8	100.0%	0.0%	0.0%
beta-BHC	8	8	100.0%	0.0%	0.0%
delta-BHC	8	8	100.0%	0.0%	0.0%
DIELDRIN	8	8	100.0%	0.0%	0.0%
ENDOSULFAN I	8	8	100.0%	0.0%	0.0%
ENDOSULFAN II	8	8	100.0%	0.0%	0.0%
ENDOSULFAN SULFATE	8	8	100.0%	0.0%	0.0%
ENDRIN	8	8	100.0%	0.0%	0.0%
ENDRIN ALDEHYDE	4	4	100.0%	0.0%	0.0%
ENDRIN KETONE	8	8	100.0%	0.0%	0.0%
gamma-BHC (LINDANE)	8	8	100.0%	0.0%	0.0%
gamma-CHLORDANE	8	8	100.0%	0.0%	0.0%
HEPTACHLOR	8	8	100.0%	0.0%	0.0%
HEPTACHLOR EPOXIDE	8	8	100.0%	0.0%	0.0%
METHOXYCHLOR	8	8	100.0%	0.0%	0.0%
TOXAPHENE	8	8	100.0%	0.0%	0.0%

Table O-21A
Summary of Precision Calculations for Total Metals in Surface Water

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
Aluminum	4	1	25.0%	100.0%	100.0%
Antimony	4	4	100.0%	0.0%	0.0%
Arsenic	4	4	100.0%	0.0%	0.0%
Barium	4	4	100.0%	100.0%	100.0%
Beryllium	4	4	100.0%	0.0%	0.0%
Cadmium	4	4	100.0%	0.0%	0.0%
Calcium	4	4	100.0%	100.0%	100.0%
Cesium	3	3	100.0%	0.0%	0.0%
Chromium	4	4	100.0%	0.0%	0.0%
Cobalt	4	4	100.0%	0.0%	0.0%
Copper	4	1	25.0%	75.0%	50.0%
Iron	4	2	50.0%	75.0%	100.0%
Lead	4	2	50.0%	50.0%	75.0%
Lithium	4	4	100.0%	100.0%	100.0%
Magnesium	4	4	100.0%	100.0%	100.0%
Manganese	4	4	100.0%	100.0%	100.0%
Mercury	4	4	100.0%	25.0%	25.0%
Molybdenum	4	4	100.0%	0.0%	0.0%
Nickel	4	4	100.0%	0.0%	0.0%
Potassium	4	4	100.0%	100.0%	100.0%
Selenium	4	4	100.0%	0.0%	0.0%
Silicon	4	4	100.0%	100.0%	100.0%
Silver	4	4	100.0%	0.0%	0.0%
Sodium	4	4	100.0%	100.0%	100.0%
Strontium	4	4	100.0%	100.0%	100.0%
Thallium	4	4	100.0%	50.0%	0.0%
Tin	4	4	100.0%	0.0%	0.0%
Vanadium	4	4	100.0%	25.0%	25.0%
Zinc	3	1	33.3%	66.7%	66.7%

Table O-21B
Summary of Precision Calculations for Dissolved Metals in Surface Water

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
Aluminum	4	3	75.0%	25.0%	0.0%
Antimony	4	4	100.0%	0.0%	0.0%
Arsenic	4	4	100.0%	0.0%	0.0%
Barium	4	4	100.0%	100.0%	100.0%
Beryllium	4	4	100.0%	0.0%	0.0%
Cadmium	4	4	100.0%	0.0%	0.0%
Calcium	4	4	100.0%	100.0%	100.0%
Cesium	2	2	100.0%	0.0%	0.0%
Chromium	4	4	100.0%	0.0%	0.0%
Cobalt	4	4	100.0%	0.0%	0.0%
Copper	4	4	100.0%	0.0%	0.0%
Iron	4	4	100.0%	25.0%	50.0%
Lead	4	3	75.0%	0.0%	25.0%
Lithium	4	3	75.0%	100.0%	100.0%
Magnesium	4	4	100.0%	100.0%	100.0%
Manganese	4	4	100.0%	100.0%	100.0%
Mercury	4	4	100.0%	0.0%	0.0%
Molybdenum	4	4	100.0%	0.0%	0.0%
Nickel	4	4	100.0%	0.0%	0.0%
Potassium	4	4	100.0%	100.0%	100.0%
Selenium	4	3	75.0%	25.0%	50.0%
Silicon	4	4	100.0%	100.0%	100.0%
Silver	4	4	100.0%	0.0%	0.0%
Sodium	4	4	100.0%	100.0%	100.0%
Strontium	4	4	100.0%	100.0%	100.0%
Thallium	4	4	100.0%	25.0%	25.0%
Tin	4	4	100.0%	0.0%	0.0%
Vanadium	4	3	75.0%	0.0%	25.0%
Zinc	3	3	100.0%	66.7%	66.7%

Table O-22A
Summary of Precision Calculations for Total Radionuclides in Surface Water

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%
Americium-241	3	0	0.0%
Gross Alpha	3	1	33.3%
Gross Beta	3	1	33.3%
Plutonium-239/240	2	0	0.0%
Strontium-89/90	3	2	66.7%
Total Radiocesium	1	0	0.0%
Uranium-233/234	4	2	50.0%
Uranium-235	4	0	0.0%
Uranium-238	4	1	25.0%

Table O-22B
Summary of Precision Calculations for Dissolved Radionuclides in Surface Water

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%
Americium-241	3	1	33.3%
Cesium-137	1	0	0.0%
Gross Alpha	4	1	25.0%
Gross Beta	4	1	25.0%
Plutonium-239/240	4	0	0.0%
Strontium-89/90	4	1	25.0%
Total Radiocesium	1	1	100.0%
Uranium-233/234	3	3	100.0%
Uranium-235	3	1	33.3%
Uranium-238	3	3	100.0%

Table O-23
Summary of Precision Calculations for Volatile Organics in Surface Water

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
1,1,2,2-TETRACHLOROETHANE	4	4	100.0%	0.0%	0.0%
1,1,2-TRICHLOROETHANE	4	4	100.0%	0.0%	0.0%
1,1-DICHLOROETHANE	4	4	100.0%	0.0%	0.0%
1,1-DICHLOROETHENE	4	4	100.0%	0.0%	0.0%
1,2-DICHLOROETHANE	4	4	100.0%	0.0%	0.0%
1,2-DICHLOROETHENE	4	4	100.0%	0.0%	0.0%
1,2-DICHLOROPROPANE	4	4	100.0%	0.0%	0.0%
2-BUTANONE	1	1	100.0%	0.0%	0.0%
2-HEXANONE	4	4	100.0%	0.0%	0.0%
4-METHYL-2-PENTANONE	4	4	100.0%	0.0%	0.0%
ACETONE	4	4	100.0%	0.0%	0.0%
BENZENE	4	4	100.0%	0.0%	0.0%
BROMODICHLOROMETHANE	4	4	100.0%	0.0%	0.0%
BROMOFORM	4	4	100.0%	0.0%	0.0%
BROMOMETHANE	3	3	100.0%	0.0%	0.0%
CARBON DISULFIDE	4	4	100.0%	0.0%	0.0%
CARBON TETRACHLORIDE	4	4	100.0%	0.0%	0.0%
CHLOROBENZENE	4	4	100.0%	0.0%	0.0%
CHLOROETHANE	3	3	100.0%	0.0%	0.0%
CHLOROFORM	4	4	100.0%	0.0%	0.0%
CHLOROMETHANE	4	4	100.0%	0.0%	0.0%
DIBROMOCHLOROMETHANE	4	4	100.0%	0.0%	0.0%
ETHYLBENZENE	4	4	100.0%	0.0%	0.0%
METHYLENE CHLORIDE	4	4	100.0%	25.0%	25.0%
STYRENE	4	4	100.0%	0.0%	0.0%
TETRACHLOROETHENE	4	4	100.0%	0.0%	0.0%
TOLUENE	4	4	100.0%	0.0%	0.0%
TOTAL XYLENES	4	4	100.0%	0.0%	0.0%
TRICHLOROETHENE	4	4	100.0%	0.0%	0.0%
VINYL ACETATE	4	4	100.0%	0.0%	0.0%
VINYL CHLORIDE	4	4	100.0%	0.0%	0.0%
cis-1,3-DICHLOROPROPENE	4	4	100.0%	0.0%	0.0%
trans-1,3-DICHLOROPROPENE	4	4	100.0%	0.0%	0.0%

Table O-24
Summary of Precision Calculations for Semi-Volatile Organics in Surface Water

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
1,2-DICHLOROBENZENE	4	4	100.0%	0.0%	0.0%
1,3-DICHLOROBENZENE	4	4	100.0%	0.0%	0.0%
1,4-DICHLOROBENZENE	4	4	100.0%	0.0%	0.0%
2,4,5-TRICHLOROPHENOL	4	4	100.0%	0.0%	0.0%
2,4,6-TRICHLOROPHENOL	4	4	100.0%	0.0%	0.0%
2,4-DICHLOROPHENOL	4	4	100.0%	0.0%	0.0%
2,4-DIMETHYLPHENOL	4	4	100.0%	0.0%	0.0%
2,4-DINITROPHENOL	2	2	100.0%	0.0%	0.0%
2,4-DINITROTOLUENE	4	4	100.0%	0.0%	0.0%
2,6-DINITROTOLUENE	4	4	100.0%	0.0%	0.0%
2-CHLORONAPHTHALENE	4	4	100.0%	0.0%	0.0%
2-CHLOROPHENOL	4	4	100.0%	0.0%	0.0%
2-METHYLNAPHTHALENE	4	4	100.0%	0.0%	0.0%
2-METHYLPHENOL	4	4	100.0%	0.0%	0.0%
2-NITROANILINE	4	4	100.0%	0.0%	0.0%
2-NITROPHENOL	4	4	100.0%	0.0%	0.0%
3,3'-DICHLOROBENZIDINE	4	4	100.0%	0.0%	0.0%
3-NITROANILINE	4	4	100.0%	0.0%	0.0%
4,6-DINITRO-2-METHYLPHENOL	4	4	100.0%	0.0%	0.0%
4-CHLORO-3-METHYLPHENOL	4	4	100.0%	0.0%	0.0%
4-CHLOROANILINE	4	4	100.0%	0.0%	0.0%
4-CHLOROPHENYL PHENYL ETHER	4	4	100.0%	0.0%	0.0%
4-METHYLPHENOL	4	4	100.0%	0.0%	0.0%
4-NITROPHENOL	4	4	100.0%	0.0%	0.0%
ACENAPHTHENE	4	4	100.0%	0.0%	0.0%
ACENAPHTHYLENE	4	4	100.0%	0.0%	0.0%
ANTHRACENE	4	4	100.0%	0.0%	0.0%
BENZO(a)ANTHRACENE	4	4	100.0%	0.0%	0.0%
BENZO(a)PYRENE	4	4	100.0%	0.0%	0.0%
BENZO(b)FLUORANTHENE	4	4	100.0%	0.0%	0.0%
BENZO(ghi)PERYLENE	4	4	100.0%	0.0%	0.0%
BENZO(k)FLUORANTHENE	4	4	100.0%	0.0%	0.0%

Table O-24 (Continued)

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
BENZYL ALCOHOL	4	4	100.0%	0.0%	0.0%
BIS(2-CHLOROETHOXY)METHANE	4	4	100.0%	0.0%	0.0%
BIS(2-CHLOROETHYL)ETHER	4	4	100.0%	0.0%	0.0%
BIS(2-CHLOROISOPROPYL)ETHER	4	4	100.0%	0.0%	0.0%
BIS(2-ETHYLHEXYL)PHTHALATE	4	3	75.0%	0.0%	25.0%
BUTYL BENZYL PHTHALATE	4	4	100.0%	0.0%	0.0%
CHRYSENE	4	4	100.0%	0.0%	0.0%
DI-n-BUTYL PHTHALATE	4	4	100.0%	0.0%	0.0%
DI-n-OCTYL PHTHALATE	4	4	100.0%	0.0%	0.0%
DIBENZO(a,h)ANTHRACENE	4	4	100.0%	0.0%	0.0%
DIBENZOFURAN	4	4	100.0%	0.0%	0.0%
DIETHYL PHTHALATE	4	4	100.0%	0.0%	0.0%
DIMETHYL PHTHALATE	4	4	100.0%	0.0%	0.0%
FLUORANTHENE	4	4	100.0%	0.0%	0.0%
FLUORENE	4	4	100.0%	0.0%	0.0%
HEXACHLOROBENZENE	4	4	100.0%	0.0%	0.0%
HEXACHLOROBUTADIENE	4	4	100.0%	0.0%	0.0%
HEXACHLOROCYCLOPENTADIENE	4	4	100.0%	0.0%	0.0%
HEXACHLOROETHANE	4	4	100.0%	0.0%	0.0%
INDENO(1,2,3-cd)PYRENE	4	4	100.0%	0.0%	0.0%
ISOPHORONE	4	4	100.0%	0.0%	0.0%
N-NITROSO-DI-n-PROPYLAMINE	4	4	100.0%	0.0%	0.0%
N-NITROSODIPHENYLAMINE	4	4	100.0%	0.0%	0.0%
NAPHTHALENE	4	4	100.0%	0.0%	0.0%
NITROBENZENE	4	4	100.0%	0.0%	0.0%
PENTACHLOROPHENOL	4	4	100.0%	0.0%	0.0%
PHENANTHRENE	4	4	100.0%	0.0%	0.0%
PHENOL	4	4	100.0%	0.0%	0.0%
PYRENE	4	4	100.0%	0.0%	0.0%
p-BROMODIPHENYL ETHER	4	4	100.0%	0.0%	0.0%

Table O-25
Summary of Precision Calculations for Pesticides and PCBs in Surface Water

ANALYTE	NUMBER OF REAL/DUP PAIRS	NUMBER WITH RPD < 30%	PERCENTAGE WITH RPD <30%	PERCENT DETECTS FOR REAL SAMPLES	PERCENT DETECTS FOR DUP SAMPLES
4,4'-DDD	4	4	100.0%	0.0%	0.0%
4,4'-DDE	4	4	100.0%	0.0%	0.0%
4,4'-DDT	4	4	100.0%	0.0%	0.0%
ALDRIN	4	4	100.0%	0.0%	0.0%
AROCLOR-1016	4	4	100.0%	0.0%	0.0%
AROCLOR-1221	4	4	100.0%	0.0%	0.0%
AROCLOR-1232	4	4	100.0%	0.0%	0.0%
AROCLOR-1242	4	4	100.0%	0.0%	0.0%
AROCLOR-1248	4	4	100.0%	0.0%	0.0%
AROCLOR-1254	4	4	100.0%	0.0%	0.0%
AROCLOR-1260	4	4	100.0%	0.0%	0.0%
DIELDRIN	4	4	100.0%	0.0%	0.0%
ENDOSULFAN I	4	4	100.0%	0.0%	0.0%
ENDOSULFAN II	4	4	100.0%	0.0%	0.0%
ENDOSULFAN SULFATE	4	4	100.0%	0.0%	0.0%
ENDRIN	4	4	100.0%	0.0%	0.0%
ENDRIN KETONE	4	4	100.0%	0.0%	0.0%
HEPTACHLOR	4	4	100.0%	0.0%	0.0%
HEPTACHLOR EPOXIDE	4	4	100.0%	0.0%	0.0%
METHOXYCHLOR	4	4	100.0%	0.0%	0.0%
TOXAPHENE	4	4	100.0%	0.0%	0.0%
alpha-BHC	4	4	100.0%	0.0%	0.0%
alpha-CHLORDANE	4	4	100.0%	0.0%	0.0%
beta-BHC	4	4	100.0%	0.0%	0.0%
delta-BHC	4	4	100.0%	0.0%	0.0%
gamma-BHC (LINDANE)	4	4	100.0%	0.0%	0.0%
gamma-CHLORDANE	4	4	100.0%	0.0%	0.0%

Table O-26: TM15 Sampling Summary

Location	TM15 Program	Sample Number	QC Code	QC Partner	Sample Type	Completion Type	IHSS	Analyses Requested						
								Rads	Metals	VOA	SVOA	PestPCB	Water Qual	Geotech
58793	GW	GW50123AS	REAL		GW	WELL	133	X	X	X	X	X	X	
58793	GW	GW50124AS	RNS	GW50123AS	GW	WELL	133	X		X			X	
59393	GW	GW50127AS	REAL	-	GW	WELL	115/196		X	X	X	X	X	
59393	GW	GW50134AS	TB	GW50127AS	GW	WELL	115/196			X				
59493	GW	GW50113AS	REAL		GW	WELL	115/196	X	X	X	X	X	X	
59493	GW	GW50113AS	REAL		GW	WELL	115/196	X	X	X	X	X	X	
59493	GW	GW50114AS	DUP	GW50113AS	GW	WELL	115/196	X	X	X	X	X	X	
59493	GW	GW50114AS	DUP	GW50113AS	GW	WELL	115/196	X	X	X	X	X	X	
59593	GW	GW50131AS	REAL		GW	WELL	115/196	X	X	X	X	X	X	
59793	GW	GW50133AS	REAL		GW	WP	115/196			X			X	
59793	GW	GW50136AS	RNS	GW50133AS	GW	WP	115/196	X	X	X	X	X	X	
59893	GW	GW50222AS	REAL		GW	WP	115/196						X	
59993	GW	GW50148AS	REAL		GW	WP	115/196			X			X	
59993	GW	GW50224AS	REAL		GW	WP	115/196		X				X	
60093	GW	GW50218AS	REAL		GW	WP	115/196	X	X	X	X		X	
60093	GW	GW50219AS	TB	GW50218AS	GW	WP	115/196			X				
60293	GW	GW50143AS	REAL		GW	WP	115/196	X	X	X	X	X	X	
60293	GW	GW50144AS	DUP	GW50143AS	GW	WP	115/196	X	X	X	X	X	X	
60293	GW	GW50170AS	REAL		GW	WP	115/196	X	X	X	X		X	
60293	GW	GW50171AS	DUP	GW50170AS	GW	WP	115/196	X	X	X	X		X	
60293	GW	GW50181AS	TB	GW50170-171AS	GW	WP	115/196			X				
60393	GW	GW50220AS	REAL		GW	WP	115/196		X	X			X	
60393	GW	GW50221AS	TB	GW50220AS	GW	WP	115/196			X				
60493	GW	GW50156AS	REAL		GW	WP	115/196						X	
60493	GW	GW50226AS	REAL		GW	WP	115/196						X	
60593	GW	GW50155AS	REAL		GW	WP	115/196						X	
60593	GW	GW50212AS	REAL		GW	WP	115/196	X	X	X	X		X	
60593	GW	GW50213AS	TB	GW50212AS	GW	WP	115/196			X				
60693	GW	GW50160AS	REAL		GW	WP	115/196						X	
60693	GW	GW50214AS	REAL	-	GW	WP	115/196	X	X	X	X		X	
60693	GW	GW50215AS	TB	GW50214AS	GW	WP	115/196			X				
60893	GW	GW50157AS	REAL		GW	WP	115/196						X	
60893	GW	GW50158AS	RNS	GW50157AS	GW	WP	115/196		X		X		X	
60893	GW	GW50175AS	REAL		GW	WP	115/196	X	X	X	X		X	
60993	GW	GW50210AS	REAL		GW	MINI	115/196		X	X			X	
60993	GW	GW50211AS	TB	GW50210AS	GW	MINI	115/196			X				
61093	GW	GW50150AS	RNS	GW50151AS	GW	MINI	115/196	X	X	X	X	X	X	
61093	GW	GW50151AS	REAL		GW	MINI	115/196	X	X	X	X	X	X	
61093	GW	GW50154AS	DUP	GW50151AS	GW	MINI	115/196	X	X	X	X	X	X	
61093	GW	GW50164AS	TB	GW50151AS	GW	MINI	115/196			X				
61093	GW	GW50176AS	REAL		GW	MINI	115/196	X	X	X	X		X	
61093	GW	GW50177AS	DUP	GW50176AS	GW	MINI	115/196	X	X	X	X		X	
61093	GW	GW50194AS	TB	GW50176AS	GW	MINI	115/196			X				
61293	GW	GW50125AS	RNS	GW50126AS	GW	WELL	115/196	X	X	X	X	X	X	
61293	GW	GW50126AS	REAL		GW	WELL	115/196		X	X			X	
62593	GW	GW50216AS	REAL		GW	WP	133	X	X		X		X	
62693	GW	GW50217AS	REAL		GW	WP	133	X	X		X		X	
62793	GW	GW50147AS	REAL		GW	WP	115/196			X			X	
62793	GW	GW50149AS	DUP	GW50147AS	GW	WP	115/196			X			X	
62793	GW	GW50152AS	TB	GW50147AS	GW	WP	115/196			X				
62793	GW	GW50228AS	REAL		GW	WP	115/196		X	X			X	
62793	GW	GW50229AS	TB	GW50228AS	GW	WP	115/196			X				
62893	GW	GW50122AS	REAL		GW	WP	115/196	X	X	X	X	X	X	
62893	GW	GW50140AS	REAL		GW	WP	115/196						X	
62893	GW	GW50163AS	TB	GW50165AS	GW	WP	115/196			X				
62893	GW	GW50165AS	REAL		GW	WP	115/196						X	
62893	GW	GW50180AS	REAL		GW	WP	115/196	X	X	X	X		X	
62893	GW	GW50200AS	TB	GW50180AS	GW	WP	115/196			X				
63093	GW	GW50129AS	RNS	GW50135AS	GW	WELL	133						X	

Table O-26 (Continued)

Location	TM15 Program	Sample Number	QC Code	QC Partner	Sample Type	Completion Type	IHSS	Analyses Requested						
								Rads	Metals	VOA	SVOA	Pest/PCB	Water Qual	Geotech
63093	GW	GW50135AS	REAL		GW	WELL	133	X	X	X	X	X	X	
63093	GW	GW50168AS	TB	GW50135AS	GW	WELL	133			X				
63193	GW	GW50128AS	REAL		GW	MINI	115/196	X	X	X	X	X	X	
63193	GW	GW50130AS	DUP	GW50128AS	GW	MINI	115/196	X	X	X	X	X	X	
63193	GW	GW50132AS	RNS	GW50128AS	GW	MINI	115/196	X	X	X	X	X	X	
63193	GW	GW50182AS	REAL		GW	MINI	115/196	X	X	X	X		X	
63193	GW	GW50183AS	DUP	GW50182AS	GW	MINI	115/196	X	X	X	X		X	
63193	GW	GW50184AS	RNS	GW50182-183AS	GW	MINI	115/196	X	X	X	X		X	
63193	GW	GW50200AS	TB	GW50182-183AS	GW	MINI	115/196			X				
63693	GW	GW50137AS	REAL		GW	WP	133			X			X	
63693	GW	GW50139AS	DUP	GW50137AS	GW	WP	133			X			X	
63693	GW	GW50166AS	REAL		GW	WP	133						X	
63693	GW	GW50167AS	TB	GW50166AS	GW	WP	133			X				
63693	GW	GW50207AS	REAL		GW	WP	133						X	
63793	GW	GW50115AS	REAL		GW	MINI	133	X	X	X	X	X	X	
63793	GW	GW50115AS	REAL		GW	WP	133	X	X	X	X	X	X	
63793	GW	GW50116AS	RNS	GW50115AS	GW	WP	133	X	X	X	X	X	X	
63793	GW	GW50117AS	TB	GW50115AS	GW	WP	133			X				
63793	GW	GW50206AS	REAL		GW	WP	133	X	X		X		X	
63893	GW	GW50120AS	REAL		GW	WP	115	X	X	X	X	X	X	
63893	GW	GW50121AS	REAL		GW	WP	115		X	X	X	X	X	
63893	GW	GW50187AS	REAL		GW	WP	115	X	X	X	X		X	
63893	GW	GW50196AS	TB	GW50187AS	GW	WP	115			X				
63993	GW	GW50119AS	REAL		GW	WP	115	X	X	X	X	X	X	
63993	GW	GW50188AS	REAL		GW	WP	115	X	X	X	X		X	
63993	GW	GW50197AS	TB	GW50188AS	GW	WP	115			X				
64093	GW	GW50118AS	REAL		GW	WP	115	X	X	X	X	X	X	
64093	GW	GW50189AS	REAL		GW	WP	115	X	X	X	X		X	
64093	GW	GW50198AS	TB	GW50189AS	GW	WP	115			X				
55194	TDEM	BH00028AS	REAL		BH	MINI	133	X	X					
55194	TDEM	BH00029AS	REAL		BH	MINI	133	X	X					
55194	TDEM	BH00030AS	REAL		BH	MINI	133	X	X					
55194	TDEM	BH00101AS	RNS		BH	MINI	133	X	X					
55294	TDEM	BH00031AS	REAL		BH	BH	133	X	X					
55294	TDEM	BH00032AS	REAL		BH	BH	133	X	X					
55294	TDEM	BH00033AS	REAL		BH	BH	133	X	X					
55394	GW	BH00055AS	REAL		GEOTECH	MINI	133							X
55394	GW	GW50106AS	REAL		GW	MINI	133	X	X	X	X	X	X	
55394	GW	GW50107AS	RNS		GW	MINI	133	X	X	X	X	X	X	
55394	GW	GW50111AS	TB		GW	MINI	133			X				
55494	TDEM	BH00023AS	REAL		GEOTECH	MINI	133							X
55494	TDEM	BH00024AS	REAL		GEOTECH	MINI	133							X
55594	TDEM	BH00025AS	REAL		GEOTECH	MINI	133							X
55594	TDEM	BH00100AS	RNS		BH	MINI	133	X	X					
55694	TDEM	BH00041AS	REAL		BH	BH	133	X	X					
55694	TDEM	BH00042AS	REAL		BH	BH	133	X	X					
55794	GW	BH00057AS	REAL		GEOTECH	MINI	133							X
55894	TDEM	BH00036AS	REAL		BH	BH	133	X	X					
55894	TDEM	BH00103AS	RNS		BH	BH	133	X	X					
55994	TDEM	BH00034AS	REAL		BH	BH	133	X	X					
55994	TDEM	BH00035AS	REAL		BH	BH	133	X	X					
55994	TDEM	BH00102AS	RNS		BH	BH	133	X	X					
56094	TDEM	BH00037AS	REAL		BH	BH	133	X	X					
56094	TDEM	BH00038AS	REAL		BH	BH	133	X	X					
56094	TDEM	BH00039AS	REAL		BH	BH	133	X	X					
56094	TDEM	BH00040AS	REAL		BH	BH	133	X	X					
56094	TDEM	BH00104AS	RNS		BH	BH	133	X	X					
56194	TDEM	BH00043AS	REAL		BH	BH	133	X	X					
56194	TDEM	BH00072AS	REAL		BH	BH	133	X	X					

Table O-26 (Continued)

Location	TM15 Program	Sample Number	QC Code	QC Partner	Sample Type	Completion Type	IHSS	Analyses Requested						
								Rads	Metals	VOA	SVOA	Pest/PCB	Water Qual	Geotech
56194	TDEM	BH00073AS	REAL		BH	BH	133	X	X					
56194	TDEM	BH00074AS	REAL		BH	BH	133	X	X					
56194	TDEM	BH00075AS	REAL	BH00076AS	BH	BH	133	X	X					
56194	TDEM	BH00076AS	DUP	BH00075AS	BH	BH	133	X	X					
56194	TDEM	BH00077AS	REAL		BH	BH	133	X	X					
56194	TDEM	BH00105AS	RNS		BH	BH	133							
56194	TDEM	BH00107AS	RNS		BH	BH	133	X	X					
56294	GW	BH00026AS	REAL		GEOTECH	MINI	133							X
56294	GW	BH00027AS	REAL		GEOTECH	MINI	133							X
56394	GW	BH00056AS	REAL		GEOTECH	BH	133							X
56494	GW	BH00021AS	REAL		GEOTECH	MINI	133							X
56494	GW	BH00022AS	REAL		GEOTECH	MINI	133							X
56594	GW	BH00058AS	REAL		GEOTECH	MINI	133							X
56594	GW	GW50105AS	REAL		GW	MINI	133	X	X	X	X	X	X	
56594	GW	GW50110AS	TB		GW	MINI	133			X				
56694	GW	BH00092AS	REAL		BH	BH	115/196			X				
56694	GW	BH00093AS	REAL		BH	BH	115/196			X				
56694	GW	BH00094AS	REAL		BH	BH	115/196			X				
56694	GW	BH00095AS	REAL	BH00096AS	BH	BH	115/196	X	X		X	X		
56694	GW	BH00096AS	DUP	BH00095AS	BH	BH	115/196	X	X		X	X		
56694	GW	BH00097AS	REAL		BH	BH	115/196			X				
56694	GW	BH00098AS	REAL		BH	BH	115/196	X	X		X	X		
56694	GW	BH00099AS	REAL		BH	BH	115/196			X				
56694	GW	BH00109AS	RNS		BH	BH	115/196	X	X	X	X	X		
56694	GW	BH00110AS	RNS		BH	BH	115/196	X	X	X	X	X		
56694	GW	BH00111AS	REAL		DRUM	BH	115/196	X	X	X	X	X		
56694	GW	BH00112AS	REAL		DRUM	BH	115/196	X	X	X	X	X		
56694	GW	BH00113AS	REAL		DRUM	BH	115/196	X	X	X	X	X		
56694	GW	BH00115AS	RNS		DRUM	BH	115/196	X	X	X	X	X		
56694	GW	BH00116AS	FB		BH	BH	115/196			X				
56694	GW	BH00122AS	REAL		DRUM	BH	115/196	X	X	X	X	X		
56694	GW	BH00134AS	REAL		GEOTECH	BH	115/196							X
56794	GEOTECH	BH00228AS	REAL		GEOTECH	BH	115/196							X
56794	GEOTECH	BH00229AS	REAL		GEOTECH	BH	115/196							X
56794	GEOTECH	BH00230AS	REAL		GEOTECH	BH	115/196							X
56794	GEOTECH	BH00231AS	REAL		GEOTECH	BH	115/196							X
56794	GEOTECH	BH00232AS	REAL		GEOTECH	BH	115/196							X
56794	GEOTECH	BH00233AS	REAL		GEOTECH	BH	115/196							X
56794	GEOTECH	BP00034AS	REAL	BP00035AS	DRUM	BH	115/196	X	X	X	X	X		
56794	GEOTECH	BP00035AS	DUP	BP00034AS	DRUM	BH	115/196	X	X	X	X	X		
56794	GEOTECH	BP00036AS	RNS		DRUM	BH	115/196	X	X	X	X	X		
56894	GEOTECH	BH00216AS	REAL		GEOTECH	BH	115/196							X
56894	GEOTECH	BH00217AS	REAL		GEOTECH	BH	115/196							X
56894	GEOTECH	BH00218AS	REAL		GEOTECH	BH	115/196							X
56894	GEOTECH	BH00219AS	REAL		GEOTECH	BH	115/196							X
56894	GEOTECH	BH00220AS	REAL		GEOTECH	BH	115/196							X
56894	GEOTECH	BH00221AS	REAL		GEOTECH	BH	115/196							X
56894	GEOTECH	BH00222AS	REAL		GEOTECH	BH	115/196							X
56894	GEOTECH	BH00244AS	TB		BH	BH	115/196			X				
56894	GEOTECH	BP00032AS	REAL		DRUM	BH	115/196	X	X	X	X	X		
56894	GEOTECH	BP00033AS	RNS		DRUM	BH	115/196	X	X	X	X	X		
56994	GEOTECH	BH00185AS	REAL		GEOTECH	WELL	115/196							X
56994	GEOTECH	BH00186AS	REAL		GEOTECH	WELL	115/196							X
56994	GEOTECH	BH00187AS	REAL		GEOTECH	WELL	115/196							X
56994	GEOTECH	BH00188AS	REAL		GEOTECH	WELL	115/196							X
56994	GEOTECH	BH00189AS	REAL		GEOTECH	WELL	115/196							X
56994	GEOTECH	BH00190AS	REAL		GEOTECH	WELL	115/196							X
56994	GEOTECH	BH00191AS	REAL		GEOTECH	WELL	115/196							X
56994	GEOTECH	BP00013AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		

Table O-26 (Continued)

Location	TM15 Program	Sample Number	QC Code	QC Partner	Sample Type	Completion Type	IHSS	Analyses Requested						
								Rads	Metals	VOA	SVOA	Pest\PCB	Water Qual	Geotech
57094	GEOTECH	BH00138AS	REAL		GEOTECH	WELL	115/196							X
57094	GEOTECH	BH00139AS	REAL		GEOTECH	WELL	115/196							X
57094	GEOTECH	BH00140AS	REAL		GEOTECH	WELL	115/196							X
57094	GEOTECH	BH00141AS	REAL		GEOTECH	WELL	115/196							X
57094	GEOTECH	BH00142AS	REAL		GEOTECH	WELL	115/196							X
57094	GEOTECH	BH00143AS	REAL		GEOTECH	WELL	115/196							X
57094	GEOTECH	BH00144AS	REAL		GEOTECH	WELL	115/196							X
57094	GEOTECH	BH00145AS	REAL		GEOTECH	WELL	115/196							X
57094	GEOTECH	BH00146AS	REAL		GEOTECH	WELL	115/196							X
57094	GEOTECH	BH00147AS	REAL	BH00148AS	DRUM	WELL	115/196	X	X	X	X	X		
57094	GEOTECH	BH00148AS	DUP	BH00147AS	DRUM	WELL	115/196	X	X	X	X	X		
57194	GEOTECH	BH00192AS	REAL		GEOTECH	WELL	115/196							X
57194	GEOTECH	BH00193AS	REAL		GEOTECH	WELL	115/196							X
57194	GEOTECH	BH00194AS	REAL		GEOTECH	WELL	115/196							X
57194	GEOTECH	BH00195AS	REAL		GEOTECH	WELL	115/196							X
57194	GEOTECH	BH00196AS	REAL		GEOTECH	WELL	115/196							X
57194	GEOTECH	BP00014AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
57194	GEOTECH	BP00015AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
57194	GEOTECH	BP00016AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
57194	GEOTECH	BP00017AS	RNS		DRUM	WELL	115/196	X	X	X	X	X		
57194	GEOTECH	BP00018AS	RNS		DRUM	WELL	115/196	X	X	X	X	X		
57194	GEOTECH	BP00029AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
57294	TREAT	BH00090AS	REAL		BH	BH	133							
57294	TREAT	BH00091AS	REAL		DRUM	BH	133	X	X					
57394	GEOTECH	BH00123AS	REAL		GEOTECH	BH	115/196							X
57394	GEOTECH	BH00124AS	REAL		GEOTECH	BH	115/196							X
57394	GEOTECH	BH00125AS	REAL		GEOTECH	BH	115/196							X
57494	GEOTECH	BH00175AS	REAL		GEOTECH	BH	115/196							X
57494	GEOTECH	BH00176AS	REAL		GEOTECH	BH	115/196							X
57494	GEOTECH	BH00177AS	REAL		GEOTECH	BH	115/196							X
57494	GEOTECH	BP00004AS	REAL		DRUM	BH	115/196	X	X	X	X	X		
57594	GW	BH00078AS	REAL		BH	WELL	115/196	X	X		X	X		
57594	GW	BH00079AS	REAL		BH	WELL	115/196			X				
57594	GW	BH00080AS	REAL		BH	WELL	115/196			X				
57594	GW	BH00081AS	REAL		BH	WELL	115/196			X				
57594	GW	BH00082AS	REAL		BH	WELL	115/196	X	X		X	X		
57594	GW	BH00083AS	REAL		BH	WELL	115/196			X				
57594	GW	BH00084AS	REAL		BH	WELL	115/196			X				
57594	GW	BH00085AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
57594	GW	BH00086AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
57594	GW	BH00087AS	REAL		BH	WELL	115/196	X	X	X	X	X		
57594	GW	BH00108AS	RNS		BH	WELL	115/196	X	X					
57594	GW	BH00117AS	RNS		DRUM	WELL	115/196	X	X	X				
57594	GW	BH00121AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
57694	GEOTECH	BH00197AS	REAL		GEOTECH	BH	115/196							X
57694	GEOTECH	BH00198AS	REAL		GEOTECH	BH	115/196							X
57694	GEOTECH	BH00199AS	REAL		GEOTECH	BH	115/196							X
57694	GEOTECH	BH00200AS	REAL		GEOTECH	BH	115/196							X
57694	GEOTECH	BH00201AS	REAL		GEOTECH	BH	115/196							X
57694	GEOTECH	BP00019AS	REAL		DRUM	BH	115/196	X	X	X	X	X		
57694	GEOTECH	BP00022AS	RNS		DRUM	BH	115/196	X	X	X	X	X		
57794	GEOTECH	BH00128AS	REAL		GEOTECH	BH	115/196							X
57794	GEOTECH	BH00129AS	REAL		GEOTECH	BH	115/196							X
57794	GEOTECH	BH00130AS	REAL		GEOTECH	BH	115/196							X
57794	GEOTECH	BH00131AS	REAL		GEOTECH	BH	115/196							X
57894	GW	GW50141AS	DUP	GW50161AS	GW	MINI	115/196	X	X	X	X	X	X	
57894	GW	GW50142AS	RNS		GW	MINI	115/196	X	X	X	X	X	X	
57894	GW	GW50145AS	TB		GW	MINI	115/196			X				
57894	GW	GW50161AS	REAL	GW50141AS	GW	MINI	115/196	X	X	X	X	X	X	

Table O-26 (Continued)

Location	TM15 Program	Sample Number	QC Code	QC Partner	Sample Type	Completion Type	IHSS	Analyses Requested						
								Rads	Metals	VOA	SVOA	Pest\PCB	Water Qual	Geotech
57894	GW	GW50162AS	TB		GW	MINI	115/196							
57994	GW	BH00044AS	REAL		BH	MINI	115/196			X				
57994	GW	BH00045AS	REAL		BH	MINI	115/196			X				
57994	GW	BH00046AS	REAL		BH	MINI	115/196			X				
57994	GW	BH00047AS	REAL		BH	MINI	115/196	X	X		X	X		
58094	GW	BH00061AS	REAL		GEOTECH	MINI	115/196							X
58094	GW	GW50101AS	RNS		GW	MINI	115/196	X	X	X	X	X	X	
58094	GW	GW50102AS	REAL	GW50103AS	GW	MINI	115/196	X	X	X	X	X	X	
58094	GW	GW50103AS	DUP	GW50102AS	GW	MINI	115/196	X	X	X	X	X	X	
58094	GW	GW50108AS	TB		GW	MINI	115/196			X				
58194	GW	BH00062AS	REAL		GEOTECH	MINI	115/196							X
58294	GW	BH00048AS	REAL		BH	MINI	115/196			X				
58294	GW	BH00049AS	REAL		BH	MINI	115/196			X				
58294	GW	BH00050AS	REAL		BH	MINI	115/196	X	X		X	X		
58394	GEOTECH	BH00223AS	REAL		GEOTECH	WELL	115/196							X
58394	GEOTECH	BH00224AS	REAL		GEOTECH	WELL	115/196							X
58394	GEOTECH	BH00225AS	REAL		GEOTECH	WELL	115/196							X
58394	GEOTECH	BH00226AS	REAL		GEOTECH	WELL	115/196							X
58394	GEOTECH	BH00227AS	REAL		GEOTECH	WELL	115/196							X
58394	GEOTECH	BP00046AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
58494	GW	BH00065AS	REAL		BH	MINI	115/196			X				
58494	GW	BH00066AS	REAL		BH	MINI	115/196			X				
58494	GW	BH00067AS	REAL		BH	MINI	115/196			X				
58494	GW	BH00068AS	REAL		BH	MINI	115/196	X	X		X	X		
58494	GW	BH00069AS	REAL		BH	MINI	115/196			X				
58494	GW	BH00070AS	REAL		BH	MINI	115/196			X				
58494	GW	BH00071AS	REAL		BH	MINI	115/196	X	X		X	X		
58594	GW	BH00063AS	REAL		GEOTECH	MINI	115/196							X
58594	GW	GW50104AS	REAL		GW	MINI	115/196	X	X	X	X	X	X	
58594	GW	GW50109AS	TB		GW	MINI	115/196			X				
58694	GW	BH00051AS	REAL		BH	MINI	115/196			X				
58694	GW	BH00052AS	REAL		BH	MINI	115/196	X	X		X	X		
58794	GW	BH00053AS	REAL		BH	MINI	115/196			X				
58794	GW	BH00054AS	REAL		BH	MINI	115/196	X	X		X	X		
58794	GW	BH00106AS	RNS		BH	MINI	115/196	X	X	X	X	X		
58894	TDEM	BH00064AS	REAL		BH	BH	133	X	X		X	X		
58994	GEOTECH	BH00126AS	REAL		GEOTECH	BH	115/196							X
58994	GEOTECH	BH00127AS	REAL		GEOTECH	BH	115/196							X
59094	GEOTECH	BH00202AS	REAL		GEOTECH	BH	115/196							X
59094	GEOTECH	BH00203AS	REAL		GEOTECH	BH	115/196							X
59094	GEOTECH	BP00023AS	REAL		DRUM	BH	115/196	X	X	X	X	X		
59094	GEOTECH	BP00024AS	RNS		DRUM	BH	115/196	X	X	X	X	X		
59094	GEOTECH	BP00030AS	TB		DRUM	BH	115/196			X				
59194	GEOTECH	BH00238AS	REAL		GEOTECH	WELL	115/196							X
59194	GEOTECH	BH00239AS	REAL		GEOTECH	WELL	115/196							X
59194	GEOTECH	BH00240AS	REAL		GEOTECH	WELL	115/196							X
59194	GEOTECH	BH00241AS	REAL		GEOTECH	WELL	115/196							X
59194	GEOTECH	BH00242AS	REAL		GEOTECH	WELL	115/196							X
59194	GEOTECH	BP00039AS	REAL	BP00040AS	DRUM	WELL	115/196	X	X	X	X	X		
59194	GEOTECH	BP00040AS	DUP	BP00039AS	DRUM	WELL	115/196	X	X	X	X	X		
59194	GEOTECH	BP00041AS	RNS		DRUM	WELL	115/196	X	X	X	X	X		
59194	GEOTECH	BP00052AS	TB		DRUM	WELL	115/196							
59294	GEOTECH	BH00170AS	REAL		GEOTECH	WELL	115/196							X
59294	GEOTECH	BH00171AS	REAL		GEOTECH	WELL	115/196							X
59294	GEOTECH	BH00172AS	REAL		GEOTECH	WELL	115/196							X
59294	GEOTECH	BH00173AS	REAL		GEOTECH	WELL	115/196							X
59294	GEOTECH	BP00003AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
59494	GW	BH00149AS	RNS		BH	BH	115/196	X	X	X	X	X		
59494	GW	BH00150AS	REAL		BH	BH	115/196			X				

Table O-26 (Continued)

Location	TM15 Program	Sample Number	QC Code	QC Partner	Sample Type	Completion Type	IHSS	Analyses Requested						
								Rads	Metals	VOA	SVOA	Pest/PCB	Water Qual	Geotech
59494	GW	BH00151AS	REAL		BH	BH	115/196			X				
59494	GW	BH00152AS	REAL		BH	BH	115/196	X	X		X	X		
59494	GW	BH00153AS	REAL		BH	BH	115/196			X				
59494	GW	BH00154AS	REAL		BH	BH	115/196			X				
59494	GW	BH00155AS	REAL		BH	BH	115/196	X	X		X	X		
59494	GW	BH00156AS	REAL		BH	BH	115/196			X				
59494	GW	BH00157AS	REAL		BH	BH	115/196			X				
59494	GW	BH00158AS	REAL		BH	BH	115/196			X				
59494	GW	BH00159AS	REAL	BH00160AS	BH	BH	115/196	X	X		X	X		
59494	GW	BH00160AS	DUP	BH00159AS	BH	BH	115/196	X	X		X	X		
59494	GW	BH00165AS	TB		BH	BH	115/196			X				
59594	GEOTECH	BH00132AS	REAL		GEOTECH	WELL	115/196							X
59594	GEOTECH	BH00133AS	REAL		GEOTECH	WELL	115/196							X
59594	GEOTECH	BH00135AS	REAL		GEOTECH	WELL	115/196							X
59594	GEOTECH	BH00136AS	REAL		GEOTECH	WELL	115/196							X
59594	GEOTECH	BH00137AS	REAL		GEOTECH	WELL	115/196							X
59594	GEOTECH	BP00001AS	REAL		DRUM	WELL	115/196			X				
59594	GEOTECH	BP00002AS	REAL		DRUM	WELL	115/196			X				
59594	GEOTECH	BP00006AS	REAL		DRUM	WELL	115/196		X					
59594	GEOTECH	BP00037AS	REAL		DRUM	WELL	115/196		X					
59594	GEOTECH	BP00038AS	RNS		DRUM	WELL	115/196		X					
59694	GEOTECH	BH00211AS	REAL		GEOTECH	WELL	115/196							X
59694	GEOTECH	BH00212AS	REAL		GEOTECH	WELL	115/196							X
59694	GEOTECH	BH00213AS	REAL		GEOTECH	WELL	115/196							X
59694	GEOTECH	BH00214AS	REAL		GEOTECH	WELL	115/196							X
59694	GEOTECH	BH00215AS	REAL		GEOTECH	WELL	115/196							X
59694	GEOTECH	BP00028AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
59694	GEOTECH	BP00031AS	RNS		DRUM	WELL	115/196	X	X					
59794	GEOTECH	BH00178AS	REAL		GEOTECH	WELL	115/196							X
59794	GEOTECH	BH00179AS	REAL		GEOTECH	WELL	115/196							X
59794	GEOTECH	BH00180AS	REAL		GEOTECH	WELL	115/196							X
59794	GEOTECH	BP00005AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
59894	GW	BH00161AS	REAL		BH	WELL	115/196			X				
59894	GW	BH00162AS	REAL		BH	WELL	115/196	X	X		X	X		
59894	GW	BH00163AS	RNS		BH	WELL	115/196	X	X	X	X	X		
59894	GW	BH00164AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
59894	GW	BH00166AS	TB		BH	WELL	115/196			X				
59894	GW	BP00007AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
59894	GW	BP00010AS	FB		DRUM	WELL	115/196			X				
59894	GW	BP00011AS	REAL		DRUM	WELL	115/196	X	X	X				
59894	GW	BP00012AS	REAL		DRUM	WELL	115/196	X	X	X				
59894	GW	BP00020AS	TB		DRUM	WELL	115/196			X				
59994	TDEM	BH00088AS	REAL		BH	BH	133	X	X	X	X	X		
60094	TDEM	BH00089AS	REAL		BH	BH	133	X	X					
71194	GEOTECH	BH00182AS	REAL		GEOTECH	WELL	115/196							X
71194	GEOTECH	BH00183AS	REAL		GEOTECH	WELL	115/196							X
71194	GEOTECH	BH00184AS	REAL		GEOTECH	WELL	115/196							X
71194	GEOTECH	BP00008AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
71194	GEOTECH	BP00009AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
71194	GEOTECH	BP00021AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
71194	GEOTECH	BP00025AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
71294	GEOTECH	BH00204AS	REAL		GEOTECH	BH	115/196							X
71294	GEOTECH	BH00205AS	REAL		GEOTECH	BH	115/196							X
71294	GEOTECH	BH00206AS	REAL		GEOTECH	BH	115/196							X
71294	GEOTECH	BH00207AS	REAL		GEOTECH	BH	115/196							X
71294	GEOTECH	BH00208AS	REAL		GEOTECH	BH	115/196							X
71294	GEOTECH	BH00209AS	REAL		GEOTECH	BH	115/196							X
71294	GEOTECH	BH00210AS	REAL		GEOTECH	BH	115/196							X
71294	GEOTECH	BP00026AS	REAL		DRUM	BH	115/196	X	X	X	X	X		

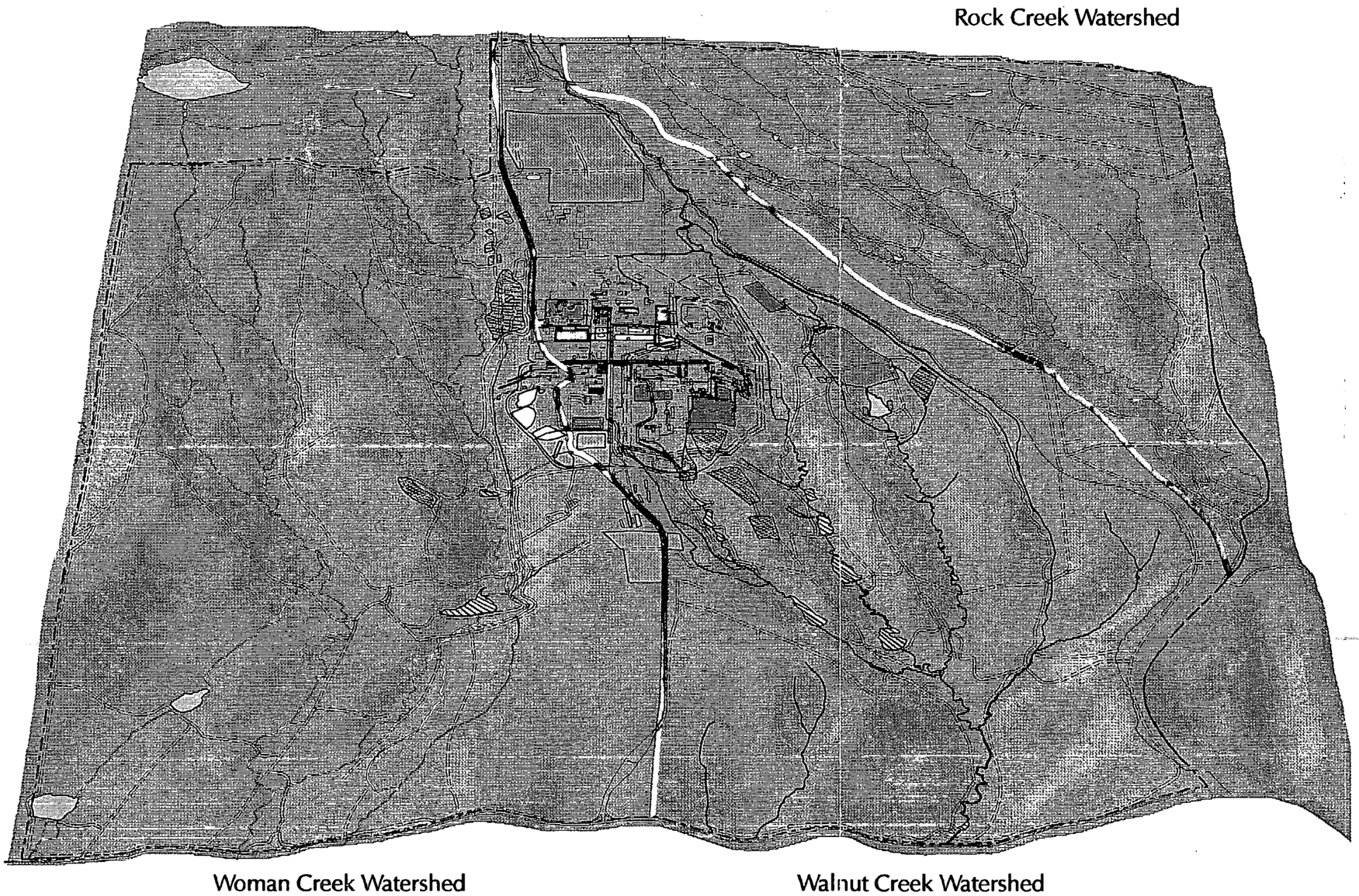
Table O-26 (Continued)

Location	TM15 Program	Sample Number	QC Code	QC Partner	Sample Type	Completion Type	IHSS	Analyses Requested						
								Rads	Metals	VOA	SVOA	Pest\PCB	Water Qual	Geotech
71294	GEOTECH	BP00027AS	RNS		DRUM	BH	115/196	X	X	X	X	X		
71394	GW	BH00245AS	REAL		GEOTECH	BH	133							X
71494	GEOTECH	BH00243AS	REAL		GEOTECH	WELL	115/196							X
71494	GEOTECH	BP00042AS	REAL	BP00043AS	DRUM	WELL	115/196	X	X	X	X	X		
71494	GEOTECH	BP00043AS	DUP	BP00042AS	DRUM	WELL	115/196	X	X	X	X	X		
71494	GEOTECH	BP00044AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
71494	GEOTECH	BP00045AS	REAL		DRUM	WELL	115/196	X	X	X	X	X		
71494	GEOTECH	BP00047AS	RNS		DRUM	WELL	115/196	X	X	X	X	X		
71494	GEOTECH	BP00048AS	REAL	BP00049AS	DRUM	WELL	115/196	X	X	X	X	X		
71494	GEOTECH	BP00049AS	DUP	BP00048AS	DRUM	WELL	115/196	X	X	X	X	X		
71494	GEOTECH	BP00050AS	RNS		DRUM	WELL	115/196	X	X	X	X	X		
71494	GEOTECH	BP00051AS	TB		DRUM	WELL	115/196			X				
SS133194	SS	SS00001AS	REAL		SS	SS	115/196	X						
SS133294	SS	SS00002AS	REAL		SS	SS	115/196	X						
SS133394	SS	SS00003AS	REAL		SS	SS	115/196	X						
SS133494	SS	SS00004AS	REAL		SS	SS	115/196	X						
SS133594	SS	SS00005AS	REAL		SS	SS	115/196	X						
SS133694	SS	SS00006AS	REAL		SS	SS	115/196	X						
SS133794	SS	SS00007AS	REAL		SS	SS	115/196	X						
SS133894	SS	SS00008AS	REAL	SS00009AS	SS	SS	115/196	X						
SS133894	SS	SS00009AS	DUP	SS00008AS	SS	SS	115/196	X						
SS133894	SS	SS00010AS	RNS		SS	SS	115/196	X						

Table O-27
Summary of Data Completeness

Sampling Station Type	Number of Sampling Stations	
	Planned	Installed or Sampled
Boreholes	47	48
Monitoring Wells	25	28
Surface Soils	100	105
Surface-Water Stations	22	19
Sediment Stations	15	15
Total	209	215

Overall approximate percent completeness = 103%



EXPLANATION

- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings
- Operable Unit 1 881 Hillside
- Operable Unit 2 903 Pad, Mound, and East Trenches
- Operable Unit 4 Solar Ponds
- Operable Unit 5 Woman Creek
- Operable Unit 6 Walnut Creek
- Operable Unit 7 Present Landfill
- Operable Unit 8 700 Area
- Operable Unit 9 Original Process Waste Line
- Operable Unit 10 Other Outside Closures
- Operable Unit 11 West Spray Field
- Operable Unit 12 400/800 Area
- Operable Unit 13 100 Area
- Operable Unit 14 Radioactive Sites
- Operable Unit 15 Inside Building Closures
- Operable Unit 16 Low Priority Sites

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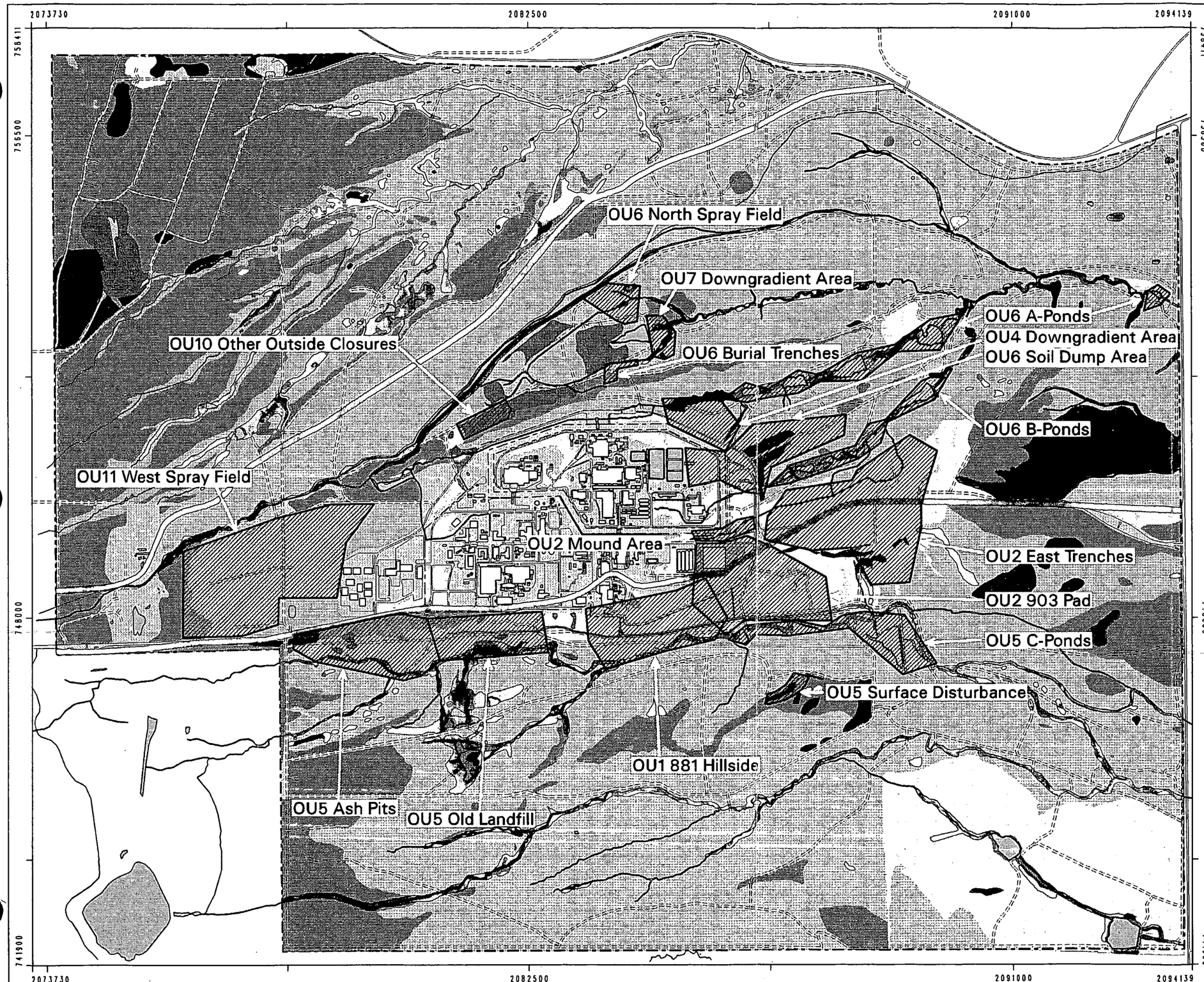
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Walnut Creek, Woman Creek, and Rock Creek Watersheds

September 1995 | Figure N1-2

20-SEP-1995 GRA: wshed3dall.gra + AML: /export/home/data3/swero/srcl8area/cmts/report/wshed3d.aml



EXPLANATION

- Wet Meadow
- Short Marsh
- Tall Marsh
- Riparian Woodland
- Ponderosa Pine Woodland
- Tree Plantings
- Riparian Shrub
- Short Upland Shrub
- Tall Upland Shrub
- Short Grassland
- Mesic Mixed Grassland
- Xeric Mixed Grassland
- Reclaimed Grassland
- Disturbed Area - Annual Grass/Forb
- Disturbed Area - Disturbed/Barren Land
- Disturbed Area - Developed Areas
- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings
- Source Areas

Scale = 1 : 20400
1 inch = 1700 feet

880 0 1700ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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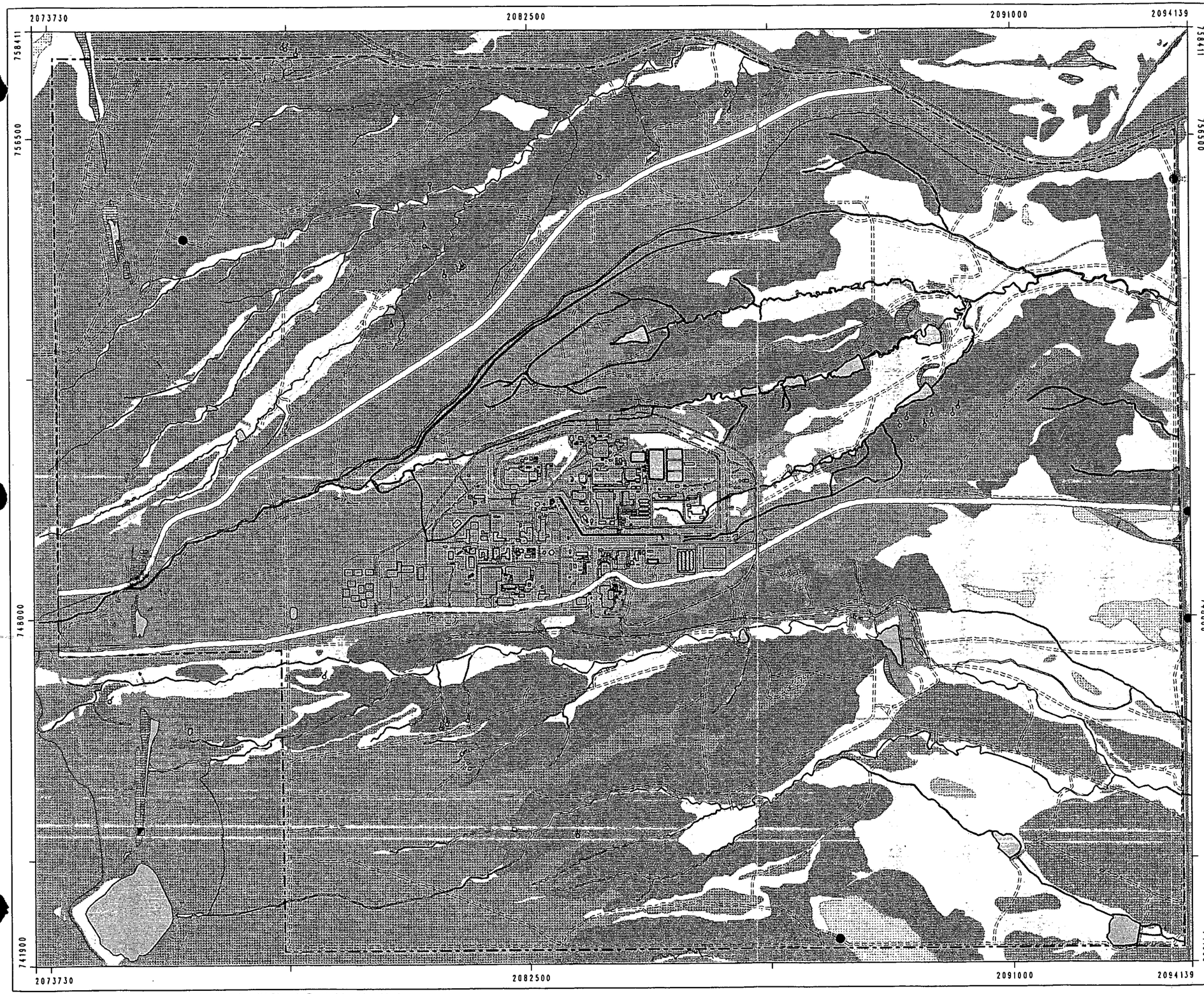
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Vegetation Types and Source Areas

September 1995 | Figure N3-5

19-SEP-1995 CRA: $DATA3/swera/srcBlorea/maps/veg-src.gra + AML: /export/home/data3/swera/srcBlorea/amls/report/mainplot.aml



EXPLANATION

- Artificial Fill (latest Recent)
- Piney Creek and Post-Piney Creek Alluvium (Recent)
- Terrace Alluvium, undivided (late and middle Pleistocene)
- Slocum Alluvium (middle Pleistocene)
- Verdos Alluvium (early middle Pleistocene)
- Rocky Flats Alluvium (early Pleistocene)
- Colluvium, undivided (Holocene to middle Pleistocene)
- Landslide Deposits (Holocene to middle Pleistocene)
- Arapahoe Formation (Upper Cretaceous)
- Laramie Formation (Upper Cretaceous)
- Fox Hills Sandstone (Upper Cretaceous)
- Strike and Dip of Beds
- Spring
- Mine Shaft
- Clast Identification Site
- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings

Modified from: USGS 1994

Scale = 1 : 20400
1 inch = 1700 feet

850 0 1700ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Surficial Geology

September 1995 | Figure N2-1

19-SEP-1995 CRA: $DATA3/swera/srcBarea/maps/geo.gra + AML: /export/home/data3/swera/srcBarea/amls/report/mainplot.aml

EXPLANATION

- Denver clay loam, 2 - 5%
- Denver clay loam, 5 - 9%
- Denver-Kutch clay loam, 5 - 9%
- Denver-Kutch clay loam, 9 - 15%
- Denver-Kutch-Midway clay loam, 9 - 25%
- Englewood clay loam, 0 - 2%
- Englewood clay loam, 2 - 5%
- Flatirons very cobbly sandy loam, 0 - 3%
- Flatirons very stoney sandy loam, 0 - 5%
- Haverson loam, 0 - 3%
- Leyden-Primen-Standley cobbly clay loam, 15 - 50%
- McClave clay loam, 0 - 3%
- Midway clay loam, 9 - 30%
- Nederland very cobbly sandy loam, 15 - 50%
- Nunn clay loam, 0 - 2%
- Nunn clay loam, 2 - 5%
- Pits, gravel
- Sedimentary rock outcrop
- Standley-Nunn gravelly clay loam, 0 - 5%
- Valmont clay loam, 0 - 3%
- Veldkamp-Nederland very cobbly sandy loam, 0 - 3%
- Willowman-Leyden cobbly loam, 9 - 30%
- Yoder Variant-Midway complex, 15 - 60%

- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings

Modified from: Price and Amen 1983

Scale = 1 : 20400
1 inch = 1700 feet

860 0 1700ft

Datum: NAD27
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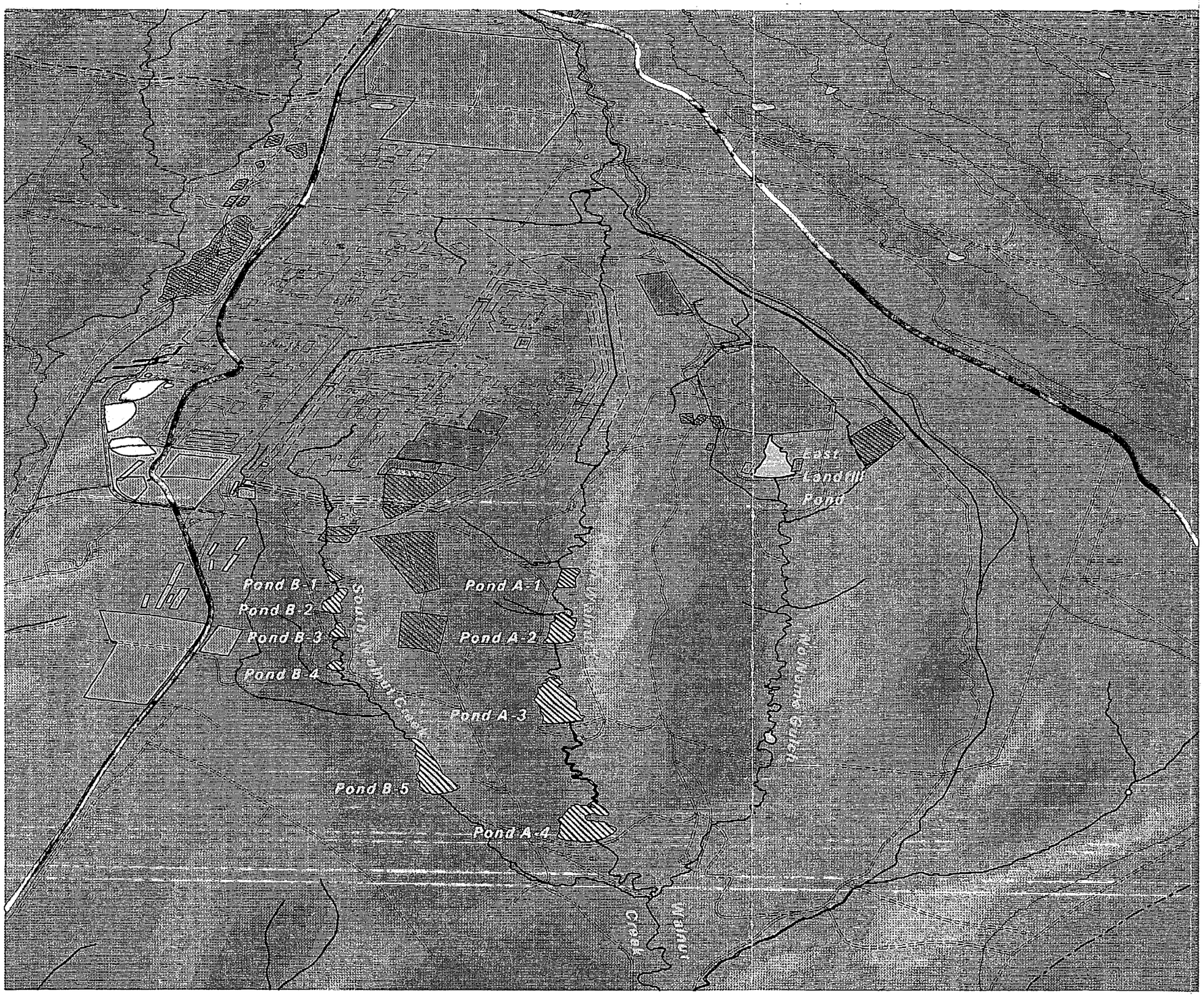
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Soil Types

September 1995 | Figure N2-2

19-SEP-1995 GRA: $DATA3/swera/srcBarea/maps/soil.gra + AML: /export/home/data3/swera/srcBarea/amls/report/mainplot.aml



EXPLANATION

- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings

- Operable Unit 1 881 Hillside
- Operable Unit 2 903 Pad, Mound, and East Trenches
- Operable Unit 4 Solar Ponds
- Operable Unit 5 Woman Creek
- Operable Unit 6 Walnut Creek
- Operable Unit 7 Present Landfill
- Operable Unit 10 Other Outside Closures
- Operable Unit 11 West Spray Field

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ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Distribution of IHSSs in Walnut Creek Watershed

September 1995 | Figure N2-3

20-SEP-1995 GRA: wshed3dwcd.gra • AML: /export/home/data3/swera/srcBarea/units/report/wshed3d.aml

EXPLANATION

- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings
- Operable Unit 1 881 Hillside
- Operable Unit 2 903 Pad, Mound, and East Trenches
- Operable Unit 4 Solar Ponds
- Operable Unit 5 Woman Creek
- Operable Unit 6 Walnut Creek
- Operable Unit 10 Other Outside Closures
- Operable Unit 11 West Spray Field

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ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Distribution of IHSSs in Woman Creek Watershed

September 1995 | Figure N2-4

20-SEP-1995 GRA: wshed3dwom.gra + AML: /export/home/data3/swera/srcf0area/amls/report/wshed3d.aml

EXPLANATION

- Wet Meadow
- Short Marsh
- Tall Marsh
- Riparian Woodland
- Ponderosa Pine Woodland
- Tree Plantings
- Riparian Shrub
- Short Upland Shrub
- Tall Upland Shrub
- Short Grassland
- Mesic Mixed Grassland
- Xeric Mixed Grassland
- Reclaimed Grassland
- Disturbed Area - Annual Grass/Forb
- Disturbed Area - Disturbed/Barren Land
- Disturbed Area - Developed Areas

- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings

Scale = 1 : 20400
1 inch = 1700 feet

850 0 1700ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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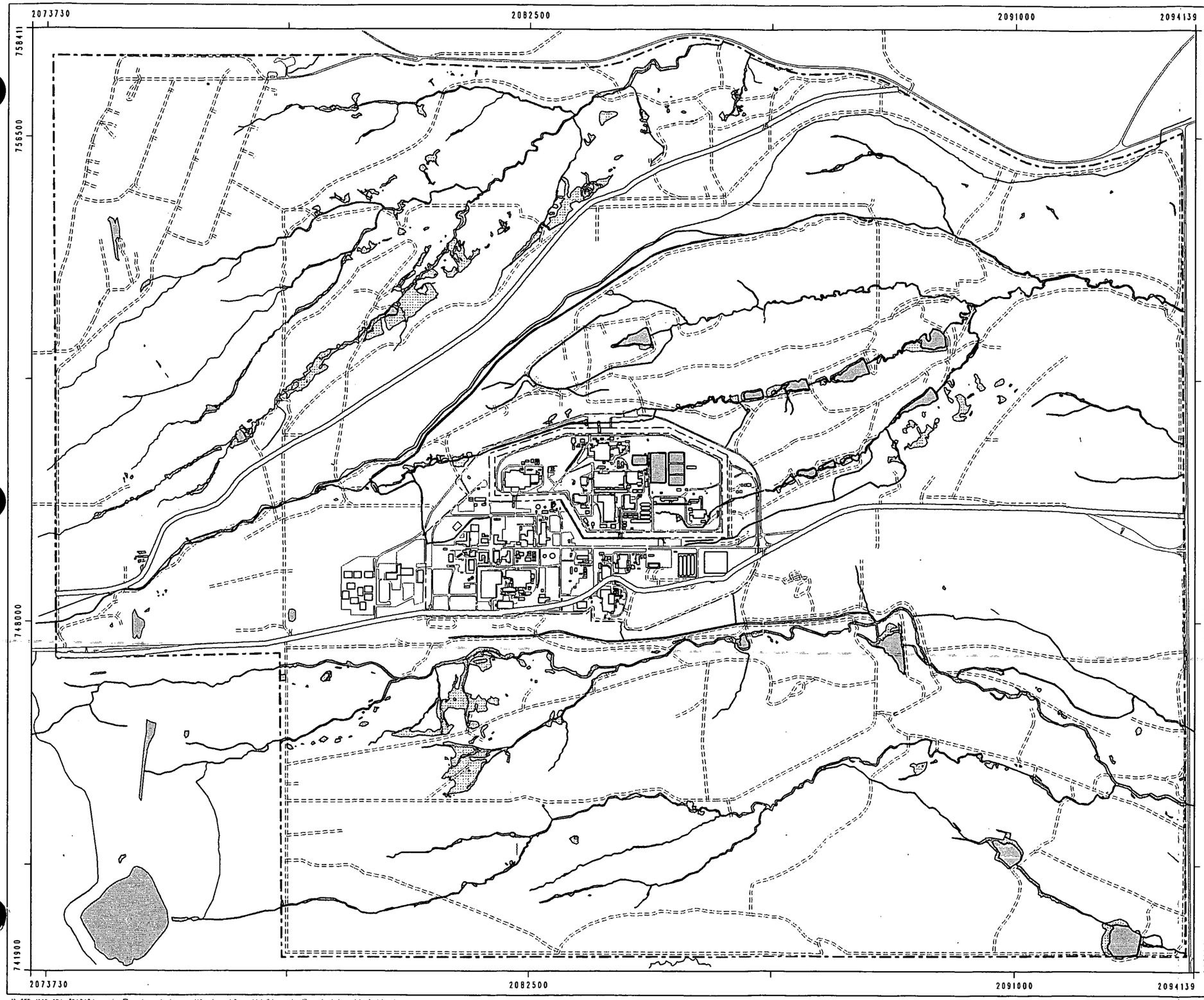
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Vegetation Types

September 1995 | Figure N2-5

B-SP-R95 GRA: $DATA3/swera/srcfilarea/maps/veg.pro + AML: /export/home/data3/swera/srcfilarea/arcls/report/mainplot.aml



EXPLANATION

- Wetlands
- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings

Modified from: DOE 1994a

Scale = 1 : 20400
1 inch = 1700 feet

850 0 1700ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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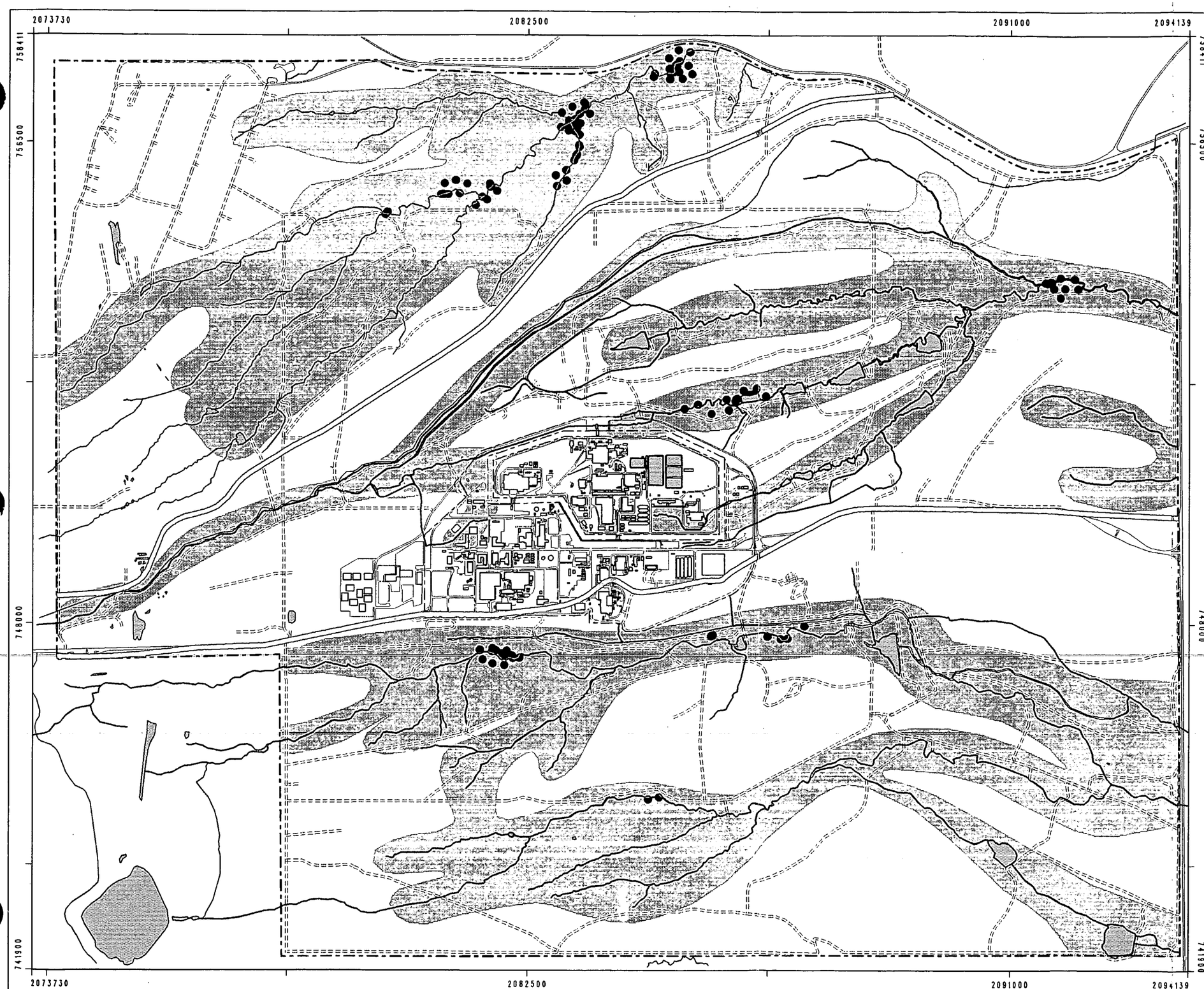
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Wetlands

September 1995 | Figure N2-6

19-SEP-1995 GRA: $DATA3/swera/srcBorea/maps/wel.gra + AML: /export/home/data3/swera/srcBorea/amls/report/mainplot.aml



EXPLANATION

- Records of Preble's Meadow Jumping Mouse
- Probable Habitat
- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings

Modified from: DOE 1995c

Scale = 1 : 20400
1 inch = 1700 feet

850 0 1700ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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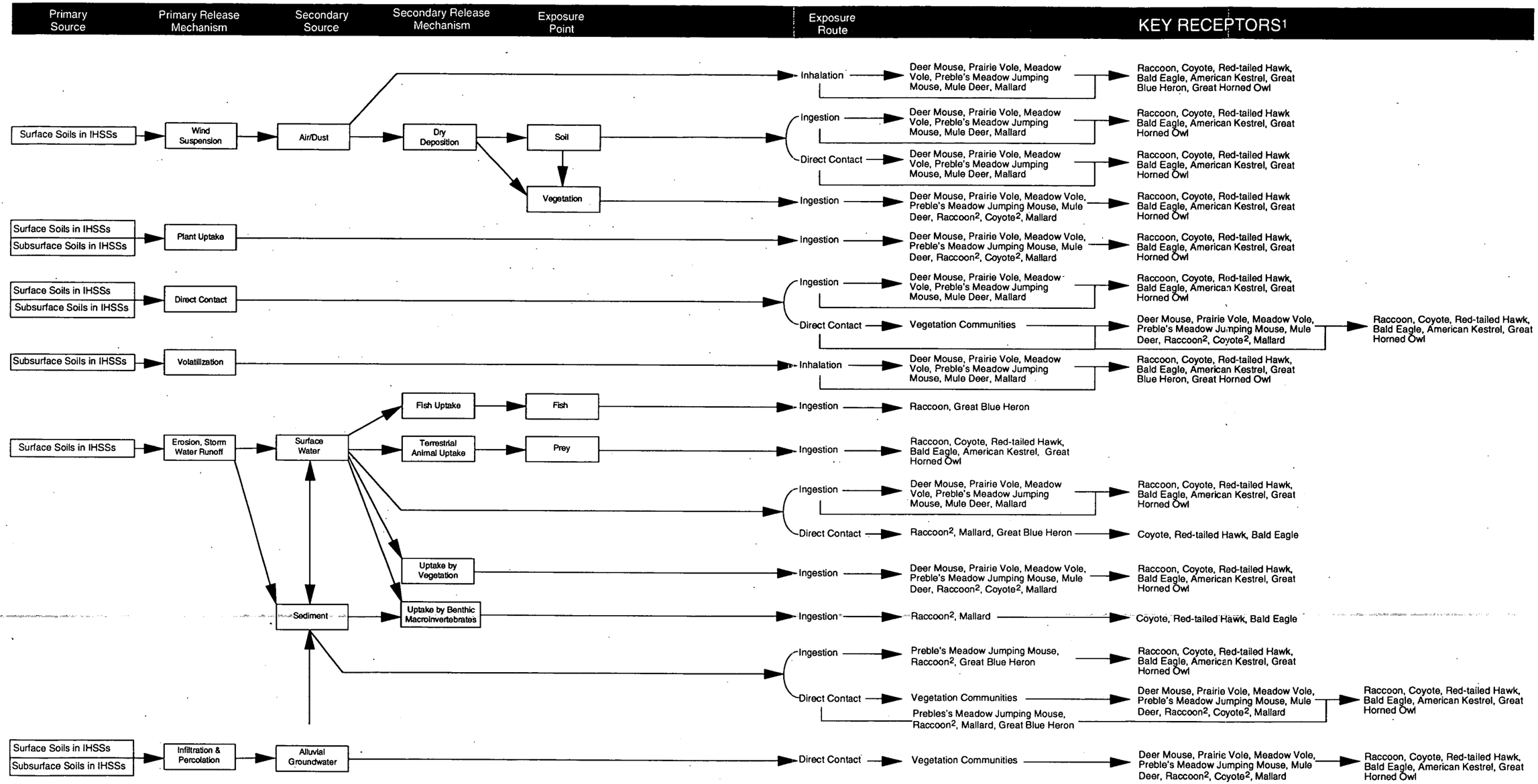
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Capture Locations and Probable Habitat of Preble's Meadow Jumping Mouse at RFETS

(Zapus hudsonius preblei)

September 1995	Figure N2-7

20-SEP-1995 GRA: $DATA3/swera/srcBlarea/maps/preb.gra • AML: /export/home/data3/swera/srcBlarea/aml/report/mainplot.aml



[1] A subset of wildlife species representing trophic and functional groups may be included in exposure estimations.
[2] Not typically a prey species

G95\ES\EXP PTHWY Aquatic -2501.cdw

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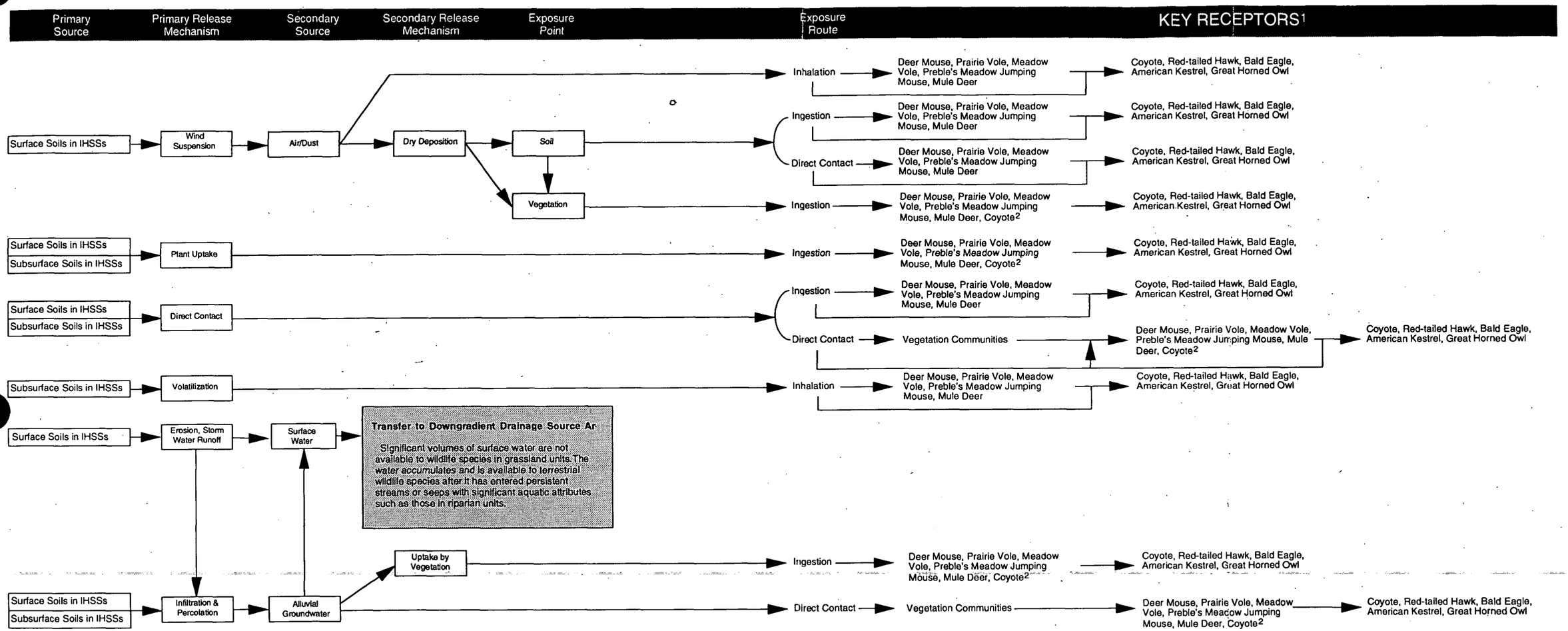
ERAs for
Walnut Creek and Woman Creek Watersheds
at RFETS

Riparian and Aquatic Community Exposure Pathway Model

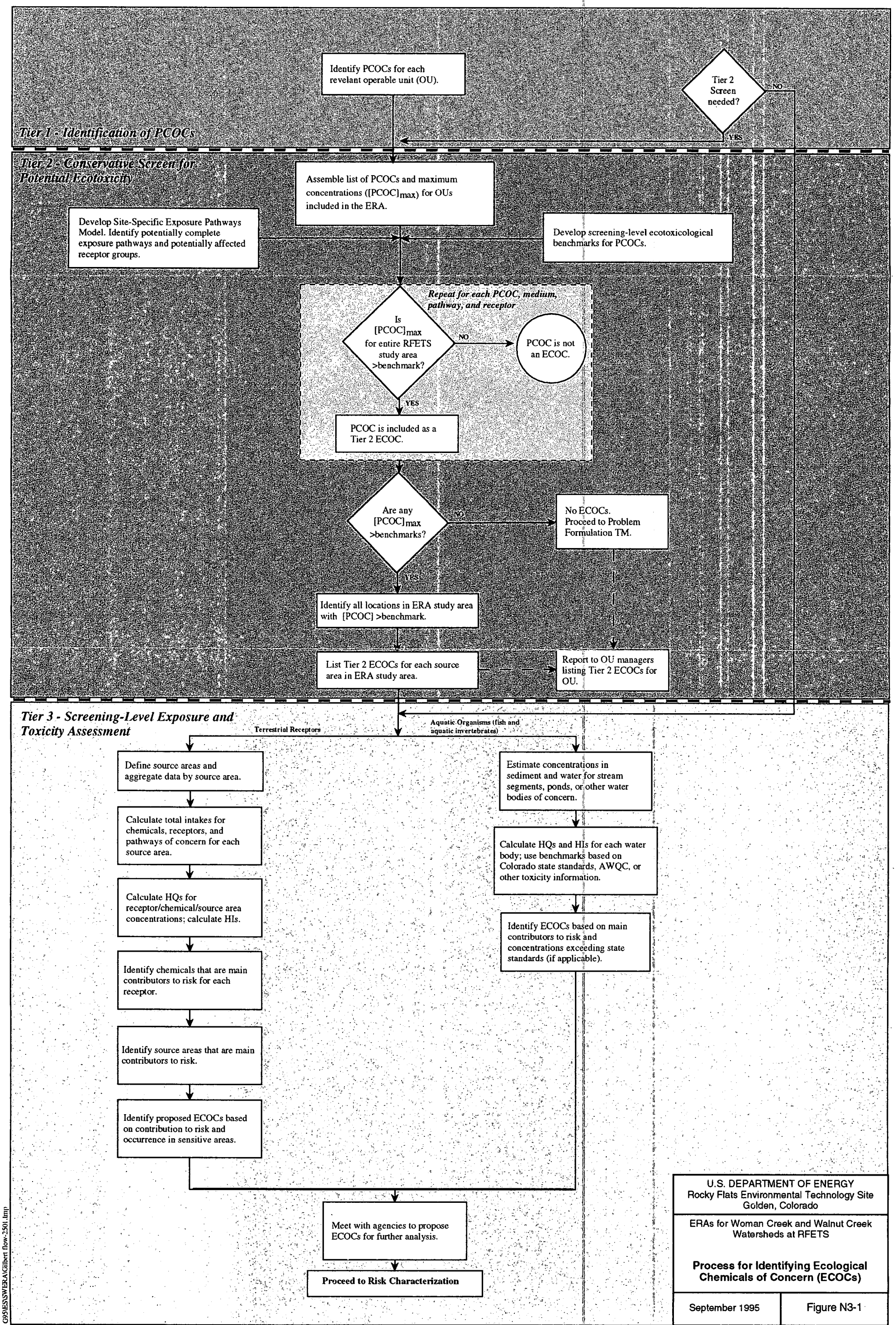
September 1995 | Figure N2-8



1 A subset of wildlife species representing trophic and functional groups may be included in exposure estimations
2 Not typically a prey species

U.S. DEPARTMENT OF ENERGY Rocky Flats Environmental Technology Site Golden, Colorado	
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS **Grassland Community Exposure Pathway Model**	
September 1995	Figure N2-9

G95\ES\EXP PATHS Terrestrial-2501.cdw



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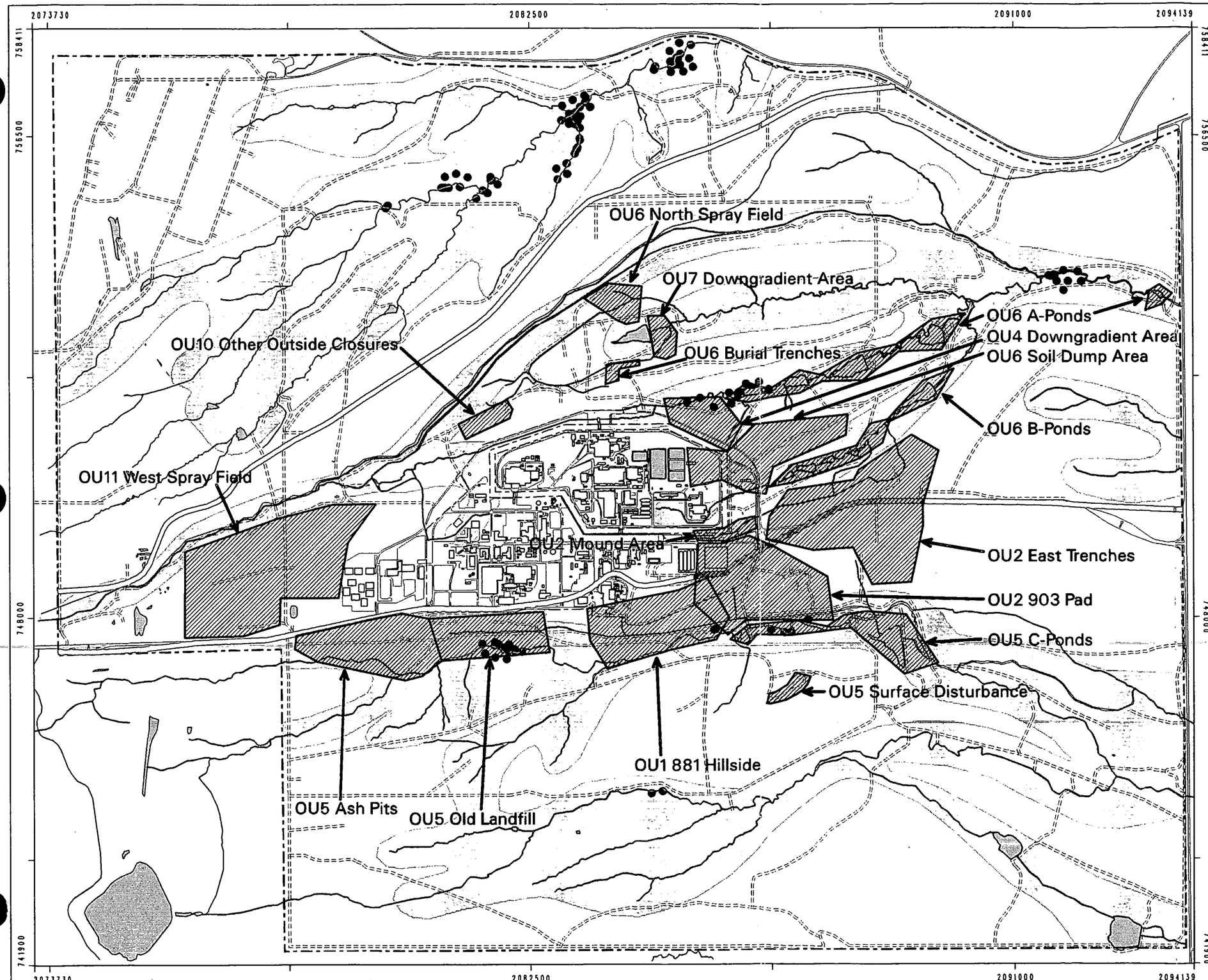
Golden, Colorado

ERAs for Woman Creek and Walnut Creek Watersheds at RFETS

Process for Identifying Ecological Chemicals of Concern (ECOCs)

September 1995 | Figure N3-1



EXPLANATION

- Records of Preble's Meadow Jumping Mouse
- Probable Habitat
- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings
- Source Areas

Modified from: DOE 1995c

Scale = 1 : 20400
1 inch = 1700 feet

850 0 1700ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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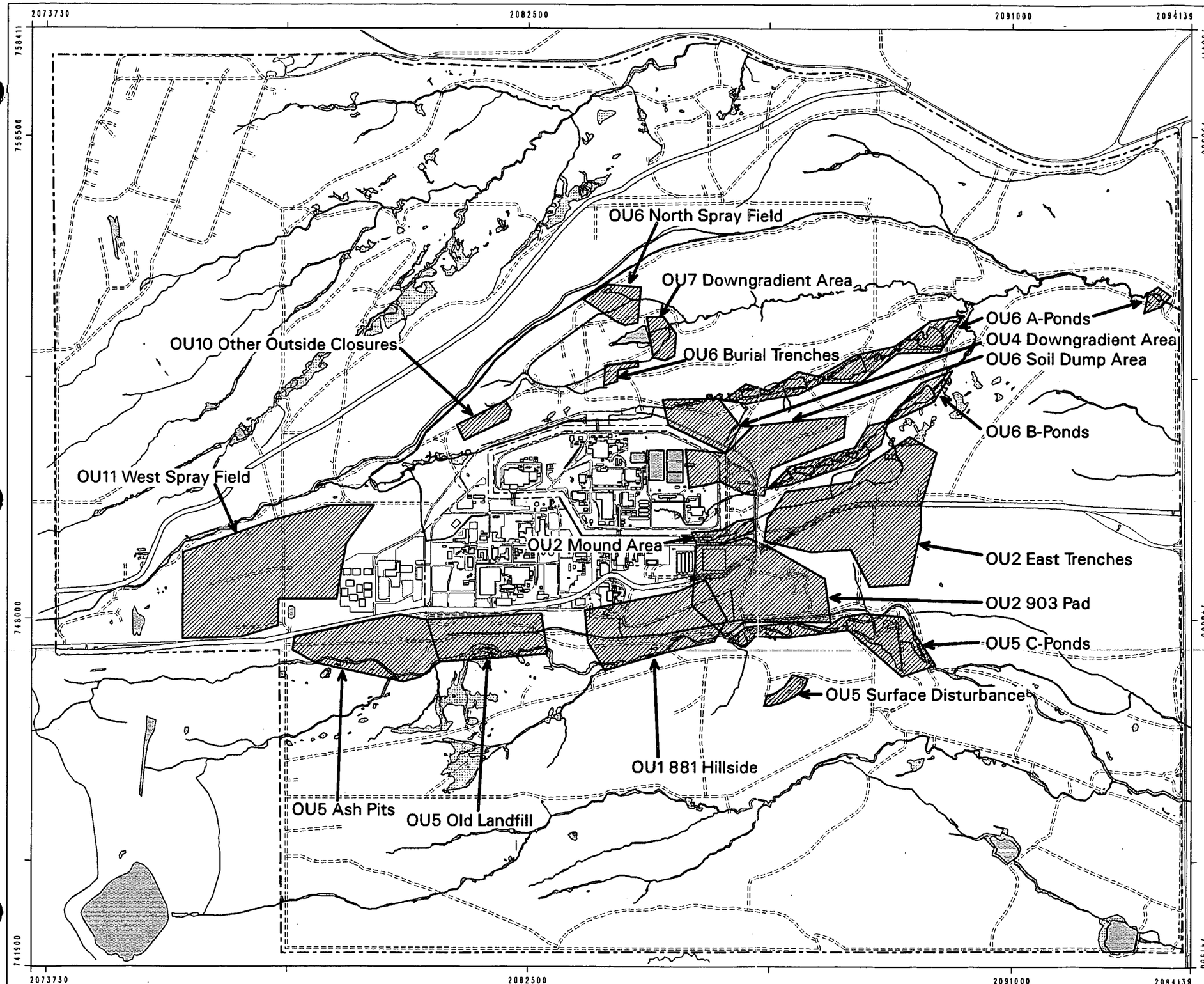
Golden, Colorado

ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Probable Habitat of Preble's Meadow Jumping Mouse and ERA Source Areas

September 1995 | Figure N3-7

20-SEP-1995 CRA: $DATA3/swera/srcBarea/maps/preb-src.gra + AML: /export/home/data3/swera/srcBarea/aml/report/mainplot.aml



EXPLANATION

- Wetlands
- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings
- Source Areas

Modified from: DOE 1994a

Scale = 1 : 20400
1 inch = 1700 feet

850 0 1700ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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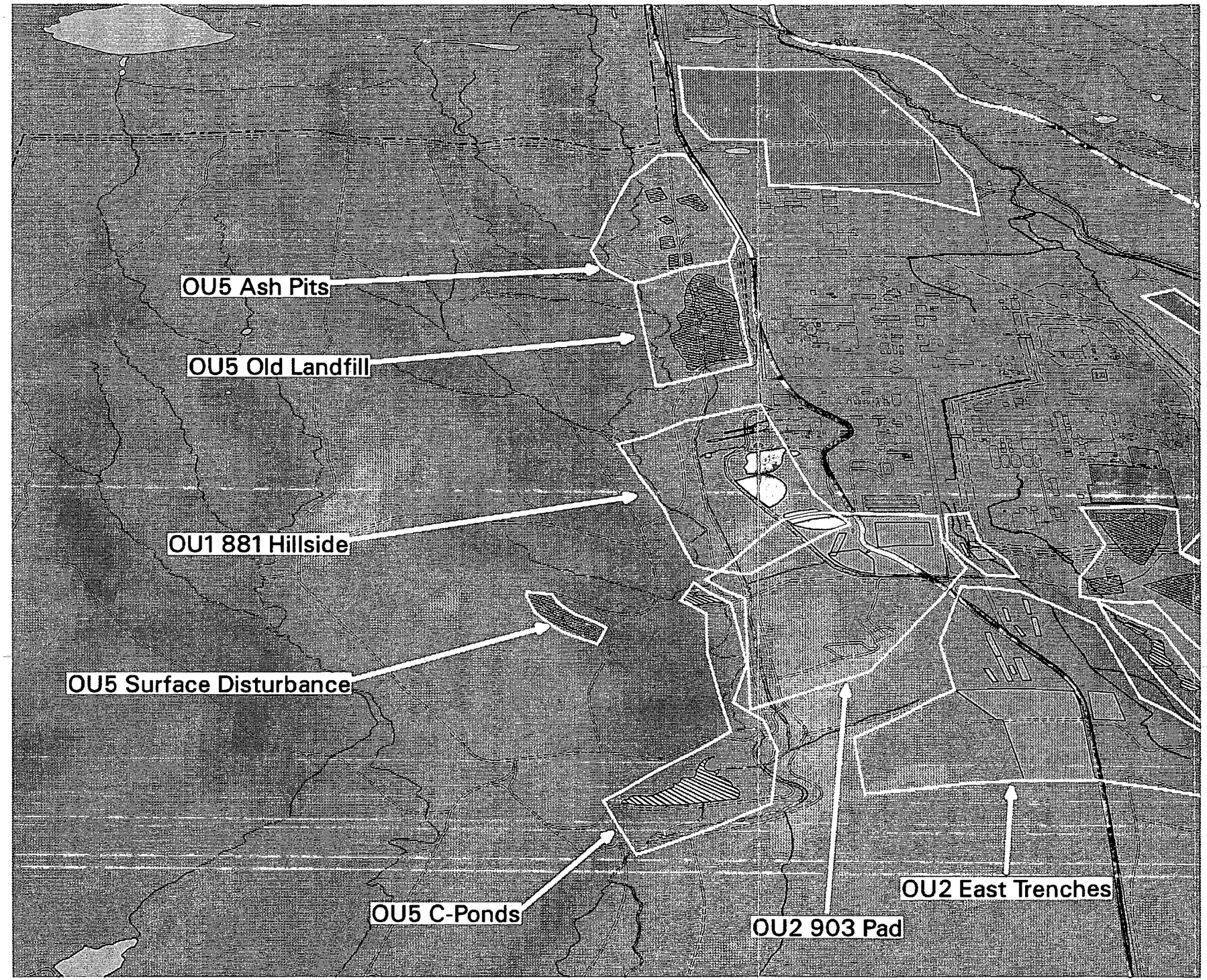
Golden, Colorado

ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Wetlands and Source Areas

September 1995 | Figure N3-6

19-SEP-1995 GRA: $DATA3/swera/srcBarea/maps/wet-src.gra + AML: /export/home/data3/swera/srcBarea/amls/report/mainplot.aml



EXPLANATION

- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
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- Lakes and Ponds
- Buildings
- Operable Unit 1 881 Hillside
- Operable Unit 2 903 Pad, Mound, and East Trenches
- Operable Unit 4 Solar Ponds
- Operable Unit 5 Woman Creek
- Operable Unit 6 Walnut Creek
- Operable Unit 10 Other Outside Closures
- Operable Unit 11 West Spray Field
- ERA Source Areas

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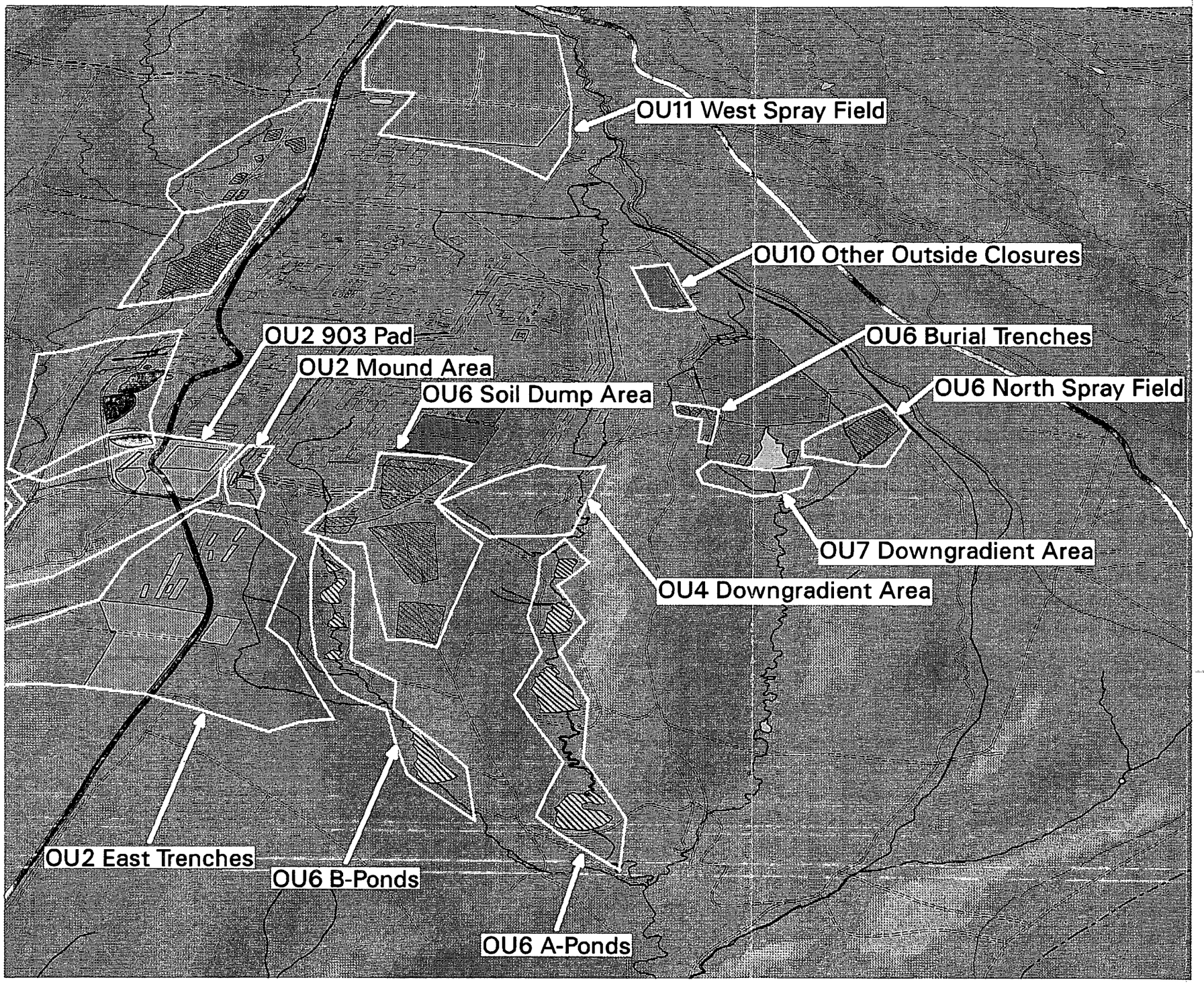
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

ERA Source Areas in Woman Creek Watershed

September 1995 | Figure N3-3

20-SEP-1995 GRA: wshed3dwomsrc.gro + AML: /export/home/data3/swero/srcBarea/cmts/report/wshed3d.aml



EXPLANATION

- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings
- Operable Unit 1 881 Hillside
- Operable Unit 2 903 Pad, Mound, and East Trenches
- Operable Unit 4 Solar Ponds
- Operable Unit 5 Woman Creek
- Operable Unit 6 Walnut Creek
- Operable Unit 7 Present Landfill
- Operable Unit 10 Other Outside Closures
- Operable Unit 11 West Spray Field
- ERA Source Areas

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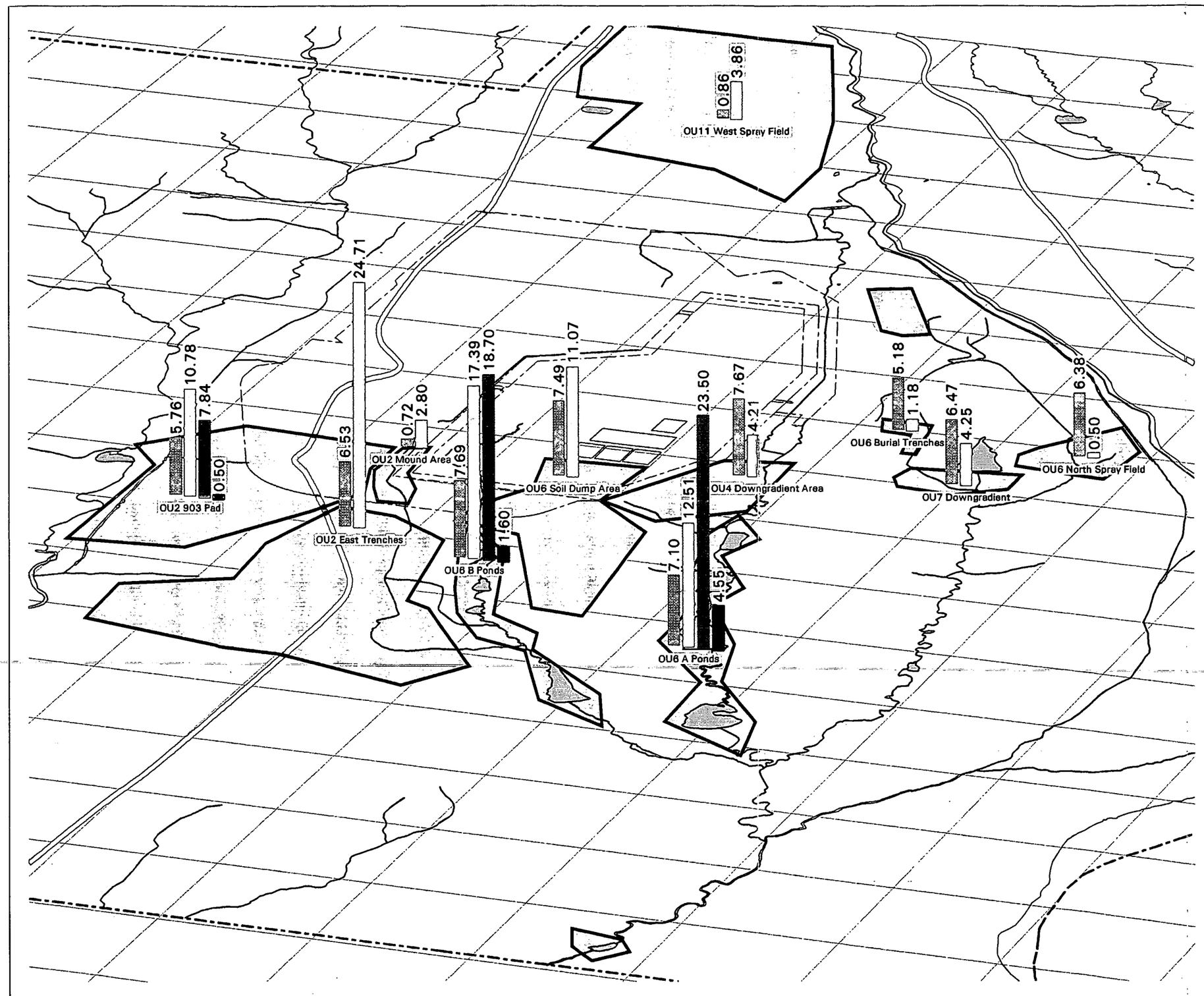
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

ERA Source Areas in Walnut Creek Watershed

September 1995 | Figure N3-2

20-SEP-1995 GRA: wshed3dwolsrc.gra + AML: /export/home/data3/swero/src@area/arnis/report/wshed3d.aml



EXPLANATION

- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Source Areas

- Preble's Meadow Jumping Mouse
- American Kestrel
- Great Blue Heron
- Mallard

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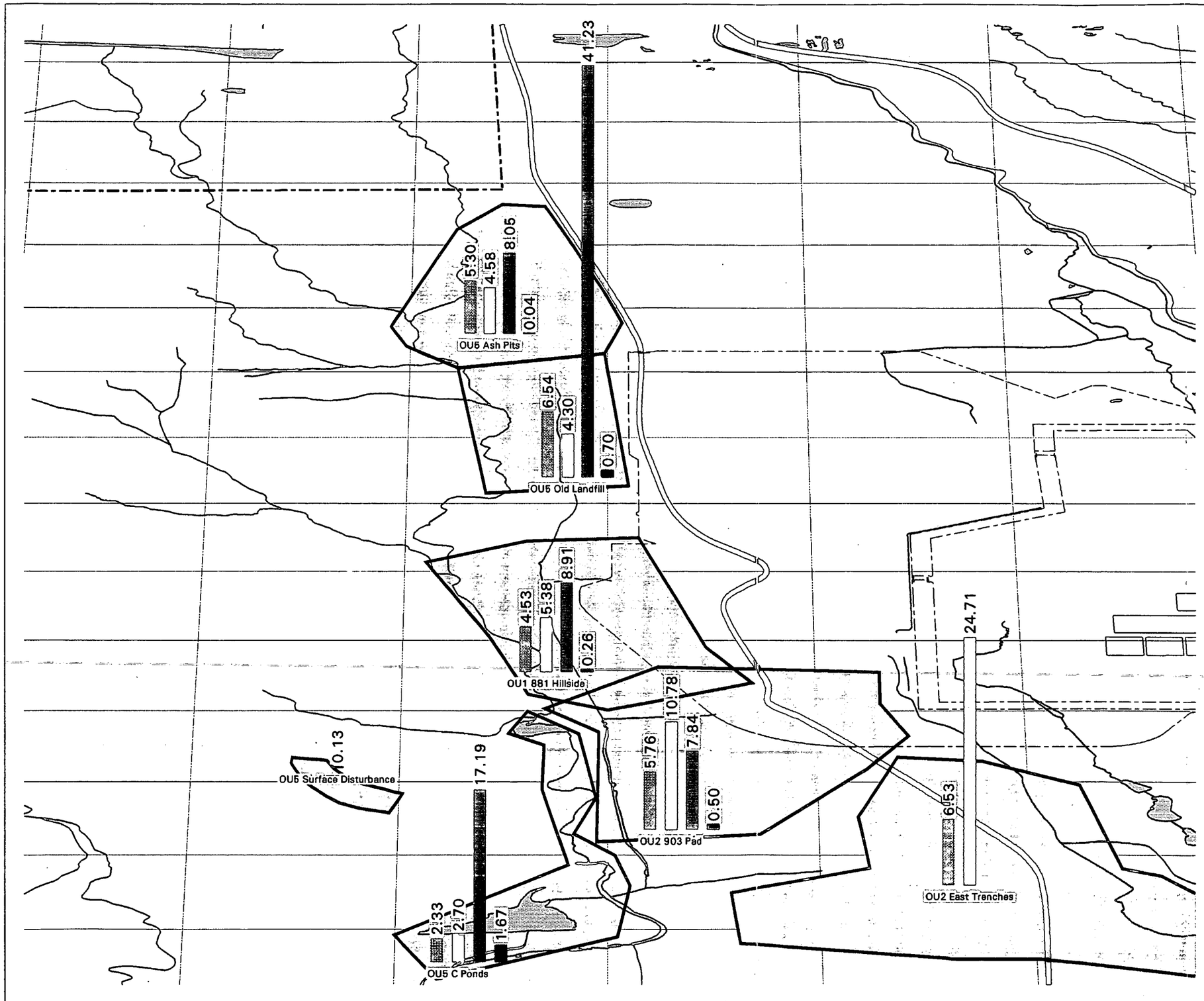
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Hazard Indices for Walnut Creek Watershed

September 1995

Figure N3-10

20-SEP-1995 GRA: $DATA3/swera/srcBarea/maps/bar3dwn1.gra • AML: /export/home/data3/swera/srcBarea/amls/report/bar3d.aml



EXPLANATION

- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Source Areas

- Preble's Meadow Jumping Mouse
- American Kestrel
- Great Blue Heron
- Mallard

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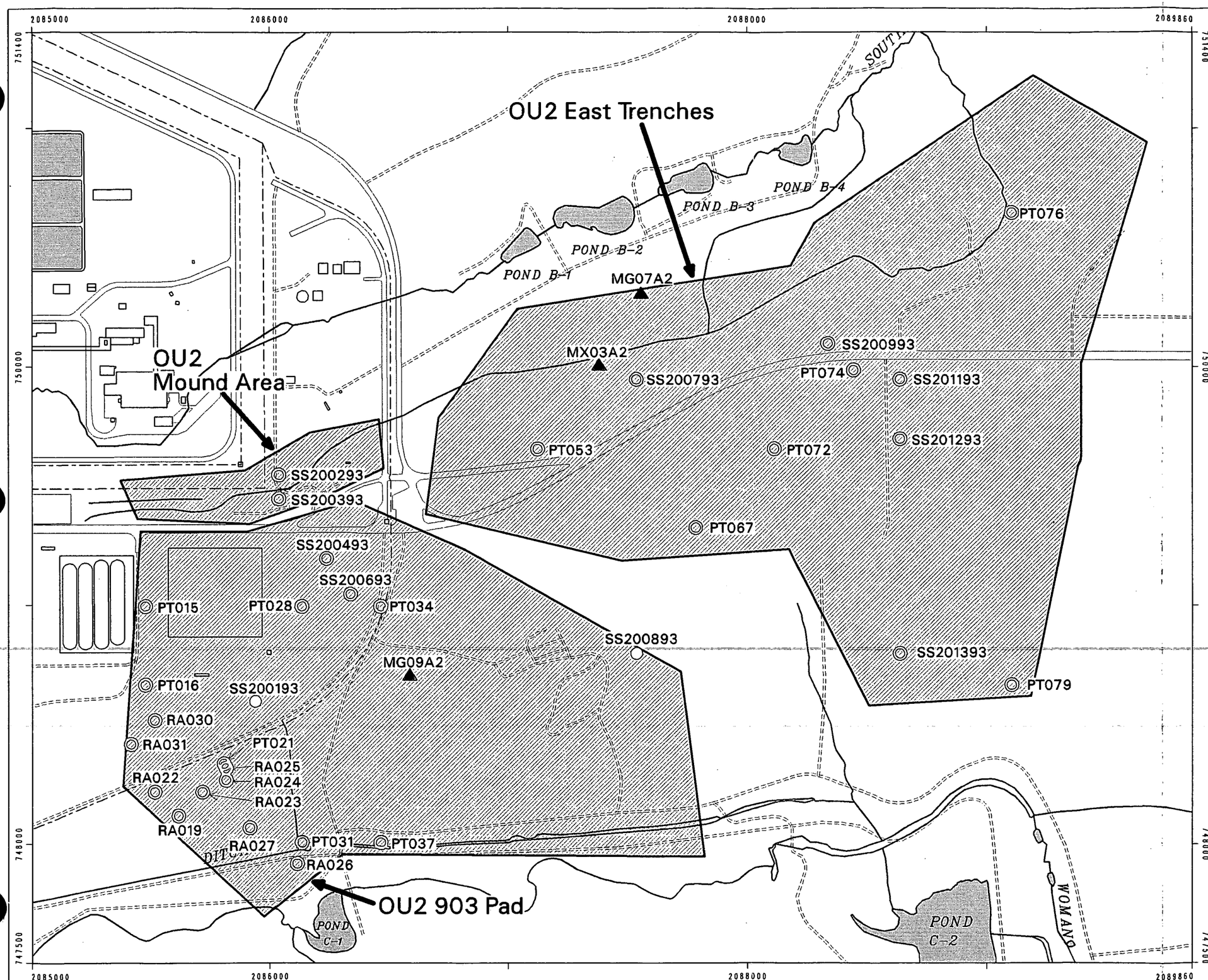
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Hazard Indices for Woman Creek Watershed

September 1995

Figure N3-11

20-SEP-1995 GRA: $DATA3/swera/srcfilarea/maps/bar3dwom.gra • AML: /export/home/data3/swera/srcfilarea/amls/report/bar34.aml



EXPLANATION

- Watershed Boundary
- Walnut Creek Watershed
- Woman Creek Watershed
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Source Areas
- Buildings
- Terrestrial Arthropod Sample Locations*
- Surficial Soil Sample Locations
- Surficial Soil Sample Locations with Chromium Concentrations Above the Background UCL_{95}

*NOTE: Terrestrial arthropods were also sampled at location MX07A2; coordinate for this location were not available

Scale = 1 : 4800
1 inch = 400 feet

200 0 400ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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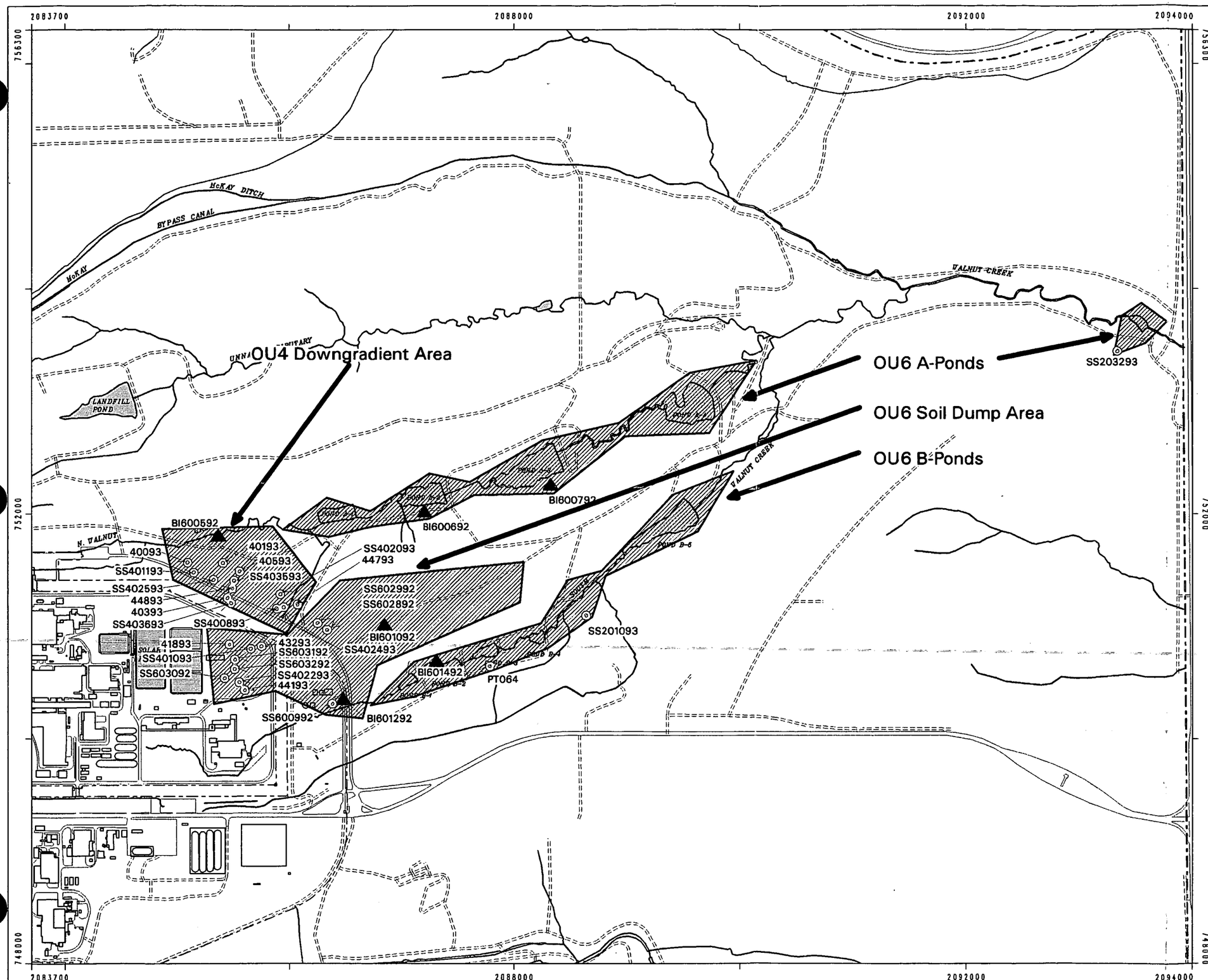
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

OU2 Source Areas and Terrestrial Arthropod and Surficial Soil Sampling Locations

September 1995 | Figure N5-14

01-SEP-1995 CWA: $DATA3/swera/srcBarea/maps/ssou2.gra + AML: /export/home/data3/swera/srcBarea/amls/report/mainplot.aml



EXPLANATION

- Watershed Boundary
- Walnut Creek Watershed
- Woman Creek Watershed
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Source Areas
- Buildings
- Small Mammal Sample Locations
- Surficial Soil Sample Locations

Scale = 1 : 10200
1 inch = 850 feet

425 0 850ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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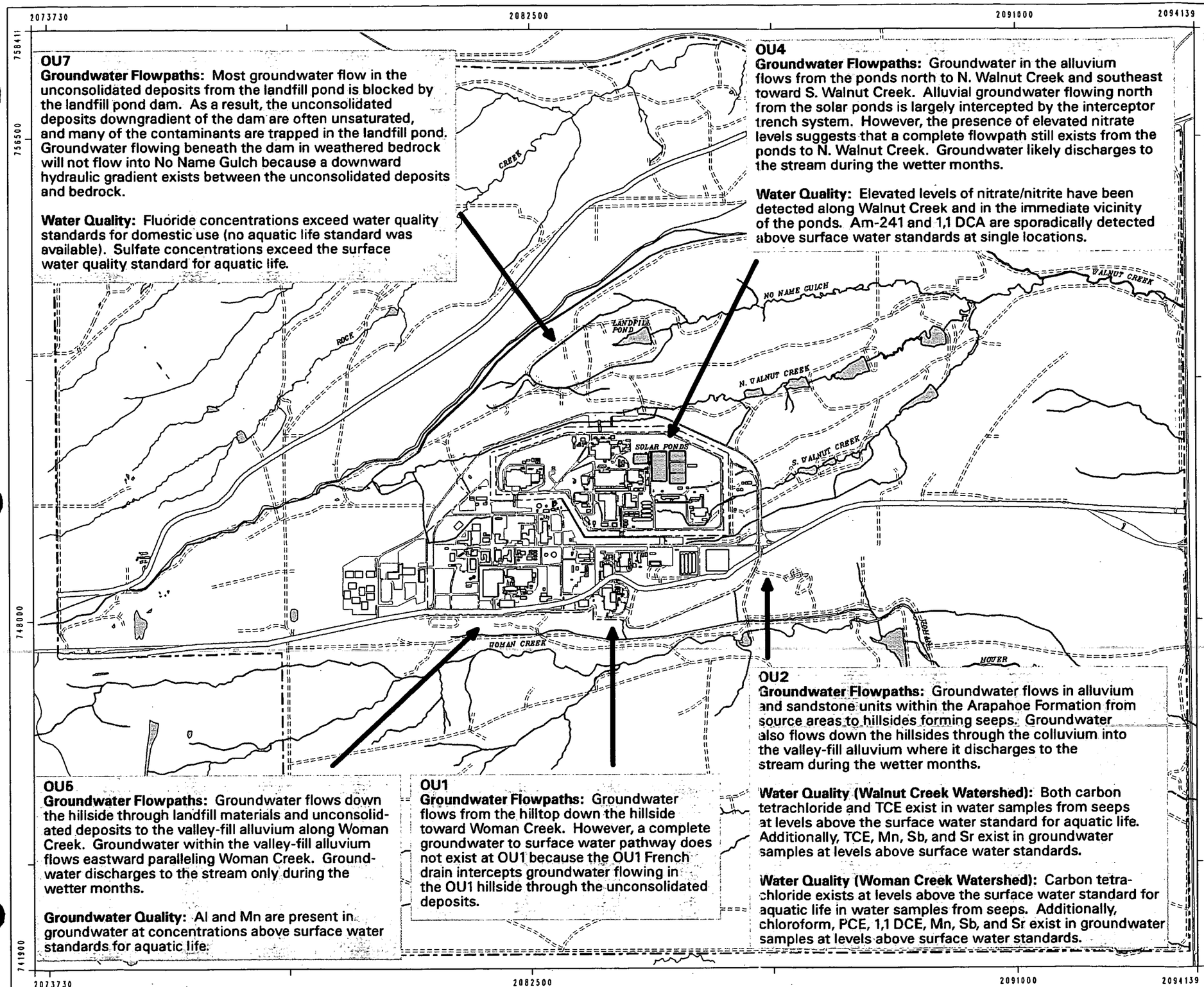
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

OU4/OU6 Source Areas and Small Mammal and Surficial Soil Sampling Locations

September 1995 | Figure N5-15

19-SEP-1995 CRA: $DATA3/swera/srcBlorea/maps/ssou4-6.gra + AML: /export/home/data3/swera/srcBlorea/amls/report/mainplot.aml



OU7
Groundwater Flowpaths: Most groundwater flow in the unconsolidated deposits from the landfill pond is blocked by the landfill pond dam. As a result, the unconsolidated deposits downgradient of the dam are often unsaturated, and many of the contaminants are trapped in the landfill pond. Groundwater flowing beneath the dam in weathered bedrock will not flow into No Name Gulch because a downward hydraulic gradient exists between the unconsolidated deposits and bedrock.

Water Quality: Fluoride concentrations exceed water quality standards for domestic use (no aquatic life standard was available). Sulfate concentrations exceed the surface water quality standard for aquatic life.

OU4
Groundwater Flowpaths: Groundwater in the alluvium flows from the ponds north to N. Walnut Creek and southeast toward S. Walnut Creek. Alluvial groundwater flowing north from the solar ponds is largely intercepted by the interceptor trench system. However, the presence of elevated nitrate levels suggests that a complete flowpath still exists from the ponds to N. Walnut Creek. Groundwater likely discharges to the stream during the wetter months.

Water Quality: Elevated levels of nitrate/nitrite have been detected along Walnut Creek and in the immediate vicinity of the ponds. Am-241 and 1,1 DCA are sporadically detected above surface water standards at single locations.

OU2
Groundwater Flowpaths: Groundwater flows in alluvium and sandstone units within the Arapahoe Formation from source areas to hillsides forming seeps. Groundwater also flows down the hillsides through the colluvium into the valley-fill alluvium where it discharges to the stream during the wetter months.

Water Quality (Walnut Creek Watershed): Both carbon tetrachloride and TCE exist in water samples from seeps at levels above the surface water standard for aquatic life. Additionally, TCE, Mn, Sb, and Sr exist in groundwater samples at levels above surface water standards.

Water Quality (Woman Creek Watershed): Carbon tetrachloride exists at levels above the surface water standard for aquatic life in water samples from seeps. Additionally, chloroform, PCE, 1,1 DCE, Mn, Sb, and Sr exist in groundwater samples at levels above surface water standards.

OU5
Groundwater Flowpaths: Groundwater flows down the hillside through landfill materials and unconsolidated deposits to the valley-fill alluvium along Woman Creek. Groundwater within the valley-fill alluvium flows eastward paralleling Woman Creek. Groundwater discharges to the stream only during the wetter months.

Groundwater Quality: Al and Mn are present in groundwater at concentrations above surface water standards for aquatic life.

OU1
Groundwater Flowpaths: Groundwater flows from the hilltop down the hillside toward Woman Creek. However, a complete groundwater to surface water pathway does not exist at OU1 because the OU1 French drain intercepts groundwater flowing in the OU1 hillside through the unconsolidated deposits.

EXPLANATION

- Watershed Boundary
- Rock Creek Watershed
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings

Scale = 1 : 20400
1 inch = 1700 feet
850 0 1700ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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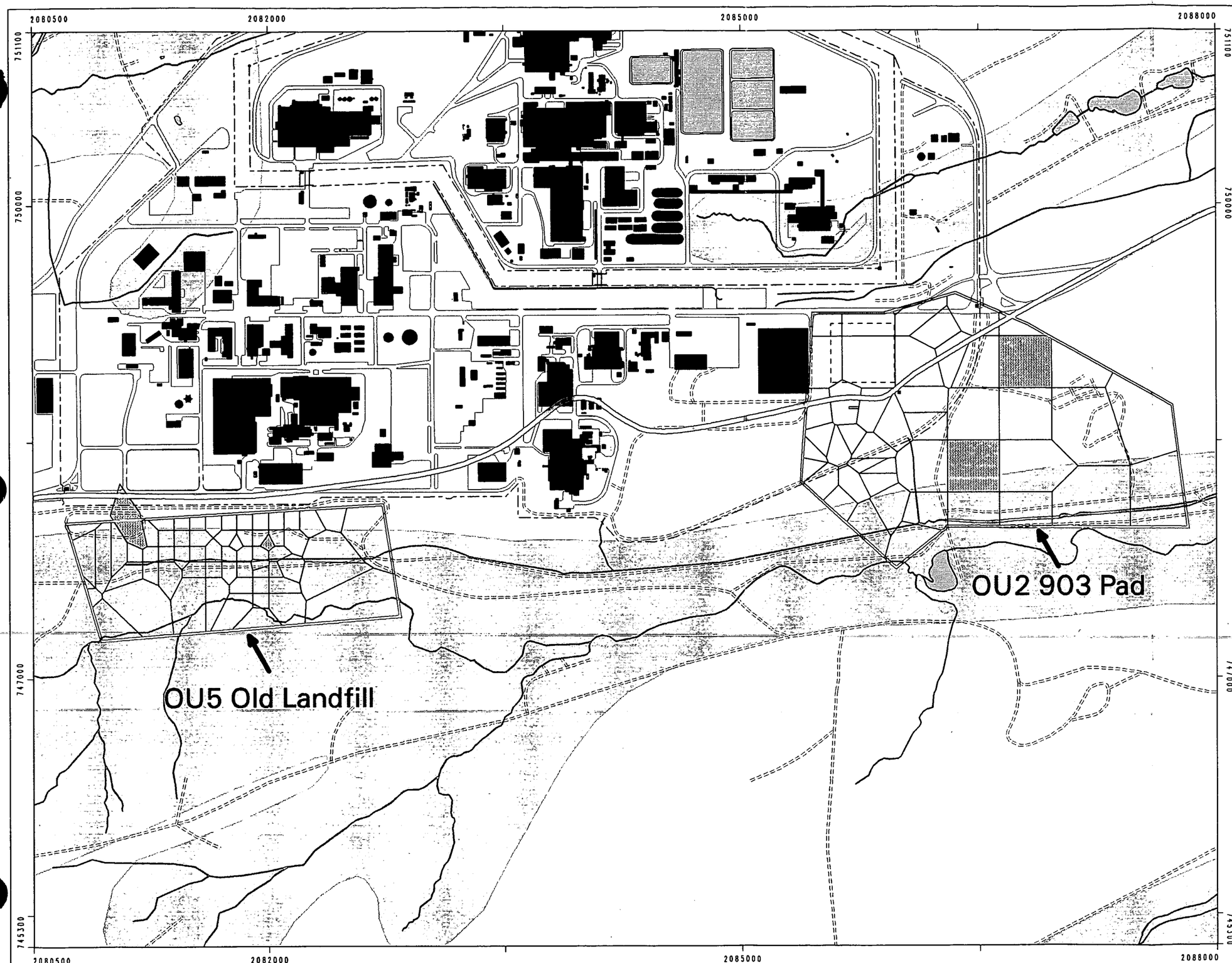
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Summary of Potential Groundwater Effects on Surface Water

September 1995 | Figure N5-10

19-SEP-1995 GRA: $DATA3/swera/sreBarea/maps/gwbox.gra + AML: /export/home/data3/swera/sreBarea/amls/report/mainplot.aml



EXPLANATION

- Areas Where Surface Soil Radionuclide Concentrations Exceed Toxicity Reference Value (TRV)
- Watershed Boundary
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings
- Source Areas
- Preble's Meadow Jumping Mouse Probable Habitat
- 903 Pad

NOTE: Thiessen polygons used to denote approximate area where radionuclide concentrations exceed the TRV.

Polygons outside of source areas are not shown unless radionuclide concentrations exceed TRV.

Scale = 1 : 7200
1 inch = 600 feet

300 0 600ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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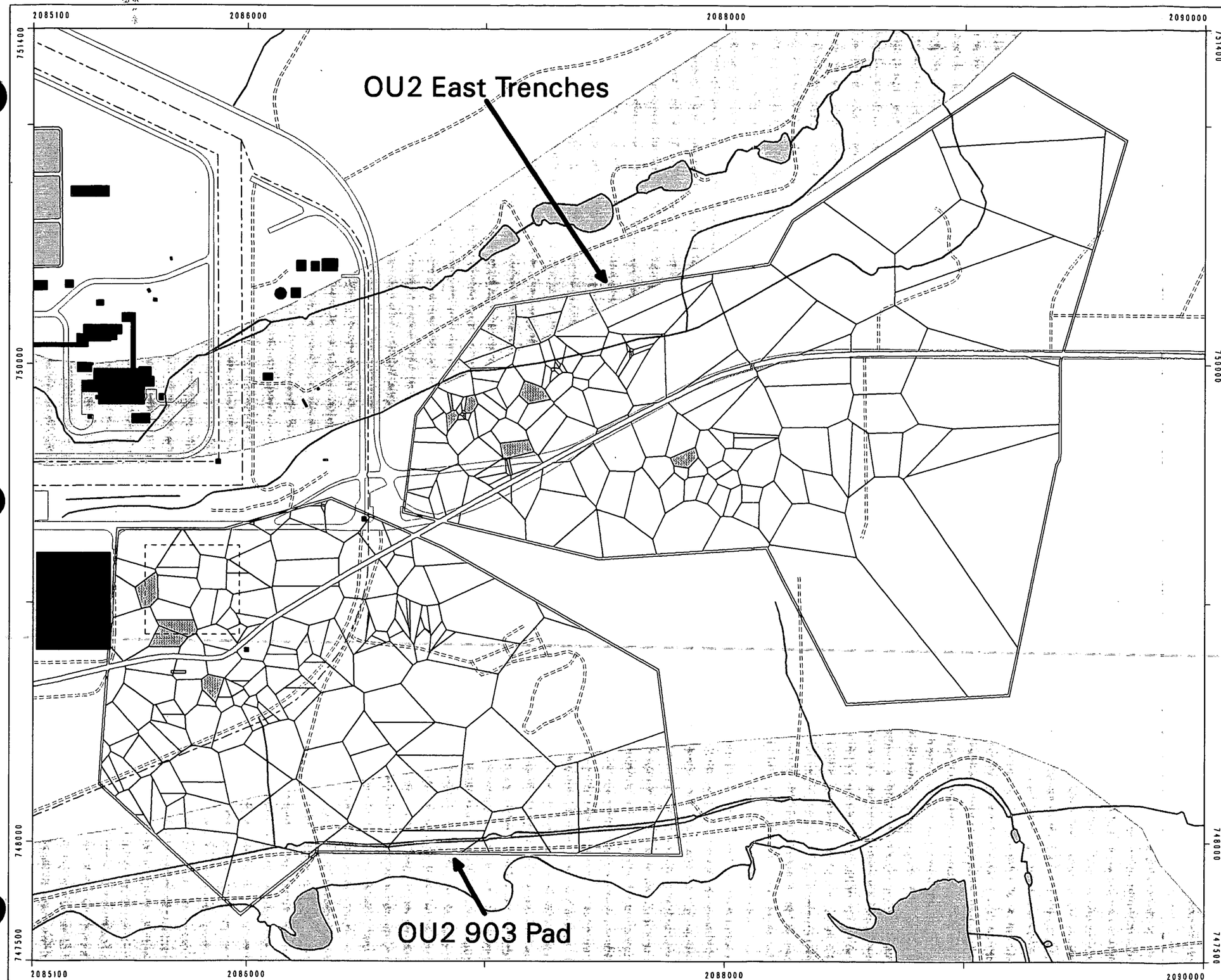
ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Surface Soil Radionuclide Concentrations Exceeding TRV

September 1995 | Figure N5-20

20-SEP-1995 GRA: $DATA3/swera/src@area/maps/ou2@bad.gra • AML: /export/home/data3/swera/src@area/aml's/report/ssthiessplot.aml



EXPLANATION

- Areas Where Subsurface Toluene Concentrations Exceed Toxicity Reference Value (TRV)
- Watershed Boundary
- Walnut Creek Watershed
- Woman Creek Watershed
- Central Avenue
- Dirt Roads
- Canals and Ditches
- Security Fences
- Rocky Flats Buffer Zone
- Lakes and Ponds
- Buildings
- Source Areas
- Preble's Meadow Jumping Mouse Probable Habitat
- 903 Pad

NOTE: Thiessen polygons used to denote approximate area where toluene concentrations exceed the TRV

Scale = 1 : 4800
1 inch = 400 feet

200 0 400ft

Datum: NAD27
Colorado Central Zone
State Plane Coordinate System

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ERAs for Walnut Creek and Woman Creek Watersheds at RFETS

Subsurface Soil Toluene Concentrations Exceeding the TRV for Exposure to Burrow Air

September 1995 | Figure N5-18

20-SEP-1995 GRA: $DATA3/swera/srcflarea/maps/ou2fltlay.ra + AML: /export/home/data3/swera/srcflarea1/amls/report/thiessplot.aml