APPENDIX E

Baseline Ecological Risk Assessment in Support of the RCRA Facility Investigation at Fort Buchanan U.S. Army Garrison Fort Buchanan, Puerto Rico

Prepared for

U.S. Army Environmental Command
Fort Sam Houston, San Antonio, Texas
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Prepared by

EA Engineering, Science, and Technology, Inc.
1311 Continental Drive, Suite K
Edgewood, Maryland 21040
(410) 538-8202

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TABLE OF CONTENTS

APPENDIX E ..... **i**
Baseline Ecological Risk Assessment in Support of the ..... **i**
Prepared for ..... **i**
Prepared by ..... **i**
LIST OF ATTACHMENTS ..... **viii**
LIST OF FIGURES ..... **viii**
LIST OF TABLES ..... **ix**
LIST OF ACRONYMS AND ABBREVIATIONS ..... **xiv**
1. INTRODUCTION **1**
1.1. SCOPE AND PURPOSE 1
1.2. SITE LOCATION AND HISTORY 2
1.2.1. Site Location and Description 2
1.2.2. Site History 2
1.2.3. Previous Investigations 3
2. OVERALL CONCEPTUAL SITE MODEL **5**
2.1. ECOLOGICAL SETTING 5
2.1.1. Terrestrial Habitats 5
2.1.2. Aquatic Habitats 6
2.1.3. Threatened and Endangered Species 6
2.2. POTENTIAL SOURCES OF CHEMICALS 7
2.3. FATE AND TRANSPORT PROCESSES 8
2.4. POTENTIAL MEDIA OF CONCERN 9
2.5. EXPOSURE PATHWAYS 9
2.5.1. Plants and Terrestrial Invertebrates 9
2.5.2. Aquatic and Benthic Organisms 10
2.6. SUMMARY OF THE OVERALL CSM 11
3. RISK ASSESSMENT METHODOLOGY **13**
3.1. DATA QUALITY EVALUATION/DATA PREPARATION 13
3.2. SLERA METHODOLOGY (STEPS 1 AND 2) 13
3.2.1. SLERA Assessment Endpoints 14
3.2.2. SLERA Measurement Endpoints 14
3.2.3. SLERA Toxicity Evaluation 15

3.2.4. SLERA Exposure Assessment 15
3.2.5. SLERA Risk Calculation & Risk Characterization 15
3.3. REFINED ASSESSMENT METHODOLOGY USED IN THE BRAPF (STEP 3) 15
3.3.1. Refined Assessment Endpoints 16
3.3.2. Refined Measurement Endpoints 16
3.3.3. Refined Exposure Assessment 19
3.3.4. Refined Toxicity Assessment 26
3.3.5. Refined Risk Calculation 31
3.3.6. Chemical Bioavailability and Factors Affecting Toxicity, including Comparisons to Background 31
3.3.7. Evaluation of Receptor Home-Range 33
3.3.8. Evaluation of Habitat Quality 33
3.3.9. Refined Risk Characterization 33
4. SITE 1, SWMU 1: OLD HAZARDOUS WASTE CONTAINERS 34
4.1. CSM FOR SITE 1 34
4.2. DATA SUMMARIZATION 35
4.3. SLERA (Steps 1 & 2) for Site 1 35
4.3.1. SLERA Results 35
4.4. BRAPF (Step 3) for Site 1 36
4.4.1. Refined Assessment Endpoints 36
4.4.2. Refined Measurement Endpoints 36
4.4.3. BRAPF for Plants at Site 1 38
4.4.4. BRAPF for Soil Invertebrates at Site 1 39
4.4.5. BRAPF Results for Wildlife at Site 1 41
4.5. Conclusions for Site 1 45
5. SITE 2, SWMU 3: PESTICIDES AND CHEMICALS BURIAL TRENCH 47
5.1. CSM FOR SITE 2 47
5.2. DATA SUMMARIZATION 48
5.3. SLERA (Steps 1 & 2) for Site 2 48
5.3.1. SLERA Results 48
5.4. BRAPF (Step 3) for Site 2 49
5.4.1. Refined Assessment Endpoints 49
5.4.2. Refined Measurement Endpoints 49
5.4.3. BRAPF for Plants at Site 2 50

5.4.4. BRAPF for Soil Invertebrates at Site 2 53
5.4.5. BRAPF Results for Wildlife at Site 2 55
5.5. Conclusions for Site 2 59
6. SITE 3, SWMU 4: SPENT SOLVENTS STORAGE AREA 61
6.1. CSM FOR SITE 3 61
6.2. DATA SUMMARIZATION 61
6.3. SLERA (Steps 1 & 2) for Site 3 62
6.3.1. SLERA Results 62
6.4. BRAPF (Step 3) for Site 3 63
6.4.1. Refined Assessment Endpoints 63
6.4.2. Refined Measurement Endpoints 63
6.4.3. BRAPF for Plants at Site 3 64
6.4.4. BRAPF for Soil Invertebrates at Site 3 66
6.4.5. BRAPF Results for Wildlife at Site 3 69
6.5. CONCLUSIONS FOR SITE 3 73
7. SITE 4, SWMU 5: PCB TRANSFORMER STORAGE AREA #1 75
7.1. CSM FOR SITE 4 75
7.2. CONCLUSIONS FOR SITE 4 75
8. SITE 5, SWMU 6: PCB TRANSFORMER STORAGE AREA #2 76
8.1. CSM FOR SITE 5 76
8.2. CONCLUSIONS FOR SITE 5 76
9. SITE 6: PESTICIDE STORAGE AREA 77
9.1. CSM FOR SITE 6 77
9.2. DATA SUMMARIZATION 77
9.3. SLERA (Steps 1 & 2) for Site 6 78
9.3.1. SLERA Results 78
9.4. BRAPF (Step 3) for Site 6 79
9.4.1. Refined Assessment Endpoints 79
9.4.2. Refined Measurement Endpoints 79
9.4.3. BRAPF for Plants at Site 6 81
9.4.4. BRAPF for Soil Invertebrates at Site 6 82
9.4.5. BRAPF Results for Wildlife at Site 6 84
9.4.6. BRAPF for Aquatic and Benthic Organisms at Site 6 85
9.5. Conclusions for Site 6 87

10. SITE 7: BUILDING 541 ... 88
10.1. CSM FOR SITE 7 ... 88
10.2. DATA SUMMARIZATION ... 89
10.3. SLERA (Steps 1 & 2) for Site 7 ... 89
10.3.1. SLERA Results ... 89
10.4. BRAPF (Step 3) for Site 7 ... 90
10.4.1. Refined Assessment Endpoints ... 90
10.4.2. Refined Measurement Endpoints ... 90
10.4.3. BRAPF for Plants at Site 7 ... 91
10.4.4. BRAPF for Soil Invertebrates at Site 7 ... 94
10.4.5. BRAPF Results for Wildlife at Site 7 ... 96
10.5. Conclusions for Site 7 ... 99
11. SITE 8: BUILDING S-563 ... 101
11.1. CSM FOR SITE 8 ... 101
11.2. DATA SUMMARIZATION ... 101
11.3. SLERA (Steps 1 & 2) for Site 3 ... 102
11.3.1. SLERA Results ... 102
11.4. BRAPF (Step 3) for Site 8 ... 102
11.4.1. Refined Assessment Endpoints ... 103
11.4.2. Refined Measurement Endpoints ... 103
11.4.3. BRAPF for Plants at Site 8 ... 104
11.4.4. BRAPF for Soil Invertebrates at Site 8 ... 106
11.4.5. BRAPF Results for Wildlife at Site 8 ... 109
11.5. Conclusions for Site 8 ... 112
12. SITE 9: USED OIL STAGING AREA ... 114
12.1. CSM FOR SITE 9 ... 114
12.2. DATA SUMMARIZATION ... 114
12.3. SLERA (Steps 1 & 2) for Site 9 ... 115
12.3.1. SLERA Results ... 115
12.4. BRAPF (Step 3) for Site 9 ... 115
12.4.1. Refined Assessment Endpoints ... 116
12.4.2. Refined Measurement Endpoints ... 116
12.4.3. BRAPF for Plants at Site 9 ... 117
12.4.4. BRAPF for Soil Invertebrates at Site 9 ... 119

1.1.1. BRAPF Results for Wildlife at Site 9 122
1.1. Conclusions for Site 9 125
13. SITE 10: 65TH ARMY RESERVE COMMAND REFUELING AREA 127
13.1. CSM FOR SITE 10 127
13.2. DATA SUMMARIZATION 127
13.3. SLERA (Steps 1 & 2) for Site 10 128
13.3.1. SLERA and BRAPF for Site 10 128
13.3.2. Conclusions for Site 10 129
14. SITE 11: HEAVY EQUIPMENT STORAGE AREA 130
14.1. CSM FOR SITE 11 130
14.2. DATA SUMMARIZATION 130
14.3. SLERA (Steps 1 & 2) for Site 11 131
14.3.1. SLERA Results 131
14.4. BRAPF (Step 3) for Site 11 131
14.4.1. Refined Assessment Endpoints 132
14.4.2. Refined Measurement Endpoints 132
14.4.3. BRAPF for Plants at Site 11 133
14.4.4. BRAPF for Soil Invertebrates at Site 11 135
14.4.5. BRAPF Results for Wildlife at Site 11 138
14.5. Conclusions for Site 11 142
15. SITE 12: OLD LANDFILL 143
15.1. CSM FOR SITE 12 143
15.2. DATA SUMMARIZATION 144
15.3. SLERA (Steps 1 & 2) for Site 12 144
15.3.1. SLERA Results 144
15.4. BRAPF (Step 3) for Site 12 145
15.4.1. Refined Assessment Endpoints 146
15.4.2. Refined Measurement Endpoints 146
15.4.3. BRAPF for Plants at Site 12 147
15.4.4. BRAPF for Soil Invertebrates at Site 12 149
15.4.5. BRAPF Results for Wildlife at Site 12 151
15.4.6. BRAPF for Aquatic and Benthic Organisms at Site 12 155
18.1. CONCLUSIONS FOR SITE 12 157
16. SITE 13: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE 158

16.1. CSM FOR SITE 13 158
16.2. DATA SUMMARIZATION 158
16.3. SLERA (Steps 1 & 2) for Site 13 159
16.3.1. SLERA Results 159
16.4. BRAPF (Step 3) for Site 13 160
16.4.1. Refined Assessment Endpoints 160
16.4.2. Refined Measurement Endpoints 160
16.4.3. BRAPF for Plants at Site 13 162
16.4.4. BRAPF for Soil Invertebrates at Site 13 165
16.4.5. BRAPF Results for Wildlife at Site 13 167
16.5. Conclusions for Site 13 172
17. SITE 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE 173
17.1. CSM FOR SITE 15 173
17.2. DATA SUMMARIZATION 173
17.3. SLERA (Steps 1 & 2) for Site 15 174
17.3.1. SLERA Results 174
17.4. BRAPF (Step 3) for Site 15 175
17.4.1. Refined Assessment Endpoints 175
17.4.2. Refined Measurement Endpoints 175
17.4.3. BRAPF for Plants at Site 15 176
17.4.4. BRAPF for Soil Invertebrates at Site 15 179
17.4.5. BRAPF Results for Wildlife at Site 15 182
17.5. Conclusions for Site 15 186
19. UNCERTAINTY EVALUATION 187
19.1. SAMPLE DESIGN AND DATA REPRESENTATIVENESS 187
19.2. ANALYSIS OF CHEMICAL DATA 187
19.3. ANALYSIS OF ESTIMATED EXPOSURE AND TOXICITY DATA 188
19.4. ASSESSMENT OF RISKS 189
20. BERA SUMMARY and CONCLUSIONS 190
20.1. BERA CONCLUSIONS FOR SITE 1 190
20.2. BERA CONCLUSIONS FOR SITE 2 190
20.3. BERA CONCLUSIONS FOR SITE 3 191
20.4. BERA Conclusions for Site 4 192
20.5. BERA Conclusions for Site 5 192

20.6. BERA Conclusions for Site 6 192
20.7. BERA Conclusions for Site 7 193
20.8. BERA Conclusions for Site 8 193
20.9. BERA Conclusions for Site 9 194
20.10. BERA Conclusions for Site 10 195
20.11. BERA Conclusions for Site 11 195
20.12. BERA Conclusions for Site 12 196
20.13. BERA Conclusions for Site 13 197
20.14. BERA Conclusions for Site 15 197
20.15. Uncertainties 198
20.16. BERA Conclusions 198
21. REFERENCES 199

LIST OF ATTACHMENTS

Attachment A. Wildlife Exposure Modeling Used in the Ecological Risk Assessment

LIST OF FIGURES

Figure 1-1 Ecological Risk Assessment Process for Superfund
Figure 1-2 Fort Buchanan Site Features and Locations of Site Wide RFI Sites
Figure 4-1 Soil Sample Locations at Site 1/SWMU 1
Figure 4-2 Conceptual Site Model for Site 1
Figure 5-1 Soil Sample Locations at Site 2/SWMU 3
Figure 5-2 Conceptual Site Model for Site 2
Figure 6-1 Soil Sample Locations at Site 3/SWMU 4
Figure 6-2 Conceptual Site Model for Site 3
Figure 7-1 Soil Sample Locations at Site 4/SWMU 5
Figure 7-2 Conceptual Site Model for Site 4
Figure 8-1 Soil Sample Locations at Site 5/SWMU 6
Figure 8-2 Conceptual Site Model for Site 5
Figure 9-1 Soil and Sediment Sample Locations at Site 6
Figure 9-2 Conceptual Site Model for Site 6
Figure 10-1 Soil Sample Locations at Site 7
Figure 10-2 Conceptual Site Model for Site 7
Figure 11-1 Soil Sample Locations at Site 8
Figure 11-2 Conceptual Site Model for Site 8
Figure 12-1 Soil Sample Locations at Site 9
Figure 12-2 Conceptual Site Model for Site 9
Figure 13-1 Soil Sample Locations at Site 10
Figure 13-2 Conceptual Site Model for Site 10
Figure 14-1 Soil Sample Locations at Site 11
Figure 14-2 Conceptual Site Model for Site 11
Figure 15-1 Soil Sample Locations at Site 12
Figure 15-2 Sediment and Surface Water Sample Locations at Site 12
Figure 15-3 Conceptual Site Model for Site 12
Figure 16-1 Soil Sample Locations at Site 13
Figure 16-2 Conceptual Site Model for Site 13
Figure 17-1 Soil Sample Locations at Site 15
Figure 17-2 Conceptual Site Model for Site 15

LIST OF TABLES

Table 3-1	Groupings and Samples Used in the Ecological Risk Assessment of the Fort Buchanan Site
Table 3-2	U.S. Environmental Protection Agency Region 4 Ecological Screening Criteria
Table 3-3	Assessment Endpoints and Representative Receptor Species for Ecological Risk Assessment of the Fort Buchanan Site
Table 3-4	Measurement Endpoints for Ecological Risk Assessment of the Fort Buchanan Site
Table 3-5	Wildlife Exposure Factors for Ecological Risk Assessment of the Fort Buchanan Site
Table 3-6	Uptake Models Relating Concentrations in Soil to Concentrations in Plants
Table 3-7	Uptake Models Relating Concentrations in Soil to Concentrations in Soil Invertebrates
Table 3-8	Uptake Models Relating Doses ingested by Small Mammals to Concentrations in Small Mammals
Table 3-9	Uptake Models Relating Concentrations in Surface Water to Concentrations in Fish
Table 3-10	Soil Toxicity Reference Values for Plants and Soil Invertebrates
Table 3-11	Sediment Toxicity Reference Values for Benthic Organism Exposures
Table 3-12	Surface Water Toxicity Reference Values for Aquatic Organism Exposures
Table 3-13	Dose-based Toxicity Reference Values for Mammals
Table 3-14	Dose-based Toxicity Reference Values for Birds
Table 3-15	Upper Prediction Limits of Background Data Fort Buchanan, Puerto Rico
Table 3-16	Comparison of Site Sizes and Receptor Home Range Size
Table 4-1	Detection Comparison to Region 4 Screening Levels
Table 4-2	Detection Comparison to Region 4 Screening Levels
Table 4-3	Frequency of Detection and Exposure Point Concentrations
Table 4-4	Frequency of Detection and Exposure Point Concentrations
Table 4-5	Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 4-6	Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 4-7	Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 4-8	Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 4-9	Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 4-10	Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 4-11	Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 4-12	Comparison of Modeled Wildlife Doses to Birds to Avian TRVs

Table 5-1	Detection Comparison to Region 4 Screening Levels
Table 5-2	Frequency of Detection and Exposure Point Concentrations
Table 5-3	Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 5-4	Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 5-5	Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 5-6	Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 6-1	Detection Comparison to Region 4 Screening Levels
Table 6-2	Frequency of Detection and Exposure Point Concentrations
Table 6-3	Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 6-4	Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 6-5	Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 6-6	Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 9-1	Detection Comparison to Region 4 Screening Levels
Table 9-2	Detection Comparison to Region 4 Screening Levels
Table 9-3	Frequency of Detection and Exposure Point Concentrations
Table 9-4	Frequency of Detection and Exposure Point Concentrations
Table 9-5	Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 9-6	Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 9-7	Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 9-8	Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 9-9	Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 9-10	Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 9-11	Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 9-12	Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 9-13	Comparison of Exposure Point Concentrations (EPCs) in Sediment to Benthic Organism Toxicity Reference Values
Table 10-1	Detection Comparison to Region 4 Screening Levels
Table 10-2	Detection Comparison to Region 4 Screening Levels
Table 10-3	Frequency of Detection and Exposure Point Concentrations
Table 10-4	Frequency of Detection and Exposure Point Concentrations
Table 10-5	Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values

Table 10-6 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 10-7 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 10-8 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 10-9 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 10-10 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 10-11 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 10-12 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 11-1 Detection Comparison to Region 4 Screening Levels
Table 11-2 Frequency of Detection and Exposure Point Concentrations
Table 11-3 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 11-4 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 11-5 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 11-6 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 12-1 Detection Comparison to Region 4 Screening Levels
Table 12-2 Frequency of Detection and Exposure Point Concentrations
Table 12-3 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 12-4 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 12-5 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 12-6 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 13-1 Detection Comparison to Region 4 Screening Levels
Table 13-2 Detection Comparison to Region 4 Screening Levels
Table 13-3 Frequency of Detection and Exposure Point Concentrations
Table 13-4 Frequency of Detection and Exposure Point Concentrations
Table 13-5 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 13-6 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 13-7 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 13-8 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 13-9 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 13-10 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 13-11 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs

Table 13-12 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 14-1 Detection Comparison to Region 4 Screening Levels
Table 14-2 Frequency of Detection and Exposure Point Concentrations
Table 14-3 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 14-4 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 14-5 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 14-6 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 15-1 Detection Comparison to Region 4 Screening Levels
Table 15-2 Frequency of Detection and Exposure Point Concentrations
Table 15-3 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 15-4 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 15-5 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 15-6 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 15-7 Comparison of Exposure Point Concentrations (EPCs) in Surface Water to Aquatic Organism Toxicity Reference Values
Table 15-8 Comparison of Exposure Point Concentrations (EPCs) in Sediment to Benthic Organism Toxicity Reference Values
Table 16-1 Detection Comparison to Region 4 Screening Levels
Table 16-2 Detection Comparison to Region 4 Screening Levels
Table 16-3 Frequency of Detection and Exposure Point Concentrations
Table 16-4 Frequency of Detection and Exposure Point Concentrations
Table 16-5 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 16-6 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 16-7 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 16-8 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 16-9 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 16-10 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 16-11 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 16-12 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 17-1 Detection Comparison to Region 4 Screening Levels
Table 17-2 Detection Comparison to Region 4 Screening Levels
Table 17-3 Frequency of Detection and Exposure Point Concentrations

Table 17-4 Frequency of Detection and Exposure Point Concentrations
Table 17-5 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 17-6 Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values
Table 17-7 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 17-8 Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values
Table 17-9 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 17-10 Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
Table 17-11 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
Table 17-12 Comparison of Modeled Wildlife Doses to Birds to Avian TRVs

LIST OF ACRONYMS AND ABBREVIATIONS

AEC	Army Environmental Command
AOC	Area of Concern
AWQC	Ambient Water Quality Criteria
BERA	Baseline Ecological Risk Assessment
BRAPF	Baseline Risk Assessment Problem Formulation
COC	Chemical of Concern
COPC	Contaminant of Potential Concern
CPR	Caribbean Petroleum Refinery Company
CSM	Conceptual Site Model
DOD	Department of Defense
EA	EA Engineering, Science, and Technology, Inc.
EBS	Environmental Baseline Study
EcoSSL	Ecological Soil Screening Level
EPA	U.S. Environmental Protection Agency
EPC	Exposure Point Concentration
EQB	Environmental Quality Board
ERA	Ecological Risk Assessment
ER-L	Effects-range Low
ET	Ecotox Threshold
FI	Food Ingestion Rate
FORSCOM	U.S. Army Forces Command
HHRA	Human Health Risk Assessment
HMW	High Molecular Weight
HQ	Hazard Quotient
L	Liter
LD_{50}	Lethal Dose 50
LMW	Low Molecular Weight
LOAEL	Lowest Observed Adverse Effect Level
mg/kg	Milligrams per kilogram
mg/kg-day	Milligrams of chemical per kilogram body weight per day
MMRP	Military Munitions Response Program
NOAEL	No Observed Adverse Effect Level
ORNL	Oak Ridge National Laboratory
PAH	Polycyclic aromatic hydrocarbon

PCB	Polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
Red-ox	Reduction and oxidation
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
ROTC	Reserve Officer Training Corps
SI	Soil/sediment ingestion rate
Site	Fort Buchanan RCRA Site
SLERA	Screening-Level Ecological Risk Assessment
SQB	Sediment Quality Benchmark
SVOC	Semivolatile organic compound
SWMU	Solid Waste Management Unit
TEF	Toxicity Equivalency Factor
TEL	Threshold Effects Level
TEQ	Toxic Equivalents Quotient
TRV	Toxicity Reference Values
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USARSO	U.S. Army South
VOC	Volatile organic compound
WES	Waterways Experiment Station

1. INTRODUCTION

This document presents the Ecological Risk Assessment (ERA) conducted by EA Engineering, Science and Technology, Inc. (EA) for the Fort Buchanan Site (Site) located south of San Juan in Puerto Rico. EA prepared the ERA Report, in support of the Resource Conservation and Recovery Act (RCRA) Facilities Investigation at Fort Buchanan, for the U.S. Army Environmental Command in Fort Sam Houston, Texas, under Contract No. W91ZLK-04-D-0015.

1.1. SCOPE AND PURPOSE

The purpose of this assessment is to characterize and quantify potential environmental impacts from chemicals residual in soil, sediment and surface water from historic practices on Fort Buchanan. The Army Environmental Command (AEC) tasked EA to conduct a RCRA Facility Investigation (RFI) for the 14 RFI sites at Fort Buchanan. The purpose of the investigation is to document the activities performed, discuss the results and make recommendations for further action at the sites.

In order to assist in the determination of the fate for these RFI sites, it is necessary for a Baseline Ecological Risk Assessment (BERA) to be performed on the sites. The BERA is performed in accordance with the process for ERA (**Figure 1-1**) outlined in the United States Environmental Protection Agency (EPA) document *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Final* (EPA 1997) and is based upon agreements between EA, AEC, the EPA, and stakeholders. The Fort Buchanan RFI is being addressed as part of the RCRA process per agreements between the Army and EPA; therefore, its assessment must comply with EPA guidance for the RCRA process, including specific risk assessment components that must be completed. This document represents the Screening-Level Ecological Risk Assessment (SLERA) and Baseline Risk Assessment Problem Formulation (BRAPF) for the Fort Buchanan RFI sites.

The process for ERA outlined in EPA guidance includes eight steps (**Figure 1-1**) (EPA 1997). This document presents the first three steps of the ERA process. Step 1 and 2 in the process are the SLERA. The SLERA uses highly conservative assumptions regarding exposure and toxicity to develop a screening level conceptual site model (CSM). The screening level evaluation typically relies on chemical analytical data available from the remedial investigation. Maximum chemical concentrations are compared to media-specific screening criteria protective of ecological receptors to determine contaminants of potential concern (COPCs) to be carried into Step 3.

Step 3 of the ERA process is the BRAPF. Based on the results of the SLERA, the conceptual site model is expanded to define complete and significant exposure pathways and identify assessment and measurement endpoints. The BRAPF draws from the risk evaluation performed in the SLERA to identify the COPCs, exposure pathways, assessment endpoints, and risk questions requiring further consideration. The BRAPF often includes refinement of the screening level risk calculations through use of more realistic or more relevant exposure and toxicity data. The goal of the BRAPF is to provide a clear definition of the ecological risk

problems for the Site. This problem formulation forms the basis for either further assessment, or in cases where sufficient data are available, risk management.

An overall description of site history, location, and setting for Fort Buchanan is provided in Section 1.2. A total of 14 RFI Sites have been identified for investigation as part of this BERA. These sites are all located at Fort Buchanan and share a related suite of habitats and potential receptors. Given their proximity and similarity, it is important to use a consistent methodology across all sites that can be tailored to the specific sources, chemicals of concern (COCs) and pathways of each. Therefore, an overall CSM is presented in Section 2.0 and an overall methodology for both the SLERA (Steps 1 and 2) and refined assessment as part of the BRAPF (Step 3) is presented in Section 3.0. For each of the 14 sites, a site-specific CSMs and application of these methods are provided in Sections 4 through 17. These sections present risk calculations as part of a weight of evidence approach and conclusions are drawn to characterize risks at each site. Uncertainties associated with risk characterization are discussed in Section 18. Uncertainties and results for each site are considered together in developing the conclusions which are presented in Section 19.

1.2. SITE LOCATION AND HISTORY

1.2.1. Site Location and Description

Camp Buchanan was established in 1923, originally located on a 300-acre tract of land approximately six miles south of San Juan Bay, Puerto Rico. From 1926 to 1930, Camp Buchanan was used as a maneuver training area and range by the regular Army, by National Guard troops, and as a Citizen Military Training Camp. In 1940 it was designated as Fort Buchanan and expanded to 1,514 acres, later expanding to 4,500 acres just after the end of World War II.

The installation is bordered by Roosevelt Avenue to the east (main gate), road PR-No. 2 to the south, Caribbean Petroleum Refinery Company (CPR) to the west, and De Diego Expressway to the north. The installation currently occupies approximately 746 acres within two municipalities, Bayamon and Guaynabo. Physiographically, Fort Buchanan is located on the northern coastal plain of Puerto Rico, which is about 5 miles wide and slopes gently upward to the central mountain chain, the Cordillera Central.

1.2.2. Site History

During World War II, Fort Buchanan housed a depot supplying the Army Antilles Department. It also processed local troops through its replacement center. The industrial complex included pier facilities, ammunition storage areas, and an extensive railroad network connecting it to the bay. After World War II, the Installation was gradually reduced in size to its present 746 acres. With the deactivation of the Antilles Command in 1966, Fort Buchanan came under U.S. Army control. A detachment of Army personnel remained as a residual element designated as U.S. Army Command Group and placed under command of the U.S. Army Forces Southern Command in Panama. This element consisted of a small command group and support detachment, Rodriguez U.S. Army Hospital (inactivated in 1971), and advisory groups for the U.S. Army Reserve, the National Guard, and the Reserve Officer Training Corps (ROTC). While not related to the command, an Armed Forces Examining and Entrance Station and Intelligence Corps Detachment (inactivated in 1971) also received support from the command.

In 1971, Fort Buchanan returned to U.S. Army control under the Third Army. It continued to support the Army Reserve, including support of seven Army Reserve Centers throughout Puerto Rico, serving as host to a number of tenant activities through the Navy, Coast Guard, Air Force Reserve components, and several non-military federal agencies. In 1973, during reorganization, the installation was re-designated as U.S. Army Garrison, Fort Buchanan, under direct control of the US Army Forces Command (FORSCOM). Fort Buchanan became a U.S. Army South (USARSO) installation in June 1997, and USARSO headquarters moved to the installation in 1999. In October 2003, Fort Buchanan was transferred from an active military installation under USARSO to a reserve installation under the U.S. Army Reserve Command.

Today, Fort Buchanan continues to support the active and reserve component soldiers in Puerto Rico and the U.S. Virgin Islands and is a definite asset for Department of Defense (DOD) relations with Central and South America. The installation also provides support to DOD operations in the Caribbean area.

Of the 15 identified sites of concern, 14 have been addressed within the confines of the RFI. One of the sites (Site 14: Small Arms Firing range) will be addressed within the confines of the Military Munitions Response Program (MMRP) and is known as the Camp Buchanan Training Area. **Figure 1-2** presents an aerial photograph of the Fort Buchanan with the 14 RFI site locations.

The 14 RFI sites are as follows:

- Site 1: Old Hazardous Waste Containers
- Site 2, SWMU 3: Pesticides and Chemicals Burial Trench
- Site 3, SWMU 4: Spent Solvent Storage Area
- Site 4, SWMU 5: Polychlorinated biphenyl (PCB) Transformer Storage Area #1
- Site 5, SWMU 6: PCB Transformer Storage Area #2
- Site 6: Pesticide Storage Area
- Site 7: Building 541
- Site 8: Building S-563
- Site 9: Used Oil Staging Area
- Site 10: 65th Army Reserve Command Refueling Area
- Site 11: Heavy Equipment Storage Area
- Site 12: Old Landfill
- Site 13: Potential Hazardous Material Burial Site
- Site 15: Building S-159

1.2.3. Previous Investigations

Several environmental investigations have been conducted at Fort Buchanan that served to help direct the RFI. These include an Army Installation Assessment in 1984; a RCRA Facility Assessment (RFA) completed by the Commonwealth of Puerto Rico, Environmental Quality Board (EQB) in 1991; a Phase I and II Assessment for a pesticide shop closure of Building 596 in 1991; an Environmental Baseline Study (EBS) by the Army in 1997; a geohydrological study of the Old Landfill completed by the Army in 1999; and a Phase I on a suspected hazardous

material burial site south of old Building S-18 in 2000. The RFA identified five Solid Waste Management Units (SWMUs), and one Area of Concern (AOC); the EBS identified nine more areas of potential contamination to the EPA.

Most of the RFI sites are very limited in terms of previous investigations. Site 2 was investigated by USACE-WES (United States Army Corps- Waterways Experiment Station) in the early 1990's, and little evidence of the chemical and pesticides burial trench was uncovered. The Old Landfill (Site 12) was also investigated previously, by USACHPPM in 1998/1999. Results indicated high levels of arsenic in sediment and groundwater. Little analytical investigation activities were performed at the other sites.

2. OVERALL CONCEPTUAL SITE MODEL

The RFI Sites at Fort Buchanan are all located within an area of 300 acres and share a related suite of habitats and potential receptors. For purposes of assessment and management, it is important to use a consistent methodology across all sites that can be tailored to the specific sources, COCs and pathways of each. Therefore, an overall CSM is developed in this section to support the use of an overall methodology for both the SLERA (Steps 1 and 2) and refined assessment as part of the BRAPF (Step 3) as presented in Section 3.0. This overall CSM discusses the ecological setting, potential sources of chemicals, fate and transport pathways, media of concern, and exposure pathways at Fort Buchanan. Presentation of CSMs specific to each RFI Site are presented in Sections 4 through 18.

2.1. ECOLOGICAL SETTING

The overall ecological setting at Fort Buchanan is best characterized as lawn and wooded mixture in a light industrial setting with a few small, ephemeral drainages that provide limited aquatic habitat. Site-specific descriptions of ecological setting are presented in Sections 4 through 15; however, conditions are similar across Fort Buchanan and it is appropriate to standardize the assumptions and methods used in the ERA.

2.1.1. Terrestrial Habitats

Vegetation consists of both ornamental plantings in the developed portions of the installation and semi-native forest located along the installation's southern and northeast perimeters. The areas of forested vegetation are of the tropical semi-evergreen forest (170.6 acres) and seasonal swamp forest (1 acre) types. Of these forested areas, 36.72 acres are classified as high disturbance, 111.20 acres as moderate disturbance, and 23.68 as low disturbance. Many of the individual RFI Sites are close to the western boundary of Fort Buchanan, and surround the DPW complex. These sites are situated on asphalt, in highly disturbed areas, and within fenced areas. Several are on mowed or manicured grass, like Site 6, which is situated on a golf course. Few sites have any sort of tree canopy or undergrowth associated with them (Sites 2, 4, 12, and 13). Tree species prevalent in the developed areas, primarily occurring along roads and adjacent to buildings, include the African tuliptree (Spathodea campanulata), queen-of-flowers (Lagerstroemia speciosa), flamboyant-tree (Delonix regia), coconut (Cocos nucifera), silk cotton tree (Ceiba pentandra), and mango (Mangifera indica).

Because of development over much of the installation, Puerto Rico's native wildlife species are not well represented at Fort Buchanan. The majority of wildlife inhabiting the installation occurs within the southern-forested areas, while most of the sites addressed in this ERA are located in developed areas. Some sites consist of areas of concrete and asphalt that provide no current habitat.

Bats are the only native mammals on the island of Puerto Rico. Other mammals observed or documented to occur on Fort Buchanan are the house mouse (Mus musculus), black rat (Rattus rattus alexandrinus), Indian mongoose (Herpestes auropunctatus), and bats (unknown spp.). Feral dogs (Canis familiaris) and cats (Felis domesticus) also occur on the installation.

Various species of birds have been identified on Fort Buchanan, including the Puerto Rican lizard cuckoo (Saurotheca vieilloti), red-legged thrush (Turdus plumbeus), bananaquit (Coereba

flaveola), stripe-headed tanager (Spindalis zena), black-faced grassquit (Tiaris bicolor), Puerto Rican bullfinch (Loxigilla portoricensis), zenaida dove (Zenaida aurita), Adelaide's warbler (Dendroica adelaidae), Puerto Rican woodpecker (Melanerpes portoricensis), loggerhead kingbird (Tyrannus caudifasciatus), and red-tailed hawk (Buteo jamaicensis).

At least eight species of reptiles and four amphibian species are known to occur on Fort Buchanan. Reptiles include the common Puerto Rican anole (*Anolis cristatellus*), pasture anole (*Anolis pulchellus*), saddled anole (*Anolis stratulus*), siguana or Puerto Rican giant ameiva (Ameiva exsul), common salamanquita (*Sphaerodactylus macrolepis*), salamanca (*Hemidactylus mabouia*), Puerto Rican boa (*Epicrates inornatus*), Puerto Rican slider turtle (*Trachemys stejnegeri*), and Puerto Rican racer snake (Alsophis portoricensis). Turtles (unknown species, probably *Trachemys stejnegeri*) inhabit the CEMEX Lake. Amphibian species include the marine toad (*Bufo marinus*), white-lipped frog (*Leptodactylus albilabris*), pasture coquí (*Eleutherodactylus antillensis*), and common coquí (*Eleutherodactylus coqui*).

2.1.2. Aquatic Habitats

There are a few different aquatic habitats present on the Fort Buchanan site. Given the light industrial setting, most habitats are small concrete lined or ephemeral drainages that provide limited aquatic habitat. These ditches drain either to El Toro Creek, the CEMEX Lake, or other drainage ditches. Site 6 and Site 12 are the only two RFI Sites supporting aquatic habitats. These habitats consist of small ephemeral ditches. El Toro Creek runs southeast to northwest and carries most of the storm water from the installation and adjacent land areas. El Toro Creek is a rectangular, concrete-lined ditch that receives runoff from the maintenance shop areas, the vehicle wash racks, and the exchange service station. The CEMEX Lake receives minor discharges from the natural and man-made storm water systems serving the installation. The lake was pumped for water used in the production of cement in the past, but it is no longer used for that purpose. The lake is not associated with any direct inputs from RFI Sites. No fish species have been recorded in the streams at Fort Buchanan, however, the CEMEX Lake contains common species such as tilapia (*Tilapia nilotica*), catfish (unknown species), largemouth bass or lobina (*Micropterus salmoides*), and black bass (*Micropterus* sp.).

2.1.3. Threatened and Endangered Species

An important consideration in forming an ecological conceptual model is the presence of endangered, threatened, and rare species, both plant and animal, on the site. Signs located on the northern side of the Directorate of Public Works building indicate that the Puerto Rican Boa has been observed in the forested area north of the building. There is no additional site-specific information presently available for the site regarding sensitive species. It is important to consider that the minimal habitat at most of the Fort Buchanan sites precludes the presence of most any species, not just the threatened and endangered species.

The species listed in the following table are from the U.S. Fish and Wildlife Service for threatened and endangered species found in Puerto Rico and the Virgin Islands and have not been confirmed in the field.

SCIENTIFIC NAME	COMMON NAME	STATUS
AMPHIBIANS		
Eleutherodactylus jasperi (HC)	Golden coqui	Threatened
Peltrophryne lemur	Puerto Rican crested toad	Threatened
Eleutherodactylus cooki	Puerto Rican rock frog	Threatened
REPTILES		
Ameiva polops (HC)	St. Croix ground lizard	Endangered
Anolis roosevelti (HC)	Culebra giant anole	Endangered
Cyclura stejnegeri (HC)	Mona ground iguana	Threatened
Epicrates inornatus	Puerto Rican boa	Endangered
Epicrates monensis granti	Virgin Islands tree boa	Endangered
Epicrates monensis monensis (HC)	Mona Island boa	Threatened
Sphaerodactylus micropithecus (HC)	Monito gecko	Endangered
BIRDS		
Accipiter striatus venator	Puerto Rican sharp-shinned hawk	Endangered
Agelaius xanthomus (HC)	Yellow-shouldered blackbird	Endangered
Amazona vittata vittata	Puerto Rican parrot	Endangered
Buteo platypterus brunnescens	Puerto Rican broad-winged hawk	Endangered
Caprimulgus noctitherus	Puerto Rican nightjar	Endangered
Charadrius melodus	Piping plover	Threatened
Columba inornata wetmorei	Puerto Rican plain pigeon	Endangered
Corvus leucognaphalus	White-necked crow	Endangered
Pelecanus o. occidentalis	Brown pelican	Endangered
Sterna d. dougalii	Roseate tern	Threatened

2.2. POTENTIAL SOURCES OF CHEMICALS

There are a number of potential sources of chemicals at the fourteen RCRA permitted sites located within Fort Buchanan, Puerto Rico. The sources of the COCs have been identified as the release of hazardous materials from various holding units or facilities, the dumping of municipal waste, the dumping of chemicals, the release of petroleum products, and the overflow of hazardous material from secondary containment structures. Migration of chemicals offsite is also a potential concern, since surface water pathways may carry chemicals to nearby water bodies or potable drinking water wells. The RFI Sites can be grouped by the following general source types:

- **PCB Transformer Yards:** Site 4, Site 5
- **Petroleum, Oil, and Vehicle Maintenance-Related Areas:** Site 8, Site 9, Site 10
- **Chemical or Equipment Storage Yards:** Site 1, Site 3, Site 6, Site 7, Site 11, Site 15
- **Suspected Landfills or Burial Areas:** Site 2, Site 12, Site 13

Based on these potential sources and media, there is a wide range of COPCs present at one or more site, with the specific COPCs varying by site. These may include metals, PCBs, pesticides, herbicides, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). The potential sources and COPCs associated with each RFI Site are discussed in addition detail as part of the CSM for each site in Sections 4 through 17.

2.3. FATE AND TRANSPORT PROCESSES

A number of fate and transport pathways are expected to influence the transfer of elevated concentrations of COPCs between different environmental media among the 14 RFI sites. Most of the sites consist of pads, buildings, or storage yards where chemicals or equipment were stored on paved surfaces. It is possible that if chemicals were spilled, they might be carried from paved surfaces into surface soil by runoff. Several of the sites are landfills and burial sites where chemicals may have been released directly to soil. Chemicals in surface soil may have been transferred vertically to subsurface soil by leaching, or horizontally to soil further from the paved area. Given the gradual topographic slope associated with the majority of these sites and the tendency for many chemicals (i.e. pesticides, metals, SVOCs, VOCs, PCBs, herbicides) to bind to soil, horizontal transport would be limited. At sites where chemicals may have been transported into subsurface soil, the only way that chemicals may be transported back to the surface is by anthropogenic disturbance.

For those sites at or near waterbodies, runoff and erosion might also transport chemicals into sediment or surface water. Similarly, sediment containing chemicals may be eroded and deposited farther downstream. Chemicals carried in surface waters from the Fort Buchanan site have the potential to adsorb onto sediment or soil particles. Chemicals may also desorb from the sediment where they are released back into the surface waters. These processes concern ecological receptors in that they allow chemicals from low quality habitats to be redistributed to high quality habitats utilized by wildlife and plants. Bioaccumulation is also a relevant transport pathway. Plants and animals that come in contact with contamination in soil, sediment, or water may uptake chemicals. Dependent upon the chemical and the organism, these chemicals may accumulate in tissue.

It is important to note that all of the transport pathways discussed above are dependent upon factors that influence the forms of chemicals in environmental media and their bioavailability. This is especially important for metals. Metals are present in nature in a wide range of chemical forms. Soluble forms of some metals are highly mobile in soil, sediment, and water, facilitating higher transport rates and making them more bioavailable, meaning that they are taken up more easily by plants and animals. Many of the mineral forms of metals found in naturally occurring rocks and soils are relatively insoluble and are not readily taken up by wildlife. Changes in the chemistry of soil, sediment, or water may make metals more or less soluble, and thus determine their ultimate mobility and bioavailability.

2.4. POTENTIAL MEDIA OF CONCERN

Based on the sources, COPCs, and transport pathways discussed above, the potential media of concern at Fort Buchanan sites include:

- **Surface soil:** Based on the nature and extent evaluation performed in the RFI, chemicals may have been transported to surface soil at 9 of the 14 RFI Sites (Sites 1, 4, 5, 6, 7, 10, 12, 13, 15). Samples were collected to investigate source-related COPCs in surface soil from these sites. Consistent with EPA standard practice, surface soil was defined as soil in unpaved areas extending from the ground surface to no more than 2 feet in depth.

- **Subsurface soil:** Based on the nature and extent evaluation performed in the RFI, chemicals may have been transported to subsurface soil at 12 of the 14 RFI Sites (Sites 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 15) as discussed in more detail in Sections 4 through 17 below. Subsurface soil was defined as soil present below pavement or soil in unpaved areas originating from 2 feet below ground surface or deeper.

- **Sediment:** Based on the nature and extent evaluation performed in the RFI, chemicals may have been transported to sediment at 2 of the 14 RFI Sites (Sites 6 and 12) as discussed in more detail below. Consistent with EPA standard practice, subsurface soil was considered to extend from 2 feet below ground surface or deeper.

- **Surface water:** Based on the nature and extent evaluation performed in the RFI, chemicals may have been transported to surface water at 1 of the 14 RFI Sites (Sites 12) as discussed in more detail in Sections 4 through 17 below. Consistent with EPA standard practice, subsurface soil was considered to extend from 2 feet below ground surface or deeper.

Sections 4 through 15 below discuss in greater detail which media are relevant for each site.

2.5. EXPOSURE PATHWAYS

Based on the ecological setting (Section 2.1) and media of concern (Section 2.4) discussed above, ecological receptors potentially present in one or more RFI Sites at Fort Buchanan include plants, terrestrial invertebrates, wildlife (birds and mammals), and aquatic organisms. Media of concern and ecological receptors are evaluated to determine potential exposure routes linking the two and to determine which pathways are complete and significant. The following sections identify the major routes of exposure and their applicability to each of these receptor groups.

2.5.1. Plants and Terrestrial Invertebrates

Plants and terrestrial invertebrates may be exposed to environmental media through direct contact. Plants may absorb chemicals from surface and subsurface soil via their roots. They may also absorb chemicals from air or airborne particles through their leaves, although the waxy surfaces of leaves limit this exposure. Terrestrial invertebrates may be exposed to chemicals in soil through direct contact and chemicals may be absorbed from soil through the skin. Based on the fact that Fort Buchanan soil types are relatively compact below 2 feet and contain the most organic matter in the top 2 feet, plant and invertebrate exposures are expected to occur primarily in surface soil. Exposure to subsurface soil would be limited to future hypothetical scenarios in

which land use has changed and paved surfaces are removed and subsurface soils are brought to the surface; special issues associated with evaluation of subsurface soil are discussed in Section 2.5.4 below. Based on the media of concern presented in Section 2.4, exposure pathways linking plants and soil invertebrates to either surface or subsurface soil are complete and therefore relevant for the assessment of all 14 RFI Sites.

2.5.2. Aquatic and Benthic Organisms

Aquatic and benthic organisms may be exposed to chemicals in sediment and surface water through direct contact and absorption through the skin and gills. Direct exposure to one these media is considered a complete and significant pathway for aquatic and benthic organisms, and therefore relevant for the assessment of Site 6 for sediment exposure and Site 12 for sediment and water exposures.

2.5.3. Wildlife

The most significant exposure route for wildlife is ingestion of chemicals in contaminated media (EPA 2003a). Wildlife may ingest chemicals in environmental media by drinking surface water or by incidentally ingesting soil and sediment while grooming or foraging. As discussed above, chemicals may bioaccumulate in the tissue of plants and animals. Therefore, wildlife may also ingest chemicals through plants and animals that they consume as food. Ingestion of chemicals in surface soil, sediment, surface water, and/or food is considered a complete and potentially significant exposure pathway.

Wildlife may be exposed to chemicals in air, soil (both surface and subsurface), sediment, or water via direct contact during foraging or burrowing. Most wildlife are equipped with protective outer coverings such as fur, feathers, or scales that prevent or limit the dermal absorption of chemicals from environmental media (CHPPM, 2004). EPA guidance identifies that, in most cases, dermal exposures are likely to be less significant than exposures through ingestion and their evaluation involves considerable uncertainty (EPA 2003a). Given that many metals demonstrate relatively low dermal absorption, this exposure route is considered complete but relatively insignificant for wildlife with the exception of amphibians.

Inhalation is a potentially complete pathway for both terrestrial invertebrates and wildlife. These animals may inhale chemicals which have volatilized or which are adsorbed to airborne particulates. EPA guidance indicates that, in general, inhalation pathways are likely to be insignificant compared to ingestion pathways (EPA 2003a).

Wildlife exposures to subsurface soil under current exposure scenarios are considered too limited to be significant because:

- wildlife are most likely to ingest soil while foraging, which would involves exposures limited to the top 6 inches of the soil;
- none of the likely wildlife species at the site live in burrows;
- soils below two feet at the site are compacted and difficult to burrow through.

Significant exposure to subsurface soil would thus be limited to future hypothetical scenarios in which land use has changed and paved surfaces are removed and subsurface soils are brought to

the surface; special issues associated with evaluation of subsurface soil are discussed in Section 2.5.4 below.

2.5.4. Special Issues Associated with Exposures to Subsurface Soils

All exposures of plants, invertebrates, and wildlife to soil are expected to occur in the top 1 to 2 feet off the soil surface. This is the zone of greatest biological activity where most roots, foraging, and burrowing are expected to occur. With the exception of RFI Sites 6, 13, and 15, all sites are located on soil types which contain dense blocky concreted soil called plinthite 2 to 3 feet below the soil surface which would inhibit deeper exposures. At RFI Sites 6, 13, and 15, soil layers at 2 to 3 feet below the surface are dense clays which would similarly inhibit exposure.

Based on input during development of the risk assessment approach, this document makes conservative assessments of potential future terrestrial habitat for RFI Sites where subsurface soil data are available. The potential future terrestrial habitat scenario was evaluated for Sites 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, and 15. At many of these sites, soil was collected from beneath concrete, asphalt, or gravel pads. In these cases, the assessment assumes that subsurface soil/soil beneath pavement (if present) is excavated, exposed and re-vegetated. Concentrations detected in subsurface soil are used to assess future exposures. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils and soil below pavement would consist of compacted, nutrient poor plinthite or dense clays unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

2.6. SUMMARY OF THE OVERALL CSM

The overall CSM developed in this section provides a framework for developing a consistent risk assessment methodology that can be applied across sites. It can be summarized as follows:

- **Ecological Setting:** Many RFI Sites consist of paved or disturbed areas associated with grassy mowed habitats. A few support forest. Two RFI sites (Site 6 and Site 12) support aquatic habitat in the form of ephemeral drainage ditches.

- **Potential Sources:** sources among the RFI Sites consist of PCB transformer yards; petroleum, oil, and vehicle maintenance-related areas; chemical or equipment storage yards; and suspected landfills or burial areas.

- **Fate and Transport:** Chemicals in surface soil may have been transported to subsurface soil or into aquatic media at Site 6 and Site 12. Based on gradual slopes and the likely COPCs, transport is likely to have been limited in extent. Chemicals in subsurface soil would only reach the surface via anthropogenic activity.

- **Media of Concern:** Potential media of concern include surface soil (Sites 1, 4, 5, 6, 7, 10, 12, 13, 15), subsurface soil (Sites 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 15), sediment (Site 6 and Site 12) and surface water (Site 12).

- **Exposure Pathways:** The following conclusions were made regarding exposure pathways
    - Exposure pathways linking plants and soil invertebrates to either surface soil are complete and therefore relevant for the assessment of all 14 RFI Sites. Subsurface soil will be evaluated for future exposure scenarios.
    - Exposure to sediment and/or surface water are considered a complete and significant pathway for aquatic and benthic organisms, and therefore relevant for the assessment of Site 6 for sediment exposure and Site 12 for sediment and water exposures.
    - Ingestion of chemicals in soil, sediment, surface water, and/or food is considered a complete and potentially significant exposure pathway. Dermal exposures and inhalation are considered insignificant.

3. RISK ASSESSMENT METHODOLOGY

This section presents an overall methodology for both the SLERA (Steps 1 and 2) and refined assessment as part of the BRAPF (Step 3). The methodology is applied to assess relevant media and assessment endpoints at each RFI Site, with site-specific implementation and results presented in Sections 4 through 17. The sections below present the methodology for data quality evaluation/data summarization; SLERA, and refined assessment as part of the BRAPF.

3.1. DATA QUALITY EVALUATION/DATA PREPARATION

The ERA is conducted using chemical analytical data obtained for environmental media collected during the RFI. Samples utilized in this ERA are summarized in **Table 3-1**. In accordance with EPA (1989) guidance, the following steps were first used to summarize the chemical analytical data for the ERA:

- Sample data were compared to blank (laboratory, equipment rinse, field, and trip) concentration data. If the chemical concentration detected in a site-related sample was less than 10 times (for common laboratory chemicals) or five times (for all other compounds) the concentration detected in the corresponding blank sample, the sample was excluded from the ERA in accordance with EPA (1989) guidance. The identification and validation of sampling or laboratory artifacts were performed prior to data summarization. Data that were rejected by the data validator (R qualified) were not used in the ERA.

- The average concentration of a pair of duplicate or split samples (taken from the same location on the same date) was used to represent the concentration for that location.

- The mean concentration of a chemical within a given sample data grouping was calculated as the Kaplan-Myer mean derived by the EPA statistical software package proUCL version 4.0. Where the Kaplan-Myer mean could not be calculated because of low detection frequencies, the mean was calculated using the full reporting limit to represent non-detects. This is highly precautionary and creates uncertainties that are discussed further in Section 18; however, it is consistent with the methods utilized in proUCL version 4.0.

- Frequency of detection was calculated as the number of samples in which the chemical was detected over the total number of samples analyzed.

There are a number of uncertainties associated with the chemical analytical data associated with sample coverage and study design. Uncertainties associated with the data used in the ERA are discussed in Section 18.

3.2. SLERA METHODOLOGY (STEPS 1 AND 2)

Steps 1 and 2 of the BERA form the SLERA. The SLERA is intended as a conservative initial evaluation of available chemical analytical data to determine COPCs. Step 1 is the screening-

level problem formulation and ecological effects evaluation. Step 2 is the screening-level exposure estimate and risk calculation. This section includes the overall methods for SLERA at Fort Buchanan RFI Sites.

3.2.1. SLERA Assessment Endpoints

Assessment endpoints are clear statements of the environmental value to be protected from impacts (EPA 1997). Assessment endpoints are usually defined in terms of an ecological entity and its attributes. The selection of assessment endpoints is based on the fundamental knowledge of site ecology, and incorporates consideration of the COPCs, exposure pathways, toxic mechanisms, and potentially important exposure groups. Per EPA guidance (EPA 1997), the focus of the ERA is to protect the ecological values at the Site-wide population or community level except where threatened or endangered species are concerned.

Based on guidance provided by U.S. EPA in review of the draft RFI BERA, appropriate assessment endpoints for screening level assessment are defined in broad terms associated with complete exposure pathways linking potential receptors to media of concern. The following preliminary assessment endpoints were defined to reflect the potential impacts of complete and significant exposure pathways discussed in the CSM as applicable to specific sites:

- **All 14 RFI Sites:** Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.
- **Site 6:** Viable, functional populations of organisms exposed directly or indirectly to chemicals in sediment.
- **Site 12:** Viable, functional populations of organisms exposed directly or indirectly to chemicals in sediment and surface water.

These assessment endpoints are general and are refined and revised for sites warranting evaluation in the refined assessment conducted in Step 3 as part of the BRAPF.

3.2.2. SLERA Measurement Endpoints

While the goal of the risk assessment is to evaluate risks to specific assessment endpoints, these endpoints are usually expressed in terms that cannot be directly quantified. Therefore, measurement endpoints are defined that provide metrics that can be quantified that are directly related to assessment endpoints. To evaluate risks to the assessment endpoints above, impacts of contaminants in a media to receptors will be assessed by comparing the site maximum concentration of each contaminant to its respective media-specific ecological screening criteria. The following measurement endpoints are evaluated at the screening level:

- **All 14 RFI Sites:** Comparison of maximum concentrations of chemicals in surface soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

- **Site 6:** Comparison of maximum concentrations of chemicals in sediment to screening values protective of a broad range of potential receptors, including aquatic organisms/benthos and wildlife.

- **Site 12:** Comparison of maximum concentrations of chemicals in sediment and surface water to screening values protective of a broad range of potential receptors, including aquatic organisms/benthos and wildlife.

These measurement endpoints utilize exposure and toxicity data derived in Sections 3.2.3 and 3.2.4 below. Evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios in which subsurface soil is brought to the surface.

3.2.3. SLERA Toxicity Evaluation

Given the range of receptors potentially present at fort Buchanan and the variety of COPCs present at different RFI Sites, the SLERA toxicity evaluation is based on contaminant exposure levels that represent conservative thresholds for a broad range of adverse ecological effects. The EPA Region 4 Ecological Screening Criteria (EPA 2001b) were chosen as the thresholds for this screening-level assessment. They are presented in **Table 3-2**. These screening values are media specific for surface soil, sediment, and surface water. This source does not provide screening values for subsurface samples; therefore, subsurface soil concentrations were screened against the surface soil criteria as a conservative measure. Chemicals that were detected in a specific medium but for which EPA Region 4 Ecological Screening Criteria were unavailable were carried through the SLERA as COPCs for evaluation in the BRAPF.

3.2.4. SLERA Exposure Assessment

Exposure estimates for the SLERA were derived from chemical analytical data for each RFI Site. The maximum detected concentration of each chemical in each media of concern identified for the RFI Site were used as the exposure estimate for comparison to the media-specific screening-level for that chemical. Use of the maximum concentration is conservative and does not represent population-level exposures; it represents the maximum exposure that may occur at a site.

3.2.5. SLERA Risk Calculation & Risk Characterization

As part of Step 2 of the SLERA, maximum exposure estimates are compared to media-specific screening-levels. The results of this risk calculation are used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. Because of the conservative nature of the screening-level assessment, chemicals with a HQ less than 1 can be removed from further examination. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. At this stage of the screening-level assessment, many chemicals are retained as COPCs. Inclusion of these chemicals as COPCs does not necessarily indicate that these chemicals pose risks; it indicates that the chemicals cannot be definitively eliminated from further consideration.

3.3. REFINED ASSESSMENT METHODOLOGY USED IN THE BRAPF (STEP 3)

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the results of the SLERA to identify chemicals driving risks to receptors that must be carried forward into further

risk assessment or risk management based on a scientific management decision point. While the results of the SLERA provide an initial list of COPCs, these results are conservative, are not specific to ecological receptors, and do not represent population level risks. Therefore, a refinement of risk calculations (typically referred to as Step 3a) is necessary as part of the BRAPF to provide more realistic, appropriate, site-specific, and relevant results for use in risk assessment and management. This section presents the methodology used for Step 3a for those RFI sites requiring such an evaluation.

3.3.1. Refined Assessment Endpoints

The following refined assessment endpoints were defined to reflect the potential impacts of complete and significant exposure pathways discussed above and to aid in selecting representative receptor species:

All RFI Sites:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.

Sites 6 and 12:

- Viability of aquatic and benthic organism communities.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups. Assessment endpoints are summarized in **Table 3-3** with an indication of the sites to which they apply.

3.3.2. Refined Measurement Endpoints

Because assessment endpoints are often defined in terms of ecological characteristics that are hard to measure (i.e. the health of a population or community), measurement endpoints are selected to provide a quantifiable means of characterizing risks. Measurement endpoints are quantifiable ecological characteristics that are related to each assessment endpoint (EPA 1989). Measurement endpoints have been identified for the SLERA, including a refinement of screening level models. As presented in **Table 3-4**, each measurement endpoint includes explicit criteria as to whether results indicate potential or no potential for risk.

Measurement endpoints for each assessment endpoint can be summarized as follows:

Viability of plant communities (All RFI Sites)

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.
- Compare site-specific exposures to background exposures and evaluate factors affecting site-specific bioavailability.

- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities (All RFI Sites)

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures and evaluate factors affecting site-specific bioavailability.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities (All RFI Sites)

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the proportion of area used by wildlife to indicate whether exposures are over-estimated.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Viability of aquatic and benthic organism communities (Sites 6 and 12)

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for aquatic and benthic organisms.
- Compare site-specific exposures to background exposures and evaluate factors affecting site-specific bioavailability.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on aquatic and benthic communities.

3.3.2.1. Lower Trophic Level Organisms

The measurement endpoints for plants and soil invertebrates include comparison of exposure point concentrations (EPCs) to benchmarks called toxicity reference values (TRVs) protective of exposures to soil. Potential risks to aquatic and benthic organisms (plankton, invertebrates, and fish) were evaluated by comparing exposure point concentrations in surface water and sediment to TRVs for these media. TRVs represent the threshold above which effects are expected and below which either no effect or a low effect is expected. EA has selected conservative benchmarks to ensure that all chemicals that may pose a risk are accurately identified. Comparisons will initially be made using maximum EPCs as a precautionary initial screen. Comparisons will then be refined using mean and point-by-point concentrations as EPCs. As defined in EPA guidance (EPA 1997), the ratio of a chemical's concentration to its TRV is called a Hazard Quotient (HQ). HQs greater than or equal to one indicate a potential for unacceptable

risk, while HQs less than one indicate no potential for unacceptable risk. Results of comparisons will be interpreted in light of factors that include regional background concentrations, anticipated environmental chemistry of site media, and spatial relationships that may affect comparison results and relevance. More detailed presentation of measurement endpoints is provided in **Table 3-4**. Sections 3.4 through 3.7 detail the specific exposure assumptions, toxicity assumptions, and calculations performed to test measurement endpoints, and Sections 4 through 17 present the detailed risk characterization which describes tests and presents results.

3.3.2.2. Higher Trophic Level Wildlife

For wildlife, measurement endpoints are based on the results of food web models that predict the dose of chemicals ingested by wildlife. These doses will be compared to TRVs for wildlife. The first measurement endpoint evaluated will be a comparison of doses based on maximum exposure point concentrations to no-effects TRVs. Refinement of the models will be conducted using mean EPCs. As defined in EPA guidance (EPA 1997), the ratio of a chemical's dose to its TRV is called an HQ. HQs greater than or equal to one indicate a potential for unacceptable risk, while HQs less than one indicate no potential for unacceptable risk. As part of refinement, doses will be compared to low-effects TRVs as well as modeled doses for background areas. Results of comparisons will be interpreted in light of factors that include regional background concentrations, anticipated environmental chemistry of site media, and spatial relationships that may affect comparison results and relevance. The refinement will include a qualitative discussion of habitat quality and other factors such as bioavailability and physical factors that may influence results. The refinement for wildlife will also include qualitative evaluation of information available from past studies regarding habitat quality.

More detailed presentation of measurement endpoints is provided in **Table 3-4**. Sections 3.4 through 3.7 detail the specific exposure assumptions, toxicity assumptions, and calculations performed to test measurement endpoints, and Sections 4 through 17 present the detailed risk characterization which describes tests and presents results.

3.3.2.3. SELECTION OF REPRESENTATIVE RECEPTORS

Measurement endpoints utilize risk calculations for specific receptor species selected to represent the wide variety of species or groups or organisms potential present at the site. These are called representative receptors. Ecological receptors potentially present at the site include plants, terrestrial invertebrates, wildlife (birds, mammals) and aquatic organisms. Selection of representative receptor species is based primarily on several factors: 1) the likelihood of a species to use the site and the area immediately surrounding the site, 2) the potential for exposure to site-related contaminants based on the feeding habits and life history of the organisms/guild represented by the receptor species, 3) the availability of life history and exposure information for the selected receptor species, and 4) the availability of toxicity information for the representative receptor species. Potential representative receptors were evaluated based on these criteria and based on the applicability of available toxicity benchmarks to plants, soil invertebrates, wildlife, and aquatic and benthic organisms.

Terrestrial Plants - Based on the general nature of available plant toxicity data, no specific plant species are selected for evaluation. Instead, the assessment evaluates the potential for adverse effects to herbaceous plant populations.

Terrestrial Invertebrates - Earthworms are selected as the receptor species for evaluating the potential for adverse effects to soil invertebrates for several reasons. Earthworms have direct contact with soil and are sensitive to chemicals in soil, relative to other soil invertebrates. Furthermore, earthworms serve an important ecological role in the aeration of soils and cycling of nutrients and are an important food source for some soil invertebrate-eating species.

Terrestrial Vertebrates - To identify potentially impacted species, groups, or guilds, the feeding guilds of the mammals, invertebrates, and birds known to occur in the area are reviewed. While the risk assessments make conclusions concerning the potential for adverse effects to individual organisms, the objective is to be protective of the populations that use the Fort Buchanan area. However, few methods are available to extrapolate the potential for adverse effects from the individual level to the population level. Therefore, it is assumed that if there is potential or no potential for direct adverse effects to individual organisms, then it is also likely or unlikely for there to be the potential for direct adverse effects to populations.

Aquatic and Benthic Organisms - Because the toxicity data being used in the ERA were designed to evaluate the potential for adverse effects to benthic organism populations, no individual species were selected for evaluation, and the assessment will evaluate the potential for adverse effects to the overall aquatic and benthic populations.

The receptors of concern (and representative receptor species) included in this ERA are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)
- Piscivorous birds (great blue heron)
- Benthic and aquatic organisms (multiple species)

Table 3-5 provides a summary of exposure parameters for the avian and mammalian representative receptor species identified for evaluation.

3.3.3. Refined Exposure Assessment

Many of the measurement endpoints identified above rely on exposure estimation using chemical analytical data. In some cases, chemical concentrations are used as the exposure estimate, and measured or mean concentrations are identified as EPCs for comparison to benchmarks. In other

cases, chemical concentrations are the EPC inputs for food web models that estimate exposures as ingested doses. The exposure assessment identifies the models and input parameters that were used in benchmark comparisons and food web dose modeling. These parameters include identification of EPCs, food web model assumptions and literature-based uptake factors. These are discussed on a receptor-by-receptor basis.

3.3.3.1. Exposure Point Concentrations

Two separate EPCs were used in the ERA. The initial measurement endpoint for each receptor consists of a screening level comparison of the maximum case scenario exposure estimate to no-effects benchmarks. Therefore, the maximum concentrations detected in on-site media were used as the EPC in exposure estimation. The maximum EPC is a realistic estimate of hot spot exposures to plants, soil invertebrates, and aquatic and benthic organisms that may spend their entire lives in a small area. However, use of the maximum EPCs for assessment of wildlife is conservative and is likely to over-estimate risks because it assumes that individual organisms spend 100% of their time inhabiting and feeding from the most contaminated sample location at the site. There are also two separate exposure scenarios, present (surface soil) and future (subsurface soil) for most sites. This means that for soil samples, there are not just maximum and mean scenarios, but also current and future scenarios.

Additional measurement endpoints were evaluated based on the mean concentration found in on-site media. The mean is a more realistic value for consideration of the site-wide populations and exposures for mobile receptors, because it assumes an average exposure across the site. As discussed above, the mean concentration of a chemical within a given sample data grouping was calculated as the Kaplan-Myer mean derived by the EPA statistical software package proUCL version 4.0. Where the Kaplan-Myer mean could not be calculated because of low detection frequencies, the mean was calculated using the full reporting limit to represent non-detects. Use of the Kaplan-Myer mean and the mean based on the full reporting limit is conservative, and produces an exposure estimate that is biased high. This creates uncertainties that are discussed further in Section 18; however, it is consistent with the methods utilized in proUCL version 4.0.

3.3.3.2. Exposure Modeling for Lower Trophic Level Organisms

The measurement endpoints for lower trophic level organisms (plants, terrestrial invertebrates, and aquatic and benthic organisms) include comparison of EPCs to TRVs protective of exposures to environmental media. The use of EPCs to represent exposures for these organisms is discussed further below.

Plants - Chemical concentrations measured in the soil of the Site were used to evaluate the potential for adverse effects to terrestrial plants. Consistent with EPA guidance (EPA 1997), the maximum detected concentration was used as the initial EPC in comparisons against benchmarks protective of plants. In addition, the chemical concentrations at each sample location were used as sample-specific EPCs in comparisons to benchmarks; the results of these sample-specific comparisons were used to calculate site-wide frequencies of exceedence. Finally, the mean concentration was evaluated as an EPC in comparisons to indicate the potential for population-wide impacts, although it was weighted less heavily in risk characterization.

Terrestrial Invertebrates - Chemical concentrations measured in the soil of the Site were used to evaluate the potential for adverse effects to terrestrial soil invertebrates. Consistent with EPA guidance (EPA 1997), the maximum detected concentration was used as the initial EPC in comparisons against benchmarks protective of soil invertebrates. In addition, the chemical concentrations at each sample location were used as sample-specific EPCs in comparisons to benchmarks; the results of these sample-specific comparisons were used to calculate site-wide frequencies of exceedence. Finally, the mean concentration was evaluated as an EPC in comparisons to indicate the potential for population-wide impacts, although it was weighted less heavily in risk characterization.

Aquatic and Benthic Organisms - Chemical concentrations measured in surface water samples were used to evaluate the potential for adverse effects to aquatic life. Data from each of the waterbodies were compared to literature-based toxicity values for aquatic life. Both the maximum and mean concentrations of chemicals within each waterbody were used to evaluate the potential for adverse effects to aquatic life from the presence of chemicals in surface water.

Chemical concentrations detected in the sediment samples were used to evaluate the potential for adverse effects to benthic organisms. The maximum detected concentrations of chemicals within each watershed were used in the evaluation of sediment contamination in accordance with EPA guidance (EPA 1997). Although use of the maximum concentration is conservative, it is relevant in the evaluation of potential adverse effects to benthic organisms. Based on the relative immobility of most benthic invertebrates, chemical concentrations that exceed a toxicity value at one location have potential to be associated with adverse effects to aquatic invertebrates at that location. If a chemical was not detected at concentrations exceeding the available toxicity value, it was concluded that the chemical is not likely to adversely affect benthic organisms in that area. The mean sediment concentration was also evaluated as an indicator of population-wide risks.

3.3.3.3. Exposure Modeling for Higher Trophic Level Wildlife

Food web dose modeling was used in deriving the dose-based exposure estimates for wildlife. This section presents the methods used to quantify the potential exposure of wildlife to chemicals via the ingestion of food, surface water, and sediment/soil. The methods were derived based on equations presented in EPA (1993) and Sample et al. (1996). The equations and exposure parameters discussed below are consistent with EPA (1997) guidance and standard risk assessment practice.

Chemicals in the exposure media for each receptor were evaluated in the exposure models. Concentrations of these chemicals within other media to which a receptor could be exposed were then also considered for evaluation, whether or not they were COPCs within that media. Using such an approach, concentrations of chemicals within surface water which were not COPCs in surface water, but were COPCs in surface soil, were included in the model. Based on the exposure models presented in the following sections, all surface soil and surface water COPCs were evaluated for the Jamaican fruit bat, Ruddy quail-dove, pearly-eyed thrasher, Antillean ghost-faced bat, and red tailed hawk. All sediment and surface water COPCs were evaluated in the exposure models for great blue heron. **Table 3-5** provides a summary of exposure parameters for the avian and mammalian representative receptor species identified for evaluation. Uptake factors used in exposure models are presented in **Table 3-6 through Table**

3-9; food web dose models for the Site and background for each receptor species are presented in **Attachment A**.

It should be noted that, in general, conservative assumptions were used in the food web models. The objective of the models is to provide an upper bound risk estimate. Accordingly, in almost all cases, actual risks are likely to be overestimated by the models. Uncertainties associated with conservative assumptions and other exposure estimation factors are discussed in Section 18.

Two separate EPCs were used in food web dose modeling. The initial measurement endpoint for each bird and mammal receptor consists of a screening level comparison of the maximum case scenario exposure estimate to no-effects benchmarks. Therefore, the maximum concentration detected in on-site surface soil was used as the EPC in exposure estimation for this endpoint. Use of the maximum is highly conservative and is likely to over-estimate risks because it assumes that that wildlife spend 100% of their time inhabiting and feeding from the most contaminated sample location at the site.

Therefore, food web modeling for the other wildlife measurement endpoints was based on the mean concentration in the exposure media. The mean is a more realistic value for consideration of the site-wide population, because it assumes an average exposure across the site. As discussed above, the mean concentration of a chemical within a given sample data grouping was calculated as the Kaplan-Myer mean derived by the EPA statistical software package proUCL version 4.0. Where the Kaplan-Myer mean could not be calculated because of low detection frequencies, the mean was calculated using the full reporting limit to represent non-detects. Use of the Kaplan-Myer mean and the mean based on the full reporting limit is conservative, and produces an exposure estimate that is biased high. This creates uncertainties that are discussed further in Section 18; however, it is consistent with the methods utilized in proUCL version 4.0.

Ingestion of Chemicals from Abiotic Media

As discussed in the conceptual model, terrestrial wildlife may ingest soil, surface water, and sediment while foraging or grooming. Therefore, food web models account for incidental ingestion of soil, surface water, and sediment. Based on their foraging and habitat characteristics, it was assumed for the purposes of the models that Jamaican fruit bat, Ruddy quail-dove, pearly-eyed thrasher, Antillean ghost-faced bat, and red tailed hawk would be exposed to soil. The ingestion of soil by red-tailed hawks was assumed to be negligible based on information presented in EPA (1993) and Sample and Suter (1994). The great blue heron, as a piscivorous bird, would be exposed to surface water and sediment. As discussed above, all chemicals within an abiotic media were evaluated via this potential exposure pathway.

The following equation was used to calculate the dose of chemical terrestrial wildlife would obtain from the ingestion of soil ($Dose_{soil/sediment}$, mg/kg):

$$\boxed{Dose_{soil/sediment} = SI * C_{soil/sediment}}$$

Where:

$Dose_{soil/sediment}$ = amount of chemical ingested per day from soil/sediment (mg/kg bw-d);
SI = soil/sediment ingestion rate (kg/kg bw-d); and
$C_{soil/sediment}$ = chemical concentration in surface soil/sediment (mg/kg)

Percent soil/sediment ingestion values taken from the scientific literature for the terrestrial wildlife species of concern were multiplied by the food ingestion rates (FI) for these species to estimate soil/sediment ingestion rates (SI). A summary of the percent soil/sediment ingestion rates and food ingestion rates taken from the scientific literature is presented in **Table 3-5**.

Exposures to surface water were calculated in a manner similar to those in soil by multiplying the daily drinking water ingestion rate by the concentrations of chemicals in surface water. The following equation was used to calculate the upper bound dose of chemical that terrestrial wildlife could obtain from the ingestion of surface water:

$$\boxed{Dose_{sw} = WI * C_{sw}}$$

Where:

$Dose_{sw}$ = amount of chemical ingested per day from surface water (mg/kg bw-d);
WI = surface water ingestion rate (L/kg bw-d);
C_{sw} = maximum chemical concentration in surface water (mg/kg).

<u>Ingestion of Chemicals from Food</u>

The following equation was used to calculate the dose of chemicals that a terrestrial wildlife species could obtain from the ingestion of food ($Dose_{food/prey}$, mg/kg bw-d):

$$\boxed{Dose_{food/prey} = FI * C_{food/prey}}$$

Where:

FI = food ingestion rate (kg/kg bw-d);
$C_{food/prey}$ = estimated maximum concentration of chemical in food (mg/kg).

A summary of the food ingestion rates used in the SLERA for each of the terrestrial wildlife species selected for evaluation is presented in **Table 3-5**. The following section discusses the equations used to estimate chemical concentrations within each food group ($C_{plant/invert/prey}$).

Food item concentrations were developed using Bioaccumulation Factors (BAFs)/Bioconcentration Factors (BCFs). A hierarchy was used to select BAFs and BCFs. In general, values were selected from defensible, compilation- and consensus-based sources or sources which include validation of models. (i.e. EPA 2005, Sample et al. 1998a, etc.) were used instead of values from single studies. First preference was given to regression equations derived from paired field- or laboratory-based measurements. Second preference was given to ratio-derived BAFs developed based on paired data of tissue concentrations compared to media concentrations unless validation studies showed these to be preferable to regressions. Examples of regression and ratio BAF development can be found in Sample et al., 1998a. Third preference was given to modeled equilibrium partitioning-derived BAFs based on physical or chemical characteristics. If no values could be identified, a BAF or BCF of 1 was selected.

EPCs in Plants - Plant tissue concentrations were derived from literature-based uptake factors for this receptor (**Table 3-6**). Maximum case scenario dry weight plant tissue concentration was calculated by multiplying the dry weight soil times the uptake factor or, where a regression was used, by entering the dry weight soil concentration into the equation. Mean case scenario tissue concentrations were calculated using the mean dry weight soil concentration. Where conversion to wet weight values was required, terrestrial plants were considered to contain 75% moisture as a default (USACHPPM, 2004).

EPCs in Soil Invertebrates - Soil invertebrate concentrations were derived from literature-based uptake factors for uptake in earthworms (**Table 3-7**). Maximum case scenario dry weight worm tissue concentration was calculated by multiplying the dry weight soil times the uptake factor or, where a regression was used, by entering the dry weight soil concentration into the equation. Mean case scenario tissue concentrations were calculated using the mean dry weight soil concentration. Where conversion to wet weight values was required, soil invertebrates were considered to contain 75% moisture as a default (USACHPPM, 2004).

EPCs in Small Mammals - Small mammal concentrations were derived from literature-based uptake factors for uptake in small mammals (**Table 3-8**). All small mammals combined, described as "general," were selected to model chemical accumulation in small mammals because dietary information indicates that for red-tailed hawks a range of rodents and lagomorphs are the predominant small mammal food items (USACHPPM 2004). Maximum case scenario dry weight mammal tissue concentration was calculated by multiplying the dry weight soil times the uptake factor or, where a regression was used, by entering the dry weight soil concentration into the equation. Mean case scenario tissue concentrations were calculated using the mean dry weight soil concentration.

EPCs in Aquatic Prey Items - Fish were selected as representatives of the potential for chemicals to accumulate from surface water into aquatic food items. In the SLERA, fish were used as model prey items to evaluate the potential for adverse effects to piscivorous birds (as represented by great blue herons), because they are important dietary components for these species.

In the SLERA, literature-based water-to-fish uptake factors or bioaccumulation equations were used to estimate concentrations of COPCs in fish tissue using the following equation:

$$\boxed{C_{fish} = C_{water} * UPF}$$

Where:

C_{water} = maximum concentration of COPC in water (mg/L);
UPF = uptake factor for chemicals in fish (unit less).

The maximum concentrations of surface water detected at each site were used as the C_{water} value in the equation. UPFs and log K_{ow}s for organic chemicals, and their sources are summarized in **Table 3-9**. In the absence of a literature-based bioaccumulation model or uptake factor for a COPC, an accumulation factor of one was used to estimate chemical concentrations in fish. Use of this default accumulation factor is expected to provide a conservative estimate of

accumulation for most chemicals and is expected to overestimate accumulation for non-bioaccumulative compounds.

Total Chemical Ingestion

The total dietary exposure doses for small herbivorous mammals (Jamaican fruit bat) and birds (Ruddy quail-dove) ($Dose_{total(bat/quail\text{-}dove)}$, mg/kg bw-d) for the evaluated chemicals were determined using the following equation:

$$Dose_{total} = Dose_{plant} + Dose_{soil} + Dose_{water}$$

Where:

$Dose_{plant}$ = amount of chemical ingested per day from plants (mg/kg bw-d);
$Dose_{soil}$ = amount of chemical ingested per day from soil (mg/kg bw-d);
$Dose_{water}$ = amount of chemical ingested per day from water (mg/kg bw-d)

The total dietary exposure doses for small insectivorous mammals (Antillean ghost-faced bat) and birds (pearly-eyed thrasher) ($Dose_{total(bat/thrasher)}$, mg/kg bw-d) for the evaluated chemicals were determined using the following equation:

$$Dose_{total} = Dose_{invert} + Dose_{soil} + Dose_{water}$$

Where:

$Dose_{invert}$ = amount of chemical ingested per day from invertebrates (mg/kg bw-d);
$Dose_{soil}$ = amount of chemical ingested per day from soil (mg/kg bw-d);
$Dose_{water}$ = amount of chemical ingested per day from water (mg/kg bw-d)

The total dietary exposure doses for predatory birds (red-tailed hawks) ($Dose_{total(hawk)}$, mg/kg bw-d) for the evaluated chemicals were determined using the following equation:

$$Dose_{total} = Dose_{prey} + Dose_{soil} + Dose_{water}$$

Where:

$Dose_{prey}$ = amount of chemical ingested per day from prey (mg/kg bw-d);
$Dose_{soil}$ = amount of chemical ingested per day from soil (mg/kg bw-d);
$Dose_{water}$ = amount of chemical ingested per day from water (mg/kg bw-d)

The ingestion of soil by red-tailed hawk was assumed to be negligible based on information presented in EPA (1993).

The total dietary intakes are compared to dietary toxicity values to determine if adverse effects are likely to occur to terrestrial wildlife from the ingestion of chemicals in food, soil and surface water.

3.3.4. Refined Toxicity Assessment

This section derives toxicity values for use in evaluating exposure estimates for each representative receptor selected for evaluation. The TRVs represent concentrations or doses of the chemicals that are protective of the ecological receptors being evaluated. TRVs are compared to EPCs or estimated doses to evaluate each chemical's potential for adverse effects on the receptor in question. The following sections summarize TRVs for each indicator species or community identified for evaluation.

3.3.4.1. Overview of Bioavailability and Toxicity

The toxicity of chemicals is related to their bioavailability. Both inorganic elements and organic compounds may form complexes or compounds that bind them to soil or sediment and make them chemically inaccessible to ecological receptors. Alternatively, these elements and compounds may be present in forms that are easily dissolved and absorbed, or in forms that tend to bind to biological tissues. It is these forms of easily absorbed chemicals that are most toxic. Most TRVs are based on forms of chemicals that are readily bioavailable.

Metals

The conceptual model for the site identifies metals as a primary concern for the site. For metals, bioavailability is governed largely by formation of metallic compounds, binding to the soil matrix, and speciation. These factors also determine the likelihood of bioaccumulation.

The compounds and bonds formed by metals are determined by reduction and oxidation (red-ox) reactions, by the dominant pH in soil and sediment, and by the presence of organic carbon. These factors affect different metals in different ways. Acidity increases the bioavailability of many cationic compounds, such as cadmium, chromium, copper, lead, silver, and zinc, which may become soluble at pHs below 5. Some metals, such as aluminum, may also form complexes with iron oxides and hydroxides; this makes these metals less bioavailable and less mobile. The effect of acidity on other metals is complex; arsenic, for example may form compounds that are less bioavailable under acidic conditions; however, it may also become more bioavailable if arsenic bound to iron hydroxide compounds is released (Bodek et al. 1988).

Red-ox conditions and pH also determine the speciation of metals. Some metals may exist in different valence states or chemical forms that demonstrate different toxicity and bioavailability. For example, arsenic can be found in nature as As III or As V, with higher toxicity and mobility typically exhibited by As III (EPA, 2005b).

Organic Compounds

The conceptual model for the site identifies organic compounds as concerns for specific areas. For organic compounds, the primary factors determining persistence, mobility, and fate are: 1) degradation, 2) volatilization, and 3) binding to soil, sediment, or in tissue. Many classes of organic compounds, including chlorinated VOCs and SVOCs, polycyclic aromatic hydrocarbons (PAHs), and some pesticides, degrade over time, resulting in lower concentrations.

Another factor affecting VOCs and SVOCs is volatilization. Concentrations of these chemicals may decrease in soil, sediment, and surface water over time due to transfer to and dispersion in the air. Volatilization may be an important factor in eliminating them from soil and sediment. Expected contributions of these chemicals to air pathways are insignificant.

Perhaps the most important factor affecting fate of organic compounds in soil and sediment is their affinity for binding to fine grained soils and organic matter. Many organic compounds, such as PCBs and pesticides, are hydrophobic and will bind tightly to these soil and sediment particles. This drastically decreases the mobility of these compounds, preventing them from dissolving in pore water and the water column. However, while the hydrophobicity of these organic compounds may decrease solubility, it may also increase their uptake into the tissues of biota and the potential for bioaccumulation. Hydrophobic compounds may bioaccumulate and biomagnify in fats and lipids within fish, invertebrates, or wildlife (EPA 2000).

3.3.4.2. Plants

To assess the potential for inorganic and organic chemicals to adversely affect plants, soil concentrations were compared to TRVs protective of plants (**Table 3-10**) (Efroymson et al. 1997a; EPA 2005 e-h; EPA 2006; EPA 2007a, d-e, h, i; 2008). TRVs protective of plants were used to assess the potential for inorganic and organic chemicals to adversely affect plants (Efroymson et al. 1997a). TRVs from studies by Efroymson et al. (1997b) were established at a level associated with a 20% reduction in growth or other measured toxicological endpoint. This level is consistent with other screening level benchmarks for ecological risk assessment and the current regulatory approach. TRVs from EPA EcoSSL (Ecological Soil Screening Levels) are based on statistical evaluation of no observed adverse effect level (NOAEL) and lowest observed adverse effect level (LOAEL) values from multiple studies (EPA 2003 a-d, 2005 b-g, 2006, 2007 a-g). Because few toxicity values have been developed for organic chemicals, surrogate organic chemical TRVs were used for the evaluation of potential adverse effects to plants, as applicable.

There are limitations associated with the toxicity values available for plants. The majority of the plant toxicity information available from the scientific literature is for inorganic chemicals and has been based on the evaluation of potential adverse effects to agricultural crops from the presence of inorganic chemicals in soil. Furthermore, the phytotoxicity of most chemicals varies with the plant species and with the availability and form of a given chemical. If a chemical is more bioavailable to a plant for absorption or uptake, the phytotoxic potential of the chemical increases. Uncertainties associated with derivation of plant benchmarks are discussed in Section 18.

3.3.4.3. Terrestrial Invertebrates

To assess the potential for inorganic and organic chemicals to adversely affect soil invertebrates, soil concentrations were compared to TRVs protective of soil invertebrates (**Table 3-10**) (Efroymson et al. 1997b; EPA 2005 a, c-e and g; EPA 2007 a, d, e, g-i; Reinecke and Nash 1984; Rhett et al. 1989; Cathey 1982). TRVs protective of worms were used to assess the potential for inorganic and organic chemicals to adversely affect worms (Efroymson et al. 1997b). TRVs from studies by Efroymson et al. (1997b) were established at a level associated with a 50% mortality or other measured toxicological endpoint for earthworms. This level is consistent with

other screening level benchmarks for ecological risk assessment and the current regulatory approach. TRVs from EPA EcoSSL are based on statistical evaluation of NOAEL and LOAEL values from multiple studies (EPA, 2003 a-d, 2005 b-g, 2006a, 2007 a-g). Because few toxicity values have been developed for organic chemicals, surrogate organic chemical TRVs were used for the evaluation of potential adverse effects to soil invertebrates, as applicable. Many of the uncertainties identified for derivation of plant TRVs above also apply for derivation of worm TRVs. Uncertainties associated with derivation of plant benchmarks are discussed in Section 18.

3.3.4.4. Aquatic and Benthic Organisms

TRVs for Exposure to Water

National Ambient Water Quality Criteria (AWQC) developed by EPA (1999b) for the protection of aquatic life were used to assess potential impacts to aquatic species from chemicals in surface water. Chronic freshwater AWQC were used as TRVs to evaluate the potential for adverse effects to aquatic life from chemicals measured in the surface water samples, because chronic freshwater AWQC are the most representative of longer-term exposure likely to occur in these water bodies (**Table 3-12**). When a chronic AWQC was not available for a particular chemical, the Tier II chronic value from Suter and Tsao (1996) was used as the TRV.

TRVs for Exposure to Sediment

Several sources of toxicity data were used to identify the potential for chemicals in sediment to cause adverse effects to benthic communities (**Table 3-13**). Effects-Range Low (ER-L) values were employed as TRVs to determine whether chemicals in the sediments are likely to impact benthic organisms. ER-L values reported in Long et al. (1995), and alternatively in Long and Morgan (1990), were employed as TRVs to determine whether chemicals in the sediments are likely to impact aquatic communities. Effects range values were derived from the compilation of the available sediment toxicity data for a chemical. The ER-L value is equivalent to the lower 10th percentile of the available toxicity data, which is estimated to be the approximate concentration at which adverse effects are likely to occur in sensitive life stages and/or species.

Threshold effects levels (TELs) for coastal sediments have been derived by MacDonald et al. (1996) using a weight-of-evidence approach based on the results of numerous laboratory, field, and modeling studies performed on coastal sediments. The geometric mean was taken of the combined 15th percentile of results showing effects and the 50th percentile of results showing no effects. TEL values are defined as values that are rarely associated with adverse biological effects. These TELs were used in the absence of ER-Ls.

In the absence of the above TRVs, the lowest was chosen from sediment quality benchmark (SQB) values in MacDonald et al. (2000), Jones et al. (1997), and ecotox threshold (ET) values from EPA (1996).

The methodology used to generate the SQBs is the equilibrium partitioning approach. SQBs are derived by using the amount of total organic carbon in sediment to determine the amount of chemical partitioned in sediment porewater. This value is then used in conjunction with AWQCs

(EPA 1999b) or Tier II values from Suter and Tsao (1996) to set SQBs. Values for SQBs were calculated using average sediment organic carbon values.

ET values were derived using the EPA's Ecotox Threshold software, which derives site-specific ETs by adjusting for pH and hardness in surface water and total organic carbon in sediment. ECOTOX uses an organic carbon value of 1%. Hardness-dependent values were calculated according to equations given by EPA (1999b). The same hardness as was used for calculating TELs was used for calculating ETs. ETs are derived by the ECOTOX program by selecting from EPA sediment quality criteria, literature based SQBs, and literature based ER-Ls.

3.3.4.5. Wildlife

Chemicals identified as having the potential to adversely affect terrestrial species were evaluated using dose-based toxicological benchmarks. Two types of benchmarks were used, each corresponding to a different level of ecological impacts (**Table 3-13 and Table 3-14** for mammals and birds respectively). First, modeled doses were compared to dose-based NOAELs. NOAELs are doses that have been shown to cause no adverse impacts in test species. The NOAELs used in this ERA were derived, in descending order of preference, from studies by EPA (EPA, 2003 a-d, 2005 b-g, 2006a, 2007 a-g) and by Oak Ridge National Laboratory (ORNL) (Sample et al., 1996). The ORNL NOAELs were generally derived based upon measurements of survival, growth, or reproduction in the laboratory. Values from EPA EcoSSLs were derived through statistical analyses of results from multiple toxicological studies with multiple endpoints. Because NOAELs are conservative and highly protective, they were used as TRVs in this ERA.

The second set of benchmarks utilized were LOAELs. These are doses at which a very low level of adverse effect was observed on individual test organisms. The severity of effects considered "low level" varies based on the study from which LOAELs are derived; in general, they correspond to minor changes in growth or reproduction. LOAELs are useful because there is considerable uncertainty associated with NOAELs. Because NOAELs are associated with no effects in a test study, it is uncertain whether they are close to or far below the threshold value at which effects would first be observed. LOAELs thus serve to bound the range of NOAELs, and the threshold of toxic effects is considered to lie between the NOAEL and the LOAEL. Therefore, LOAELS were also utilized as TRVs. In some cases, LOAELs were available from studies by ORNL (Sample et al. 1996). When LOAELs were not available from this source or exceeded more reliable NOAELs from EPA EcoSSL sources, the data provided in EPA EcoSSL documents was used to derive LOAELs; this was performed for PAHs, arsenic, barium, cobalt, and silver. In all cases, the geometric mean of the bounded LOAELs for growth and reproduction was calculated; this approach is similar to that used for derivation of many EcoSSL NOAELs.

In general, chemical exposures and toxicity were evaluated on a chemical-by-chemical basis. However, combined effects were evaluated for two classes of chemicals. The first of these are the dioxins and furans. Studies have shown that various dioxin congeners may cause impacts on wildlife by the same mode of toxic action; these studies also provide a means of weighting and summing the different dioxin congeners to determine their combined toxicity (Van der Berg 1998, 2006). This is done by multiplying the concentration of each dioxin congener by a toxicity

equivalency factor (TEF) that relates all dioxin toxicity to that of 2,3,7,8-TCDD, which is most toxic. Concentrations are multiplied by the TEF and then summed to produce a toxic equivalents quotient (TEQ) that can be compared to benchmarks for 2,3,7,8-TCDD. Toxicity evaluation using TEQs is performed for birds and mammals throughout the ERA.

The second group evaluated for combined toxicity is the PAHs. EPA studies show that the PAHs can be grouped into high molecular weight (HMW) and low molecular weight (LMW) groups and concentrations summed for comparison to benchmarks (EPA 2007d). Toxicity evaluation using summed PAHs concentrations is performed for plants, soil invertebrates, birds and mammals throughout the ERA.

When applicable, surrogate organic chemical TRVs were used for the evaluation of potential adverse effects to wildlife. In cases where toxicological benchmarks or appropriate surrogates were not available for chemicals, the scientific literature was reviewed for oral toxicity data. A dose that is protective was identified from the available scientific literature to develop a TRV for each chemical. The following criteria were used to select the dose values:

- Doses based on the indicator species selected for evaluation were used preferentially; however, if toxicity information was not available for these species, doses for animals within the same class as the indicator species were used.
- Data for reproductive or growth effects were used preferentially; otherwise, the lowest dose (i.e., most conservative) for which a NOAEL or LOAEL was available was used.
- Chronic data were used in preference to subchronic or acute data, and NOAELs were used in preference to LOAELs and LD_{50}s.

Doses were then used to derive TRVs for avian and mammalian species as described in the following paragraphs. Avian TRVs were derived using daily doses from various references (see Table 3-14) and the following equation:

$$\boxed{TRV = d / UcF}$$

Where:

d	=	literature-based daily dose (mg/kg bw-d); and
UcF	=	total uncertainty factor.

The UcFs used were taken from Sample et al. (1996) and Wentsel et al. (1994). The magnitude of the uncertainty factor is dependent upon both the length of the toxicological study used (i.e., chronic, subchronic, acute) and the endpoint measured (i.e., NOAEL, LOAEL, LD_{50}).

TRVs could not be derived for certain chemicals due to a lack of available information in the scientific literature. Toxicity data were also lacking for reptiles. The uncertainty associated with the lack of TRVs is discussed in Section 18.

3.3.5. Refined Risk Calculation

Several measurement endpoints are based on refined risk calculations. To calculate a refined estimate of risks, refined estimates of exposure (either EPCs or modeled doses) are compared to receptor-specific TRVs. Risk calculation is performed by dividing EPCs or modeled doses by either NOAEL- or LOAEL-based TRVs. This produces refined HQs for each level of effect for each receptor. When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. At this stage of the screening-level assessment, many chemicals are retained as COPCs. Inclusion of these chemicals as COPCs does not necessarily indicate that these chemicals pose risks; it indicates that the chemicals cannot be definitively eliminated from further consideration.

3.3.6. Chemical Bioavailability and Factors Affecting Toxicity, including Comparisons to Background

An additional measurement endpoint is included as part of the BRAPF focusing on region- and soil type- specific factors affecting the bioavailability of COPCs; this evaluation focuses specifically on metals and pesticides.

3.3.6.1. Metals

For metals, this evaluation focuses on factors specific to local soil types. All of the RFI Sites except for Sites 6, 13, and 15 at Fort Buchanan are located in areas of Almirante or Vega Alta soil types. Sites 6, 13, and 15 are located in Vega Baja soil types. All of these soil types are rich in tropical clays, and the Almirante and Vega Alta soil types and have plinthite horizons within 2 to 3 feet of the soil surface (USDA 1978). Plinthite forms in highly weathered soils. It consists of dense, blocky concretized soil rich in iron and quartz. Studies have also shown plinthites to contain naturally elevated concentrations of aluminum, chromium, nickel, and vanadium (Davies 1996). Plinthite is poor in nutrients, and due to its dense concretized structure and high concentration of free metal ions, is naturally unsuited to support vegetation without amendment. This information must be taken into account when evaluating sites where subsurface soil is evaluated for hypothetical future exposures for two reasons. First, subsurface soils naturally contain elevated concentrations of metals which may be higher than those identified in site-specific background studies. Second, subsurface soils would require considerable amendment with other soil types and/or organic matter in order to support vegetation if they were exposed.

Benchmarks for many metals are based on bioavailable forms used in toxicity testing. For example, EPA's EcoSSL benchmarks for plants and soil invertebrates are developed by selecting studies using soils that have the highest bioavailability scores based on pH and organic matter content (USEPA 2003a). Benchmarks are also often based in part or in whole on the most toxic form of a compound in terms of valence (i.e. hexavalent versus trivalent chromium) or compound (i.e. soluble salts of metals rather than forms bound in oxides). The soil types present at the Fort Buchanan RFI Sites (USDA 1978) score medium to high for potential bioavailability of cationic metals such as aluminum, but low to medium for bioavailability of anionic metals such as arsenic, selenium, and vanadium. This primarily due to low pH of soils. This

information must be taken into account when including results from benchmark comparisons as part of a weight of evidence approach.

3.3.6.2. Pesticides

Use of organochlorine pesticides was widespread in the United States and Puerto Rico up into the 1970's and in some cases beyond. Therefore, concentrations of these compounds are widespread and can be found elevated in soil throughout areas near agricultural or developed areas. It is anticipated that spraying of these pesticides was part of common practice at fort Buchanan and the surrounding area historically. Because concentrations of these chemicals are widespread, biota are likely acclimated to these widespread exposures. This is considered in the risk assessment. In addition, risk management should consider that detected concentrations of pesticides may not be related to RCRA sources.

3.3.6.3. Comparison to background

To support the evaluation of this measurement endpoint, exposures levels (concentrations and doses) or risks estimates at RFI Sites are compared to exposures in background areas as an indicator of comparability to local conditions. This bears direct relevance to assessment results and decision points based on risk results for two reasons:

- Comparison to regional background concentrations is a useful indicator of whether the metals detected at the site are likely to have originated from natural minerals in the soil; metals from naturally occurring minerals would be expected to pose minimal toxicity. Many metals are found at naturally occurring concentrations higher than screening values and/or receptor-specific TRVs. Biota are acclimated to these concentrations of these metals which in many cases are bound in non-bioavailable mineral forms. Therefore, comparisons to background provide an essential context for risk results.

- The scope of the risk assessment is to identify risks associated with potential RCRA source areas. Many chemicals such as pesticides and herbicides may be present due to widespread spraying and are thus not necessarily associated with RCRA sources. Other chemicals such as polycyclic aromatic hydrocarbons (PAHs) may be present in association with non-RCRA sources such as common building materials (i.e. asphalt, pressure treated wood) and vehicle exhaust. Thus background plays a role in appropriate assignation of the source of risks.

The RFI evaluated naturally elevated concentrations of certain metals found in Puerto Rico. Certain metals are thought to occur at naturally elevated concentrations (with respect to the mainland United States) due to the limestone and carbonate geology of Puerto Rico. In 2007, the Army directed and conducted an internal background study of metals concentrations to address these concerns. In 2011, the Army directed and conducted a second background investigation to characterize pesticide concentrations that could be anticipated in areas not influenced by releases from chemical sources.

The 95% Upper Prediction Limits (UPL) of the background dataset were calculated using the USEPA's ProUCL software and used as comparison values. The 95% UPL represents a cut-off

value at the upper end of the range of the background data, and any on-site sample concentrations that are greater than the 95% UPL are statistically significantly different from the background dataset. The comparison of on-site data to background data is perhaps the most effective way to identify site-related impacts. This is especially true for a site with unique geology, such as Fort Buchanan, where elevated concentrations of some compounds are naturally occurring. The screening levels used in this RFI do not take into account the natural concentrations of inorganic compounds found at the site, and thus can result in conclusions that are of limited relevance to actual conditions. Appendix H of the RFI presents the background technical memorandum, which describes in detail the statistical process for calculating background comparison values and includes the ProUCL outputs for the background dataset. Frequency of detection of metals and pesticides in background as well as range of concentrations and 95% UPL are presented in **Table 3-15**.

3.3.7. Evaluation of Receptor Home-Range

An additional measurement endpoint evaluated in this assessment is area use by ecological receptors in comparison to the size of each site. The exposure estimates discussed above assume that receptors will occupy the site 100% of the time and thus all food and contact with environmental media occur at the site. In reality, mobile receptors such as birds and mammals may have home ranges larger than the site size so the receptor would spend less than 100% of the time at the site, making exposure estimates overly conservative. For chemicals with exposure estimates exceeding TRVs, home range and site size are compared and the results used semi-quantitatively to provide context for risk calculation results. Site size was calculated by identifying the area immediately of habitat surrounding each source extending to the nearest feature or features that would limit access and transport. In many cases, this over-estimates the area of elevated concentrations at the site. Receptor home range was estimated based on sources in the scientific literature. Areas, information sources, and comparisons are presented in **Table 3-16**.

3.3.8. Evaluation of Habitat Quality

An additional measurement endpoint evaluated in the BRAPF is habitat quality. As discussed in the CSM (Section 2), many of the RFI Sites consist of paved or highly disturbed areas. In many cases, the primary stressors at these sites are likely to be anthropogenic factors other than chemical stressors such as soil compaction, mowing, or construction. This information is important for consideration when interpreting risk results as part of risk assessment and management decisions.

3.3.9. Refined Risk Characterization

The purpose of the risk characterization is to draw conclusions regarding the potential for risks to each assessment endpoint/representative receptor for each RFI Site. This is done using a qualitative weight of evidence approach in which results for each measurement endpoints are considered as lines of evidence. In general, lines of evidence which provide results based on site-specific data applicable at the population level are given the greatest weight. Per EPA guidance (EPA 1997), the focus of the ERA is to protect the ecological values at the site-wide population or community level except where threatened or endangered species are concerned.

4. SITE 1, SWMU 1: OLD HAZARDOUS WASTE CONTAINERS

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 1 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 4.1), data summarization (Section 4.2), SLERA results (Section 4.3), and BRAPF (Section 4.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 1 (Section 4.5).

4.1. CSM FOR SITE 1

Site 1 is SWMU 1: Old Hazardous Waste Containers. This site is associated with a 600 square foot, concrete-floored building (Building 539) that stored various chemicals from 1968 to 1977 in the forms of acids, bases, solvents, and pesticides, including DDT. There is no evidence of any historic use of metals at the site. Currently the building is used as an armory storage area. An aerial photograph is presented in **Figure 4-1**. Surrounding the building are approximately two acres of a mowed monoculture lawn which gently slopes northwest to Toro Creek. No drainage outfalls from the building were discovered in the EBS report (Woodward-Clyde 1997) and there is no expected transport to aquatic environments. The grassy area does not contain any canopy habitat and is surrounded by a fence and roads on all sides. There is some woodland habitat to the north and west of the area. Previous investigations indicated that pesticides were present in the soil around the building.

The CSM for Site 1 is presented in **Figure 4-2**. The potential chemical source at the site is the building where chemicals may have been stored. Possible COPCs include acids, bases, solvents, and pesticides, including DDT. If chemicals were disposed immediately outside the building, the primary transport pathways for further migration include leaching, runoff, and erosion. Given the gradual slope and vegetated lawn, runoff and erosion are less important pathways than leaching. Therefore, the primary media of concern at the site are surface soil and subsurface soil. The available data for soil, site topography and land use, and expected behavior of COPCs all indicate against transport to aquatic habitats or transport beyond the area immediately around the building. Bioaccumulation may be a relevant transport pathway. Plants and animals that come in contact with chemicals in soil may uptake chemicals. Dependent upon the chemical and the organism, these chemicals may accumulate in tissue.

Complete and significant exposure pathways under current scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

The same pathways apply under future scenarios in which subsurface soil has been brought to the surface. Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, and wildlife.

4.2. DATA SUMMARIZATION

Four surface soil samples were taken from Site 1 and were analyzed for VOCs, SVOCs, organochlorine pesticides, organophosphorus pesticides, PCBs, and herbicides. Four subsurface samples were taken between 2-4 feet and were analyzed for VOCs, SVOCs, organochlorine pesticides, organophosphorus pesticides, PCBs, and herbicides. These samples are evaluated in the SLERA and BRAPF. Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 1 are summarized in **Table 3-1**.

4.3. SLERA (Steps 1 & 2) for Site 1

Site 1 consists of terrestrial habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

Both surface and subsurface soil concentrations were evaluated for the measurement endpoint. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

4.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 4-1** and **Table 4-2**. The results of this risk calculation is used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Surface Soil COPCs

- 4,4-DDD
- 4,4-DDE
- 4,4-DDT
- Alpha-chlordane
- Aroclor 1260
- Dieldrin
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Chrysene
- Dibenz(a,h)anthracene
- Fluoranthene
- Indeno(1,2,3-c,d)pyrene

- Pyrene
- HMW PAHs
- LMW PAHs
- Acetone

Subsurface Soil COPCs

- Pentachlorophenol
- 4,4-DDD
- 4,4-DDE
- 4,4-DDT
- Alpha-chlordane
- Benzo(a)anthracene
- Benzo(b)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Chrysene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-c,d)pyrene
- HMW PAHs
- 1,1-dichloroethene
- Acetone
- Carbon disulfide

4.4. BRAPF (Step 3) for Site 1

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. The SLERA for Site 1 identified 5 pesticides, 1 PCB, 10 PAHs, and 1 VOC as COPCs for current terrestrial exposure pathways at Site 1 based on maximum concentrations in surface soil. It identified 4 pesticides, 1 SVOC, 7 PAHs, and 3 VOCs as COPCs for future exposure scenarios based on maximum concentrations in surface soil. A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

4.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 1 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

4.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 1 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

<u>Viability of plant communities</u>

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.

- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the proportion of area used by wildlife to indicate whether exposures are over-estimated.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Refined measurement endpoints are assessed using the data summarized in Section 4.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for surface and subsurface soil as presented in **Table 4-3** and **Table 4-4**. The representative receptors selected for use in evaluating measurement endpoints for Site 1 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

4.4.3. BRAPF for Plants at Site 1

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
  - comparison using maximum EPCs and
  - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

4.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

When maximum and mean EPCs of COPCs were compared to TRVs, none of the contaminant concentrations exceeded TRVs protective of plants. Comparisons are presented in **Table 4-5** for surface soil and **Table 4-6** for subsurface soil. Chemicals without available plant TRVs include pesticides, which are typically not toxic to plants, and the VOCs acetone and carbon disulfide. The uncertainty associated with the lack of TRVs is discussed in Section 18.

4.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 4-5** for surface soil and **Table 4-6** for subsurface soil.

Background comparison values are only available for metals (which were not identified as COPCs) and organochlorine pesticides. Site concentrations of DDTr are higher than those found in background. The uncertainty associated with the lack of TRVs is discussed in Section 18.

4.4.3.3. Evaluation of Habitat for Plants at Site 1

Site 1 consists of approximately two acres or less of mowed monoculture lawn which gently slopes northwest to Toro Creek. The grassy area does not contain any canopy habitat and is surrounded by a fence and roads on all sides. Plant communities at the site are likely to be subject to stress from anthropogenic disturbance unrelated to chemical concentrations in soil. Plant communities present in this poor quality habitat are unlikely to include sensitive species, and are more likely to include hardy, opportunistic species.

4.4.3.4. BRAPF Conclusions for Plants at Site 1

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that there are no chemicals in soil with concentrations exceeding plant benchmarks under the current scenarios based on surface soil or under future scenarios based on subsurface soil.

Another measurement endpoint evaluated was comparison of EPCs to background concentrations. Background concentrations were only available for organochlorine pesticides. Site concentrations were higher than background concentrations.

The last measurement endpoint evaluated was qualitative evaluation of habitat quality. Habitat quality at the site consists of a mowed monoculture lawn. Plant communities in such an environment are likely subject to stronger non-chemical stressors than chemical stressors. These plant communities tend to consist of hardy opportunistic species that may be less sensitive to chemical exposures.

Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to plants at Site 1 now or in the future. Uncertainties associated with this characterization of risks are discussed further in Section 18.

4.4.4. BRAPF for Soil Invertebrates at Site 1

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to soil invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including
    - comparison using maximum EPCs and
    - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most

weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

4.4.4.1. Comparison of Chemical Concentrations to Soil Invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

When maximum and mean EPCs of COPCs were compared to TRVs, none of the contaminant concentrations exceeded TRVs protective of soil invertebrates grown in soil. Comparisons are presented in **Table 4-7** for surface soil and **Table 4-8** for subsurface soil. Chemicals without available soil invertebrate TRVs include alpha-chlordane, dieldrin, 1,1-dichloroethene, and carbon disulfide. The uncertainty associated with the lack of TRVs is discussed in Section 18.

4.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 4-7** for surface soil and **Table 4-8** for subsurface soil.

Background comparison values are only available for metals (which were not identified as COPCs) and organochlorine pesticides. Site concentrations of DDTr are higher than those found in background. The uncertainty associated with the lack of TRVs is discussed in Section 18.

4.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 1

Site 1 consists of approximately two acres or less of mowed monoculture lawn which gently slopes northwest to Toro Creek. The grassy area does not contain any canopy habitat and is surrounded by a fence and roads on all sides. Invertebrate communities at the site are likely to be subject to stress from anthropogenic disturbance unrelated to chemical concentrations in soil, including soil compaction and pest management practices. Invertebrate communities present in this poor quality habitat are unlikely to include sensitive species, and are more likely to include hardy, opportunistic species resistant to chemical stress.

4.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 1

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on soil invertebrate survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of soil invertebrates. This comparison indicated that there are no chemicals in soil with

concentrations exceeding soil invertebrate benchmarks under the current scenarios based on surface soil or under future scenarios based on subsurface soil.

Another measurement endpoint evaluated was comparison of EPCs to background concentrations. Background concentrations were only available for organochlorine pesticides. Site concentrations were higher than background concentrations.

The last measurement endpoint evaluated was qualitative evaluation of habitat quality. Habitat quality at the site consists of a mowed monoculture lawn. Invertebrate communities in such an environment are likely subject to stronger non-chemical stressors than chemical stressors. These communities tend to consist of hardy opportunistic species that may be less sensitive to chemical exposures.

Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to soil invertebrates at Site 1 now or in the future. Uncertainties associated with this characterization of risks are discussed further in Section 18.

4.4.5. BRAPF Results for Wildlife at Site 1

The refined CSM for Site 1 identifies viability of wildlife an assessment endpoint. The conceptual model identified five representative receptors for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammal (i.e. Jamaican fruit bat), insectivorous bird (i.e. pearly-eyed thrasher), insectivorous mammal (i.e. Antillean ghost-faced bat), and predatory bird (i.e. red-tailed hawk).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL-based benchmarks protective of wildlife;
- comparison of mean case scenario doses ingested through the food web to NOAEL-based and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and
- qualitative evaluation of habitat quality.

Comparison of modeled doses to benchmarks and background are presented in **Table 4-9** through **Table 4-12**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-1 to A-10. Comparisons using mean concentrations were considered the best indicator of population wide risks at the site, and were given the most weight in the weight of evidence evaluation. The comparison of maximum concentrations to benchmarks is the most conservative indicator of risks and do not reflect population-wide conditions, and thus was given less weight, although it is an important indicator for hot spots. While comparison to NOAELs provides a highly conservative indicator of risks, comparison to LOAELs provides a clearer indicator of whether risks are likely to occur. In the weight of evidence, both were considered in conjunction with the other lines of evidence. Other lines of

evidence included comparisons to background, which are an important indicator of the relevance of toxicity and bioavailability assumptions, and mean case scenario comparisons modified based on home range, which are a useful indicator for potential effects to actual wildlife populations.

4.4.5.1. Comparison of Maximum Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
None	4,4-DDE (4.95) 4,4-DDT (2.64) DDTr (7.85)	None	4,4-DDE (5.11) 4,4-DDT (2.73) DDTr (8.12)	None

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
None	None	None	None	None

TRVs were unavailable for carbon disulfide for mammals and acetone, carbon disulfide, and 1,1-dichloroethene for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

4.4.5.2. Comparison of Mean Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The second measurement endpoint evaluated was a comparison of ingested doses for wildlife based on mean EPCs to NOAEL-based TRVs. Doses based on mean EPCs are a more realistic indicator of risk because the mean case scenario reflects exposures across the site and across wildlife populations, which are the focus of the ERA.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	**Insectivorous Mammals**	**Herbivorous Birds**	**Insectivorous Birds**	**Predatory Birds**
None	4,4-DDE (1.41) 4,4-DDT (1.12) DDTr (2.69)	**None**	4,4-DDE (1.46) 4,4-DDT (1.16) DDTr (2.77)	None

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	**Insectivorous Mammals**	**Herbivorous Birds**	**Insectivorous Birds**	**Predatory Birds**
None	None	None	None	None

TRVs were unavailable for carbon disulfide for mammals and acetone, carbon disulfide, and 1,1-dichloroethene for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

4.4.5.3. Comparison of Mean Case Scenario Exposure Estimates to Low-Effects TRVs for Wildlife

The third measurement endpoint evaluated is comparison of exposure estimates based on mean EPCs to LOAEL-based TRVs. LOAELs are a valuable indicator of risk because they provide a bound to NOAELs. Exceeding a NOAEL does not necessarily indicate a risk, because NOAELs, by definition, correspond to no effects, and may not be the highest concentration at which no effects occur. LOAELs provide a clear indication of potential effects and a potential for risk; therefore, comparisons to LOAELs provide an important tool for ERA. Comparisons focus on mean case scenario exposure estimates because are the most relevant estimates for wildlife populations. When mean case scenario doses are compared to LOAEL-based TRVs, the following chemicals exceed:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	**Insectivorous Mammals**	**Herbivorous Birds**	**Insectivorous Birds**	**Predatory Birds**
None	None	None	None	None

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	**Insectivorous Mammals**	**Herbivorous Birds**	**Insectivorous Birds**	**Predatory Birds**
None	None	None	None	None

TRVs were unavailable for carbon disulfide for mammals and acetone, carbon disulfide, and 1,1-dichloroethene for birds. The uncertainty associated with the lack of TRVs is discussed in

Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

4.4.5.4. Comparison of On-Site and Background Exposures as an Indicator of Source-Relatedness and Bioavailability

Background concentration data and associated comparison values (95% UPLs) are available for metals and chlorinated pesticides. Several chlorinated pesticides are COPCs for wildlife listed in **Table 4-9** through **Table 4-12**. Maximum case scenario exposures to pesticides for wildlife are higher than background for current exposure scenarios based on surface soil but lower than background for future exposure scenarios based on subsurface soil.

4.4.5.5. Comparison of Site Size and Receptor Home Range Size

The fifth measurement endpoint evaluated is comparison of site size and receptor home range. The exposure estimates calculated assume that the receptors will be at the site 100% so any prey, soil, and water consumed would be from Site 1. In some cases, the receptor home range will be larger than the site size so the receptor would spend less than 100% of the time at the site, making this assumption overly conservative.

Comparison of site size to receptors' home ranges is presented in Table 3-16 for all RFI Sites including Site 1. The area of this site is associated with a building surrounded with a fence and almost two acres of lawn. The most conservative boundary of the site would be the roads that surround the lawn on all sides. This area is smaller than the home ranges of all the mammalian receptors site; therefore, the risk assessment is a very conservative measure of the exposure since each receptor will likely spend less than 100% of its time at the site. The area bounded by roads is smaller than the home ranges of all the avian receptors except for the pearly-eyed thrasher, an insectivorous bird. A conservative measure of the site area is about 150% larger than the bird's home range, so it is not overly conservative to calculate the risk to the receptor based on it spending 100% of its time at the site. However, if the fence around the building is used as the boundary of the site, the site size is reduced to just over half an acre. All of the receptors have a greater area of home range than this more realistic measure of site size, and the risk assessment is a very conservative measure of the exposure since each receptor will likely spend less than 100% of its time at the site.

4.4.5.6. Evaluation of Habitat Quality

Site 1 consists of approximately two acres or less of mowed monoculture lawn which gently slopes northwest to Toro Creek. The grassy area does not contain any canopy habitat and is surrounded by a fence and roads on all sides. Given the poor quality of this habitat, it is unlikely to provide resources valuable to wildlife, which are more likely to frequent other nearby habitats which are less disturbed such as forested and grassy areas further removed from development.

4.4.5.7. BRAPF Conclusions for Wildlife at Site 1

The risk characterization for wildlife at Site 1 draws from numerous measurement endpoints as lines of evidence for evaluation of the potential for risks to wildlife. First, maximum

concentrations of chemicals were used as EPCs in food web exposure models to estimate doses for each representative receptor species. Doses were then compared to NOAEL-based TRVs. Using maximum EPCs and conservative exposure factors, DDT and its breakdown products (DDTr) exceed TRVs for insectivorous birds and mammals under current and future exposure scenarios. No chemicals exceed TRVs for herbivorous or predatory wildlife.

Next, doses were estimated using mean EPCs and compared to NOAEL-based TRVs. The mean case scenario dose is most representative of population-wide exposures. Using mean EPCs, the same COPCs were identified as were found under the maximum case scenario.

An additional measurement endpoint was the comparison of mean case scenario doses to LOAEL-based TRVs. This comparison identified no chemicals as exceeding LOAELs for any of the feeding guilds.

Another measurement endpoint considered was comparison of the doses of COPCs on-site to doses in off-site areas. While no chemicals were identified as COPCs based on comparisons to LOAELs, it is noted that DDTr exposures were elevated above background for current exposure scenarios based on surface soil but were below background for future exposure scenarios based on subsurface soil.

Home range and habitat quality were also considered. The fenced area of the yard where samples were collected is smaller than the conservatively estimated foraging range for all receptors. This area also provides poor quality habitat. As such, wildlife are likely to spend some of their time foraging in other less disturbed habitats.

In summary, concentrations of DDTr compounds were detected in surface soil and exposure estimates exceed no-effects benchmarks. However, DDTr exposures do not exceed low-effects benchmarks. Also, the site is smaller than the home ranges for most wildlife receptors, and the area provides poor quality habitat for foraging. No COPCs exceeded benchmarks in subsurface soil. Based on this information, COPCs at Site 1 are unlikely to cause risk to wildlife under either current or future scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

4.5. Conclusions for Site 1

The SLERA and refined assessment conducted as part of the BRAPF for Site 1 form the basis for the following conclusions for each refined assessment endpoint:

Viability of Plant Communities - Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to plants at Site 1 and are unlikely to pose risks now or in the future.

Viability of Soil Invertebrate Communities - Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to soil invertebrates at Site 1 and are unlikely to pose risks now or in the future.

Viability of Wildlife Communities - COPCs at Site 1 are unlikely to cause risk to wildlife. Concentrations of DDTr compounds were detected in surface soil and exposure estimates exceed

no-effects benchmarks. However, DDTr exposures do not exceed low-effects benchmarks. Also, the site is smaller than the home ranges for most wildlife receptor, and the area provides poor quality habitat for foraging. No COPCs exceeded benchmarks in subsurface soil. Therefore, risks are unlikely under either current or future scenarios.

5. SITE 2, SWMU 3: PESTICIDES AND CHEMICALS BURIAL TRENCH

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 2 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 5.1), data summarization (Section 5.2), SLERA results (Section 5.3), and BRAPF (Section 5.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 2 (Section 5.5).

5.1. CSM FOR SITE 2

As a result of the Installation Assessment (IA) conducted in 1982 at Fort Buchanan, a suspected disposal site for hazardous materials was identified and is now recognized as SWMU 3, called Site 2. This disposal site was believed to be a trench 6 feet deep, 30 feet wide, and 100 feet long that was reportedly used to dispose one ton of dry pesticides in 1977, as wells as construction debris and trees. The location and existence of the trench has not yet been confirmed; extensive studies performed prior to the RFI and documented in the RFI have not found evidence of its existence. The trench was rumored to be along the perimeter road on the northwest corner of Fort Buchanan. Along the south side of the road, there is a swath of wooded habitat that is typically 150 feet wide and the north side of the road is highly disturbed. The suspected trench area is located in the disturbed open area between the road and the woods. An aerial photograph is presented in **Figure 5-1**. It was suspected that the pesticides chlordane, p,p'-DDE, and heptachlor may have been disposed in the trench. This trench was thought to be a possible source of the TCE found in a plume present in the northwest portion of Fort Buchanan and under portions of the privately held CPR property. The TCE plume is being investigated by Fort Buchanan, and an RFI addressing the plume has been prepared (EA 2009).

The CSM for Site 2 is presented in **Figure 5-2**. The potential chemical source at the site is the trench where organic chemicals may have been buried. Possible COPCs include VOCs, SVOCs, pesticides, PCBs, herbicides, metals, and total petroleum hydrocarbons. There is no evidence of surface disposal, and the RFI determined that, if present, contamination would be located in subsurface soil. If chemicals were disposed in the trench and it was filled in, the primary transport pathway for further migration would be leaching. Therefore, the primary media of concern at the site is subsurface soil. Plants and animals that come in contact with chemicals in soil may uptake chemicals. Dependent upon the chemical and the organism, these chemicals may accumulate in tissue.

There are no complete and significant exposure pathways under current scenarios. Complete and significant exposure pathways under future scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, and wildlife.

5.2. DATA SUMMARIZATION

Eight subsurface samples were taken from Site 2 at various depths, from 4-8 feet to as deep as 36-37 feet. These samples were analyzed for VOCs, SVOCs, herbicides, pesticides, PCBs, and metals. These samples are evaluated in the SLERA and BRAPF. Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 2 are summarized in **Table 3-1**.

5.3. SLERA (Steps 1 & 2) for Site 2

Site 2 consists of terrestrial habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

Subsurface soil concentrations were evaluated for the measurement endpoint. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

5.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 5-1**. The results of this risk calculation is used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Subsurface Soil COPCs

- Arsenic
- Cadmium
- Chromium
- Cobalt
- Copper
- Mercury
- Nickel
- Selenium
- Vanadium
- Zinc
- 4,4-DDE
- 2-methylnaphthalene
- Benzo(a)anthracene
- Chrysene
- Fluorene
- Naphthalene
- LMW PAHs
- HMW PAHs
- Bis(2-ethylhexyl) phthalate
- Dibenzofuran

- Acetone
- Benzene
- Ethylbenzene
- Isobutyl alcohol

5.4. BRAPF (Step 3) for Site 2

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. The SLERA for Site 2 identified 10 metals, 1 pesticide, 3 PAHs, 3 SVOCs, and 4 VOC as COPCs for future terrestrial exposure pathways at Site 2 based on maximum concentrations in surface soil. A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

5.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 2 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

5.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 2 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

Viability of plant communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.

- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the proportion of area used by wildlife to indicate whether exposures are over-estimated.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Refined measurement endpoints are assessed using the data summarized in Section 5.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for surface and subsurface soil as presented in **Table 5-2**. The representative receptors selected for use in evaluating measurement endpoints for Site 2 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

5.4.3. BRAPF for Plants at Site 2

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
  - comparison using maximum EPCs and
  - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations

(i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

5.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 5-3** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

- Arsenic (3.43)
- Chromium (109)
- Cobalt (2.9)
- Mercury (1.27)
- Nickel (1.05)
- Selenium (8.46)
- Vanadium (101)

HQs for arsenic, cobalt, mercury, nickel, and selenium are low and range from 1.05 to 8.46. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of chemicals are likely to fall below low effects levels. When mean EPCs of COPCs were compared to TRVs, none of the contaminant concentrations exceeded TRVs protective of plants. Chemicals without available plant TRVs include 4,4-DDE, dibenzofuran, acetone, benzene, ethylbenzene, and isobutyl alcohol which are typically not toxic to plants. The uncertainty associated with the lack of TRVs is discussed in Section 18.

5.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 5-3**.

Background comparison values are available for metals and organochlorine pesticides. Maximum site concentrations of metals are all higher than background comparison values. Mean site concentrations of metals are lower than background values, indicating that many of the samples contained Site concentrations lower than typically found in background. Less than half the detections are greater than the 95% UPL for background concentrations in all cases. In several cases, it is only one detection is greater than the 95% UPL for background concentrations. DDTr concentrations are lower than those found in background. The uncertainty associated with the lack of TRVs is discussed in Section 18. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

5.4.3.3. Evaluation of Habitat for Plants at Site 2

Site 2 consists of a suspected former trench located in the disturbed open area between the road and the woods. While the woods provide high quality habitat, the open area does not, and is likely to receive chemical inputs from the road and to experience compaction associated with maintenance. Plant communities at the site are likely to be subject to stress from anthropogenic disturbance unrelated to chemical concentrations in soil. Plant communities present in this poor quality habitat are unlikely to include sensitive species, and are more likely to include hardy, opportunistic species.

It is important to note that in evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. Concentrations detected in subsurface soil are used to assess future exposures. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

5.4.3.4. BRAPF Conclusions for Plants at Site 2

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that there are seven metals (arsenic, chromium, cobalt, mercury, nickel, selenium, vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. HQs for arsenic, cobalt, mercury, nickel, and selenium are low and range from 1.05 to 8.46. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of chemicals are likely to fall below low effects levels. When mean concentrations are considered, no COPC concentrations exceed benchmarks.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that the maximum concentrations of these metals exceed background concentrations. Mean site concentrations of metals are lower than background values, indicating that many of the samples contained Site concentrations lower than typically found in background. Less than half the detections are greater than the 95% UPL for background concentrations in all cases. In several cases, it is only one detection is greater than the 95% UPL for background concentrations. Consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to plants may be over-estimated. A third measurement endpoint was evaluation of site habitat. Current site habitat is poor given the nearby presence of a roadbed. Also, evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

There are seven metals (arsenic, chromium, cobalt, mercury, nickel, selenium, vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure

scenarios. However, based on the magnitude of exceedence, values for all metals but chromium are expected to fall below low effects levels. Also, the mean EPC as well as more than half of the chromium and vanadium concentrations are within background. Information regarding local soils indicates that chromium, vanadium, and other metals are associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to plants under future scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

5.4.4. BRAPF for Soil Invertebrates at Site 2

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to soil invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including
    - comparison using maximum EPCs and
    - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

5.4.4.1. Comparison of Chemical Concentrations to Soil Invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 5-4** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

- Arsenic (1.03)
- Chromium (273)
- Mercury (3.80)
- Selenium (1.07)

HQs for arsenic, mercury, and selenium are low and range from 1.03 to 3.80. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following contaminant concentrations exceeded TRVs protective of soil invertebrates.

- Chromium (120)
- Mercury (1.26)

Chemicals without available TRVs include cobalt, vanadium, dibenzofuran, acetone, benzene, ethylbenzene, and isobutyl alcohol. The uncertainty associated with the lack of TRVs is discussed in Section 18.

5.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. Comparisons are presented in **Table 5-4**.

Background comparison values are available for metals and organochlorine pesticides. Maximum site concentrations of metals are all higher than background comparison values. Mean site concentrations of metals are lower than background values, indicating that many of the samples contained Site concentrations lower than typically found in background. Less than half the detections are greater than the 95% UPL for background concentrations in all cases. In several cases, only one detection is greater than the 95% UPL for background concentrations. DDTr concentrations are lower than those found in background. The uncertainty associated with the lack of TRVs is discussed in Section 18.

5.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 2

Site 2 consists of a suspected former trench located in the disturbed open area between the road and the woods. While the woods provide high quality habitat, the open area does not, and is likely to receive chemical inputs from the road and to experience compaction associated with maintenance. Invertebrate communities at the site are likely to be subject to stress from anthropogenic disturbance unrelated to chemical concentrations in soil. As discussed above for plants, evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios is highly conservative because it assumes no change in soil concentrations. This is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

5.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 2

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on soil invertebrate survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of soil invertebrates. This comparison indicated that there are seven metals (arsenic, chromium,

mercury, selenium) in subsurface soil with maximum concentrations exceeding soil invertebrate benchmarks under the future exposure scenarios. HQs for arsenic, mercury, and selenium are low and range from 1.03 to 3.80. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean concentrations are considered, only mercury and chromium concentrations exceed benchmarks.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that the maximum concentrations of these metals exceed background concentrations. However, less than half of the detections exceed background concentrations. A third measurement endpoint was evaluation of site habitat. Current site habitat is poor given the nearby presence of a roadbed. Also, evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

There are four metals (arsenic, chromium, mercury, selenium) in subsurface soil with concentrations exceeding soil invertebrate benchmarks under the future exposure scenarios. Based on magnitude of exceedence, HQs for arsenic, mercury, and selenium are likely to fall below low effects levels. However, the mean EPC as well as more than half of the chromium and vanadium concentrations are within background. Based on magnitude of exceedence, HQs for arsenic, mercury, and selenium are likely to fall below low effects levels. Information regarding local soils indicates that chromium, vanadium, and other metals are associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to soil invertebrates under future scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

5.4.5. BRAPF Results for Wildlife at Site 2

The refined CSM for Site 2 identifies viability of wildlife an assessment endpoint. The conceptual model identified five representative receptors for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammal (i.e. Jamaican fruit bat), insectivorous bird (i.e. pearly-eyed thrasher), insectivorous mammal (i.e. Antillean ghost-faced bat), and predatory bird (i.e. red-tailed hawk).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL-based benchmarks protective of wildlife;
- comparison of mean case scenario doses ingested through the food web to NOAEL-based and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and

- qualitative evaluation of habitat quality.

Comparison of modeled doses to benchmarks and background are presented in **Table 5-5** and **Table 5-6**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-11 to A-15. Comparisons using mean concentrations were considered the best indicator of population wide risks at the site, and were given the most weight in the weight of evidence evaluation. The comparison of maximum concentrations to benchmarks is the most conservative indicator of risks and do not reflect population-wide conditions, and thus was given less weight, although it is an important indicator for hot spots. While comparison to NOAELs provides a highly conservative indicator of risks, comparison to LOAELs provides a clearer indicator of whether risks are likely to occur. In the weight of evidence, both were considered in conjunction with the other lines of evidence. Other lines of evidence included comparisons to background, which are an important indicator of the relevance of toxicity and bioavailability assumptions, and mean case scenario comparisons modified based on home range, which are a useful indicator for potential effects to actual wildlife populations.

5.4.5.1. Comparison of Maximum Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Selenium (2.28)	Cadmium (1.43) Selenium (1.60) Vanadium (3.56)	None	Cadmium (1.21) Vanadium (71.9)	Vanadium (2.89)

TRVs were unavailable for dibenzofuran, ethylbenzene, isobutyl alcohol for mammals and acetone, benzene, dibenzofuran, ethylbenzene, isobutyl alcohol for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

5.4.5.2. Comparison of Mean Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The second measurement endpoint evaluated was a comparison of ingested doses for mammals based on mean EPCs to NOAEL-based TRVs. Doses based on mean EPCs are a more realistic indicator of risk because the mean case scenario reflects exposures across the site and across mammal populations, which are the focus of the ERA.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Selenium (2.07)	Selenium (1.51) Vanadium (1.71)	None	Vanadium (34.6)	Vanadium (1.39)

TRVs were unavailable for dibenzofuran, ethylbenzene, isobutyl alcohol for mammals and acetone, benzene, dibenzofuran, ethylbenzene, isobutyl alcohol for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

5.4.5.3. Comparison of Mean Case Scenario Exposure Estimates to Low-Effects TRVs for Wildlife

The third measurement endpoint evaluated is comparison of exposure estimates based on mean EPCs to LOAEL-based TRVs. LOAELs are a valuable indicator of risk because they provide a bound to NOAELs. Exceeding a NOAEL does not necessarily indicate a risk, because NOAELs, by definition, correspond to no effects, and may not be the highest concentration at which no effects occur. LOAELs provide a clear indication of potential effects and a potential for risk; therefore, comparisons to LOAELs provide an important tool for ERA. Comparisons focus on mean case scenario exposure estimates because are the most relevant estimates for wildlife populations. When mean case scenario doses are compared to LOAEL-based TRVs, the following chemicals exceed:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
None	None	None	Vanadium (17.3)	None

TRVs were unavailable for carbon disulfide for mammals and acetone, carbon disulfide, and 1,1-dichloroethene for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

5.4.5.4. Comparison of On-Site and Background Exposures as an Indicator of Source-Relatedness and Bioavailability

An additional measurement endpoint evaluated for wildlife was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case

of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 5-3**.

Background comparison values are available for metals and organochlorine pesticides. Maximum site concentrations of metals are all higher than background comparison values. Mean site concentrations of metals are lower than background values, indicating that many of the samples contained metal concentrations lower than typically found in background. Less than half the detections are greater than the 95% UPL for background concentrations in all cases. In several cases, only one detection is greater than the 95% UPL for background concentrations. DDTr concentrations are lower than those found in background. The uncertainty associated with the lack of TRVs is discussed in Section 18. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

5.4.5.5. Comparison of Site Size and Receptor Home Range Size

The fifth measurement endpoint evaluated is comparison of site size and receptor home range. The exposure estimates calculated assume that the receptors will be at the site 100% so any prey, soil, and water consumed would be from Site 2. In some cases, the receptor home range will be larger than the site size so the receptor would spend less than 100% of the time at the site, making this assumption overly conservative.

Comparison of site size to receptors' home ranges is presented in **Table 3-16** for all RFI Sites including Site 2. This site is associated with a suspected hazardous waste disposal trench and a large grassy field south of the trench. This site is just over 6 acres and this area is smaller than the home range of all of the mammalian receptors. Therefore, the risk assessment is a very conservative measure of the exposure since each receptor will likely spend less than 100% of its time at the site. The herbivorous and insectivorous bird's home ranges are half the site of the site.

5.4.5.6. Evaluation of Habitat Quality

Site 2 consists of a suspected former trench located in the disturbed open area between the road and the woods. While the woods provide high quality habitat, the open area does not, and is likely to receive chemical inputs from the road and to experience compaction associated with maintenance. However, it is possible that wildlife utilizing the wooded habitats nearby may also use the disturbed area near the road. As discussed above for plants, evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios is highly conservative because it assumes no change in soil concentrations. This is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

5.4.5.7. BRAPF Conclusions for Wildlife at Site 2

The risk characterization for wildlife at Site 2 draws from numerous measurement endpoints as lines of evidence for evaluation of the potential for risks to wildlife. First, maximum concentrations of chemicals were used as EPCs in food web exposure models to estimate doses for each representative receptor species. Doses were then compared to NOAEL-based TRVs.

Using maximum EPCs and conservative exposure factors, cadmium, selenium, and vanadium exceed NOAEL-based TRVs for several feeding guilds under future exposure scenarios.

Next, doses were estimated using mean EPCs and compared to NOAEL-based TRVs. The mean case scenario dose is most representative of population-wide exposures. Using mean EPCs, future case scenario exposure estimates for selenium and vanadium exceeded TRVs.

An additional measurement endpoint was the comparison of mean case scenario doses to LOAEL-based TRVs. This comparison identified vanadium as the only chemical with exposure estimates exceeding LOAELs for insectivorous birds only.

Another measurement endpoint considered was comparison of the doses of COPCs on-site to doses in off-site areas. Maximum exposure estimates for metals were higher than exposure estimates for background areas. However, it is likely that bioavailability and toxicity of metals may be over-estimated based on typical soil types at Fort Buchanan.

Home range and habitat quality were also considered. The field associated with the suspected trench location is smaller than the foraging range for mammals but much larger than that for birds. This area provides poor quality habitat, but is located next to higher quality habitat. As such, wildlife are likely to spend some of their time foraging in other less disturbed habitats. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

It is important to note that the only chemical with mean exposure estimates exceeding both LOAELs and background is vanadium; it exceeds the LOAEL for insectivorous birds. When area use is considered, the HQ of 17.3 drops by half. As discussed in Section 3.3, vanadium is naturally associated with many plinthite soils in the subsurface of tropical soil. This vanadium is naturally occurring and unlikely to be bioavailable. Excavation of plinthite soil for use as a base for habitat would require extensive amendment and mixing due to the dense and nutrient poor nature of this material. Therefore, risk under future scenarios is over-estimated.

Exposure estimates for cadmium, selenium, and vanadium exceed NOAELs. Vanadium is the only COPC for which exposure estimates exceed both LOAELs and background; it exceeds for a single wildlife receptor. There are many factors that decrease the expected risk from vanadium, including the low bioavailability of vanadium in soil; the fact that subsurface soils would not support habitat for wildlife unless amended or mixed, and the existing poor habitat quality of the site. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to wildlife under future scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

5.5. Conclusions for Site 2

The SLERA and refined assessment conducted as part of the BRAPF for Site 2 examined future potential risks from subsurface soils to terrestrial wildlife. This ERA finds the following conclusions:

Viability of Plant Communities - There are seven metals (arsenic, chromium, cobalt, mercury, nickel, selenium, vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. However, based on the magnitude of exceedence, values for all metals but chromium are expected to fall below low effects levels. The mean EPC as well as more than half of the chromium and vanadium concentrations are within background. Information regarding local soils indicates that chromium, vanadium, and other metals are associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to plants under future scenarios.

Viability of Soil Invertebrate Communities - There are four metals (arsenic, chromium, mercury, selenium) in subsurface soil with concentrations exceeding soil invertebrate benchmarks under the future exposure scenarios. Based on magnitude of exceedence, HQs for arsenic, mercury, and selenium are likely to fall below low effects levels. However, the mean EPC as well as more than half of the chromium and vanadium concentrations are within background. Information regarding local soils indicates that chromium, vanadium, and other metals are associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to soil invertebrates under future scenarios.

Viability of Wildlife Communities - Exposure estimates for cadmium, selenium, and vanadium exceed NOAELs. Vanadium is the only COPC for which exposure estimates exceed both LOAELs and background; it exceeds for a single wildlife receptor. There are many factors that decrease the expected risk from vanadium, including the low bioavailability of vanadium in soil; the fact that subsurface soils would not support habitat for wildlife unless amended or mixed, and the existing poor habitat quality of the site. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to wildlife under future scenarios.

6. SITE 3, SWMU 4: SPENT SOLVENTS STORAGE AREA

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 3 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 6.1), data summarization (Section 6.2), SLERA results (Section 6.3), and BRAPF (Section 6.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 3 (Section 6.5).

6.1. CSM FOR SITE 3

Site 3 is located in an area completely covered by asphalt on the southwest portion of the Building 556 yard that was used to store 55-gallon drums of spent solvents. The site is bordered by a parking lot and a road with no vegetation in the vicinity. An aerial photograph is presented in **Figure 6-1**. The containers were stored without any secondary release protection on the asphalt, and supposedly contained hydrogen fluoride. Staining near the site was observed around 1990, after the area had been used for approximately 10 years. The area is flat, with runoff going to the stormwater catch basins. Spent solvents are no longer stored at the site. Site 3 consists of areas where soil is covered by asphalt. The subsurface soil is evaluated in the ERA as a conservative measure in the event that it is brought to the surface and becomes habitat.

The CSM for Site 3 is presented in **Figure 6-2**. The potential chemical source at the site is soil under an asphalt pad where chemicals may have leached from past releases. Possible COPCs include VOCs, SVOCs, pesticides, PCBs, herbicides, metals, and total petroleum hydrocarbons. Given that the site is paved, the primary media of concern at the site is subsurface soil.

There are no complete and significant exposure pathways under current scenarios. Complete and significant exposure pathways under future scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, and wildlife.

6.2. DATA SUMMARIZATION

Eight subsurface soil samples were taken from Site 3 from either 1-2 feet or 2-4 feet below the soil surface underneath the asphalt pad. These samples were analyzed for VOCs, SVOCs, herbicides, pesticides, PCBs, and metals. These samples are evaluated in the SLERA and BRAPF. Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 3 are summarized in **Table 3-1**.

6.3. SLERA (Steps 1 & 2) for Site 3

Site 3 consists of terrestrial habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

Subsurface soil concentrations were evaluated for the measurement endpoint. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

6.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 6-1**. The results of this risk calculation is used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Subsurface Soil COPCs

- Dichlorprop
- Pentachlorophenol
- Aluminum
- Arsenic
- Calcium
- Chromium
- Cobalt
- Copper
- Iron
- Magnesium
- Manganese
- Mercury
- Nickel
- Potassium
- Selenium
- Silver
- Sodium
- Thallium
- Vanadium
- Zinc
- 4,4-DDD
- 4,4-DDE
- 4,4-DDT
- Alpha-chlordane
- Dieldrin
- Endosulfan I
- Heptachlor
- Acetone
- Carbon disulfide

6.4. BRAPF (Step 3) for Site 3

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. The SLERA for Site 3 identified 2 herbicides, 18 metals, 7 pesticides, and 2 VOCs as COPCs for future terrestrial exposure pathways at Site 3 based on maximum concentrations in surface soil. A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

6.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 3 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

6.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 3 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

Viability of plant communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the proportion of area used by wildlife to indicate whether exposures are over-estimated.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Refined measurement endpoints are assessed using the data summarized in Section 6.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for surface and subsurface soil as presented in **Table 6-2**. The representative receptors selected for use in evaluating measurement endpoints for Site 3 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

6.4.3. BRAPF for Plants at Site 3

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
    - comparison using maximum EPCs and
    - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be

interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

6.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 6-3** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

- Aluminum (644)
- Arsenic (6.78)
- Chromium (167)
- Cobalt (3.48)
- Copper (1.05)
- Manganese (58.2)
- Selenium (7.12)
- Thallium (4.00)
- Vanadium (146)

HQs for arsenic, cobalt, copper, selenium, and thallium are low and range from 1.05 to 7.12. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean EPCs of COPCs were compared to TRVs, all of the same COPC concentrations exceeded TRVs protective of plants. Chemicals without available plant TRVs include dichlorprop, calcium, iron, magnesium, potassium, sodium, 4,4-DDD, 4,4-DDE, 4,4-DDT, alpha-chlordane, dieldrin, endosulfan I, heptachlor, acetone, carbon disulfide. The uncertainty associated with the lack of TRVs is discussed in Section 18.

6.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 6-3**.

Background comparison values are available for metals and organochlorine pesticides. With the exception of copper, all of the metals with values exceeding TRVs had concentrations exceeding background comparison values. However, less than half of the detections of aluminum, cobalt, manganese, and thallium exceeded background. DDTr also exceeded background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

6.4.3.3. Evaluation of Habitat for Plants at Site 3

Site 3 provides no current habitat. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated,

exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

6.4.3.4. BRAPF Conclusions for Plants at Site 3

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that there are seven metals (aluminum, arsenic, chromium, cobalt, copper, manganese, selenium, thallium, and vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. HQs for arsenic, cobalt, copper, selenium, and thallium are low and range from 1.05 to 7.12. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean concentrations are considered, the same COPC concentrations exceed benchmarks.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that the maximum concentrations of all of these metals with the exception of copper exceed background concentrations. However, less than half of the detections of aluminum, cobalt, manganese, and thallium exceeded background. Consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to plants may be over-estimated. There is currently no viable habitat at the site. Also, evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

There are seven metals (aluminum, arsenic, chromium, cobalt, copper, manganese, selenium, thallium, and vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. HQs for arsenic, cobalt, mercury, nickel, and selenium are low and concentrations of these metals are expected to fall below low effects levels. Less than half of the detections of aluminum, cobalt, manganese, and thallium exceeded background. Information regarding local soils indicates that chromium, vanadium, and other metals are associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to plants under future scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

6.4.4. BRAPF for Soil Invertebrates at Site 3

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to soil invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including
    - comparison using maximum EPCs and
    - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

6.4.4.1. Comparison of Chemical Concentrations to Soil Invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 6-4** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

- Arsenic (2.03)
- Chromium (418)
- Manganese (28.4)
- Mercury (2.00)

HQs for arsenic and mercury are low and range from 2.00 to 2.03. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean EPCs of COPCs were compared to TRVs, the following contaminant concentrations exceeded TRVs protective of soil invertebrates.

- Arsenic (1.06)
- Chromium (257)
- Manganese (5.92)

Chemicals without available TRVs include dichlorprop, aluminum, calcium, cobalt, iron, magnesium, potassium, silver, sodium, thallium, vanadium, alpha-chlordane, dieldrin, endosulfan I, heptachlor, acetone, and carbon disulfide. The uncertainty associated with the lack of TRVs is discussed in Section 18.

6.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison

provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 6-4**.

Background comparison values are available for metals and organochlorine pesticides. Except for mercury, all of the metals with values exceeding TRVs had concentrations exceeding background comparison values. However, only 2 of the 8 detections of manganese exceed background. DDTr also exceeded background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

6.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 3

Site 3 provides no current habitat. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

6.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 3

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on soil invertebrates' survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of invertebrates. This comparison indicated that there are four metals (arsenic, chromium, manganese, and mercury) in subsurface soil with concentrations exceeding soil invertebrate benchmarks under the future exposure scenarios. HQs for arsenic and mercury are low and range from 2.00 to 2.03. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean concentrations are considered, the same COPC concentrations exceed benchmarks. For chromium, all of the detections exceed benchmarks. However, for manganese, the exceedence is driven by the detections from Boring 1.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that the maximum concentrations of all of these metals, except for mercury, exceed background concentrations. However, only 2 of the 8 detections of manganese exceed background. Consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to plants may be over-estimated. There is currently no viable habitat at the site. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

There are four metals (arsenic, chromium, manganese, and mercury) in subsurface soil with mean concentrations exceeding plant benchmarks under the future exposure scenarios. Mean concentrations of mercury do not exceed benchmarks, and maximum concentrations do not exceed background. HQs for arsenic and mercury are low and concentrations of these metals are expected to fall below low effects levels. Only 2 of the 8 detections of manganese exceed background. Information regarding local soils indicates that chromium is associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to plants under future scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

6.4.5. BRAPF Results for Wildlife at Site 3

The refined CSM for Site 3 identifies viability of wildlife an assessment endpoint. The conceptual model identified five representative receptors for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammal (i.e. Jamaican fruit bat), insectivorous bird (i.e. pearly-eyed thrasher), insectivorous mammal (i.e. Antillean ghost-faced bat), and predatory bird (i.e. red-tailed hawk).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL-based benchmarks protective of wildlife;
- comparison of mean case scenario doses ingested through the food web to NOAEL-based and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and
- qualitative evaluation of habitat quality.

Comparison of modeled doses to benchmarks and background are presented in **Table 6-5** and **Table 6-6**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-16 to A-20. Comparisons using mean concentrations were considered the best indicator of population wide risks at the site, and were given the most weight in the weight of evidence evaluation. The comparison of maximum concentrations to benchmarks is the most conservative indicator of risks and do not reflect population-wide conditions, and thus was given less weight, although it is an important indicator for hot spots. While comparison to NOAELs provides a highly conservative indicator of risks, comparison to LOAELs provides a clearer indicator of whether risks are likely to occur. In the weight of evidence, both were considered in conjunction with the other lines of evidence. Other lines of evidence included comparisons to background, which are an important indicator of the relevance of toxicity and bioavailability assumptions, and mean case scenario comparisons modified based on home range, which are a useful indicator for potential effects to actual wildlife populations.

6.4.5.1. Comparison of Maximum Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (48.4) Manganese (8.11) Selenium (1.88) Thallium (1.57)	Aluminum (164) Selenium (1.41) Thallium (45.0) Vanadium (5.13)	None	Aluminum (6.37) Silver (3.02) Thallium (1.58) Vanadium (104)	Vanadium (4.16)

TRVs were unavailable for calcium, dichlorprop, iron, magnesium, potassium for mammals and calcium, iron, magnesium, potassium, sodium, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

6.4.5.2. Comparison of Mean Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The second measurement endpoint evaluated was a comparison of ingested doses for mammals based on mean EPCs to NOAEL-based TRVs. Doses based on mean EPCs are a more realistic indicator of risk because the mean case scenario reflects exposures across the site and across mammal populations, which are the focus of the ERA.

Dose modeling and comparisons based on mean EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (40.3) Manganese (1.69)	Aluminum (137) Thallium (14.9) Vanadium (3.11)	None	Aluminum (5.30) Silver (1.73) Vanadium (62.8)	Vanadium (2.53)

TRVs were unavailable for calcium, dichlorprop, iron, magnesium, potassium for mammals and calcium, iron, magnesium, potassium, sodium, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

6.4.5.3. Comparison of Mean Case Scenario Exposure Estimates to Low-Effects TRVs for Wildlife

The third measurement endpoint evaluated is comparison of exposure estimates based on mean EPCs to LOAEL-based TRVs. LOAELs are a valuable indicator of risk because they provide a bound to NOAELs. Exceeding a NOAEL does not necessarily indicate a risk, because NOAELs, by definition, correspond to no effects, and may not be the highest concentration at which no effects occur. LOAELs provide a clear indication of potential effects and a potential for risk; therefore, comparisons to LOAELs provide an important tool for ERA. Comparisons focus on mean case scenario exposure estimates because are the most relevant estimates for wildlife populations. When mean case scenario doses are compared to LOAEL-based TRVs, the following chemicals exceed:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (4.03)	Aluminum (13.7) Thallium (1.49) Vanadium (1.56)	None	Vanadium (31.4)	Vanadium (1.26)

TRVs were unavailable for calcium, dichlorprop, iron, magnesium, potassium for mammals and calcium, iron, magnesium, potassium, sodium, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

6.4.5.4. Comparison of On-Site and Background Exposures as an Indicator of Source-Relatedness and Bioavailability

The fourth measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 6-5 and 6-6**. Background comparison values are available for metals and organochlorine pesticides. All of the metals with values exceeding TRVs had concentrations exceeding background comparison values. However, only a quarter of the detections of aluminum and thallium exceeded background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

6.4.5.5. Comparison of Site Size and Receptor Home Range Size

The fifth measurement endpoint evaluated is comparison of site size and receptor home range. The exposure estimates calculated assume that the receptors will be at the site 100% so any prey, soil, and water consumed would be from Site 3. In some cases, the receptor home range will be

larger than the site size so the receptor would spend less than 100% of the time at the site, making this assumption overly conservative.

Comparison of site size to receptors home ranges is presented in **Table 3-16** for all RFI Sites including Site 3. Site 3 occupies approximately 0.17 acres, and is thus smaller than the home range of all of the mammalian and avian receptors. This indicates that exposure models for wildlife may over-estimate risk because receptors consume some of their diet from off-site. If mean case scenario HQs are adjusted to account for the fact that most receptors will be spending less than 2% of their time at the site, HQs for most receptors fall below 1.

6.4.5.6. Evaluation of Habitat Quality

Site 3 provides no current habitat. The area around the site is highly industrialized and unlikely to provide habitat attractive to wildlife. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

6.4.5.7. BRAPF Conclusions for Wildlife at Site 3

The risk characterization for wildlife at Site 3 draws from numerous measurement endpoints as lines of evidence for evaluation of the potential for risks to wildlife. First, maximum concentrations of chemicals were used as EPCs in food web exposure models to estimate doses for each representative receptor species. Doses were then compared to NOAEL-based TRVs. Using maximum EPCs and conservative exposure factors, aluminum, manganese, selenium, silver, thallium, and vanadium exceed NOAEL-based TRVs for several feeding guilds under future exposure scenarios. Next, doses were estimated using mean EPCs and compared to NOAEL-based TRVs. The mean case scenario dose is most representative of population-wide exposures. Using mean EPCs, future case scenario exposure estimates for the same COPCs exceeded TRVs.

An additional measurement endpoint was the comparison of mean case scenario doses to LOAEL-based TRVs. This comparison identified aluminum, thallium, and vanadium as chemicals with exposure estimates exceeding LOAELs.

Another measurement endpoint considered was comparison of the doses of COPCs on-site to doses in off-site areas. Maximum exposure estimates for metals were higher than exposure estimates for background areas. However, it is likely that bioavailability and toxicity of metals may be over-estimated based on typical soil types at Fort Buchanan.

Home range and habitat quality were also considered. The site is currently an asphalt pad. As such, it provides no habitat. It is located in an industrialized area that does not provide sufficient resources to attract wildlife. As such, wildlife are likely to spend some of their time foraging in other less disturbed habitats. When home range is considered, it is evident that risk estimates for

wildlife are highly over-estimated. Incorporation of area use factors into risk estimates would decrease HQs to at or below 1. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

Mean exposure estimates for aluminum, thallium, and vanadium in subsurface soils at Site 3 exceed LOAELs and background. There are many factors that decrease the expected risk from vanadium, including the low bioavailability of vanadium in soil; the fact that subsurface soils would not support habitat for wildlife unless amended or mixed; the fact that the site is currently paved, which further decreases the likelihood of habitat restoration at the site; and the existing poor habitat quality of the site. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to wildlife under future scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

6.5. CONCLUSIONS FOR SITE 3

The SLERA and refined assessment conducted as part of the BRAPF for Site 3 examined future potential risks from subsurface soils to terrestrial wildlife. This ERA finds the following conclusions:

Viability of Plant Communities - There are seven metals (aluminum, arsenic, chromium, cobalt, copper, manganese, selenium, thallium, and vanadium) in subsurface soil at Site 3 with concentrations exceeding plant benchmarks under the future exposure scenarios. HQs for arsenic, cobalt, mercury, nickel, and selenium are low and concentrations of these metals are expected to fall below low effects levels. Less than half of the detections of aluminum, cobalt, manganese, and thallium exceeded background. Information regarding local soils indicates that chromium, vanadium, and other metals are associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 3 do not pose risks to plants under future scenarios.

Viability of Soil Invertebrate Communities - There are four metals (arsenic, chromium, manganese, and mercury) in subsurface soil at Site 3 with mean concentrations exceeding plant benchmarks under the future exposure scenarios. Mean concentrations of mercury do not exceed benchmarks, and maximum concentrations do not exceed background. HQs for arsenic and mercury are low and concentrations of these metals are expected to fall below low effects levels. Only 2 of the 8 detections of manganese exceed background. Information regarding local soils indicates that chromium is associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 3 do not pose risks to plants under future scenarios.

Viability of Wildlife Communities - Mean exposure estimates for aluminum, thallium, and vanadium in subsurface soils at Site 3 exceed LOAELs and background. Area use factors drastically decrease exceedences, with all but one COPC for one receptor falling below 1. There are many factors that decrease the expected risk from vanadium, including the low

bioavailability of vanadium in soil; the fact that subsurface soils would not support habitat for wildlife unless amended or mixed; the fact that the site is currently paved, which further decreases the likelihood of habitat restoration at the site; and the existing poor habitat quality of the site. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at site 3 do not pose risks to wildlife under future scenarios.

7. SITE 4, SWMU 5: PCB TRANSFORMER STORAGE AREA #1

This section presents the SLERA (Steps 1 and 2) of the ERA for RFI Site 4 at Fort Buchanan. This section presents the site-specific CSM (Section 7.1) and risk assessment conclusions for RFI Site 3 (Section 7.4).

7.1. CSM FOR SITE 4

PCB transformers were stored at Site 4 over an asphalt yard immediately north of the DPW building. An aerial photograph is presented in **Figure 7-1**. The area slopes away to the north and drains to El Toro Creek. The area south of the site is highly disturbed with virtually no vegetation but there is approximately 8 acres of wooded habitat north of the site.

The CSM for Site 4 is presented in **Figure 7-2**. The potential chemical source at the site is soil around the asphalt yard where PCBs may have been released from transformers. Possible COPCs include PCBs. PCBs bind to soil and are unlikely to undergo long range transport in vegetated areas with gradual slopes such as that found at Site 4. The primary media of concern at the site is surface soil.

Six surface soil samples taken from Site 4 were analyzed for PCBs. No PCBs were detected. Based on this information there is no evidence of a release. With no release of chemicals to the environment, there are no complete exposure pathways for this site and no data that requires evaluation through risk calculations.

7.2. CONCLUSIONS FOR SITE 4

Based on the lack of any evidence of a release of PCBs from Site 4, the SLERA finds that there is no source, there are no complete exposure pathways, and therefore no risks to ecological receptors.

8. SITE 5, SWMU 6: PCB TRANSFORMER STORAGE AREA #2

This section presents the SLERA (Steps 1 and 2) of the ERA for RFI Site 5 at Fort Buchanan. This section presents the site-specific CSM (Section 7.1) and risk assessment conclusions for RFI Site 3 (Section 7.4).

8.1. CSM FOR SITE 5

An approximately 100 square foot facility south of the DPW building was used in the early 1980s to store transformers (Woodward-Clyde 2007). An aerial photograph is presented in **Figure 8-1**. A spill of two gallons of transformer fluid reportedly occurred in June 1982, and the storage unit was destroyed in 1989 by Hurricane Hugo (Woodward-Clyde 1997). The area has a concrete floor and is now occupied by a metal structure. Transformers are currently not stored on the site, and the concrete slab is surrounded by an asphalt work area (Woodward-Clyde 1997). South of the site is a grassy area with several trees.

The CSM for Site 5 is presented in **Figure 8-2**. The potential chemical source at the site is soil below the concrete floor where PCBs may have been released. Possible COPCs include PCBs. PCBs bind to soil and are unlikely to undergo long range transport in soils. The primary media of concern at the site is subsurface soil.

The four subsurface soil samples taken from Site 5 were analyzed for PCBs. No PCBs were detected. Based on this information there is no evidence of a release. With no release of chemicals to the environment, there are no complete exposure pathways for this site and no data that requires evaluation through risk calculations.

8.2. CONCLUSIONS FOR SITE 5

Based on the lack of any evidence of a release of PCBs from Site 5, the SLERA finds that there is no source, there are no complete exposure pathways, and therefore no risks to ecological receptors.

9. SITE 6: PESTICIDE STORAGE AREA

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 6 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 9.1), data summarization (Section 9.2), SLERA results (Section 9.3), and BRAPF (Section 9.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 6 (Section 9.5).

9.1. CSM FOR SITE 6

A pesticide and herbicide mixing area located on a 5-by-5 foot unbermed concrete slab was used north of Building 138 from 1975 to approximately 1985. Various reports indicated that spills occurred during the mixing of pesticides at the location. Stormwater runoff is to the north of the mixing area into an open-banked drainage ditch. The area is situated on a golf course with manicured grass and currently includes a mixing area that drains to a 500 square foot bermed concrete slab and then a holding tank. An aerial photograph is presented in **Figure 9-1**.

The CSM for Site 6 is presented in **Figure 9-2**. The potential chemical source at the site is the mixing area where pesticides and herbicides may have been mixed and spilled. Possible COPCs include pesticides and herbicides. If chemicals were spilled, the primary transport pathways for further migration include leaching, runoff, and erosion. Given that the site includes a drainage ditch, runoff and erosion may have transported chemicals into sediment. The ditch is ephemeral and does not hold standing water. Therefore, the primary media of concern at the site are surface soil, subsurface soil, and sediment. Bioaccumulation may be a relevant transport pathway. Plants and animals that come in contact with chemicals in soil may uptake chemicals. Dependent upon the chemical and the organism, these chemicals may accumulate in tissue.

Complete and significant exposure pathways under current scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.
- direct contact of aquatic or benthic invertebrates with sediment;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

Pathways for surface soil apply under future scenarios in which subsurface soil has been brought to the surface. Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, aquatic and benthic organisms, and wildlife. Wildlife include species that would be exposed via ingestion of food from both terrestrial and aquatic habitats.

9.2. DATA SUMMARIZATION

Six surface soil samples, six subsurface samples at 2-4 depth, and six sediment samples were taken from Site 6. Three samples of each type were analyzed for organochlorine pesticides and

herbicides and three of each were analyzed for organophosphorus pesticides. These samples are evaluated in the SLERA and BRAPF. Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 6 are summarized in **Table 3-1**.

9.3. SLERA (Steps 1 & 2) for Site 6

Site 6 consists of terrestrial and aquatic habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.
- Viable, functional populations of organisms exposed directly or indirectly to chemicals in sediment.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

- Comparison of maximum concentrations of chemicals in sediment to screening values protective of a broad range of potential receptors, including aquatic and benthic organism and wildlife.

Both surface and subsurface soil concentrations were evaluated for terrestrial measurement endpoints. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

9.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 9-1** and **Table 9-2**. The results of this risk calculation is used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Surface Soil COPCs

- Pentachlorophenol
- 4,4-DDD
- 4,4-DDE
- Alpha-chlordane

Subsurface Soil COPCs

- Pentachlorophenol
- Alpha-chlordane

Sediment COPCs

- Heptachlor epoxide
- 4,4-DDE
- Alpha-chlordane
- Carbon disulfide

9.4. BRAPF (Step 3) for Site 6

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. The SLERA for Site 6 identified 4 COPCs for current terrestrial exposure pathways at Site 6 based on maximum concentrations in surface soil. It identified 2 COPCs for future exposure scenarios based on maximum concentrations in surface soil. It identified 4 COPCs for current exposures to sediment. A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

9.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 6 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.
- Viability of aquatic and benthic organism communities.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

9.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 6 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

<u>Viability of plant communities</u>

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.

- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the proportion of area used by wildlife to indicate whether exposures are over-estimated.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Viability of aquatic and benthic organism communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for aquatic and benthic organisms.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on aquatic and benthic communities.

Refined measurement endpoints are assessed using the data summarized in Section 9.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for surface soil, subsurface soil, and sediment as presented in **Table 9-3** and **Table 9-4**. The representative receptors selected for use in evaluating measurement endpoints for Site 6 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)

- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)
- Benthic and aquatic organisms (multiple species)
- Piscivorous birds (great blue heron)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

9.4.3. BRAPF for Plants at Site 6

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
  - comparison using maximum EPCs and
  - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

9.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

When maximum and mean EPCs of COPCs were compared to TRVs, none of the contaminant concentrations exceeded TRVs protective of plants. Comparisons are presented in **Table 9-5** for surface soil and **Table 9-6** for subsurface soil. Chemicals without available plant TRVs include pesticides, which are typically not toxic to plants. The uncertainty associated with the lack of TRVs is discussed in Section 18.

9.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. Comparisons are presented in **Table 9-5** for surface soil and **Table 9-6** for subsurface soil. Background

comparison values are only available for metals (which were not identified as COPCs) and organochlorine pesticides. Site concentrations of pesticides are higher than those found in background.

9.4.3.3. Evaluation of Habitat for Plants at Site 6

Site 6 consists of approximately 2.4 acres mowed, manicured monoculture lawn which slopes towards the drainage ditch. The grassy area does not contain any canopy habitat and is surrounded by buildings. Plant communities at the site are likely to be subject to stress from anthropogenic disturbance unrelated to chemical concentrations in soil. Plant communities present in this poor quality habitat are unlikely to include sensitive species, and are more likely to include hardy, opportunistic species.

9.4.3.4. BRAPF Conclusions for Plants at Site 6

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that there are no chemicals in soil with concentrations exceeding plant benchmarks under the current scenarios based on surface soil or under future scenarios based on subsurface soil.

Another measurement endpoint evaluated was comparison of EPCs to background concentrations. Background concentrations were only available for organochlorine pesticides. For surface and subsurface soil, only one detection of each pesticide was higher than background concentrations. For surface and subsurface soil, only one detection of each pesticide was higher than background concentrations.

The last measurement endpoint evaluated was qualitative evaluation of habitat quality. Habitat quality at the site consists of a mowed monoculture lawn. Plant communities in such an environment are likely subject to stronger non-chemical stressors than chemical stressors. These plant communities tend to consist of hardy opportunistic species that may be less sensitive to chemical exposures.

Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to plants at Site 6 now or in the future. Uncertainties associated with this characterization of risks are discussed further in Section 18.

9.4.4. BRAPF for Soil Invertebrates at Site 6

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to soil invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including
    - comparison using maximum EPCs and

  - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

9.4.4.1. Comparison of Chemical Concentrations to Soil Invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

When maximum and mean EPCs of COPCs were compared to TRVs, none of the contaminant concentrations exceeded TRVs protective of soil invertebrates grown in soil. Comparisons are presented in **Table 9-7** for surface soil and **Table 9-8** for subsurface soil. Chemicals without available soil invertebrate TRVs include alpha-chlordane, dieldrin, 1,1-dichloroethene, and carbon disulfide. The uncertainty associated with the lack of TRVs is discussed in Section 18.

9.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. Comparisons are presented in **Table 9-7** for surface soil and **Table 9-8** for subsurface soil. Background comparison values are only available for metals (which were not identified as COPCs) and organochlorine pesticides. Site concentrations of pesticides are higher than those found in background. For surface and subsurface soil, only one detection of each pesticide was higher than background concentrations.

9.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 6

Site 6 consists of approximately 2.4 acres mowed, manicured monoculture lawn which slopes towards the drainage ditch. The grassy area does not contain any canopy habitat and is surrounded by buildings. Soil invertebrate communities at the site are likely to be subject to stress from anthropogenic disturbance unrelated to chemical concentrations in soil. Soil Invertebrate communities present in this poor quality habitat are unlikely to include sensitive species, and are more likely to include hardy, opportunistic species.

9.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 6

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on soil invertebrate survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of soil invertebrates. This comparison indicated that there are no chemicals in soil with concentrations exceeding soil invertebrate benchmarks under the current scenarios based on surface soil or under future scenarios based on subsurface soil.

Another measurement endpoint evaluated was comparison of EPCs to background concentrations. Background concentrations were only available for organochlorine pesticides. Site concentrations were higher than background concentrations. For surface and subsurface soil, only one detection of each pesticide was higher than background concentrations.

The last measurement endpoint evaluated was qualitative evaluation of habitat quality. Habitat quality at the site consists of a mowed monoculture lawn. Invertebrate communities in such an environment are likely subject to stronger non-chemical stressors than chemical stressors. These communities tend to consist of hardy opportunistic species that may be less sensitive to chemical exposures.

Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to soil invertebrates at Site 6 now or in the future. Uncertainties associated with this characterization of risks are discussed further in Section 18.

9.4.5. BRAPF Results for Wildlife at Site 6

The refined CSM for Site 6 identifies viability of wildlife an assessment endpoint. The conceptual model identified representative receptors from four taxonomic/guild pairings for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammal (i.e. Jamaican fruit bat), insectivorous bird (i.e. pearly-eyed thrasher), insectivorous mammal (i.e. Antillean ghost-faced bat), predatory bird (i.e. red-tailed hawk), and piscivorous bird (i.e. great blue heron).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL-based benchmarks protective of wildlife;
- comparison of mean case scenario doses ingested through the food web to NOAEL-based and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and
- qualitative evaluation of habitat quality.

Comparison of modeled doses to benchmarks and background are presented in **Table 9-9** through **Table 9-12**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-21 to A-31. Comparisons using mean concentrations were considered the best indicator of population wide risks at the site, and were given the most weight in the weight of evidence evaluation. The comparison of maximum concentrations to benchmarks is the most conservative indicator of risks and do not reflect population-wide conditions, and thus was given less weight, although it is an important indicator for hot spots. While comparison to NOAELs provides a highly conservative indicator of risks, comparison to LOAELs provides a clearer indicator of whether risks are likely to occur. In the weight of evidence, both were considered in conjunction with the other lines of evidence. Other lines of evidence included comparisons to background, which are an important indicator of the relevance of toxicity and bioavailability assumptions, and mean case scenario comparisons modified based on home range, which are a useful indicator for potential effects to actual wildlife populations.

9.4.5.1. Comparison of Exposure Estimates to TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Comparisons based on maximum case scenario exposure estimates found that none of the COPCs had doses equaling or exceeding wildlife NOAEL-based TRVs. As such, none had mean case scenario doses exceeding TRVs.

9.4.5.2. Comparison of On-Site and Background Exposures as an Indicator of Source-Relatedness and Bioavailability

Background concentration data and associated comparison values (95% UPLs) are available for metals and chlorinated pesticides. The maximum case scenario exposures for wildlife to several chlorinated pesticides listed in **Table 9-9** through **Table 9-12** are higher than background for current exposure scenarios based on surface soil but lower than background for future exposure scenarios based on subsurface soil.

9.4.5.3. BRAPF Conclusions for Wildlife at Site 6

The risk characterization for wildlife at Site 6 is based primarily on comparisons of doses calculated using maximum EPCs to NOAEL-based TRVs. These comparisons found that all doses were below TRVs for wildlife representative receptor species. Based on the lack of exceedences, the assessment concludes that COPCs do not drive risks to wildlife at Site 6 under current or future scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

9.4.6. BRAPF for Aquatic and Benthic Organisms at Site 6

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to aquatic and benthic organisms from COPCs in sediment.

The following measurement endpoints were evaluated as indicators of risk to aquatic and benthic organisms:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including
    - comparison using maximum EPCs and
    - comparison of mean EPCs;
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

9.4.6.1. Comparison of Chemical Concentrations to Aquatic and Benthic Organisms TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in sediment to literature-based benchmarks protective of aquatic and benthic organisms. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 9-13** for sediment. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs for aquatic and benthic organisms; the HQ is included in parentheses next to each chemical:

- 4,4-DDE (2.18)
- Heptachlor epoxide (1.66)
- Alpha-chlordane (21.3)

When mean EPCs of COPCs were compared to TRVs, the following contaminant concentrations exceeded TRVs protective of benthic organisms.

- Alpha-chlordane (8.85)

It is important to note that exceedence by alpha chlordane is driven by a single detection above the TRV upgradient of the site.

9.4.6.2. Evaluation of Habitat for Aquatic and Benthic Organisms at Site 6

Aquatic habitat at Site 6 is poor. It consists of an ephemeral ditch which in an area that is mowed. The ditch drains to the concrete-lined El Toro creek. Based on this information, the ditch provides little habitat for aquatic or benthic organisms. Any organisms that utilize the ditch are likely to be hardy, opportunistic species that are resistant to chemical exposure.

9.4.6.3. BRAPF Conclusions for Aquatic and Benthic Organisms at Site 6

The risk characterization section for aquatic and benthic organisms evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on aquatic community viability from chemicals in soil. Two measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of aquatic and benthic organisms. This comparison indicated that there are three pesticides (4,4-DDE, heptachlor epoxide, and alpha-chlordane) in subsurface soil with concentrations exceeding benchmarks for sediment. When mean concentrations are considered, only alpha-chlordane concentrations exceed benchmarks. Exceedence by alpha chlordane is driven by a single detection above the TRV upgradient of the site.

The second measurement endpoint was evaluation of habitat quality. Aquatic habitat at Site 6 is poor, consisting of an ephemeral ditch in a mowed area. Aquatic receptors in the ditch would likely be hardy species and would encounter physical and hydrologic stress greater than chemical stress associated with COPCs.

Based on the limited frequency of exceedence in sediment and the poor quality of habitat in the ditch, the assessment finds that COPCs do not pose significant risks to aquatic and benthic organisms at Site 6, where use of aquatic habitat is limited by adverse conditions and where receptors are likely to be limited to hardy species. Uncertainties associated with this characterization of risks are discussed further in Section 18.

9.5. Conclusions for Site 6

The SLERA and refined assessment conducted as part of the BRAPF for Site 6 form the basis for the following conclusions for each refined assessment endpoint:

Viability of Plant Communities - Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to plants at Site 6 and are unlikely to pose risks now or in the future.

Viability of Soil Invertebrate Communities - Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to soil invertebrates at Site 6 and are unlikely to pose risks now or in the future.

Viability of Wildlife Communities - Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to wildlife at Site 6 and are unlikely to pose risks now or in the future.

Viability of Aquatic and Benthic Organism Communities - Based on poor habitat which limits the potential receptors and physical constraints that limit potential exposure, COPCs at Site 6 do not pose a risk to for aquatic and benthic organisms at Site 6.

10. SITE 7: BUILDING 541

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 7 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 10.1), data summarization (Section 10.2), SLERA results (Section 10.3), and BRAPF (Section 10.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 7 (Section 10.5).

10.1. CSM FOR SITE 7

Building 541 historically housed a hazardous material storage area, and the drainage system discharged directly to a 55-gallon drum containment system located immediately north of the building. The drum is housed within a secondary containment in the form of a concrete berm with an open polyvinyl chloride (PVC) pipe extending to the north. Any overflow from the drum would flow into the berm and subsequently out the pipe; however, no spills have been reported at Building 541. The area around the containment system is grassy, relatively flat, and has no visible staining on the ground surface. The CEMEX Lake and the riparian habitat abutting the water body are located to the east of the site. The rest of the land near the site is highly disturbed. An aerial photograph is presented in **Figure 10-1**.

The CSM for Site 7 is presented in **Figure 10-2**. The potential chemical source at the site is a drum containment system next to a building. Possible COPCs include VOCs, SVOCs, pesticides, PCBs, herbicides, metals, and total petroleum hydrocarbons. There is no evidence of a past release, and the RFI determined that, if present, release would have occurred to surface soil. The primary transport pathways for further migration include leaching, runoff, and erosion. Given the gradual slope and vegetated lawn, runoff and erosion are less important pathways than leaching. Therefore, the primary media of concern at the site are surface soil and subsurface soil. The available data for soil, site topography and land use, and expected behavior of COPCs all indicate against transport to aquatic habitats or transport beyond the area immediately around the building. Bioaccumulation may be a relevant transport pathway. Plants and animals that come in contact with chemicals in soil may uptake chemicals. Dependent upon the chemical and the organism, these chemicals may accumulate in tissue.

Complete and significant exposure pathways under current scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

The same pathways apply under future scenarios in which subsurface soil has been brought to the surface. Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, and wildlife.

10.2. DATA SUMMARIZATION

One surface soil sample and one subsurface soil sample was taken at 2-4 feet depth from Site 7 and both were tested for VOCs, SVOCs, organochlorine pesticides, organophosphorus pesticides, PCBs, herbicides, and metals. These samples are evaluated in the SLERA and BRAPF. Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 7 are summarized in **Table 3-1**.

10.3. SLERA (Steps 1 & 2) for Site 7

Site 7 consists of terrestrial habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

Subsurface soil concentrations were evaluated for the measurement endpoint. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

10.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 10-1** and **10-2**. The results of this risk calculation is used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Surface Soil COPCs

- Aluminum
- Arsenic
- Calcium
- Chromium
- Copper
- Iron
- Magnesium
- Manganese
- Mercury
- Potassium
- Selenium
- Sodium
- Vanadium
- Zinc
- 4,4-DDD
- 4,4-DDE
- 4,4-DDT
- Dieldrin
- Benzo(a)anthracene
- Chrysene
- HMW PAHs

- Acetone

Subsurface Soil COPCs

- Aluminum
- Calcium
- Chromium
- Iron
- Magnesium
- Manganese
- Mercury
- Potassium
- Selenium
- Sodium
- Vanadium
- 1,1-dichloroethene
- Acetone

10.4. BRAPF (Step 3) for Site 7

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. The SLERA for Site 7 identified 14 metals, 4 pesticide, 2 PAHs, and 1 VOCs as COPCs for current exposure scenarios based on surface soil. COPCs for future terrestrial exposure pathways at Site 7 based on maximum concentrations in surface soil include 11 metals and 2 VOCs. A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

10.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 7 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

10.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 7 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

<u>Viability of plant communities</u>

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.
- Compare site-specific exposures to background exposures.

- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the proportion of area used by wildlife to indicate whether exposures are over-estimated.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Refined measurement endpoints are assessed using the data summarized in Section 10.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for surface and subsurface soil as presented in **Table 10-3** and **Table 10-4**. The representative receptors selected for use in evaluating measurement endpoints for Site 7 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

10.4.3. BRAPF for Plants at Site 7

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
    - comparison using maximum EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

10.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 10-5** for surface soil and **Table 10-6** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

- Aluminum (504)
- Arsenic (2.43)
- Chromium (102)
- Manganese (2.63)
- Selenium (3.27)
- Vanadium (81.5)

Future Exposure Scenario (Subsurface Soil)

- Aluminum (204)
- Chromium (14.7)
- Manganese (1.64)
- Mercury (10.0)
- Selenium (11.0)
- Vanadium (19.3)

For surface soil, HQs for arsenic, managanese, and selenium are low and range from 2.43 to 3.27. For subsurface soil, HQs for manganese and mercury are low and range from 1.64 to 10.0. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

Chemicals without available plant TRVs include calcium, iron, magnesium, potassium, sodium, 4,4-DDD, 4,4-DDE, 4,4-DDT, dieldrin, acetone, and 1,1-dichloroethene. The uncertainty associated with the lack of TRVs is discussed in Section 18.

10.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 10-5** and **Table 10-6**.

Background comparison values are available for metals and organochlorine pesticides. Maximum site concentrations of chromium, selenium, and vanadium are higher than background in surface soil, while aluminum, manganese, and mercury are below background comparison values. In subsurface soil, only mercury and selenium are above background, while aluminum, chromium, manganese, and vanadium are below background. This indicates that many of the metals that exceed benchmarks are likely to be naturally occurring and thus unlikely to drive toxicity. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

10.4.3.3. Evaluation of Habitat for Plants at Site 7

Site 7 consists of a small area (approximately 1/5 acre) of mowed, manicured monoculture lawn which slopes towards the drainage ditch. The grassy area does not contain any canopy habitat and is surrounded by buildings. Plant communities at the site are likely to be subject to stress from anthropogenic disturbance unrelated to chemical concentrations in soil. Plant communities present in this poor quality habitat are unlikely to include sensitive species, and are more likely to include hardy, opportunistic species.

It is important to note that in evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. Concentrations detected in subsurface soil are used to assess future exposures. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

10.4.3.4. BRAPF Conclusions for Plants at Site 7

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that there are seven metals (aluminum, arsenic, chromium, manganese, mercury, selenium, vanadium) in surface or subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. For surface soil, HQs for arsenic, manganese, and selenium are low and range from 2.43 to 3.27. For subsurface soil, HQs for manganese and mercury are low and range from 1.64 to 10.0. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that maximum site concentrations of chromium, selenium, and vanadium are higher than background in surface soil, while aluminum, manganese, and mercury are below background comparison values. In subsurface soil, only mercury and selenium are above background, while aluminum, chromium, manganese, and vanadium are below background. . Moreover, consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to plants may be over-estimated. A third measurement endpoint was evaluation of site

habitat. Current site habitat is poor given that the area is a frequently mowed lawn. Also, evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

Concentrations of aluminum, arsenic, chromium, manganese, mercury, selenium, or vanadium exceed benchmarks at Site 7. However, concentrations of arsenic manganese and surface soil in surface soil are expected to fall below low effects levels. Those chemicals with the highest exceedences are consistent with naturally occurring concentrations in soil as indicated by background and association with plinthite soils. Habitat quality is more likely to limit plant communities than chemical stressors, and future scenarios would likely involve drastic changes to soil composition. Based on this information, COPCs in soil are considered not to pose a significant risk to plants at Site 7. Uncertainties associated with this characterization of risks are discussed further in Section 18.

10.4.4. BRAPF for Soil Invertebrates at Site 7

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to Soil Invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of Soil Invertebrates, including
    - comparison using maximum EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

10.4.4.1. Comparison of Chemical Concentrations to Soil invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 10-7** for surface soil and **Table 10-8** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

- Chromium (255)
- Manganese (1.28)
- Mercury (1.20)

Future Exposure Scenario (Subsurface Soil)

- Mercury (30.1)
- Selenium (1.39)

For surface soil, HQs for manganese and mercury are low and range from 1.20 to 1.28. For subsurface soil, the HQ for selenium is 1.39. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

Chemicals without available soil invertebrate TRVs include aluminum, calcium, iron, magnesium, potassium, sodium, vanadium, dieldrin, acetone, and 1,1-dichloroethene. The uncertainty associated with the lack of TRVs is discussed in Section 18.

10.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 10-7** and **Table 10-8**.

Background comparison values are available for metals and organochlorine pesticides. In surface soil, maximum site concentrations of chromium are higher than background, while manganese and mercury are below background comparison values. This indicates that several of the metals that exceed benchmarks are likely to be naturally occurring and thus unlikely to drive toxicity. In subsurface soil, both mercury and selenium are above background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

10.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 7

Site 7 consists of a small area (approximately 1/5 acre) of mowed, manicured monoculture lawn which slopes towards the drainage ditch. Soil invertebrate communities at the site are likely to be subject to stress from anthropogenic disturbance unrelated to chemical concentrations in soil. Soil invertebrate communities present in this poor quality habitat are unlikely to include sensitive species, and are more likely to include hardy, opportunistic species.

It is important to note that in evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. Concentrations detected in subsurface soil are used to assess future exposures. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

10.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 7

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on soil

invertebrate survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of soil invertebrates. This comparison indicated that there are seven metals (chromium, manganese, mercury, selenium) in surface or subsurface soil with concentrations exceeding soil invertebrate benchmarks under the future exposure scenarios. For surface soil, HQs for manganese and mercury are low and range from 1.20 to 1.28. For subsurface soil, the HQ for selenium is 1.39. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that the maximum concentrations of only a subset of these metals exceed background comparison concentrations. Moreover, consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to soil invertebrates may be over-estimated. A third measurement endpoint was evaluation of site habitat. Current site habitat is poor given that the area is a frequently mowed lawn. Also, evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

Concentrations of chromium, manganese, mercury, and selenium exceed benchmarks at Site 7. Manganese and mercury concentrations are below background. selenium exceedences are low and expected to be below low effects levels. Chromium toxicity is expected to be over-estimated based on information regarding local soils which may contain plinthite, a metal-rich material. However, habitat quality is more likely to limit soil invertebrate communities than chemical stressors, and future scenarios would likely involve drastic changes to soil composition. Based on this information, COPCs in soil are considered not to pose a significant risk to soil invertebrates at Site 7. Uncertainties associated with this characterization of risks are discussed further in Section 18.

10.4.5. BRAPF Results for Wildlife at Site 7

The refined CSM for Site 7 identifies viability of wildlife an assessment endpoint. The conceptual model identified five representative receptors for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammal (i.e. Jamaican fruit bat), insectivorous bird (i.e. pearly-eyed thrasher), insectivorous mammal (i.e. Antillean ghost-faced bat), and predatory bird (i.e. red-tailed hawk).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL- and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and
- qualitative evaluation of habitat quality.

Comparison of maximum case scenario doses to LOAELs is given the most weight in the weight of evidence approach because it is the most certain indicator of risks. Comparison of maximum concentrations to NOAELs is given the second most weight as an indicator. Comparisons to background are given the third most weight because they are an important indicator of the relevance of toxicity and bioavailability assumptions. Comparisons using maximum case scenario doses and qualitative evaluation of habitat quality are given less weight. Comparison of modeled doses to benchmarks and background are presented in **Table 10-9** through **Table 10-12**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-32 to A-41.

10.4.5.1. Comparison of Maximum Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (37.9)	Aluminum (128) Vanadium (2.87)	None	Aluminum (4.98) Vanadium (58.0)	Vanadium (2.33)

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (15.3) Selenium (3.03)	Aluminum (51.8) Selenium (1.94)	None	Aluminum (2.01) Vanadium (13.7)	Vanadium (2.89)

TRVs were unavailable for calcium, iron, magnesium, potassium, and sodium for mammals and calcium, iron, magnesium, potassium, sodium, and acetone for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

10.4.5.2. Comparison of Mean Case Scenario Exposure Estimates to Low-Effects TRVs for Wildlife

The second measurement endpoint evaluated is comparison of exposure estimates based on maximum EPCs to LOAEL-based TRVs. LOAELs are a valuable indicator of risk because they

provide a bound to NOAELs. When maximum case scenario doses are compared to LOAEL-based TRVs, the following chemicals exceed:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (3.79)	Aluminum (12.8)	None	Aluminum (4.98) Vanadium (58.0)	Vanadium (2.33)

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (1.53) Selenium (1.31)	Aluminum (5.18)	None	Aluminum (2.01) Vanadium (13.7)	Vanadium (2.89)

TRVs were unavailable for calcium, iron, magnesium, potassium, and sodium for mammals and calcium, iron, magnesium, potassium, sodium, and acetone for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

10.4.5.3. Comparison of On-Site and Background Exposures as an Indicator of Source-Relatedness and Bioavailability

An additional measurement endpoint evaluated for wildlife was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 10-9** through **10-12**.

Background comparison values are available for metals and organochlorine pesticides. Maximum site concentrations of all metals with HQs greater than 1 are lower than background values, indicating that samples contained metal concentrations consistent with those typically found in background.

10.4.5.4. Comparison of Site Size and Receptor Home Range Size

The fourth measurement endpoint evaluated is comparison of site size and receptor home range. The exposure estimates calculated assume that the receptors will be at the site 100% so any prey, soil, and water consumed would be from Site 7. In some cases, the receptor home range will be larger than the site size so the receptor would spend less than 100% of the time at the site, making this assumption overly conservative.

Comparison of site size to receptors' home ranges is presented in **Table 3-16** for all RFI Sites including Site 7. This site is less than a tenth of an acres and is smaller than the home range of all of the mammalian and avian receptors. This indicates that exposure models for wildlife may

over-estimate risk because receptors consume some of their diet from off-site. If area use factors were applied HQs would decrease.

10.4.5.5. Evaluation of Habitat Quality

Site 7 consists of a mowed lawn surrounded by developed areas. Given its small size, this patch of disturbed habitat is unlikely to provide high quality resources for wildlife, which would likely frequent other portions of their home range.

10.4.5.6. BRAPF Conclusions for Wildlife at Site 7

The risk characterization for wildlife at Site 7 draws from numerous measurement endpoints as lines of evidence for evaluation of the potential for risks to wildlife. First, maximum concentrations of chemicals were used as EPCs in food web exposure models to estimate doses for each representative receptor species. Doses were then compared to NOAEL-based TRVs. Using maximum EPCs and conservative exposure factors, aluminum, selenium, and vanadium exceed NOAEL-based TRVs for several feeding guilds under future exposure scenarios. They also exceed LOAEL-based TRVs.

Another measurement endpoint considered was comparison of the doses of COPCs on-site to doses in off-site areas. Maximum exposure estimates for metals were consistent than exposure estimates for background areas, indicating that COPCs with values exceeding benchmarks are natural occurring.

Home range and habitat quality were also considered. The size of the site is smaller than the foraging range for mammals and birds, and the area provides poor quality habitat. Therefore wildlife use of the site would be limited and risks are over-estimated. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

Based on the fact that the only COPCs with exposure estimates that exceed benchmarks demonstrate concentrations below background, COPCs at Site 7 are unlikely to pose risks to wildlife. Uncertainties associated with this characterization of risks are discussed further in Section 18.

10.5. Conclusions for Site 7

The SLERA and refined assessment conducted as part of the BRAPF for Site 7 form the basis for the following conclusions for each refined assessment endpoint:

Viability of Plant Communities - Concentrations of aluminum, arsenic, chromium, manganese, mercury, selenium, or vanadium exceed benchmarks at Site 7. However, concentrations of arsenic manganese and surface soil in surface soil are expected to fall below low effects levels. Those chemicals with the highest exceedences are consistent with naturally occurring concentrations in soil as indicated by background and association with plinthite soils. Habitat quality is more likely to limit plant communities than chemical stressors, and future scenarios

would likely involve drastic changes to soil composition. Based on this information, COPCs in soil are considered not to pose a significant risk to plants at Site 7.

Viability of Soil Invertebrate Communities - Concentrations of chromium, manganese, mercury, and selenium exceed benchmarks at Site 7. Manganese and mercury concentrations are below background. selenium exceedences are low and expected to be below low effects levels. Chromium toxicity is expected to be over-estimated based on information regarding local soils which may contain plinthite, a metal-rich material. However, habitat quality is more likely to limit soil invertebrate communities than chemical stressors, and future scenarios would likely involve drastic changes to soil composition. Based on this information, COPCs in soil are considered not to pose a significant risk to soil invertebrates at Site 7.

Viability of Wildlife Communities – Based on the fact that the only COPCs with exposure estimates that exceed benchmarks demonstrate concentrations below background, COPCs at Site 7 are unlikely to pose risks to wildlife. Uncertainties associated with this characterization of risks are discussed further in Section 18.

11. SITE 8: BUILDING S-563

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 8 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 11.1), data summarization (Section 11.2), SLERA results (Section 11.3), and BRAPF (Section 11.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 3 (Section 11.5).

11.1. CSM FOR SITE 8

Building S-563 was used as an automobile body shop from an undetermined date until a hobby shop began in 1988. Past inspections identified discarded car parts in the storm drains immediately to the west of the building. The building itself discharges along both sides of the building and empty into concrete stormwater junction boxes located on the east side of the building. The EBS identified a PVC pipe extending from the southwest corner of the building and discharging directly into the stormwater drain, with no origin for the pipe (Woodward-Clyde 1997). The building is currently used as a workout room for the National Guard. Two indoor floor drains were observed during a site walkthrough, and it is assumed to flow into the stormwater system. No PVC pipe was observed during the RFI. An aerial photograph is presented in **Figure 11-1**.

The CSM for Site 8 is presented in **Figure 11-2**. The potential sources at Site 8 are former drains and discarded waste. The contaminants of concern at this site are VOCs, SVOCs, total petroleum hydrocarbons, and metals since they may be associated with historic activities at Site 8. If chemicals were disposed immediately outside the building, the primary transport pathways for further migration include leaching, runoff, and erosion. Soil that may have received releases is now paved. Therefore, the primary media of concern at the site is subsurface soil. The available data for soil, site topography and land use, and expected behavior of COPCs all indicate against transport to aquatic habitats or transport beyond the area immediately around the building. The site does not have current habitat that would encourage or support populations of most terrestrial receptors.

There are no complete and significant exposure pathways under current scenarios. Complete and significant exposure pathways under future scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, and wildlife.

11.2. DATA SUMMARIZATION

Four subsurface soil samples from Site 8 were taken at varying depths (1-2 feet to 4-6 feet) and analyzed for VOCs, SVOCs, and metals. These samples were analyzed for VOCs, SVOCs, total petroleum hydrocarbons, and metals. These samples are evaluated in the SLERA and BRAPF.

Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 3 are summarized in **Table 3-1**.

11.3. SLERA (Steps 1 & 2) for Site 3

Site 3 consists of terrestrial habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

Subsurface soil concentrations were evaluated for the measurement endpoint. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

11.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 11-1**. The results of this risk calculation are used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Subsurface Soil COPCs

- Aluminum
- Arsenic
- Calcium
- Chromium
- Cobalt
- Copper
- Iron
- Magnesium
- Manganese
- Mercury
- Potassium
- Selenium
- Sodium
- Vanadium
- Zinc
- 2-butanone
- Acetone
- Carbon disulfide

11.4. BRAPF (Step 3) for Site 8

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. The SLERA for Site 8 identified 15 metals and 3 VOCs as COPCs for future terrestrial exposure

pathways at Site 8 based on maximum concentrations in surface soil. A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

11.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 8 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

11.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 8 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

Viability of plant communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.

- Qualitatively evaluate the proportion of area use by wildlife to indicate whether exposures are over-estimated.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Refined measurement endpoints are assessed using the data summarized in Section 11.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for surface and subsurface soil as presented in **Table 11-2**. The representative receptors selected for use in evaluating measurement endpoints for Site 8 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

11.4.3. BRAPF for Plants at Site 8

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
    - comparison using maximum EPCs and
    - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

11.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 11-3** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

- Aluminum (636)
- Arsenic (1.87)
- Chromium (66.3)
- Cobalt (4.35)
- Manganese (9.32)
- Selenium (4.81)
- Vanadium (69.5)

HQs for arsenic, cobalt, manganese, and selenium are low and range from 1.87 to 9.32. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

- Aluminum (519)
- Arsenic (1.09)
- Chromium (58.4)
- Cobalt (1.85)
- Manganese (3.37)
- Selenium (2.06)
- Vanadium (48.0)

Chemicals without available plant TRVs include calcium, iron, magnesium, potassium, sodium, acetone, 2-butanone, and carbon disulfide. The uncertainty associated with the lack of TRVs is discussed in Section 18.

11.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 11-3**. Of the 7 metals with maximum concentrations exceeding plant TRVs, aluminum, cobalt, manganese and selenium had concentrations exceeding background. For aluminum and managanese, only one of the four samples detected exceeded background. For cobalt and selenium, half of the detections exceeded background. When mean concentrations are compared for these metals, only cobalt and selenium were higher than background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

11.4.3.3. Evaluation of Habitat for Plants at Site 8

Site 8 provides no current habitat. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated,

exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

11.4.3.4. BRAPF Conclusions for Plants at Site 8

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that there are seven metals (aluminum, arsenic, chromium, cobalt, manganese, selenium, and vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. HQs for arsenic, cobalt, manganese, and selenium are low and range from 1.87 to 9.32. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean concentrations are considered, the same COPC concentrations exceed benchmarks.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that aluminum, cobalt, manganese and selenium had concentrations exceeding background. For aluminum and manganese, only one of the four samples detected exceeded background. For cobalt and selenium, half of the detections exceeded background. Mean concentrations of aluminum and manganese are below background. Consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to plants may be over-estimated. There is currently no viable habitat at the site. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

There are seven metals (aluminum, arsenic, chromium, cobalt, manganese, selenium, and vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. Based on low magnitude of exceedence, concentrations of arsenic, cobalt, manganese, and selenium are also expected to fall below low effects levels. Concentrations of arsenic, chromium, and vanadium fall below background. For aluminum and manganese, only one of the four samples detected exceeded background. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to plants under future scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

11.4.4. BRAPF for Soil Invertebrates at Site 8

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to soil invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including

  - comparison using maximum EPCs and
  - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

11.4.4.1. Comparison of Chemical Concentrations to Soil Invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 11-4** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

- Chromium (166)
- Manganese (4.56)
- Mercury (1.50)

HQs for manganese and mercury are low and range from 1.50 to 4.56. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following contaminant concentrations exceeded TRVs protective of soil invertebrates.

- Chromium (146)
- Manganese (1.65)

Chemicals without available TRVs include aluminum, calcium, cobalt, iron, magnesium, potassium, silver, sodium, thallium, vanadium, 2-butanone, acetone, and carbon disulfide. The uncertainty associated with the lack of TRVs is discussed in Section 18.

11.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 11-4**. Of the metals with maximum concentrations exceeding plant TRVs, only maximum concentrations of manganese are greater than background. Concentrations of other metals and all other detected concentrations of

manganese are below background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

11.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 8

Site 8 provides no current habitat. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

11.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 8

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on soil invertebrates' survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of invertebrates. This comparison indicated that there are three metals (chromium, manganese, and mercury) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. HQs for manganese and mercury are low and range from 1.50 to 4.56. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean concentrations are considered, chromium and manganese concentrations exceed benchmarks.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that the maximum concentrations of chromium and mercury are below background concentrations but the maximum concentration of manganese is above background. Consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to soil invertebrates may be over-estimated. There is currently no viable habitat at the site. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

There are three metals (chromium, manganese, and mercury) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. Based on low magnitude of exceedence, concentrations of manganese and mercury are expected to fall below low effects levels. All chromium, all mercury, and all but one manganese detection fall below background. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposures under future scenarios would likely decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to soil invertebrates under future scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

11.4.5. BRAPF Results for Wildlife at Site 8

The refined CSM for Site 8 identifies viability of wildlife an assessment endpoint. The conceptual model identified five representative receptors for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammal (i.e. Jamaican fruit bat), insectivorous bird (i.e. pearly-eyed thrasher), insectivorous mammal (i.e. Antillean ghost-faced bat), and predatory bird (i.e. red-tailed hawk).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL-based benchmarks protective of wildlife;
- comparison of mean case scenario doses ingested through the food web to NOAEL-based and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and
- qualitative evaluation of habitat quality.

Comparison of modeled doses to benchmarks and background are presented in **Table 11-5** and **Table 11-6**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-42 to A-46. Comparisons using mean concentrations were considered the best indicator of population wide risks at the site, and were given the most weight in the weight of evidence evaluation. The comparison of maximum concentrations to benchmarks is the most conservative indicator of risks and do not reflect population-wide conditions, and thus was given less weight, although it is an important indicator for hot spots. While comparison to NOAELs provides a highly conservative indicator of risks, comparison to LOAELs provides a clearer indicator of whether risks are likely to occur. In the weight of evidence, both were considered in conjunction with the other lines of evidence. Other lines of evidence included comparisons to background, which are an important indicator of the relevance of toxicity and bioavailability assumptions, and mean case scenario comparisons modified based on home range, which are a useful indicator for potential effects to actual wildlife populations.

11.4.5.1. Comparison of Maximum Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (47.8) Manganese (1.30) Selenium (1.22)	Aluminum (162) Selenium (1.06) Vanadium (2.45)	None	Aluminum (6.29) Vanadium (49.5)	Vanadium (1.99)

TRVs were unavailable for calcium, dichlorprop, iron, magnesium, potassium for mammals and calcium, iron, magnesium, potassium, sodium, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

11.4.5.2. Comparison of Mean Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The second measurement endpoint evaluated was a comparison of ingested doses for mammals based on mean EPCs to NOAEL-based TRVs. Doses based on mean EPCs are a more realistic indicator of risk because the mean case scenario reflects exposures across the site and across mammal populations, which are the focus of the ERA.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (38.9)	Aluminum (132) Vanadium (1.69)	None	Aluminum (5.13) Vanadium (34.2)	Vanadium (1.37)

TRVs were unavailable for calcium, dichlorprop, iron, magnesium, potassium for mammals and calcium, iron, magnesium, potassium, sodium, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

11.4.5.3. Comparison of Mean Case Scenario Exposure Estimates to Low-Effects TRVs for Wildlife

The third measurement endpoint evaluated is comparison of exposure estimates based on mean EPCs to LOAEL-based TRVs. LOAELs are a valuable indicator of risk because they provide a bound to NOAELs. Exceeding a NOAEL does not necessarily indicate a risk, because NOAELs, by definition, correspond to no effects, and may not be the highest concentration at which no effects occur. LOAELs provide a clear indication of potential effects and a potential for risk; therefore, comparisons to LOAELs provide an important tool for ERA. Comparisons focus on mean case scenario exposure estimates because are the most relevant estimates for wildlife

populations. When mean case scenario doses are compared to LOAEL-based TRVs, the following chemicals exceed:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (3.89)	Aluminum (13.2)	None	Vanadium (17.1)	None

TRVs were unavailable for calcium, iron, magnesium, potassium and 2-butanone for mammals and calcium, iron, magnesium, potassium, sodium, 2-butanone, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

11.4.5.4. Comparison of On-Site and Background Exposures as an Indicator of Source-Relatedness and Bioavailability

The fourth measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 11-5** and **11-6**. Of the metals with maximum concentrations exceeding plant TRVs, aluminum, manganese, and selenium are greater than background. Only half of the detections of selenium exceed background and all other detected concentrations of aluminum and manganese fall below background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

11.4.5.5. Comparison of Site Size and Receptor Home Range Size

The fifth measurement endpoint evaluated is comparison of site size and receptor home range. The exposure estimates calculated assume that the receptors will be at the site 100% so any prey, soil, and water consumed would be from Site 8. In some cases, the receptor home range will be larger than the site size so the receptor would spend less than 100% of the time at the site, making this assumption overly conservative.

Site 8 occupies approximately 0.5 acres. Comparison of this site size to receptors home ranges is presented in **Table 3-16** for all RFI Sites including Site 8. This is smaller than the home range of all mammalian receptors, but not all avian receptors. Risks to mammals are likely over-estimated.

11.4.5.6. Evaluation of Habitat Quality

Site 8 provides no current habitat. The area around the site is highly industrialized and unlikely to provide habitat attractive to wildlife. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would

consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

11.4.5.7. BRAPF Conclusions for Wildlife at Site 8

The risk characterization for wildlife at Site 8 draws from numerous measurement endpoints as lines of evidence for evaluation of the potential for risks to wildlife. First, maximum concentrations of chemicals were used as EPCs in food web exposure models to estimate doses for each representative receptor species. Doses were then compared to NOAEL-based TRVs. Using maximum EPCs and conservative exposure factors, aluminum, manganese, selenium, vanadium exceed NOAEL-based TRVs for several feeding guilds under future exposure scenarios. Next, doses were estimated using mean EPCs and compared to NOAEL-based TRVs. The mean case scenario dose is most representative of population-wide exposures. Using mean EPCs, future case scenario exposure estimates for the aluminum and vanadium exceeded TRVs.

An additional measurement endpoint was the comparison of mean case scenario doses to LOAEL-based TRVs. This comparison identified aluminum and vanadium as chemicals with exposure estimates exceeding LOAELs.

Another measurement endpoint considered was comparison of the doses of COPCs on-site to doses in off-site areas. Mean exposure estimates for metals were higher than exposure estimates for selenium but not for other metals. It is likely that bioavailability and toxicity of selenium may be over-estimated based on typical soil types at Fort Buchanan.

Home range and habitat quality were also considered. The site is currently an asphalt pad. As such, it provides no habitat. It is located in an industrialized area that does not provide sufficient resources to attract wildlife. As such, wildlife are likely to spend some of their time foraging in other less disturbed habitats. When home range is considered, it is evident that risk estimates for wildlife are highly over-estimated. Incorporation of area use factors into risk estimates would decrease HQs for mammals. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

Aluminum, manganese, selenium, and vanadium exceed NOAELs for wildlife. However, exposures for manganese and selenium fall below LOAELs, and exposures for aluminum and vanadium fall below background levels. Application of area use factors decreases exceedences, and it is likely that changes to subsurface soil necessary to make it a base for habitat would decrease exposures. Therefore, subsurface soils at Site 8 are considered unlikely to pose potential risks to wildlife if the site is exposed and re-vegetated. Uncertainties associated with this characterization of risks are discussed further in Section 18.

11.5. Conclusions for Site 8

The SLERA and refined assessment conducted as part of the BRAPF for Site 8 examined future potential risks from subsurface soils to terrestrial wildlife. This ERA finds the following conclusions:

Viability of Plant Communities - There are seven metals (aluminum, arsenic, chromium, cobalt, manganese, selenium, and vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. Based on low magnitude of exceedence, concentrations of arsenic, cobalt, manganese, and selenium are also expected to fall below low effects levels. Concentrations of arsenic, chromium, and vanadium fall below background. For aluminum and manganese, only one of the four samples detected exceeded background. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil ate Site 8 do not pose risks to plants under future scenarios.

Viability of Soil Invertebrate Communities - There are three metals (chromium, manganese, and mercury) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. Based on low magnitude of exceedence, concentrations of manganese and mercury are expected to fall below low effects levels. All chromium, all mercury, and all but one manganese detection fall below background. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposures under future scenarios would likely decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to soil invertebrates under future scenarios.

Viability of Wildlife Communities - Aluminum, manganese, selenium, and vanadium exceed NOAELs for wildlife. However, exposures for manganese and selenium fall below LOAELs, and exposures for aluminum and vanadium fall below background levels. Application of area use factors decreases exceedences, and it is likely that changes to subsurface soil necessary to make it a base for habitat would decrease exposures. Therefore, subsurface soils at Site 8 are considered unlikely to pose potential risks to wildlife if the site is exposed and re-vegetated.

12. SITE 9: USED OIL STAGING AREA

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 9 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 12.1), data summarization (Section 12.2), SLERA results (Section 12.3), and BRAPF (Section 12.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 9 (Section 12.5).

12.1. CSM FOR SITE 9

Site 9 is located within an asphalt work area but a grassy area with several trees is located south of the site. The EBS (Woodward-Clyde 1997) noted that a used oil staging area existed south of Building T-552 (DPW yard). During the inspection, eight 55-gallon drums of used oil were observed. Prior to secondary containment being installed around the drums, staining of the soils was observed. Historical photographs depict the site as being gravel-covered, with drums staged throughout the site. An aerial photograph is presented in **Figure 12-1**.

The CSM for Site 9 is presented in **Figure 12-2**. The potential sources at Site 9 are possible releases from drums to soil. The contaminants of concern at this site are VOCs, SVOCs, pesticides, PCBs, herbicides, total petroleum hydrocarbons, and metals. If chemicals were released to soil prior to installation of the gravel pad, the primary transport pathways for further migration would have included leaching, runoff, and erosion. Soil that may have received releases is now under gravel and containment structures. Therefore, the primary media of concern at the site is subsurface soil. The site does not have current habitat that would encourage or support populations of most terrestrial receptors.

There are no complete and significant exposure pathways under current scenarios. Complete and significant exposure pathways under future scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, and wildlife.

12.2. DATA SUMMARIZATION

Six subsurface soil samples from Site 9 were analyzed for VOCs, SVOCs, organochlorine pesticides, organophosphorus pesticides, PCBs, herbicides, and metals. These samples are evaluated in the SLERA and BRAPF. Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 9 are summarized in **Table 3-1**.

12.3. SLERA (Steps 1 & 2) for Site 9

Site 9 consists of terrestrial habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

Subsurface soil concentrations were evaluated for the measurement endpoints. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

12.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 12-1**. The results of this risk calculation are used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Subsurface Soil COPCs

- Aluminum
- Arsenic
- Barium
- Calcium
- Chromium
- Cobalt
- Copper
- Iron
- Magnesium
- Manganese
- Mercury
- Potassium
- Selenium
- Sodium
- Vanadium
- Zinc
- Acetone

12.4. BRAPF (Step 3) for Site 9

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. The SLERA for Site 9 identified 16 metals and 1 VOCs as COPCs for future terrestrial exposure pathways at Site 9 based on maximum concentrations in surface soil. A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

12.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 9 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

12.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 9 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

Viability of plant communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the proportion of area use by wildlife to indicate whether exposures are over-estimated.

- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Refined measurement endpoints are assessed using the data summarized in Section 12.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for surface and subsurface soil as presented in **Table 12-2**. The representative receptors selected for use in evaluating measurement endpoints for Site 9 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

12.4.3. BRAPF for Plants at Site 9

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
  - comparison using maximum EPCs and
  - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

12.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly

relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 12-3** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

- Aluminum (455)
- Arsenic (10.5)
- Chromium (163)
- Cobalt (8.00)
- Copper (1.25)
- Manganese (32.5)
- Mercury (1.47)
- Selenium (20.6)
- Vanadium (111)

HQs for cobalt, copper, and mercury are low and range from 1.25 to 8.00. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

- Aluminum (402)
- Arsenic (5.59)
- Chromium (94.2)
- Cobalt (2.14)
- Manganese (7.86)
- Selenium (8.40)
- Vanadium (90.7)

Chemicals without available plant TRVs include calcium, iron, magnesium, potassium, sodium, and acetone. The uncertainty associated with the lack of TRVs is discussed in Section 18.

12.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 12-3**. Of the 7 metals with maximum and mean concentrations exceeding plant TRVs, all but aluminum had concentrations exceeding background. Less than half of the detected concentrations of manganese exceed background. Of the remaining metals, a majority of the detections exceed background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

12.4.3.3. Evaluation of Habitat for Plants at Site 9

Site 9 provides no current habitat. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

12.4.3.4. BRAPF Conclusions for Plants at Site 9

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival,

growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that there are nine metals (aluminum, arsenic, chromium, cobalt, copper, manganese, mercury, selenium, and vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. HQs for cobalt, copper, and mercury are low and range from 1.25 to 8.00. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean concentrations are considered, copper and mercury fall below benchmarks. Generally, the exceedences of the remaining metals are widespread within the site.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that the maximum concentrations of all 9 metals but aluminum exceed background concentrations. Only the maximum concentration of copper and mercury exceed background and less than half of the detected concentrations of manganese exceed background. Consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to plants may be over-estimated. There is currently no viable habitat at the site. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

Concentrations of aluminum, arsenic, chromium, cobalt, copper, manganese, mercury, selenium, and vanadium exceed benchmarks for plants. Of these, maximum HQs, for cobalt, copper, and mercury are low and their concentrations are expected to fall below low effects levels. Mean concentrations of arsenic are low and expected to fall below low effects levels. Concentrations of aluminum are below background. Soil types at Site 9 are likely to limit bioavailability of chromium and selenium. There is no current habitat for plants at Site 9. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 9 do not pose risks to plants under future exposure scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

12.4.4. BRAPF for Soil Invertebrates at Site 9

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to soil invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including
    - comparison using maximum EPCs and
    - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

12.4.4.1. Comparison of Chemical Concentrations to Soil Invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 12-4** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

- Arsenic (3.14)
- Chromium (408)
- Copper (1.10)
- Manganese (15.9)
- Mercury (4.40)
- Selenium (2.61)

HQs for arsenic, copper, mercury, and selenium are low and range from 1.10 to 4.40. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following contaminant concentrations exceeded TRVs protective of soil invertebrates.

- Arsenic (1.68)
- Chromium (236)
- Manganese (3.84)
- Mercury (1.06)
- Selenium (1.07)

Chemicals without available TRVs include aluminum, calcium, cobalt, iron, magnesium, potassium, silver, sodium, thallium, vanadium, and acetone. The uncertainty associated with the lack of TRVs is discussed in Section 18.

12.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 12-4**. All of the metals with maximum concentrations exceeding invertebrate TRVs are also greater than background. Mean concentrations of all the metals but mercury are above background. However, only 1 or 2 of the 6 detections of copper, manganese, and mercury exceed background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

12.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 9

Site 9 provides no current habitat. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

12.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 9

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on soil invertebrates survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of invertebrates. This comparison indicated that there are six metals (arsenic, chromium, copper, manganese, mercury, selenium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. HQs for arsenic, copper, mercury, and selenium are low and range from 1.10 to 4.40. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean concentrations are considered, the same COPCs exceed benchmarks with the exception of copper. The exceedences of chromium and manganese are widespread.

Comparison of EPCs to background concentrations was evaluated as another measurement endpoint. All of the metals with maximum concentrations exceeding invertebrate TRVs are greater than background. Only 1 or 2 of the 6 detections of copper, manganese, and mercury exceed background. Consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to soil invertebrates may be over-estimated. There is currently no viable habitat at the site. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

Concentrations of arsenic, chromium, copper, manganese, mercury, and selenium exceed benchmarks for soil invertebrates. Of these, maximum HQs for arsenic, copper, mercury, and selenium are low and their concentrations are expected to fall below low effects levels. Concentrations of aluminum are below background. Only 1 or 2 of the 6 detections of copper, manganese, and mercury exceed background and soil types at Site 9 are likely to limit bioavailability of chromium. There is no current habitat for soil invertebrates at Site 9. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 9 do not pose risks to soil invertebrates under future exposure scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

12.4.5. BRAPF Results for Wildlife at Site 9

The refined CSM for Site 9 identifies viability of wildlife an assessment endpoint. The conceptual model identified five representative receptors for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammal (i.e. Jamaican fruit bat), insectivorous bird (i.e. pearly-eyed thrasher), insectivorous mammal (i.e. Antillean ghost-faced bat), and predatory bird (i.e. red-tailed hawk).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL-based benchmarks protective of wildlife;
- comparison of mean case scenario doses ingested through the food web to NOAEL-based and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and
- qualitative evaluation of habitat quality.

Comparison of modeled doses to benchmarks and background are presented in **Table 12-5** and **Table 12-6**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-42 to A-46. Comparisons using mean concentrations were considered the best indicator of population wide risks at the site, and were given the most weight in the weight of evidence evaluation. The comparison of maximum concentrations to benchmarks is the most conservative indicator of risks and do not reflect population-wide conditions, and thus was given less weight, although it is an important indicator for hot spots. While comparison to NOAELs provides a highly conservative indicator of risks, comparison to LOAELs provides a clearer indicator of whether risks are likely to occur. In the weight of evidence, both were considered in conjunction with the other lines of evidence. Other lines of evidence included comparisons to background, which are an important indicator of the relevance of toxicity and bioavailability assumptions, and mean case scenario comparisons modified based on home range, which are a useful indicator for potential effects to actual wildlife populations.

12.4.5.1. Comparison of Maximum Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (34.2) Manganese (4.53) Selenium (6.05)	Aluminum (116) Selenium (3.07) Vanadium (3.91)	None	Aluminum (4.50) Arsenic (1.09) Selenium (1.53) Vanadium (79.1)	• Vanadium (3.18)

TRVs were unavailable for calcium, dichlorprop, iron, magnesium, potassium for mammals and calcium, iron, magnesium, potassium, sodium, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

12.4.5.2. Comparison of Mean Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The second measurement endpoint evaluated was a comparison of ingested doses for mammals based on mean EPCs to NOAEL-based TRVs. Doses based on mean EPCs are a more realistic indicator of risk because the mean case scenario reflects exposures across the site and across mammal populations, which are the focus of the ERA.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (30.2) Manganese (1.10) Selenium (2.26)	Aluminum (102) Selenium (1.59) Vanadium (3.20)	None	Aluminum (3.97) Vanadium (6.46)	Vanadium (2.59)

TRVs were unavailable for calcium, iron, magnesium, potassium for mammals and calcium, iron, magnesium, potassium, sodium, and acetone for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

12.4.5.3. Comparison of Mean Case Scenario Exposure Estimates to Low-Effects TRVs for Wildlife

The third measurement endpoint evaluated is comparison of exposure estimates based on mean EPCs to LOAEL-based TRVs. LOAELs are a valuable indicator of risk because they provide a bound to NOAELs. Exceeding a NOAEL does not necessarily indicate a risk, because NOAELs, by definition, correspond to no effects, and may not be the highest concentration at which no effects occur. LOAELs provide a clear indication of potential effects and a potential for risk;

therefore, comparisons to LOAELs provide an important tool for ERA. Comparisons focus on mean case scenario exposure estimates because are the most relevant estimates for wildlife populations. When mean case scenario doses are compared to LOAEL-based TRVs, the following chemicals exceed:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	**Insectivorous Mammals**	**Herbivorous Birds**	**Insectivorous Birds**	**Predatory Birds**
Aluminum (3.02)	Aluminum (10.2)	None	Vanadium (32.3)	Vanadium (1.3)

TRVs were unavailable for calcium, iron, magnesium, and potassium for mammals and calcium, iron, magnesium, potassium, sodium, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

12.4.5.4. Comparison of On-Site and Background Exposures as an Indicator of Source-Relatedness and Bioavailability

The fourth measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 12-5** and **Table 12-6**. Of the metals with maximum concentrations exceeding wildlife NOAELs, aluminum has no concentrations above background and only 2 of 6 of the manganese detections exceed background. A majority of the arsenic, selenium, and vanadium concentrations exceed background.

12.4.5.5. Comparison of Site Size and Receptor Home Range Size

The fifth measurement endpoint evaluated is comparison of site size and receptor home range. The exposure estimates calculated assume that the receptors will be at the site 100% so any prey, soil, and water consumed would be from Site 9. In some cases, the receptor home range will be larger than the site size so the receptor would spend less than 100% of the time at the site, making this assumption overly conservative.

Comparison of this site size to receptors home ranges is presented in **Table 3-16** for all RFI Sites including Site 9. Site 9 occupies approximately 0.15 acres. This is smaller than the home range of all mammalian and avian receptors. Therefore risks to wildlife are over-estimated and risk estimates would decrease if area use factors were applied.

12.4.5.6. Evaluation of Habitat Quality

Site 9 provides no current habitat. The area around the site is highly industrialized and unlikely to provide habitat attractive to wildlife. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would

consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

12.4.5.7. BRAPF Conclusions for Wildlife at Site 9

The risk characterization for wildlife at Site 9 draws from numerous measurement endpoints as lines of evidence for evaluation of the potential for risks to wildlife. First, maximum concentrations of chemicals were used as EPCs in food web exposure models to estimate doses for each representative receptor species. Doses were then compared to NOAEL-based TRVs. Using maximum EPCs and conservative exposure factors, aluminum, arsenic, manganese, selenium, and vanadium exceed NOAEL-based TRVs for several feeding guilds under future exposure scenarios. Next, doses were estimated using mean EPCs and compared to NOAEL-based TRVs. The mean case scenario dose is most representative of population-wide exposures. Using mean EPCs, future case scenario exposure estimates for the same COPCs exceeded TRVs.

An additional measurement endpoint was the comparison of mean case scenario doses to LOAEL-based TRVs. This comparison identified aluminum and vanadium as the only chemicals with exposure estimates exceeding LOAELs.

Another measurement endpoint considered was comparison of the doses of COPCs on-site to doses in off-site areas. Mean exposure estimates for metals were lower than background. Home range and habitat quality were also considered. The site is currently paved. As such, it provides no habitat. It is located in an industrialized area that does not provide sufficient resources to attract wildlife. As such, wildlife are likely to spend some of their time foraging in other less disturbed habitats. When home range is considered, it is evident that risk estimates for wildlife are highly over-estimated. Incorporation of area use factors into risk estimates would decrease HQs for mammals. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

While wildlife exposures exceed no-effects benchmarks for aluminum, arsenic, manganese, selenium, and vanadium, none exceed both low-effects benchmarks and background. Consideration of area use factors, habitat quality, and changes that would occur to subsurface soil further decrease the likelihood of risk. Therefore, subsurface soils at Site 9 are considered unlikely to pose potential risks to wildlife if the site is exposed and re-vegetated. Future use assumptions are highly uncertain, and it expected that soil concentrations may decrease. Uncertainties associated with this characterization of risks are discussed further in Section 18.

1.1. Conclusions for Site 9

The SLERA and refined assessment conducted as part of the BRAPF for Site 9 examined future potential risks from subsurface soils to terrestrial wildlife. This ERA finds the following conclusions:

Viability of Plant Communities - Concentrations of aluminum, arsenic, chromium, cobalt, copper, manganese, mercury, selenium, and vanadium exceed benchmarks for plants. Of these, maximum HQs, for cobalt, copper, and mercury are low and their concentrations are expected to

fall below low effects levels. Mean concentrations of arsenic are low and expected to fall below low effects levels. Concentrations of aluminum are below background. Soil types at Site 9 are likely to limit bioavailability of chromium and selenium. There is no current habitat for plants at Site 9. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 9 do not pose risks to plants under future exposure scenarios.

Viability of Soil Invertebrate Communities - Concentrations of arsenic, chromium, copper, manganese, mercury, and selenium exceed benchmarks for soil invertebrates. Of these, maximum HQs for arsenic, copper, mercury, and selenium are low and their concentrations are expected to fall below low effects levels. Concentrations of aluminum are below background. Only 1 or 2 of the 6 detections of copper, manganese, and mercury exceed background and soil types at Site 9 are likely to limit bioavailability of chromium. There is no current habitat for soil invertebrates at Site 9. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 9 do not pose risks to soil invertebrates under future exposure scenarios.

Viability of Wildlife Communities - While wildlife exposures exceed no-effects benchmarks for aluminum, arsenic, manganese, selenium, and vanadium, none exceed both low-effects benchmarks and background. Consideration of area use factors, habitat quality, and changes that would occur to subsurface soil further decrease the likelihood of risk. Therefore, subsurface soils at Site 9 are considered unlikely to pose potential risks to wildlife if the site is exposed and re-vegetated. Future use assumptions are highly uncertain, and it expected that soil concentrations may decrease.

13. SITE 10: 65TH ARMY RESERVE COMMAND REFUELING AREA

This section presents the SLERA (Steps 1 and 2) of the ERA for RFI Site 10 at Fort Buchanan. This section presents the site-specific CSM (Section 13.1) and risk assessment conclusions for RFI Site 10 (Section 13.2).

13.1. CSM FOR SITE 10

The EBS noted that a spill occurred in the refueling area in May 1995, staining approximately six square feet of soil. Sampling conducted following the removal of the stained area reported TPH concentrations of up to 25,000 milligrams per kilogram (mg/kg), which exceeds PREQB's recommended criteria for TPH in soil of 100 mg/kg. Currently, a concrete pad approximately 3-6 feet thick exists over the top of the stained soil location. No signs of a release are visible (Woodward-Clyde 1997). The area is relatively flat and surrounded on three sides by a parking lot, buildings and a road. West of the concrete pad is a grassy area. An aerial photograph is presented in **Figure 13-1**.

The CSM for Site 10 is presented in **Figure 13-2**. The potential chemical source at the site is a past spill of fuel in a small area of six square feet. Possible COPCs include VOCs, SVOCs, herbicides, pesticides, PCBs, and metals. There is no evidence of a past release, and the RFI determined that, if present, release would have occurred to surface soil. The primary transport pathways for further migration include leaching, runoff, and erosion. Given the gradual slope and vegetated lawn, runoff and erosion are less important pathways than leaching. Therefore, the primary media of concern at the site are surface soil and subsurface soil. The available data for soil, site topography and land use, and expected behavior of COPCs all indicate against transport to aquatic habitats or transport beyond the area immediately around the site. Complete and significant exposure pathways under current scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

The same pathways apply under future scenarios in which subsurface soil has been brought to the surface. Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, and wildlife.

13.2. DATA SUMMARIZATION

Three surface soil and three subsurface soil samples taken at 2-4 feet depth from Site 10 were analyzed for VOCs, SVOCs, herbicides, pesticides, PCBs, and metals. These samples are evaluated in the SLERA and BRAPF. Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 10 are summarized in **Table 3-1**.

13.3. SLERA (Steps 1 & 2) for Site 10

Site 10 consists of terrestrial habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

Surface and subsurface soil concentrations were evaluated for the measurement endpoint. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

13.3.1. SLERA and BRAPF for Site 10

Only two chemicals were detected at Site 10. Acetone was detected in surface soil, and acetone and carbon disulfide were detected in subsurface soil. Acetone and carbon disulfide were detected at very low concentrations near reporting limits. There are no screening values for these chemicals. Therefore, both were carried forward into the BRAPF. While exposure modeling was performed for both chemicals using methods documented in Section 3.3 (**Table 13-1** through **Table 13-12**; Tables A-52 to A-61 in Attachment A), there are no plant, soil invertebrate, or avian TRVs available to evaluate these compounds. There is a mammalian TRV for acetone, and all modeled doses were below it. Lacking comparison values, a qualitative evaluation was conducted of toxicity and source-relatedness.

Acetone is a VOC. It is a common lab contaminant of samples as it is used as a solvent in many standard analyses. Acetone is produced naturally by plants is a natural component of some plant and animal tissues (USNLM, 2012). As such, it is commonly metabolized by biota and is relatively non-toxic as indicated by EC50 and LC50 values of 1,000 to 10,000 ppb (USNLM, 2012). Based on this information, it is unlikely that the concentrations of 70 ppb or less detected at Site 10 would cause risks to ecological receptors.

Carbon disulfide is a VOC. It is a naturally occurring compound produced by plants and by microbial degradation of organic matter (USNLM, 2012). Carbon disulfide is commonly encountered by biota in the environment and is relatively non-toxic as indicated by EC50 and LC50 values of over 1,000 ppb (USNLM, 2012). Based on this information, it is unlikely that the detected concentrations of 1.3 ppb or less detected at Site 10 would cause risks to ecological receptors.

13.3.2. Conclusions for Site 10

At Site 10, only two chemicals were detected in environmental media: acetone and carbon disulfide. Both chemicals are commonly produced by plants and microbes in natural environments and were detected at very low concentrations near reporting limits. Toxicity data for these chemicals indicate that they are relatively non-toxic to ecological receptors likely to be found at the site. Therefore it is highly unlikely that COPCs in soil at Site 10 pose risk to ecological receptors.

14. SITE 11: HEAVY EQUIPMENT STORAGE AREA

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 11 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 14.1), data summarization (Section 14.2), SLERA results (Section 14.3), and BRAPF (Section 14.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 11 (Section 14.5).

14.1. CSM FOR SITE 11

Site 11 is located within an asphalt work area but a grassy area with several trees is located south of the site. An aerial photograph is presented in **Figure 14-1**. Southwest of the DPW building (T-552) is a heavy equipment storage area of approximately 4,000 square feet. The EBS noted the release of various petroleum products from the equipment, which has resulted in obvious soil staining at the site. The site has been paved with asphalt.

The CSM for Site 11 is presented in **Figure 14-2**. The potential chemical source at the site is soil that may have received inputs from spilled petroleum hydrocarbons. Possible COPCs include VOCs, PCBs, metals, and total petroleum hydrocarbons. The potential source area has been paved over. Therefore, the primary medium of concern at the site is subsurface soil. The available data for soil, site topography and land use, and expected behavior of COPCs all indicate against transport to aquatic habitats or transport beyond the area immediately around the building. Bioaccumulation may be a relevant transport pathway. Plants and animals that come in contact with chemicals in soil may uptake chemicals. Dependent upon the chemical and the organism, these chemicals may accumulate in tissue.

There are no complete and significant exposure pathways under current scenarios. Complete and significant exposure pathways under future scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, and wildlife.

14.2. DATA SUMMARIZATION

Four subsurface soil samples taken at 2-4 feet depths from Site 11 were analyzed for VOCs, PCBs, metals, and total petroleum hydrocarbons. These samples are evaluated in the SLERA and BRAPF. Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 11 are summarized in **Table 3-1**.

14.3. SLERA (Steps 1 & 2) for Site 11

Site 11 consists of terrestrial habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

Subsurface soil concentrations were evaluated for the measurement endpoint. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

14.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 14-1**. The results of this risk calculation is used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Subsurface Soil COPCs

- Aluminum
- Arsenic
- Calcium
- Chromium
- Cobalt
- Copper
- Iron
- Magnesium
- Manganese
- Mercury
- Potassium
- Selenium
- Sodium
- Vanadium
- Zinc
- Acetone

14.4. BRAPF (Step 3) for Site 11

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. COPCs for future terrestrial exposure pathways at Site 11 based on maximum concentrations in surface soil include 11 metals and 2 VOCs. A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

14.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 11 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

14.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 11 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

Viability of plant communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the proportion of area used by wildlife to indicate whether exposures are over-estimated.

- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Refined measurement endpoints are assessed using the data summarized in Section 14.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for subsurface soil as presented in **Table 14-2**. The representative receptors selected for use in evaluating measurement endpoints for Site 11 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

14.4.3. BRAPF for Plants at Site 11

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
  - comparison using maximum EPCs and
  - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

14.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly

relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 14-3** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

- Aluminum (478)
- Arsenic (6.61)
- Chromium (140)
- Cobalt (1.82)
- Manganese (13.8)
- Selenium (8.27)
- Vanadium (121)

HQs for arsenic, cobalt, and selenium are low and range from 1.82 to 8.27. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

- Aluminum (449)
- Arsenic (4.34)
- Chromium (101)
- Manganese (4.16)
- Selenium (4.95)
- Vanadium (94.1)

Chemicals without available plant TRVs include calcium, iron, magnesium, potassium, sodium, and acetone. The uncertainty associated with the lack of TRVs is discussed in Section 18.

14.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 14-3**. Of the 7 metals with maximum concentrations exceeding plant TRVs, all but aluminum had concentrations exceeding background. When mean concentrations are compared, all but aluminum and manganese had concentrations exceeding background. Only 1 of the 4 detected concentrations of cobalt and manganese exceeded background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

14.4.3.3. Evaluation of Habitat for Plants at Site 11

Site 11 provides no current habitat. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

14.4.3.4. BRAPF Conclusions for Plants at Site 11

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated.

The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that there are seven metals (aluminum, arsenic, chromium, cobalt, manganese, selenium, and vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. HQs for arsenic, cobalt, and selenium are low and range from 1.82 to 8.27. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean concentrations are considered, the same COPC concentrations exceed benchmarks.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that the maximum concentrations of all metals but aluminum exceed background concentrations; mean concentrations all metals but aluminum and manganese exceed background concentrations. Only 1 of the 4 detected concentrations of cobalt and manganese exceeded background. Consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to plants may be over-estimated. There is currently no viable habitat at the site. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

Concentrations of aluminum, arsenic, chromium, cobalt, manganese, selenium, and vanadium exceed benchmarks for soil invertebrates. Of these, maximum HQs for arsenic, cobalt, and selenium are low and their concentrations are expected to fall below low effects levels. Concentrations of aluminum are below background. Only 1 of the 4 detected concentrations of cobalt and manganese exceeded background and soil types at Site 11 are likely to limit bioavailability of chromium. There is no current habitat for plants at Site 11. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 11 do not pose risks to plants under future exposure scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

14.4.4. BRAPF for Soil Invertebrates at Site 11

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to soil invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including
    - comparison using maximum EPCs and
    - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations

(i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

14.4.4.1. Comparison of Chemical Concentrations to Soil Invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 14-4** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

- Arsenic (1.98)
- Chromium (350)
- Manganese (6.76)
- Mercury (2.65)
- Selenium (1.05)

HQs for arsenic, manganese, mercury, and selenium are low and range from 1.05 to 6.76. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following contaminant concentrations exceeded TRVs protective of soil invertebrates.

- Arsenic (1.30)
- Chromium (251)
- Manganese (2.03)
- Mercury (1.34)

Chemicals without available TRVs include aluminum, calcium, cobalt, iron, magnesium, potassium, silver, sodium, thallium, acetone, and vanadium. The uncertainty associated with the lack of TRVs is discussed in Section 18.

14.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 14-4**. Of the 5 metals with maximum concentrations exceeding plant TRVs, all but mercury had concentrations exceeding background. Manganese had only 1 detected concentration that exceeded background. The remaining metals, arsenic, chromium, and selenium, had at least 3 detected concentrations that exceeded background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

14.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 11

Site 11 provides no current habitat. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

14.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 11

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on soil invertebrates' survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of invertebrates. This comparison indicated that there are five metals (arsenic, chromium, manganese, mercury, and selenium) in subsurface soil with concentrations exceeding soil invertebrate benchmarks under the future exposure scenarios. HQs for arsenic, manganese, mercury, and selenium are low and range from 1.05 to 6.76. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. When mean concentrations are considered, arsenic, chromium, manganese, and mercury concentrations exceed benchmarks.

Comparison of EPCs to background concentrations as another measurement endpoint indicated that the maximum concentrations of all metals exceeding TRVs but mercury had concentrations exceeding background. When mean concentrations are compared, all but mercury and manganese had concentrations exceeding background. Only 1 of the 4 detected concentrations of cobalt and manganese exceeded background. Consideration of regional soil conditions indicates that the bioavailability – and thus toxicity – of metals to soil invertebrates may be over-estimated. There is currently no viable habitat at the site. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

Concentrations of arsenic, chromium, manganese, mercury, and selenium exceed benchmarks for soil invertebrates. Of these, maximum HQs for arsenic, manganese, mercury, and selenium are low and their concentrations are expected to fall below low effects levels. Concentrations of mercury are below background. Only 1 of the 4 detected concentrations of manganese exceeded background and soil types at Site 11 are likely to limit bioavailability of chromium. There is no current habitat at Site 11. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 11 do not pose risks to soil invertebrates under future exposure scenarios. Uncertainties associated with this characterization of risks are discussed further in Section 18.

14.4.5. BRAPF Results for Wildlife at Site 11

The refined CSM for Site 11 identifies viability of wildlife an assessment endpoint. The conceptual model identified five representative receptors for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammal (i.e. Jamaican fruit bat), insectivorous bird (i.e. pearly-eyed thrasher), insectivorous mammal (i.e. Antillean ghost-faced bat), and predatory bird (i.e. red-tailed hawk).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL-based benchmarks protective of wildlife;
- comparison of mean case scenario doses ingested through the food web to NOAEL-based and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and
- qualitative evaluation of habitat quality.

Comparison of modeled doses to benchmarks and background are presented in **Table 14-5** and **Table 14-6**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-67 to A-51. Comparisons using mean concentrations were considered the best indicator of population wide risks at the site, and were given the most weight in the weight of evidence evaluation. The comparison of maximum concentrations to benchmarks is the most conservative indicator of risks and do not reflect population-wide conditions, and thus was given less weight, although it is an important indicator for hot spots. While comparison to NOAELs provides a highly conservative indicator of risks, comparison to LOAELs provides a clearer indicator of whether risks are likely to occur. In the weight of evidence, both were considered in conjunction with the other lines of evidence. Other lines of evidence included comparisons to background, which are an important indicator of the relevance of toxicity and bioavailability assumptions, and mean case scenario comparisons modified based on home range, which are a useful indicator for potential effects to actual wildlife populations.

14.4.5.1. Comparison of Maximum Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (35.9) Manganese (1.93) Selenium (2.22)	Aluminum (122) Selenium (1.57) Vanadium (4.25)	None	Aluminum (4.73) Vanadium (85.8)	Vanadium (3.45)

TRVs were unavailable for calcium, dichlorprop, iron, magnesium, potassium for mammals and calcium, iron, magnesium, potassium, sodium, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

14.4.5.2. Comparison of Mean Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The second measurement endpoint evaluated was a comparison of ingested doses for mammals based on mean EPCs to NOAEL-based TRVs. Doses based on mean EPCs are a more realistic indicator of risk because the mean case scenario reflects exposures across the site and across mammal populations, which are the focus of the ERA.

Dose modeling and comparisons based on mean EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (33.7) Selenium (1.26)	Aluminum (114) Selenium (1.08)	None	Aluminum (4.44) Vanadium (67.0)	Vanadium (2.69)

TRVs were unavailable for calcium, dichlorprop, iron, magnesium, potassium for mammals and calcium, iron, magnesium, potassium, sodium, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

14.4.5.3. Comparison of Mean Case Scenario Exposure Estimates to Low-Effects TRVs for Wildlife

The third measurement endpoint evaluated is comparison of exposure estimates based on mean EPCs to LOAEL-based TRVs. LOAELs are a valuable indicator of risk because they provide a bound to NOAELs. Exceeding a NOAEL does not necessarily indicate a risk, because NOAELs, by definition, correspond to no effects, and may not be the highest concentration at which no effects occur. LOAELs provide a clear indication of potential effects and a potential for risk; therefore, comparisons to LOAELs provide an important tool for ERA. Comparisons focus on mean case scenario exposure estimates because are the most relevant estimates for wildlife

populations. When mean case scenario doses are compared to LOAEL-based TRVs, the following chemicals exceed:

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (3.37)	Aluminum (11.4)	None	Vanadium (33.5)	Vanadium (1.35)

TRVs were unavailable for calcium, iron, magnesium, and potassium for mammals and calcium, iron, magnesium, potassium, sodium, acetone, carbon disulfide for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

14.4.5.4. Comparison of On-Site and Background Exposures as an Indicator of Source-Relatedness and Bioavailability

The fourth measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 14-5 and Table 4-6**. Of the 4 metals with maximum doses exceeding wildlife TRVs, all but aluminum had concentrations exceeding background. Only one of the detected concentrations of manganese exceed background. At least 3 of the 4 detected concentrations of selenium and vanadium exceed background. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals.

14.4.5.5. Comparison of Site Size and Receptor Home Range Size

The fifth measurement endpoint evaluated is comparison of site size and receptor home range. The exposure estimates calculated assume that the receptors will be at the site 100% so any prey, soil, and water consumed would be from Site 11. In some cases, the receptor home range will be larger than the site size so the receptor would spend less than 100% of the time at the site, making this assumption overly conservative.

Comparison of this site size to receptors home ranges is presented in **Table 3-16** for all RFI Sites including Site 11. Site 11 occupies approximately 0.37 acres. This is smaller than the home range of all mammalian and avian receptors. Risks to wildlife are likely over-estimated by a factor of 2 to 10 or more.

14.4.5.6. Evaluation of Habitat Quality

Site 11 provides no current habitat. The area around the site is highly industrialized and unlikely to provide habitat attractive to wildlife. Concentrations detected in subsurface soil are used to assess future exposures. By evaluating subsurface soil as a potential exposure medium under future hypothetical land use scenarios, the assessment assumes that subsurface soil is excavated, exposed and re-vegetated. This is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat. This must be considered as part of risk management to ensure risk assessment results are applied accurately.

14.4.5.7. BRAPF Conclusions for Wildlife at Site 11

The risk characterization for wildlife at Site 11 draws from numerous measurement endpoints as lines of evidence for evaluation of the potential for risks to wildlife. First, maximum concentrations of chemicals were used as EPCs in food web exposure models to estimate doses for each representative receptor species. Doses were then compared to NOAEL-based TRVs. Using maximum EPCs and conservative exposure factors, aluminum, manganese, selenium, and vanadium exceed NOAEL-based TRVs for several feeding guilds under future exposure scenarios. Next, doses were estimated using mean EPCs and compared to NOAEL-based TRVs. The mean case scenario dose is most representative of population-wide exposures. Using mean EPCs, future case scenario exposure estimates for the aluminum, selenium, and vanadium exceeded TRVs.

An additional measurement endpoint was the comparison of mean case scenario doses to LOAEL-based TRVs. This comparison identified aluminum, and vanadium as chemicals with exposure estimates exceeding LOAELs.

Another measurement endpoint considered was comparison of the doses of COPCs on-site to doses in off-site areas. Mean exposure estimates for aluminum were below background, while exposure estimates for vanadium were higher than background. However, it is likely that bioavailability and toxicity of metals may be over-estimated based on typical soil types at Fort Buchanan.

Home range and habitat quality were also considered. The site is much smaller than wildlife home ranges and thus risks are overestimated by a factor of 2 to 10. The site is currently an asphalt pad. As such, it provides no habitat. It is located in an industrialized area that does not provide sufficient resources to attract wildlife. As such, wildlife are likely to spend some of their time foraging in other less disturbed habitats. When home range is considered, it is evident that risk estimates for wildlife are highly over-estimated. Incorporation of area use factors into risk estimates would decrease HQs for mammals. Evaluation of subsurface soil as a future exposure medium is highly conservative because it assumes no addition of top soil, no backfill, and no mixing of soils. This scenario is highly unlikely because deeper soils would consist of compacted, nutrient poor material unsuitable for support of habitat.

Exposure estimates for aluminum, manganese, selenium, and vanadium exceed NOAEL-based TRVs for several feeding guilds under future exposure scenarios. Aluminum, manganese, and selenium exposures fall below either benchmarks or background levels, and vanadium exposures approach background when area use factors are considered. Vanadium bioavailability is expected to be limited by soil type, and therefore over-estimated in the risk assessment. Therefore, subsurface soils at Site 11 are considered unlikely to pose potential risks to wildlife if the site is exposed and re-vegetated. Future use assumptions are highly uncertain, and it expected that soil concentrations may decrease. Uncertainties associated with this characterization of risks are discussed further in Section 18.

14.5. Conclusions for Site 11

The SLERA and refined assessment conducted as part of the BRAPF for Site 11 examined future potential risks from subsurface soils to terrestrial wildlife. This ERA finds the following conclusions:

Viability of Plant Communities - Concentrations of aluminum, arsenic, chromium, cobalt, manganese, selenium, and vanadium exceed benchmarks for soil invertebrates. Of these, maximum HQs for arsenic, cobalt, and selenium are low and their concentrations are expected to fall below low effects levels. Concentrations of aluminum are below background. Only 1 of the 4 detected concentrations of cobalt and manganese exceeded background and soil types at Site 11 are likely to limit bioavailability of chromium. There is no current habitat for plants at Site 11. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 11 do not pose risks to plants under future exposure scenarios.

Viability of Soil Invertebrate Communities - Concentrations of arsenic, chromium, manganese, mercury, and selenium exceed benchmarks for soil invertebrates. Of these, maximum HQs for arsenic, manganese, mercury, and selenium are low and their concentrations are expected to fall below low effects levels. Concentrations of mercury are below background. Only 1 of the 4 detected concentrations of manganese exceeded background and soil types at Site 11 are likely to limit bioavailability of chromium. There is no current habitat at Site 11. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 11 do not pose risks to soil invertebrates under future exposure scenarios.

Viability of Wildlife Communities - Exposure estimates for aluminum, manganese, selenium, and vanadium exceed NOAEL-based TRVs for several feeding guilds under future exposure scenarios. Aluminum, manganese, and selenium exposures fall below either benchmarks or background levels, and vanadium exposures approach background when area use factors are considered. Vanadium bioavailability is expected to be limited by soil type, and therefore over-estimated in the risk assessment. Therefore, subsurface soils at Site 11 are considered unlikely to pose potential risks to wildlife if the site is exposed and re-vegetated. Future use assumptions are highly uncertain, and it expected that soil concentrations may decrease.

15. SITE 12: OLD LANDFILL

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 12 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 15.1), data summarization (Section 15.2), SLERA results (Section 15.3), and BRAPF (Section 15.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 12 (Section 15.5).

15.1. CSM FOR SITE 12

Site 12 is a landfill, which provides habitat in the form of wooded and grassy areas and a nearby stream. Aerial photographs of the site are presented in **Figures 15-1** and **15-2.**. The site is located in the southwest portion of Fort Buchanan, adjacent to and just southwest of the elementary school. The history of the old landfill dates back to the 1960s, and the site was likely used until the early 1990s. There is anecdotal evidence from former base employees that dumping of paint cans, oil drums, and other possibly hazardous materials occurred at the site, but that these materials had been removed when observed (Woodward-Clyde 1997). In addition, in August 1979, sawdust was used to clean up a diesel spill. The contaminated sawdust was containerized in plastic bags and placed in this landfill (Woodward-Clyde 1997). During site visits made prior to and during the RFI, the debris observed at the site was construction rubble.

The area is entirely enclosed within a fence; just inside the fences is a swath of thick vegetation approximately three meters wide, and the vegetation ends at a steep ravine with bedrock outcrops. Outside the fence, to the west of the site is a large area of woodland habitat. The location of the rubble waste observed at the site suggests that the disposal method consisted of pushing material over the edge of the ravine. A shallow creek with ephemeral flow runs through the ravine.

The CSM for Site 12 is presented in **Figure 15-3**. The potential chemical source at the site is the landfill where wastes may have been disposed. Possible COPCs include SVOCs, pesticides, PCBs, herbicides, metals, and total petroleum hydrocarbons. The primary transport pathways for migration of COPCs from the landfill into habitats include leaching, runoff, erosion, and seeps. Given that the site includes a small creek, runoff and erosion may have transported chemicals into sediment and surface water. The primary media of concern at the site are surface soil, sediment, and surface water. Bioaccumulation may be a relevant transport pathway. Plants and animals that come in contact with chemicals in soil may uptake chemicals. Dependent upon the chemical and the organism, these chemicals may accumulate in tissue.

Complete and significant exposure pathways under current scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil, surface water, and sediment.
- direct contact of aquatic or benthic invertebrates with sediment and surface water;
- ingestion by wildlife of chemicals in sediment and ingestion of food items that have taken up chemicals from sediment and surface water.

Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, aquatic and benthic organisms, and wildlife. Wildlife include species that would be exposed via ingestion of food from both terrestrial and aquatic habitats.

15.2. DATA SUMMARIZATION

Four surface soil samples were tested for SVOCs, metals, pesticides, herbicides, and PAHs and four surface soil samples were tested for diesel and gasoline range organics and PCBs. Six sediment samples were tested for VOCs, SVOCs, metals, pesticides, and herbicides and six sediment samples were tested for PCBs. Six surface water samples were analyzed for VOCs, SVOCs, metals, pesticides, and herbicides and six surface water samples were analyzed for PCBs. These samples are evaluated in the SLERA and BRAPF. Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 12 are summarized in **Table 3-1**.

15.3. SLERA (Steps 1 & 2) for Site 12

Site 12 consists of terrestrial and aquatic habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.
- Viable, functional populations of organisms exposed directly or indirectly to chemicals in sediment.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

- Comparison of maximum concentrations of chemicals in sediment and surface water to screening values protective of a broad range of potential receptors, including aquatic and benthic organism and wildlife.

Surface soil was evaluated as exposure media for terrestrial wildlife, and sediment and surface water were evaluated as exposure media for aquatic receptors. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

15.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 15-1**. The results of this risk calculation are used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the

screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Surface Soil COPCs

- Aluminum
- Calcium
- Chromium
- Iron
- Magnesium
- Manganese
- Mercury
- Potassium
- Vanadium
- Zinc
- 4,4-DDE
- 4,4-DDT
- Benzo(a)anthracene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- HMW PAHs
- Bis(2-ethylhexyl) phthalate

Sediment COPCs

- Arsenic
- Barium
- Beryllium
- Cobalt
- Copper
- Mercury
- Selenium
- Tin
- Vanadium
- Benzo(b)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Fluoranthene
- Indeno(1,2,3-c,d)pyrene
- Pyrene
- LMW PAHs
- HMW PAHs
- 4,4-DDD
- 4,4-DDE
- 4,4-DDT
- Alpha-chlordane
- Dieldrin
-

Surface Water COPCs

- Barium
- Cobalt
- Copper
- Lead
- Mercury
- Selenium
- Silver
- Vanadium
- Bis(2-ethylhexyl) phthalate

15.4. BRAPF (Step 3) for Site 12

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. The SLERA for Site 12 identified 10 metals, 2 pesticides, 4 PAHs, and 1 VOC as COPCs for terrestrial exposure pathways at Site 12 based on maximum concentrations in surface soil. It identified 9 metals, 5 pesticides, and 6 PAHs as COPCs for exposures to sediment, and 8 metals and 1 VOC as COPCs for surface water . A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

15.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 12 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.
- Viability of aquatic and benthic organism communities.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

15.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 12 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

Viability of plant communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.

- Qualitatively evaluate the proportion of area used by wildlife to indicate whether exposures are over-estimated.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Viability of aquatic and benthic organism communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for aquatic and benthic organisms.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on aquatic and benthic communities.

Refined measurement endpoints are assessed using the data summarized in Section 15.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for surface soil, subsurface soil, and sediment as presented in **Table 15-2**. The representative receptors selected for use in evaluating measurement endpoints for Site 12 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)
- Benthic and aquatic organisms (multiple species)
- Piscivorous birds (great blue heron)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

15.4.3. BRAPF for Plants at Site 12

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
  - comparison using maximum EPCs and
  - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and

- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

15.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk. Comparisons are presented in **Table 15-3** for surface soil.

When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

- Aluminum (382)
- Chromium (27.2)
- Manganese (1.85)
- Vanadium (38.8)

The HQ for manganese is 1.85. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of manganese are likely to fall below low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

- Aluminum (357)
- Chromium (23.5)
- Manganese (1.69)
- Vanadium (34.2)

Chemicals without available plant TRVs include calcium, iron, magnesium, potassium, sodium, 4,4’-DDT, and 4,4,-DDE. The uncertainty associated with the lack of TRVs is discussed in Section 18.

15.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. Comparisons are presented in **Table 15-3** for surface soil. Background comparison values are available for metals and organochlorine pesticides. Site concentrations of metals and pesticides are lower than background comparison values, indicating that these chemicals are not necessarily related to site sources.

15.4.3.3. Evaluation of Habitat for Plants at Site 12

Site 12 consists of over ten acres of wooded land surrounding a ravine with steep slopes. This represents good quality habitat that may support native plant communities. This should be considered in risk management.

15.4.3.4. BRAPF Conclusions for Plants at Site 12

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that concentrations of aluminum, chromium, manganese, and vanadium exceed plant benchmarks under the current scenarios based on surface soil or under future scenarios based on subsurface soil. The HQ for manganese is 1.85. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of manganese are likely to fall below low effects levels.

Another measurement endpoint evaluated was comparison of EPCs to background concentrations. Site concentrations were lower than background concentrations. The last measurement endpoint evaluated was qualitative evaluation of habitat quality. Habitat at the site consists of a wooded area along the ravine and thus represents high quality habitat.

Based on the fact that all chemicals with concentrations exceeding benchmarks have concentrations consistent with background, the findings of the BRAPF are that COPCs do not pose a risk to plants at Site 12. Uncertainties associated with this characterization of risks are discussed further in Section 18.

15.4.4. BRAPF for Soil Invertebrates at Site 12

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to soil invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including
    - comparison using maximum EPCs and
    - comparison of mean EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative

nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

15.4.4.1. Comparison of Chemical Concentrations to Soil Invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk. Comparisons are presented in **Table 15-4** for surface soil.

When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

- Chromium (68.0)
- Mercury (1.50)

The HQ for mercury is 1.50. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of mercury are likely to fall below low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

- Chromium (58.7)
- Mercury (1.03)

Chemicals without available soil invertebrate TRVs include aluminum, calcium, iron, magnesium, potassium, and vanadium. The uncertainty associated with the lack of TRVs is discussed in Section 18.

15.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. Comparisons are presented in **Table 15-4** for surface soil. Background comparison values are available for metals and organochlorine pesticides. Site concentrations of metals exceeding TRVs are lower than background comparison values, indicating that these chemicals are not necessarily related to site sources.

15.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 12

Site 12 consists of over ten acres of wooded land surrounding a ravine with steep slopes. This represents good quality habitat that may support native soil invertebrate communities. This should be considered in risk management.

15.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 12

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on soil invertebrate survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of soil invertebrates. This comparison indicated that there are two metals – chromium and mercury - in soil with concentrations exceeding soil invertebrate benchmarks. The HQ for mercury is 1.50. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of mercury are likely to fall below low effects levels.

Another measurement endpoint evaluated was comparison of EPCs to background concentrations. Site concentrations were lower than background concentrations. The last measurement endpoint evaluated was qualitative evaluation of habitat quality. Habitat at the site consists of a wooded area along the ravine and thus represents high quality habitat.

Based on the fact that all chemicals with concentrations exceeding benchmarks have concentrations consistent with background, the findings of the BRAPF are that COPCs do not pose a risk to soil invertebrates at Site 12. Uncertainties associated with this characterization of risks are discussed further in Section 18.

15.4.5. BRAPF Results for Wildlife at Site 12

The refined CSM for Site 12 identifies viability of wildlife an assessment endpoint. The conceptual model identified representative receptors from four taxonomic/guild pairings for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammals (i.e. Jamaican fruit bat), insectivorous birds (i.e. pearly-eyed thrasher), insectivorous mammals (i.e. Antillean ghost-faced bat), predatory birds (i.e. red-tailed hawk), and piscivorous birds (i.e. great blue heron).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL-based benchmarks protective of wildlife;
- comparison of mean case scenario doses ingested through the food web to NOAEL-based and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and
- qualitative evaluation of habitat quality.

Comparison of modeled doses to benchmarks and background are presented in **Table 15-5** and **Table 15-6**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-67 to A-72. Soil concentrations were used as EPCs to model

terrestrial exposures, while sediment and water concentrations were used as EPCs to model aquatic exposures.

Comparisons using mean concentrations were considered the best indicator of population wide risks at the site, and were given the most weight in the weight of evidence evaluation. The comparison of maximum concentrations to benchmarks is the most conservative indicator of risks and do not reflect population-wide conditions, and thus was given less weight, although it is an important indicator for hot spots. While comparison to NOAELs provides a highly conservative indicator of risks, comparison to LOAELs provides a clearer indicator of whether risks are likely to occur. In the weight of evidence, both were considered in conjunction with the other lines of evidence. Other lines of evidence included comparisons to background, which are an important indicator of the relevance of toxicity and bioavailability assumptions, and mean case scenario comparisons modified based on home range, which are a useful indicator for potential effects to actual wildlife populations.

15.4.5.1. Comparison of Exposure Estimates to TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario-Terrestrial

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (28.7)	Aluminum (97.3)	None	Aluminum (3.78) Lead (1.51) Vanadium (27.6)	Vanadium (1.11)

Current Exposure Scenario-Aquatic

Piscivorous Birds
None

TRVs were unavailable for beryllium calcium, iron, magnesium, potassium for birds and calcium, iron, magnesium, and potassium for mammals. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

15.4.5.2. Comparison of Mean Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The second measurement endpoint evaluated was a comparison of ingested doses for mammals based on mean EPCs to NOAEL-based TRVs. Doses based on mean EPCs are a more realistic indicator of risk because the mean case scenario reflects exposures across the site and across mammal populations, which are the focus of the ERA.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario-Terrestrial

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (26.8)	Aluminum (91.0)	None	Aluminum (3.53) Vanadium (24.4)	None

Current Exposure Scenario-Aquatic

Piscivorous Birds
None

TRVs were unavailable for beryllium calcium, iron, magnesium, potassium for birds and calcium, iron, magnesium, and potassium for mammals. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

15.4.5.3. Comparison of Mean Case Scenario Exposure Estimates to Low-Effects TRVs for Wildlife

The third measurement endpoint evaluated is comparison of exposure estimates based on mean EPCs to LOAEL-based TRVs. LOAELs are a valuable indicator of risk because they provide a bound to NOAELs. Exceeding a NOAEL does not necessarily indicate a risk, because NOAELs, by definition, correspond to no effects, and may not be the highest concentration at which no effects occur. LOAELs provide a clear indication of potential effects and a potential for risk; therefore, comparisons to LOAELs provide an important tool for ERA. Comparisons focus on mean case scenario exposure estimates because are the most relevant estimates for wildlife populations. When mean case scenario doses are compared to LOAEL-based TRVs, the following chemicals exceed:

Current Exposure Scenario-Terrestrial

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (2.68)	Aluminum (9.10)	None	Vanadium (33.5)	Vanadium (1.35)

Current Exposure Scenario-Aquatic

Piscivorous Birds
None

TRVs were unavailable for beryllium calcium, iron, magnesium, potassium for birds and calcium, iron, magnesium, and potassium for mammals. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation.

15.4.5.4. Comparison of Chemical Concentrations to Background

The fourth measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. Comparisons are presented in **Table 15-5** and **Table 15-6** for surface soil. Background comparison values are

available for metals and organochlorine pesticides in soil. Site exposures for metals exceeding LOAEL-based TRVs are lower than background comparison values, indicating that these chemicals are not necessarily related to site sources and unlikely to be bioavailable.

15.4.5.5. Comparison of Site Size and Receptor Home Range Size

The fifth measurement endpoint evaluated is comparison of site size and receptor home range. The exposure estimates calculated assume that the receptors will be at the site 100% so any prey, soil, and water consumed would be from Site 8. In some cases, the receptor home range will be larger than the site size so the receptor would spend less than 100% of the time at the site, making this assumption overly conservative.

Comparison of this site size to receptors home ranges is presented in **Table 3-16** for all RFI Sites including Site 12. Site 12 occupies over 10.5 acres of high quality habitat acres. This is smaller than the home range of some mammalian receptors, but not all avian receptors. Risks to mammals are likely over-estimated.

15.4.5.6. Evaluation of Habitat for Wildlife at Site 12

Site 12 consists of over ten acres of wooded land surrounding a ravine with steep slopes. This represents good quality habitat that may support native soil invertebrate communities. This should be considered in risk management.

15.4.5.7. BRAPF Conclusions for Wildlife at Site 12

The risk characterization for wildlife at Site 12 draws from numerous measurement endpoints as lines of evidence for evaluation of the potential for risks to wildlife. First, maximum concentrations of chemicals were used as EPCs in food web exposure models to estimate doses for each representative receptor species. Doses were then compared to NOAEL-based TRVs. Using maximum EPCs and conservative exposure factors, aluminum, lead, and vanadium exceeded NOAEL-based TRVs for terrestrial feeding guilds. There were no TRV exceedences for piscivorous birds. Next, doses were estimated using mean EPCs and compared to NOAEL-based TRVs. The mean case scenario dose is most representative of population-wide exposures. Using mean EPCs, future case scenario exposure estimates for the aluminum and vanadium exceeded TRVs.

An additional measurement endpoint was the comparison of mean case scenario doses to LOAEL-based TRVs. This comparison identified aluminum, and vanadium as chemicals with exposure estimates exceeding LOAELs.

Another measurement endpoint considered was comparison of the doses of COPCs on-site to doses in off-site areas. Maximum exposure estimates for metals were lower than background for all metals exceeding LOAELs.

Home range and habitat quality were also considered. When home range is considered, it is evident that risk estimates for wildlife are highly over-estimated. Incorporation of area use factors into risk estimates would decrease HQs for mammals. The site provides good quality habitat that is likely to support wildlife.

Aluminum, lead, and vanadium exceed no effects benchmarks under maximum case scenarios. However, exposures for all of these COPCs either fall below LOAEL-based TRVs or below background levels. Therefore, COPCs in subsurface soil, sediment, and surface water at Site 12 are considered unlikely to pose potential risks to wildlife. Uncertainties associated with this characterization of risks are discussed further in Section 18.

15.4.6. BRAPF for Aquatic and Benthic Organisms at Site 12

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to aquatic and benthic organisms from COPCs in sediment. The following measurement endpoints were evaluated as indicators of risk to aquatic and benthic organisms:

- comparison of the chemical concentrations to benchmarks protective of aquatic and benthic organisms, including
    - comparison using maximum EPCs and
    - comparison of mean EPCs;
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Comparison of mean concentrations to benchmarks is given the second most weight as an indicator of population-wide risks with the understanding that results must be interpreted in light of spatial distribution/frequency of detection. Qualitative measurement endpoints are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

15.4.6.1. Comparison of Chemical Concentrations to Aquatic and Benthic Organisms TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in sediment and surface water to literature-based benchmarks protective of aquatic and benthic organisms. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 15-7** for surface water and **Table 15-8** for sediment. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs for aquatic and benthic organisms; the HQ is included in parentheses next to each chemical:

Sediment comparisons

- Arsenic (3.66)
- 4,4-DDD (56.1)
- 4,4-DDE (10.8)
- 4,4-DDT (2.88)
- Alpha-chlordane (17.0)
- Dieldrin (6.11)

Surface water comparisons

Total Concentrations

- Barium (147)
- Copper (1.60)
- Selenium (1.72)
- Vanadium (1.16)

Dissolved Concentrations

- Barium (28.3)

When mean EPCs of COPCs were compared to TRVs, the following contaminant concentrations exceeded TRVs protective of aquatic and benthic organisms.

Sediment comparisons

- Arsenic (2.43)
- 4,4-DDD (9.66)
- 4,4-DDE (2.28)
- 4,4-DDT (1.13)
- Alpha-chlordane (3.37)
- Dieldrin (1.82)

Surface water comparisons

Total Concentrations

- Barium (58.5)
- Selenium (1.41)

Dissolved Concentrations

- Barium (25.1)

Sediment TRVs are not available for barium, beryllium, cobalt, selenium, tin, and vanadium. Surface water TRVs are not available for 5 metals (essential nutrients).

15.4.6.2. Evaluation of Habitat for Aquatic and Benthic Organisms at Site 12

Aquatic habitat at Site 12 is poor. It consists of an ephemeral ditch in a ravine with steep sides. The ditch provides little habitat for aquatic or benthic organisms, but these organisms are likely to suffer stress from variable water levels and influence of runoff. Any organisms that utilize the ditch are likely to be hardy, opportunistic species that are resistant to chemical exposure.

15.4.6.3. BRAPF Conclusions for Aquatic and Benthic Organisms at Site 12

The risk characterization section for aquatic and benthic organisms evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on aquatic community viability from chemicals in sediment. Two measurement endpoints were evaluated. Both maximum and mean EPCs were compared to sediment and surface water benchmarks protective of aquatic and benthic organisms. For sediment, this comparison indicated that there are 1 metal and 5 pesticides (arsenic, 4,4-DDE, 4,4-DDD, 4,4-DDT, dieldrin, and alpha-chlordane) in sediment with concentrations exceeding TRVs. For surface water, this comparison indicated that there was one metal – barium - with dissolved concentration in surface water exceeding TRVs.

The second measurement endpoint was evaluation of habitat quality. Aquatic habitat at Site 12 is poor, consisting of an ephemeral ditch in a mowed area. Aquatic receptors in the ditch would likely be hardy species and would encounter physical and hydrologic stress greater than chemical stress associated with COPCs.

While background values are not available for sediment, it is important to note that concentrations of arsenic and pesticides in sediment are consistent with background concentrations found in local soils. Risk management should consider whether action on these compounds is feasible given that local surface soils may continually contribute similar concentrations.

Based on exceedence of benchmarks, arsenic, 4,4-DDE, 4,4-DDD, 4,4-DDT, dieldrin, and alpha-chlordane in sediment are identified as chemicals that may produce risks to aquatic and benthic organisms. There is some question whether concentrations of these chemicals in sediment may be associated with regional elevated concentrations in soil. Barium is identified as a chemical in surface water potentially driving risks to aquatic and benthic organisms. Uncertainties associated with this characterization of risks are discussed further in Section 18.

18.1. CONCLUSIONS FOR SITE 12

The SLERA and refined assessment conducted as part of the BRAPF for Site 12 form the basis for the following conclusions for each refined assessment endpoint:

Viability of Plant Communities - Based on the fact that all chemicals with concentrations exceeding benchmarks have concentrations consistent with background, the findings of the BRAPF are that COPCs do not pose a risk to plants at Site 12.

Viability of Soil Invertebrate Communities - Based on the fact that all chemicals with concentrations exceeding benchmarks have concentrations consistent with background, the findings of the BRAPF are that COPCs do not pose a risk to soil invertebrates at Site 12.

Viability of Wildlife Communities - Aluminum, lead, and vanadium exceed no effects benchmarks under maximum case scenarios. However, exposures for all of these COPCs either fall below LOAEL-based TRVs or below background levels. Therefore, COPCs in subsurface soil, sediment, and surface water at Site 12 are considered unlikely to pose potential risks to wildlife.

Viability of Aquatic and Benthic Organism Communities - Based on exceedence of benchmarks, arsenic, 4,4-DDE, 4,4-DDD, 4,4-DDT, dieldrin, and alpha-chlordane in sediment are identified as chemicals that may produce risks to aquatic and benthic organisms. There is some question whether concentrations of these chemicals in sediment may be associated with regional elevated concentrations in soil. This should be considered in risk management. Barium is identified as a chemical in surface water potentially driving risks to aquatic and benthic organisms.

16. SITE 13: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 13 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 16.1), data summarization (Section 16.2), SLERA results (Section 16.3), and BRAPF (Section 16.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 13 (Section 16.5).

16.1. CSM FOR SITE 13

Site 13 is a wooded area south of old building S-18 (which no longer exists) that was potentially used for the disposal of various materials. Observations made during earlier investigations (see Section 3.13) described the Site as a low area filled with trash, empty paint cans, fluorescent lamps, and construction debris. Based on site visits in 2006, the area is mostly wooded, with dense vegetation, and the drainage appears to head towards the low point just east of the wooded area. There are no aquatic habitats at this site. An aerial photograph is presented in **Figure 16-1**.

The CSM for Site 13 is presented in **Figure 16-2**. The potential chemical source at the site is a suspected disposal area. Possible COPCs include VOCs, SVOCs, pesticides, PCBs, herbicides, total petroleum hydrocarbons, and metals. The primary transport pathways for further migration include leaching, runoff, and erosion. Given the gradual slope and vegetated lawn, runoff and erosion are less important pathways than leaching. Therefore, the primary media of concern at the site are surface soil and subsurface soil. The available data for soil, site topography and land use, and expected behavior of COPCs all indicate against transport to aquatic habitats. Bioaccumulation may be a relevant transport pathway. Plants and animals that come in contact with chemicals in soil may uptake chemicals. Dependent upon the chemical and the organism, these chemicals may accumulate in tissue.

Complete and significant exposure pathways under current scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

The same pathways apply under future scenarios in which subsurface soil has been brought to the surface. Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, and wildlife.

16.2. DATA SUMMARIZATION

Seven surface soil samples from Site 13 were tested for VOCs, SVOCs, metals, organochlorine pesticides, herbicides, and PCBs and seven surface soil samples were tested for organophosphorus pesticides. Two subsurface samples were taken at the site between 2-4 feet deep. One of the subsurface samples was tested for VOCs, SVOCs, metals, organochlorine pesticides, herbicides, PCBs, and TPH and other was tested for organophosphorus pesticides, but none were detected. These samples are evaluated in the SLERA and BRAPF. Data quality was

evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 13 are summarized in **Table 3-1**.

16.3. SLERA (Steps 1 & 2) for Site 13

Site 13 consists of terrestrial habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

Surface and subsurface soil concentrations were evaluated for the measurement endpoint. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

16.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 16-1 and 16-2**. The results of this risk calculation are used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Surface Soil COPCs

- 2,4-D
- Pentachlorophenol
- Aluminum
- Arsenic
- Calcium
- Chromium
- Copper
- Iron
- Lead
- Magnesium
- Manganese
- Mercury
- Potassium
- Selenium
- Sodium
- Vanadium
- Zinc
- 4,4-DDD
- 4,4-DDE
- 4,4-DDT
- Alpha-chlordane
- Dieldrin
- Benzo(g,h,i)perylene
- HMW PAHs
- 1,1-dichloroethene
- Acetone

Subsurface Soil COPCs

- Pentachlorophenol
- Aluminum
- Arsenic
- Calcium
- Chromium
- Copper
- Iron
- Lead
- Magnesium
- Manganese
- Mercury
- Potassium
- Selenium
- Sodium
- Vanadium
- Zinc
- 4,4-DDD
- 4,4-DDE
- 4,4-DDT
- Alpha-chlordane
- Acenaphthylene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Chrysene
- Dibenz(a,h)anthracene
- Fluoranthene
- Indeno(1,2,3-c,d)pyrene
- Pyrene
- LMW PAHs
- HMW PAHs
- Bis(2-ethylhexyl) phthalate
- 1,1-dichloroethene

16.4. BRAPF (Step 3) for Site 13

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. The SLERA for Site 13 identified 2 herbicides, 15 metals, 5 pesticide, 1 PAHs, and 2 VOCs as COPCs for current exposure scenarios based on surface soil. COPCs for future terrestrial exposure pathways at Site 13 based on maximum concentrations in surface soil include 1 herbicide, 15 metals, 4 pesticides, 11 PAHs, and 2 VOCs. A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

16.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 13 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

16.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 13 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

Viability of plant communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the proportion of area used by wildlife to indicate whether exposures are over-estimated.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Refined measurement endpoints are assessed using the data summarized in Section 16.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for surface and subsurface soil as presented in **Table 16-3** and **Table 16-4**. The representative receptors selected for use in evaluating measurement endpoints for Site 13 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

16.4.3. BRAPF for Plants at Site 13

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
  - comparison using maximum EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

16.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 16-5** for surface soil and **Table 16-6** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

- Aluminum (442)
- Chromium (33.1)
- Lead (4.68)
- Manganese (5.59)
- Mercury (1.37)
- Selenium (5.38)
- Vanadium (43.3)

Future Exposure Scenario (Subsurface Soil)

- Aluminum (363)
- Chromium (29.5)
- Lead (1.07)
- Manganese (3.42)
- Mercury (1.08)
- Selenium (3.65)
- Vanadium (35.8)

For surface soil, HQs for lead, manganese, mercury, and selenium are low and range from 1.37 to 5.59. For subsurface soil, HQs for lead, manganese, mercury and selenium are low and range from 1.07 to 3.65. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels

When mean EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

- Aluminum (331)
- Chromium (18.6)
- Manganese (2.93)
- Selenium (2.79)
- Vanadium (23)

Future Exposure Scenario (Subsurface Soil)

- Because only one sample was collected, results are the same as for maximum EPCs.

Comparisons base on mean EPC for plants should be interpreted in terms of the data distribution. It is important to note that exceedences for metals in surface soil are driven primarily by elevated concentrations at a single location. In all cases except for lead, this was Boring 7. Lead was elevated in Boring 6. This indicates that elevated exposures to COPCs is relatively isolated and not reflective of exposures across the population at the site.

Chemicals without available plant TRVs include 2,4-D, calcium, iron, magnesium, potassium, sodium, 4,4-DDD, 4,4-DDE, 4,4-DDT, dieldrin, alpha-chlordane, and 1,1-dichloroethene. The uncertainty associated with the lack of TRVs is discussed in Section 18.

16.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 16-5** and **Table 16-6**.

Background comparison values are available for metals and organochlorine pesticides. Of the metals in surface soil that exceeded TRVs for plants, aluminum, chromium, and vanadium were below the background comparison value, while lead, manganese, mercury, and selenium were above. However, only 1 detection of manganese, 2 detections of lead, and 3 detections of mercury exceed background. Of the metals in subsurface soil that exceeded TRVs for plants, aluminum, chromium, manganese, and vanadium were below the background comparison value, while lead, mercury, and selenium were above. This indicates that aluminum, chromium, and vanadium are likely present due to naturally occurring sources and unlikely to impact ecological receptors.

As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals. These would include chromium, selenium, and vanadium.

16.4.3.3. Evaluation of Habitat for Plants at Site 13

Site 13 consists of 1.6 acres of wooded land adjoined by additional woods to the west and north and developed or mowed areas to the east and south. This represents good quality habitat that may support native plant communities. This should be considered in risk management.

Habitat quality under future scenarios is partly dependent on how subsurface soil is handled. This risk assessment evaluates subsurface soil as a potential exposure medium under future scenarios in which this soil is excavated, exposed, and vegetated. Subsurface soil

concentrations were used to represent these future exposures at the surface. This is highly conservative because it assumes excavated soil would not be amended, mixed with other soils, or covered with other soils. As discussed in Section 3.3.6, this is highly unlikely. Native subsurface soils are nutrient poor and consist of dense clay and concretized plinthite unlikely to support vegetation. It is likely that these soils would require mixing, cover, or amendment prior to establishment of habitat; this would effectively decrease exposures and reduce risks from any chemicals in soil.

16.4.3.4. BRAPF Conclusions for Plants at Site 13

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that there are seven metals (aluminum, chromium, lead, manganese, mercury, selenium, and vanadium) in surface and subsurface soil with maximum concentrations exceeding plant benchmarks. For surface soil, HQs for lead, manganese, mercury, and selenium are low and range from 1.37 to 5.59. For subsurface soil, HQs for lead, manganese, mercury and selenium are low and range from 1.07 to 3.65. Based on studies by Ford et al. 1992, low effects levels are typically within 10 times greater than no effects levels. Therefore, concentrations of these chemicals are likely to fall below low effects levels. Mean concentrations for surface soil were also compared to plant TRVs and evaluated in conjunction with an examination of data distribution; mean concentrations of aluminum, chromium, lead, mercury, selenium, and vanadium exceed plant TRVs. Exceedences are driven primarily by isolated elevated concentrations at one of two sample locations (Boring 6 or Boring 7).

As another measurement endpoint, EPCs for Site 13 were compared to background concentrations. Aluminum, chromium, and vanadium concentrations are within background, while lead, manganese, mercury, and selenium are above background. However, only 1 detection of manganese, 2 detections of lead, and 3 detections of mercury exceed background. Chromium, vanadium, and selenium are unlikely to be bioavailable based on local soil types.

Habitat quality was evaluated as a third measurement endpoint. Current site habitat is wooded land of good quality to support vegetative communities. While subsurface soil was evaluated as a potential exposure medium under future scenarios, it is unlikely that it could support vegetative communities due to natural characteristics (i.e. lack of nutrients and density); use as a base for habitat would require amendment or cover that would effectively change exposure concentrations.

In summary, aluminum, chromium, lead, manganese, mercury, selenium, and vanadium in soils exceed benchmarks at Site 13. However, aluminum, chromium, selenium, and vanadium are unlikely to produce risks because they are consistent with natural background concentrations and/or expected to have low bioavailability in site soil types. Lead, manganese and mercury exceedences are driven by elevated concentrations at isolated locations and they, as well as selenium, are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to plants at Site 13. Uncertainties associated with this characterization of risks are discussed further in Section 18.

16.4.4. BRAPF for Soil Invertebrates at Site 13

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to Soil Invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including
    - comparison using maximum EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

16.4.4.1. Comparison of Chemical Concentrations to Soil invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 16-7** for surface soil and **Table 16-8** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

- Chromium (82.8)
- Manganese (2.73)
- Mercury (4.10)
- Zinc (1.18)

Future Exposure Scenario (Subsurface Soil)

- Chromium (73.6)
- Manganese (1.67)
- Mercury (3.25)

Maximum EPC exceedences of TRVs for manganese, mercury, and zinc are low ranging with HQs ranging from just over 1 to 4.1. Given that low effects levels are typically within 5 to 10 times no effects levels (Ford et al. 2000), it is likely these concentrations would not exceed low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

- Chromium (46.5)
- Manganese (1.43)
- Mercury (2.01)

Future Exposure Scenario (Subsurface Soil)

- Because only one sample was collected, results are the same as for maximum EPCs.

It is important to note that exceedences for metals in surface soil are driven primarily by elevated concentrations at a single location, Boring 7. Chemicals without available soil invertebrate TRVs include aluminum, calcium, iron, magnesium, potassium, sodium, vanadium, dieldrin, acetone, and 1,1-dichloroethene. The uncertainty associated with the lack of TRVs is discussed in Section 18.

16.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 16-7** and **Table 16-8**.

Background comparison values are available for metals and organochlorine pesticides. Of the metals in surface soil that exceeded TRVs for invertebrates, all detections of chromium and zinc were below the background comparison value, while 1 detection of manganese and 3 detections of mercury were above. Of the metals in subsurface soil that exceeded TRVs for invertebrates, chromium, manganese, and zinc were below the background comparison value, while manganese and mercury were above. This indicates that chromium and zinc are likely present due to naturally occurring sources and unlikely to impact ecological receptors.

As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals. These would include chromium.

16.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 13

Site 13 consists of 1.6 acres of wooded land adjoined by additional woods to the west and north and developed or mowed areas to the east and south. This represents good quality habitat that may support native soil invertebrate communities. This should be considered in risk management.

As discussed above for plant, habitat quality under future scenarios is partly dependent on how subsurface soil is handled. This risk assessment evaluates subsurface soil as a potential exposure medium under future scenarios in which this soil is excavated, exposed, and vegetated. Subsurface soil concentrations were used to represent these future exposures at the surface. It is likely that these soils would require mixing, cover, or amendment prior to establishment of habitat; this would effectively decrease exposures and reduce risks from any chemicals in soil.

16.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 13

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of soil invertebrates. This comparison indicated that there are four metals (chromium, manganese, mercury, and zinc) in surface and subsurface soil with maximum concentrations exceeding soil invertebrate benchmarks. Maximum EPC exceedences of TRVs for manganese, mercury, and zinc are low ranging with HQs ranging from just over 1 to 4.1. Given that low effects levels are typically within 5 to 10 times no effects levels (Ford et al. 2000), it is likely these concentrations would not exceed low effects levels.

Mean concentrations for surface soil were also compared to invertebrate TRVs and evaluated in conjunction with an examination of data distribution; mean concentrations of chromium, manganese, and mercury exceed invertebrate TRVs. Exceedences are driven primarily by isolated elevated concentrations at one sample location (Boring 7).

As another measurement endpoint, EPCs for Site 13 were compared to background concentrations. Chromium and zinc concentrations are within background, while manganese, and mercury are above background. However, only 1 detection of manganese and 3 detections of mercury exceed background. Chromium is unlikely to be bioavailable based on local soil types. Manganese and zinc exceedences were low and unlikely to exceed low-effects levels.

Habitat quality was evaluated as a third measurement endpoint. Current site habitat is wooded land of good quality to support invertebrate communities. While subsurface soil was evaluated as a potential exposure medium under future scenarios, it is unlikely that it could support vegetative communities due to natural characteristics (i.e. lack of nutrients and density); use as a base for habitat would require amendment or cover that would effectively change exposure concentrations.

In summary, chromium, manganese, manganese, mercury, and zinc in soils exceed benchmarks at Site 13. However, chromium and zinc are unlikely to produce risks because they are consistent with natural background concentrations and/or expected to have low bioavailability in site soil types. Manganese and mercury exceedences are driven by elevated concentrations at isolated locations and they, as well as zinc concentrations, are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to soil invertebrates at Site 13. Uncertainties associated with this characterization of risks are discussed further in Section 18.

16.4.5. BRAPF Results for Wildlife at Site 13

The refined CSM for Site 13 identifies viability of wildlife an assessment endpoint. The conceptual model identified five representative receptors for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammal (i.e. Jamaican fruit bat), insectivorous bird (i.e. pearly-eyed thrasher), insectivorous mammal (i.e. Antillean ghost-faced bat), and predatory bird (i.e. red-tailed hawk).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL- and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and
- qualitative evaluation of habitat quality.

Comparison of maximum case scenario doses to LOAELs is given the most weight in the weight of evidence approach because it is the most certain indicator of risks. Comparison of maximum concentrations to NOAELs is given the second most weight as an indicator. Comparisons to background are given the third most weight because they are an important indicator of the relevance of toxicity and bioavailability assumptions. Comparisons using maximum case scenario doses and qualitative evaluation of habitat quality are given less weight. Comparison of modeled doses to benchmarks and background are presented in **Table 16-9** through **Table 16-12**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-73 to A-82.

16.4.5.1. Comparison of Maximum Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (33.2)	Aluminum (113) Lead (2.36) Selenium (1.15) Vanadium (1.52) 4,4-DDE (2.39) 4,4-DDT (2.77) DDTr (5.51)	None	Aluminum (4.37) Lead (12.9) Vanadium (30.8) 4,4-DDE (2.47) 4,4-DDT (2.86)	Vanadium (1.24)

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (27.3)	Aluminum (92.5)	None	Aluminum (3.59)	Vanadium (1.03)

	Vanadium (1.26) 4,4-DDE (1.86) DDTr (2.67)		Lead (3.75) Vanadium (25.5) 4,4-DDE (1.92) DDTr (2.76)	

Dose modeling and comparisons based on mean EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	**Insectivorous Mammals**	**Herbivorous Birds**	**Insectivorous Birds**	**Predatory Birds**
Aluminum (24.9)	Aluminum (84.3)	None	Aluminum (3.27) Lead (3.35) Vanadium (16.4)	None

Future Exposure Scenario (Subsurface Soil)

- Because only one sample was collected, results are the same as for maximum EPCs.

TRVs were unavailable for calcium, iron, magnesium, potassium, and sodium for mammals and calcium, iron, magnesium, potassium, sodium, and acetone for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

16.4.5.2. Comparison of Mean Case Scenario Exposure Estimates to Low-Effects TRVs for Wildlife

The third measurement endpoint evaluated is comparison of exposure estimates based on maximum EPCs to LOAEL-based TRVs. LOAELs are a valuable indicator of risk because they provide a bound to NOAELs. When mean case scenario doses are compared to LOAEL-based TRVs, the following chemicals exceed:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	**Insectivorous Mammals**	**Herbivorous Birds**	**Insectivorous Birds**	**Predatory Birds**
Aluminum (2.49)	Aluminum (8.43)	None	None	None

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	**Insectivorous Mammals**	**Herbivorous Birds**	**Insectivorous Birds**	**Predatory Birds**
Aluminum (2.73)	Aluminum (9.25)	None	Vanadium (8.20)	None

TRVs were unavailable for calcium, iron, magnesium, potassium, and sodium for mammals and calcium, iron, magnesium, potassium, sodium, and acetone for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

16.4.5.3. Comparison of On-Site and Background Exposures as an Indicator of Source-Relatedness and Bioavailability

An additional measurement endpoint evaluated for wildlife was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 16-9** through **Table 16-12**.

Background comparison values are available for metals and organochlorine pesticides. Doses based on mean EPCs for aluminum, lead and vanadium exceeded NOAEL-based TRVs. Of these metals, maximum concentrations of aluminum and vanadium concentrations were below background comparison values. The maximum concentration of lead was higher than background comparison values. This indicates that aluminum and vanadium are likely present due to naturally occurring sources and unlikely to impact ecological receptors.

As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals. These would include vanadium.

16.4.5.4. Comparison of Site Size and Receptor Home Range Size

The fifth measurement endpoint evaluated is comparison of site size and receptor home range. The exposure estimates calculated assume that the receptors will be at the site 100% so any prey, soil, and water consumed would be from Site 13. In some cases, the receptor home range will be larger than the site size so the receptor would spend less than 100% of the time at the site, making this assumption overly conservative.

Comparison of site size to receptors' home ranges is presented in **Table 3-16** for all RFI Sites including Site 13. Site 13 is approximately 1.6 acres. This is smaller than all of the average home ranges for avian and mammalian receptors. This indicates that exposure models for wildlife may over-estimate risk because receptors consume some of their diet from off-site. Application of the area use factors listed in **Table 3-16** would decrease risk estimates by over 85%.

16.4.5.5. Evaluation of Habitat Quality

Site 13 consists of 1.6 acres of wooded land adjoined by additional woods to the west and north and developed or mowed areas to the east and south. This represents good quality habitat that may provide resources for wildlife. This should be considered in risk management.

As discussed above for plants, habitat quality under future scenarios is partly dependent on how subsurface soil is handled. This risk assessment evaluates subsurface soil as a potential exposure medium under future scenarios in which this soil is excavated, exposed, and vegetated.

Subsurface soil concentrations were used to represent these future exposures at the surface. It is likely that these soils would require mixing, cover, or amendment prior to establishment of habitat; this would effectively decrease exposures and reduce risks from any chemicals in soil.

16.4.5.6. BRAPF Conclusions for Wildlife at Site 13

The risk characterization for wildlife at Site 13 draws from numerous measurement endpoints as lines of evidence for evaluation of the potential for risks to wildlife. First, maximum concentrations of chemicals were used as EPCs in food web exposure models to estimate doses for each representative receptor species. Doses were then compared to NOAEL-based TRVs. Using maximum EPCs and conservative exposure factors, aluminum, lead, selenium, vanadium, and DDTr in surface soil exceed NOAEL-based TRVs for several feeding guilds under current exposure scenarios. Maximum EPCs for subsurface soil were used to model future exposure scenarios; modeled doses of aluminum, lead, vanadium, and DDTr exceeded wildlife TRVs.

The second measurement endpoint evaluated was comparison of modeled doses based on mean EPCs to NOAEL-based TRVs as a better indicator of population-level risks. Based on mean EPCs, doses of aluminum, lead, and vanadium exceeded NOAEL-based TRVs under current exposure scenarios. Because only one subsurface sample was collected, doses based on mean EPCs were not calculated for future exposure scenarios.

Doses were also compared to LOAEL-based TRVs as measurement endpoint to provide a more certain indicator of risks. Aluminum and vanadium were the only chemicals with mean doses exceeding LOAEL-based TRVs.

Another measurement endpoint considered was comparison of the doses of COPCs on-site to doses in background areas. Maximum exposure estimates for both aluminum and vanadium were consistent with doses for background areas, indicating that these metals are likely to originate from natural sources and unlikely to pose risks.

Home range and habitat quality were also considered as measurement endpoints. The size of the site is smaller than the foraging range for mammals and birds, and risk estimates may be over-estimated by as much as 85%. Current site habitat is wooded land of good quality and may provide resources for wildlife. While subsurface soil was evaluated as a potential exposure medium under future scenarios, it is unlikely that it could support vegetative communities due to natural characteristics (i.e. lack of nutrients and density); use as a base for habitat would require amendment or cover that would effectively change exposure concentrations.

Modeled doses of aluminum, lead, vanadium, and DDTr based exceed NOAELs for wildlife when calculated using maximum EPCs. However, doses based on mean EPCs are either below LOAELs or consistent with background concentrations. When home range is considered, risk levels decrease further. Based on this information, COPCs at Site 13 are unlikely to pose risks to wildlife. Uncertainties associated with this characterization of risks are discussed further in Section 18.

16.5. Conclusions for Site 13

The SLERA and refined assessment conducted as part of the BRAPF for Site 13 form the basis for the following conclusions for each refined assessment endpoint:

Viability of Plant Communities - Aluminum, chromium, lead, manganese, mercury, selenium, and vanadium in soils exceed benchmarks at Site 13. However, aluminum, chromium, selenium, and vanadium are unlikely to produce risks because they are consistent with natural background concentrations and/or expected to have low bioavailability in site soil types. Lead, manganese and mercury exceedences are driven by elevated concentrations at isolated locations and are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to plants at Site 13.

Viability of Soil Invertebrate Communities - Chromium, manganese, mercury, and zinc in soils exceed benchmarks at Site 13. However, chromium and zinc are unlikely to produce risks because they are consistent with natural background concentrations and/or expected to have low bioavailability in site soil types. Manganese and mercury exceedences are driven by elevated concentrations at isolated locations and are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to soil invertebrates at Site 13.

Viability of Wildlife Communities – Modeled doses of aluminum, lead, vanadium, and DDTr based exceed NOAELs for wildlife when calculated using maximum EPCs. However, doses based on mean EPCs are either below LOAELs or consistent with background concentrations. When home range is considered, risk levels decrease further. Based on this information, COPCs at Site 13 are unlikely to pose risks to wildlife.

17. SITE 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE

This section presents the SLERA (Steps 1 and 2) and BRAPF (Step 3) of the ERA for RFI Site 15 at Fort Buchanan. These risk assessment components are based on the overall methodology presented in Section 3 of this document which draws from the overall CSM (Section 2). A site-specific CSM (Section 17.1), data summarization (Section 17.2), SLERA results (Section 17.3), and BRAPF (Section 17.4) are presented below. These form the basis of the risk assessment conclusions for RFI Site 15 (Section 17.5).

17.1. CSM FOR SITE 15

The EBS identified potentially leaking drums as a source of possible contamination at this site. The area around Building S-159 contained approximately twenty 55-gallon drums of used oil, solvents, and coolant. Staining was observed beneath the drum locations, and any leakage was found to flow west across asphalt into a grassy area, down a small hill, and into the stormwater system. The building currently has a used oil storage system in the form of a 1,000 gallon aboveground storage tank (AST) with secondary containment (Woodward-Clyde 1997). An aerial photograph is presented in **Figure 17-1**.

The CSM for Site 15 is presented in **Figure 17-2**. The potential chemical source at the site is an area where leaking drums may have released chemicals. Possible COPCs include total petroleum hydrocarbons and metals. The primary transport pathways for further migration include leaching, runoff, and erosion. Given the gradual slope and vegetated lawn, runoff and erosion are less important pathways than leaching. Therefore, the primary media of concern at the site are surface soil and subsurface soil. The available data for soil, site topography and land use, and expected behavior of COPCs all indicate against transport to aquatic habitats. Bioaccumulation may be a relevant transport pathway. Plants and animals that come in contact with chemicals in soil may uptake chemicals. Dependent upon the chemical and the organism, these chemicals may accumulate in tissue.

Complete and significant exposure pathways under current scenarios at the site include:

- direct contact of plants with chemicals in surface soil;
- direct contact of soil invertebrates with chemicals in surface soil;
- ingestion by wildlife of chemicals in surface soil and ingestion of food items that have taken up chemicals from surface soil.

The same pathways apply under future scenarios in which subsurface soil has been brought to the surface. Based on this information and the overall CSM (Section 2.0), the major ecological receptor groups applicable to the site include plants, terrestrial invertebrates, and wildlife.

17.2. DATA SUMMARIZATION

Two surface soil samples from Site 15 and two subsurface samples taken at 2-4 feet depth were analyzed for metals. These samples are evaluated in the SLERA and BRAPF. Data quality was evaluated and data were prepared using the methodology outlined in Section 3.1. Samples used in the assessment of Site 15 are summarized in **Table 3-1**.

17.3. SLERA (Steps 1 & 2) for Site 15

Site 15 consists of terrestrial habitats. Therefore, the following assessment and measurement endpoints were evaluated as part of the SLERA:

Assessment Endpoints

- Viable, functional populations of organisms exposed directly or indirectly to chemicals in soil.

Measurement Endpoints

- Comparison of maximum concentrations of chemicals in soil and subsurface soil at individual RFI Sites to screening values protective of a broad range of potential receptors, including plants, invertebrates, and wildlife.

Surface and subsurface soil concentrations were evaluated for the measurement endpoint. As discussed in Section 3, evaluation of subsurface soil for ecological exposures is a conservative measure applicable only to hypothetical future scenarios. Comparisons were conducted according to the methodology outlined in Section 3.2.

17.3.1. SLERA Results

Maximum exposure estimates were compared to media-specific screening-levels. Comparisons are presented in **Table 17-1** and **Table 17-2**. The results of this risk calculation are used to identify COPCs. SLERA risk calculation is performed by dividing the maximum exposure concentration by the screening level. This produces a ratio called a hazard quotient (HQ). When the HQ is less than 1, the potential for adverse effects is considered unlikely. If the HQ is equal to or greater than 1, the chemical is retained as a COPC and examined further in the BRAPF. The following chemicals were retained for further consideration because they exceeded or lacked screening values:

Surface Soil COPCs

- Aluminum
- Arsenic
- Beryllium
- Calcium
- Chromium
- Copper
- Iron
- Magnesium
- Manganese
- Mercury
- Nickel
- Potassium
- Selenium
- Sodium
- Thallium
- Vanadium
- Zinc

Subsurface Soil COPCs

- Aluminum
- Arsenic
- Calcium
- Chromium
- Copper
- Iron
- Magnesium
- Manganese
- Mercury
- Potassium
- Selenium
- Sodium
- Vanadium
- Zinc

17.4. BRAPF (Step 3) for Site 15

The purpose of the BRAPF (Step 3 of the ERA process) is to build upon the SLERA to identify COPCs and the receptors to be carried forward for further risk assessment or risk management. The SLERA for Site 15 identified 18 metals as COPCs for current exposure scenarios based on surface soil. COPCs for future terrestrial exposure pathways at Site 15 based on maximum concentrations in surface soil include 14 metals. A refined assessment of risks was performed to provide a more site-specific and realistic risk characterization for the site.

17.4.1. Refined Assessment Endpoints

Refined assessment endpoints were defined for Site 15 based on the site-specific CSM, results of the SLERA, and the overall methodology presented in Section 3.3. The assessment endpoints are:

- Viability of plant communities in fields, forests, and associated riparian habitats.
- Viability of terrestrial invertebrate communities as resources for terrestrial wildlife.
- Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.

These assessment endpoints included identification of specific ecological values defined in terms of receptor groups.

17.4.2. Refined Measurement Endpoints

Refined measurement endpoints were defined for Site 15 based on the assessment endpoints and the overall methodology presented in Section 3.3. Measurement endpoints for each assessment endpoint can be summarized as follows:

Viability of plant communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for plants.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of actual impacts on plant communities.

Viability of soil invertebrate communities

- Perform risk calculations comparing maximum, mean, and sample-specific exposure estimates to receptor-specific toxicological benchmarks for soil invertebrates.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on soil invertebrate communities.

Viability of wildlife communities

- Perform risk calculations comparing maximum and mean exposure estimates to receptor-specific toxicological benchmarks for mammals and birds.
- Compare site-specific exposures to background exposures.
- Qualitatively evaluate the proportion of area used by wildlife to indicate whether exposures are over-estimated.
- Qualitatively evaluate the quality of site habitats to determine factors that enhance or diminish the likelihood of impacts on wildlife.

Refined measurement endpoints are assessed using the data summarized in Section 17.2 and the general methodology outlined in Section 3.3. These data and methods were used to determine EPCs for surface and subsurface soil as presented in **Table 17-3** and **Table 17-4**. The representative receptors selected for use in evaluating measurement endpoints for Site 15 are:

- Terrestrial Plants (multiple species)
- Invertebrates (earthworm)
- Herbivorous bird (Ruddy quail-dove)
- Herbivorous mammal (Jamaican fruit bat)
- Insectivorous bird (pearly-eyed thrasher)
- Insectivorous mammal (Antillean ghost-faced bat)
- Predatory bird (red-tailed hawk)

The following sections evaluate each measurement endpoint as a line of evidence in a weight of evidence characterization of risks for each assessment endpoint.

17.4.3. BRAPF for Plants at Site 15

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to plants from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial plants:

- comparison of the chemical concentrations to benchmarks protective of plants, including
    - comparison using maximum EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

17.4.3.1. Comparison of Chemical Concentrations to Plant TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of plants. Because these benchmarks are directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 17-5** for surface soil and **Table 17-6** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

- Aluminum (514)
- Arsenic (1.14)
- Chromium (48.3)
- Copper (1.59)
- Manganese (4.17)
- Selenium (1.79)
- Thallium (1.10)
- Vanadium (81.0)
- Zinc (1.63)

Future Exposure Scenario (Subsurface Soil)

- Aluminum (550)
- Arsenic (2.51)
- Chromium (89.3)
- Manganese (4.17)
- Selenium (3.85)
- Vanadium (69.5)

Maximum EPC exceedences of TRVs for arsenic, copper, manganese, selenium, thallium, and zinc are low ranging from just over 1 to 4.17. Given that low effects levels are typically within 5 to 10 times no effects levels (Ford et al. 2000), it is likely these concentrations would not exceed low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of plants; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

- Aluminum (503)
- Chromium (46.2)
- Copper (1.01)
- Manganese (3.18)
- Selenium (1.51)
- Vanadium (62.9)
- Zinc (1.01)

Future Exposure Scenario (Subsurface Soil)

- Aluminum (465)
- Arsenic (1.76)
- Chromium (63.1)
- Manganese (2.32)
- Selenium (3.46)
- Vanadium (54.8)

The two locations sampled demonstrated similar concentrations of metals. Chemicals without available plant TRVs include calcium, iron, magnesium, potassium, and sodium. The uncertainty associated with the lack of TRVs is discussed in Section 18.

17.4.3.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 17-5** and **Table 17-6**.

Background comparison values are available for metals and organochlorine pesticides. Of the metals in surface soil that exceeded TRVs for plants, aluminum, arsenic, chromium, manganese, selenium, and zinc both of the detections were below the background comparison value, while one detection of copper, thallium, and vanadium were above. Of the metals in subsurface soil that exceeded TRVs for plants, aluminum, manganese, and vanadium both of the detections were below the background comparison value, while one detection of arsenic and chromium and both of the detections of selenium were above. This indicates that aluminum, arsenic, chromium, manganese, selenium, and zinc are likely present due to naturally occurring sources in surface soil, while aluminum, manganese, and vanadium are likely present due to naturally occurring sources in surface soil.

As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals. These would include arsenic, chromium, selenium, and vanadium.

17.4.3.3. Evaluation of Habitat for Plants at Site 15

Site 15 consists of 0.6 acres of mowed, manicured lawn located between a building and a baseball field. Plant communities at the site are likely to be subject to stress from anthropogenic disturbance unrelated to chemical concentrations in soil. Plant communities present in this poor quality habitat are unlikely to include sensitive species, and are more likely to include hardy, opportunistic species.

Habitat quality under future scenarios is partly dependent on how subsurface soil is handled. This risk assessment evaluates subsurface soil as a potential exposure medium under future scenarios in which this soil is excavated, exposed, and vegetated. Subsurface soil concentrations were used to represent these future exposures at the surface. This is highly conservative because it assumes excavated soil would not be amended, mixed with other soils, or covered with other soils. As discussed in Section 3.3.6, this is highly unlikely. Native subsurface soils are nutrient poor and consist of dense clay and concretized plinthite unlikely to support vegetation. It is likely that these soils would require mixing, cover, or amendment prior to establishment of habitat; this would effectively decrease exposures and reduce risks from any chemicals in soil.

17.4.3.4. BRAPF Conclusions for Plants at Site 15

The risk characterization section for plants evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on plant survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of plants. This comparison indicated that there are nine metals (aluminum, arsenic, chromium, copper, manganese, selenium, thallium, vanadium, zinc) in surface soil with maximum concentrations exceeding plant benchmarks. Maximum EPCs of six metals (aluminum, arsenic, chromium, manganese, selenium, vanadium) in subsurface soil exceeded plant TRVs. Mean concentrations for surface soil were also compared to plant TRVs and evaluated in conjunction with an examination of data distribution. Mean concentrations in surface soil of aluminum, arsenic, chromium, manganese, selenium, thallium exceed plant TRVs. Mean concentrations of all six metals in subsurface soil exceed plant TRVs. Maximum EPC exceedences of TRVs for arsenic, copper, manganese, selenium, thallium, and zinc are low and expected to fall below low-effects levels.

As another measurement endpoint, EPCs for Site 15 were compared to background concentrations. Of the metals in surface soil that exceeded TRVs for plants, aluminum, arsenic, chromium, manganese, selenium, and zinc were below the background comparison value, while one detection of copper, thallium, and vanadium were above. Of the metals in subsurface soil that exceeded TRVs for plants, aluminum, manganese, and vanadium were below the background comparison value, while at least one detection of arsenic, chromium and selenium were above. Arsenic, chromium, vanadium, and selenium are unlikely to be bioavailable based on local soil types.

Habitat quality was evaluated as a third measurement endpoint. Current habitat quality is poor because the site is mowed and located in a disturbed area near a building. While subsurface soil was evaluated as a potential exposure medium under future scenarios, it is unlikely that it could support vegetative communities due to natural characteristics (i.e. lack of nutrients and density); use as a base for habitat would require amendment or cover that would effectively change exposure concentrations.

In summary, aluminum, arsenic, chromium, copper, manganese, selenium, thallium, vanadium, zinc in soils exceed benchmarks at Site 15. However, aluminum, arsenic, chromium, manganese, selenium, vanadium and zinc are unlikely to produce risks because they are consistent with natural background concentrations and/or expected to have low bioavailability in site soil types. Arsenic, copper, manganese, selenium, thallium, and zinc are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to plants at Site 15. Uncertainties associated with this characterization of risks are discussed further in Section 18.

17.4.4. BRAPF for Soil Invertebrates at Site 15

As part of the BRAPF, refined risk calculation and evaluation of qualitative lines of evidence were evaluated to characterize risks to Soil Invertebrates from COPCs in soil. The following measurement endpoints were evaluated as indicators of risk to terrestrial soil invertebrates:

- comparison of the chemical concentrations to benchmarks protective of soil invertebrates, including
    - comparison using maximum EPCs;
- comparison of chemical concentrations to background concentrations; and
- qualitative evaluation of habitat quality.

Comparison of maximum concentrations to benchmarks is given the most weight in the weight of evidence approach because it is the most conservative indicator of risks at specific locations (i.e. hot spots). Qualitative measurement endpoints using site-specific vegetative observations are given less weight due to the qualitative nature of this data; however, they are considered important in light of the fact that literature-based benchmarks may be conservative.

17.4.4.1. Comparison of Chemical Concentrations to Soil invertebrate TRVs

The first measurement endpoint evaluated was the comparison of maximum EPCs in soil to literature-based benchmarks protective of soil invertebrates. Because these benchmarks are

directly relatable to the potential for toxic effects, they are referred to as TRVs. The TRVs selected were chosen to provide a highly conservative estimate of the potential for risk.

Comparisons are presented in **Table 17-7** for surface soil and **Table 17-8** for subsurface soil. When maximum EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

- Chromium (121)
- Copper (1.39)
- Manganese (2.04)
- Mercury (1.00)
- Zinc (2.17)

Future Exposure Scenario (Subsurface Soil)

- Chromium (223)
- Manganese (2.04)
- Mercury (1.00)

Maximum EPC exceedences of TRVs for copper, manganese, mercury, and zinc are low ranging from just over 1 to 2.17. Given that low effects levels are typically within 5 to 10 times no effects levels (Ford et al. 2000), it is likely these concentrations would not exceed low effects levels.

When mean EPCs of COPCs were compared to TRVs, the following chemical concentrations exceeded TRVs protective of soil invertebrates; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

- Chromium (116)
- Manganese (1.55)
- Zinc (1.35)

Future Exposure Scenario (Subsurface Soil)

- Chromium (158)
- Manganese (1.14)

Chemicals without available soil invertebrate TRVs include aluminum, calcium, iron, magnesium, potassium, sodium, and vanadium. The uncertainty associated with the lack of TRVs is discussed in Section 18.

17.4.4.2. Comparison of Chemical Concentrations to Background

The second measurement endpoint evaluated was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Comparisons are presented in **Table 17-7** and **Table 6-8**.

Background comparison values are available for metals and organochlorine pesticides. Of the metals in surface soil that exceeded TRVs for invertebrates, chromium, manganese, and mercury were below the background comparison value, while copper and zinc were above. Of the metals in subsurface soil that exceeded TRVs for invertebrates, chromium and manganese were below the background comparison value, while zinc was above. This indicates that chromium,

manganese, and mercury are likely present due to naturally occurring sources and unlikely to impact ecological receptors.

As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals. These would include chromium.

17.4.4.3. Evaluation of Habitat for Soil Invertebrates at Site 15

Site 15 consists of 0.6 acres of mowed, manicured lawn located between a building and a baseball field. Invertebrate communities at the site are likely to be subject to stress from anthropogenic disturbance unrelated to chemical concentrations in soil. Plant communities present in this poor quality habitat are unlikely to include sensitive species, and are more likely to include hardy, opportunistic species.

As discussed above for plant, habitat quality under future scenarios is partly dependent on how subsurface soil is handled. This risk assessment evaluates subsurface soil as a potential exposure medium under future scenarios in which this soil is excavated, exposed, and vegetated. Subsurface soil concentrations were used to represent these future exposures at the surface. It is likely that these soils would require mixing, cover, or amendment prior to establishment of habitat; this would effectively decrease exposures and reduce risks from any chemicals in soil.

17.4.4.4. BRAPF Conclusions for Soil Invertebrates at Site 15

The risk characterization section for soil invertebrates evaluates the results for the measurement endpoints above to provide a conclusion regarding the potential for adverse effects on soil invertebrate survival, growth, and reproduction from chemicals in soil. Three measurement endpoints were evaluated. The first was a comparison of EPCs to soil benchmarks protective of soil invertebrates. This comparison indicated that there are five metals (chromium, copper, manganese, mercury, selenium, and zinc) in surface soil with maximum concentrations exceeding plant benchmarks. Mean concentrations for surface soil were also compared to invertebrate TRVs and evaluated in conjunction with an examination of data distribution; mean concentrations of chromium, manganese, and mercury exceed invertebrate TRVs. Concentrations in subsurface soil were also compared to TRVs. Chromium, manganese, and zinc demonstrated exceedences based on maximum EPCs and chromium and manganese exceeded based on mean EPCs.

As another measurement endpoint, EPCs for Site 15 were compared to background concentrations. Of the metals in surface soil that exceeded TRVs for invertebrates, chromium, manganese, and mercury were below the background comparison value, while copper and zinc were above. Of the metals in subsurface soil that exceeded TRVs for invertebrates, chromium and manganese were below the background comparison value, while zinc was above.

Habitat quality was evaluated as a third measurement endpoint. Current site habitat is poor quality, and invertebrate communities are likely to be stress resistant. While subsurface soil was evaluated as a potential exposure medium under future scenarios, it is unlikely that it could support vegetative communities due to natural characteristics (i.e. lack of nutrients and density); use as a base for habitat would require amendment or cover that would effectively change exposure concentrations.

In summary, chromium, copper, manganese, mercury, selenium, and zinc in soils exceed benchmarks at Site 15. However, these metals are unlikely to produce risks because they are either consistent with natural background concentrations, expected to have low bioavailability in site soil types, or are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to soil invertebrates at Site 15. Uncertainties associated with this characterization of risks are discussed further in Section 18.

17.4.5. BRAPF Results for Wildlife at Site 15

The refined CSM for Site 15 identifies viability of wildlife an assessment endpoint. The conceptual model identified five representative receptors for assessment. These are herbivorous birds (i.e. ruddy quail-dove), herbivorous mammal (i.e. Jamaican fruit bat), insectivorous bird (i.e. pearly-eyed thrasher), insectivorous mammal (i.e. Antillean ghost-faced bat), and predatory bird (i.e. red-tailed hawk).

The following measurement endpoints were evaluated as indicators of risk to wildlife:

- comparison of maximum case scenario doses ingested through the food web to NOAEL- and LOAEL-based benchmarks protective of wildlife;
- comparison of doses ingested through the food web to background doses;
- comparison of site size to receptor home range as a modifier to risk calculations; and
- qualitative evaluation of habitat quality.

Comparison of maximum case scenario doses to LOAELs is given the most weight in the weight of evidence approach because it is the most certain indicator of risks. Comparison of maximum concentrations to NOAELs is given the second most weight as an indicator. Comparisons to background are given the third most weight because they are an important indicator of the relevance of toxicity and bioavailability assumptions. Comparisons using maximum case scenario doses and qualitative evaluation of habitat quality are given less weight. Comparison of modeled doses to benchmarks and background are presented in **Table 17-9** through **Table 17-12**. A more explicit presentation of guild-specific dose modeling can be found in Attachment A in Tables A-83 to A-92.

17.4.5.1. Comparison of Maximum Case Scenario Exposure Estimates to No-Effects TRVs for Wildlife

The first measurement endpoint evaluated was a comparison of exposure estimates (doses) based on maximum concentrations in soil to NOAEL-based literature-based TRVs protective of wildlife. Exposure estimates and TRVs were applied based on the methodology presented in Section 3.3. Literature-based TRVs are not site-specific, and these comparisons provide a highly conservative estimate of the potential for risk.

Dose modeling and comparisons based on maximum EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (38.6)	Aluminum (131) Thallium (12.4) Vanadium (2.86)	None	Aluminum (5.08) Vanadium (57.7) Zinc (1.08)	Vanadium (2.32)

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (41.3)	Aluminum (140) Vanadium (2.45)	None	Aluminum (5.44) Vanadium (49.5)	Vanadium (1.99)

Dose modeling and comparisons based on mean EPCs identified the following chemicals as equaling or exceeding wildlife TRVs for each feeding guild; the HQ is included in parentheses next to each chemical:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (37.8)	Aluminum (128) Thallium (8.16) Vanadium (2.22)	None	Aluminum (4.97) Vanadium (44.8)	Vanadium (1.80)

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (34.9)	Aluminum (118) Vanadium (1.93)	None	Aluminum (4.60) Vanadium (39.0)	Vanadium (1.57)

TRVs were unavailable for calcium, iron, magnesium, potassium, and sodium for mammals and calcium, iron, magnesium, potassium, sodium, and acetone for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

17.4.5.2. Comparison of Mean Case Scenario Exposure Estimates to Low-Effects TRVs for Wildlife

The third measurement endpoint evaluated is comparison of exposure estimates based on maximum EPCs to LOAEL-based TRVs. LOAELs are a valuable indicator of risk because they provide a bound to NOAELs. When maximum case scenario doses are compared to LOAEL-based TRVs, the following chemicals exceed:

Current Exposure Scenario (Surface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (3.78)	Aluminum (12.8) Vanadium (1.11)	None	Vanadium (22.4)	None

Future Exposure Scenario (Subsurface Soil)

Herbivorous Mammals	Insectivorous Mammals	Herbivorous Birds	Insectivorous Birds	Predatory Birds
Aluminum (3.49)	Aluminum (11.8)	None	Vanadium (19.5)	None

While no LOAEL is available for thallium, it should be noted that the NOAEL exceedence for thallium was 8.2 times the TRV. Per Ford et al. 2000, low effects levels are typically within 10 times the no effects levels. Therefore, thallium is likely to fall below low effects levels.

TRVs were unavailable for calcium, iron, magnesium, potassium, and sodium for mammals and calcium, iron, magnesium, potassium, sodium, and acetone for birds. The uncertainty associated with the lack of TRVs is discussed in Section 18: Uncertainty Evaluation. Those chemicals that had exposure estimates below TRVs were removed from further consideration.

17.4.5.3. Comparison of On-Site and Background Exposures as an Indicator of Source-Relatedness and Bioavailability

An additional measurement endpoint evaluated for wildlife was comparison of the range of detected concentrations at the site to the 95% UPL for background concentrations. This comparison provides a strong indication of whether detected concentrations are source-related or widespread to the region. Biota are acclimated to widespread concentrations which, in the case of metals, are in many cases bound in non-bioavailable mineral forms. Comparisons are presented in **Table 17-9 through Table 17-12**.

Background comparison values are available for metals and organochlorine pesticides. Doses based on mean EPCs for aluminum, thallium and vanadium exceeded NOAEL-based TRVs. Doses for all of these metals were above background comparison values. As discussed in Section 3.3, local soils provide conditions that limit the bioavailability of anionic metals. These would include vanadium and some forms of thallium.

17.4.5.4. Comparison of Site Size and Receptor Home Range Size

The fourth measurement endpoint evaluated is comparison of site size and receptor home range. The exposure estimates calculated assume that the receptors will be at the site 100% so any prey, soil, and water consumed would be from Site 15. In some cases, the receptor home range will be larger than the site size so the receptor would spend less than 100% of the time at the site, making this assumption overly conservative.

Comparison of site size to receptor home ranges is presented in **Table 3-16** for all RFI Sites including Site 15. Site 15 is approximately 0.6 acres. This is smaller than all of the average home ranges for avian and mammalian receptors. This indicates that exposure models for

wildlife may over-estimate risk because receptors consume some of their diet from off-site. Application of the area use factors listed in **Table 3-16** would decrease risk estimates by over 95%. This would bring all doses for wildlife based on mean EPCs below LOAELs.

17.4.5.5. Evaluation of Habitat Quality

Site 15 consists of 0.6 acres of mowed, manicured lawn located between a building and a baseball field. This area is likely to provide very few resources for wildlife, which are likely to frequent higher quality wooded habitat nearby.

As discussed above for plants, habitat quality under future scenarios is partly dependent on how subsurface soil is handled. This risk assessment evaluates subsurface soil as a potential exposure medium under future scenarios in which this soil is excavated, exposed, and vegetated. Subsurface soil concentrations were used to represent these future exposures at the surface. It is likely that these soils would require mixing, cover, or amendment prior to establishment of habitat; this would effectively decrease exposures and reduce risks from any chemicals in soil.

17.4.5.6. BRAPF Conclusions for Wildlife at Site 15

The risk characterization for wildlife at Site 15 draws from numerous measurement endpoints as lines of evidence for evaluation of the potential for risks to wildlife. First, maximum concentrations of chemicals were used as EPCs in food web exposure models to estimate doses for each representative receptor species. Doses were then compared to NOAEL-based TRVs. Using maximum EPCs and conservative exposure factors, aluminum, thallium, vanadium, and zinc in surface soil exceed NOAEL-based TRVs for several feeding guilds under current exposure scenarios. Maximum EPCs for subsurface soil were used to model future exposure scenarios; modeled doses of aluminum and vanadium exceeded wildlife TRVs.

The second measurement endpoint evaluated was comparison of modeled doses based on mean EPCs to NOAEL-based TRVs as a better indicator of population-level risks. Based on mean EPCs, doses of aluminum, thallium, and vanadium exceeded NOAEL-based TRVs under current and future exposure scenarios.

Doses were also compared to LOAEL-based TRVs as a measurement endpoint to provide a more certain indicator of risks. Aluminum and vanadium were the only chemicals with mean doses exceeding LOAEL-based TRVs.

Another measurement endpoint considered was comparison of the doses of COPCs on-site to doses in background areas. Maximum exposure estimates for aluminum, thallium, and vanadium were higher than doses for background areas.

Home range and habitat quality were also considered as measurement endpoints. The size of the site is smaller than the foraging range for mammals and birds, and risk estimates may be over-estimated by as much as 95%. Current site habitat is wooded land of good quality and may provide resources for wildlife. While subsurface soil was evaluated as a potential exposure medium under future scenarios, it is unlikely that it could support vegetative communities due to

natural characteristics (i.e. lack of nutrients and density); use as a base for habitat would require amendment or cover that would effectively change exposure concentrations.

Modeled doses of aluminum, thallium, vanadium, and zinc exceed NOAELs for wildlife when calculated using maximum EPCs. Doses based on mean EPCs for thallium and zinc fall below low effects levels and are unlikely to drive risks. Mean doses of aluminum and vanadium exceed LOAELs and are higher than background concentrations. When home range is considered, risk levels decrease by 95%, bringing exposures for aluminum below LOAELs and exposures for vanadium below LOAELs for all but one receptor. This is considered with the fact that vanadium is unlikely to be bioavailable in local soil types and that habitat quality is poor. Based on this information, COPCs at Site 15 are unlikely to pose risks to wildlife. Uncertainties associated with this characterization of risks are discussed further in Section 18.

17.5. Conclusions for Site 15

The SLERA and refined assessment conducted as part of the BRAPF for Site 15 form the basis for the following conclusions for each refined assessment endpoint:

Viability of Plant Communities - Aluminum, arsenic, chromium, copper, manganese, selenium, thallium, vanadium, zinc in soils exceed benchmarks at Site 15. However, aluminum, arsenic, chromium, manganese, selenium, vanadium and zinc are unlikely to produce risks because they are consistent with natural background concentrations and/or expected to have low bioavailability in site soil types. Arsenic, copper, manganese, selenium, thallium, and zinc are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to plants at Site 15. Uncertainties associated with this characterization of risks are discussed further in Section 18.

Viability of Soil Invertebrate Communities - Chromium, copper, manganese, mercury, selenium, and zinc in soils exceed benchmarks at Site 15. However, these metals are unlikely to produce risks because they are either consistent with natural background concentrations, expected to have low bioavailability in site soil types, or are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to soil invertebrates at Site 15. Uncertainties associated with this characterization of risks are discussed further in Section 18.

Viability of Wildlife Communities – Modeled doses of aluminum, thallium, vanadium, and zinc exceed NOAELs for wildlife when calculated using maximum EPCs. Doses based on mean EPCs for thallium and zinc fall below low effects levels and are unlikely to drive risks. Mean doses of aluminum and vanadium exceed LOAELs and are higher than background concentrations. When home range is considered, risk levels decrease by 95%, bringing exposures for aluminum below LOAELs and exposures for vanadium below LOAELs for all but one receptor. This is considered with the fact that vanadium is unlikely to be bioavailable in local soil types and that habitat quality is poor. Based on this information, COPCs at Site 15 are unlikely to pose risks to wildlife. Uncertainties associated with this characterization of risks are discussed further in Section 18.

19. UNCERTAINTY EVALUATION

There are a number of uncertainties inherent in the analysis tools used for this ERA and in the assessment of risks in the risk characterization. These uncertainties must be taken into consideration when interpreting the data presented in the previous sections and when making risk management decisions based on the conclusions of this risk characterization. The uncertainties are associated with four areas of the risk assessment:

- Sample design and data representativeness;
- Analysis of chemical data
- Analysis of estimated exposure and toxicity data
- Assessment of risks.

19.1. SAMPLE DESIGN AND DATA REPRESENTATIVENESS

Of the potential uncertainties associated with risk assessment of the Site, the sample design and data representativeness are likely to have the greatest impact. The greatest uncertainty associated with the sample design is associated with targeting specific analytes at specific locations. Focusing the study design to provide analyses for certain chemicals to specific suspected source areas is a valid and accepted means of maintaining a practical and efficient limit on the field effort. However, there is always a possibility that the study design could miss samples where these chemicals are present. To minimize this possibility and the associated uncertainty, the study design was based on in-depth consideration of site history, potential sources, and fate and transport. Study design also incorporated observations during site visits as part of field verification.

It is important to note that sampling for Fort Buchanan focused specifically on potential sources of chemicals identified through research of site history and disposal practices. In many cases, disposal or storage of waste occurred on paved surfaces. In such cases, sampling often focused on the soil beneath the pavement or a small number of samples immediately adjacent to the pavement. The analytical suite for each sample was often focused to only those compounds expected from past disposal. These are valid approaches consistent with RCRA guidance, especially at a site where past practices are relatively well understood. However, in some cases, only one or two samples may be available for soils beyond paved areas. To compensate for limited sample number, samples were biased to areas of expected contamination.

19.2. ANALYSIS OF CHEMICAL DATA

The maximum concentration of a chemical detected in duplicate or paired samples was the concentration considered throughout the ERA. Selecting the maximum concentration of a chemical detected in duplicate samples for use in the ERA is a conservative measure and may overestimate risks.

The 95% UCL of the mean concentration of a chemical was calculated using concentrations for samples in which the chemical was detected and the whole reporting limit of the chemical for

samples in which it was not detected. This approach also has the potential to overestimate the arithmetic mean.

19.3. ANALYSIS OF ESTIMATED EXPOSURE AND TOXICITY DATA

The potential for adverse effects to wildlife from dermal absorption or inhalation of chemicals could not be evaluated because of a lack of exposure data. However, based on the COPCs detected in the sampled media, these potential exposure pathways are unlikely to be important routes of exposure for terrestrial species, and the inclusion of these pathways is unlikely to significantly alter the risk estimates. For terrestrial wildlife, dermal absorption is also limited by fur and feathers. In addition, the potential for adverse effects to plants from chemicals via foliar uptake could not be assessed due to the lack of exposure data. It is also important to note that because of the limited number of samples, many times the concentration used in the maximum case scenario also acted as the concentration used in the mean case scenario. This could greatly overestimate the actual risk to the wildlife receptors.

A major source of uncertainty in the ERA is associated with the estimation of receptor exposure to COPCs. Generally, the models used to estimate exposures from soil and prey were created to represent a worst-case scenario of possible risks to the receptor groups, and thus, many conservative assumptions were incorporated into the models. For example, the models assume a 100% area use factor.

In the absence of site-specific information on the bioavailability and form of chemicals (such as the organic COPCs), the bioavailability of chemicals was based on values and models taken from the scientific literature. COPCs to which receptors are exposed are assumed to be present in their most bioavailable and toxic chemical form found in the environment. Availability and chemical form are affected by factors such as pH, moisture, temperature, microbial activity, and interaction with other chemicals, and in many cases, chemicals are present in less bioavailable/ toxic forms in the environment. Given the relatively conservative nature of the toxicity values in terms of chemical bioavailability and form, it is likely that the potential for adverse effects was overestimated.

There is an uncertainty associated with using allometric body scaling for TRVs. Guidance regarding use of allometric scaling varies. Allometric scaling begins with empirical data from one receptor species in which a dose is described as a NOAEL. The NOAEL is usually based on statistically significant toxicological data as well as the experimenter's judgment. This NOAEL is then scaled to the desired receptor using body size. Because the data extrapolated often combines judgment with hard data, making a statistical interpretation is difficult. However, allometric scaling for estimating exposure is proper to use when empirical data do not exist.

There is a great deal of uncertainty associated with the lack of TRVs for chemicals evaluated in the ERA. For wildlife, the lack of TRVs for specific chemicals remains an uncertainty throughout the risk assessment. Some organic chemicals identified as lacking wildlife TRVs were detected infrequently or at low concentrations; others were detected in a significant number of samples. This represents a significant uncertainty that should be considered when evaluating risk assessment results. Further uncertainty is associated with substituting toxicity criteria

derived for a specific chemical for a different, but related, chemical for which toxicity criteria have not been derived.

19.4. ASSESSMENT OF RISKS

There are uncertainties associated with the assessment of risks at the Site. The most important uncertainty is the limited ability of risk assessment to assess combined and synergistic effects of chemicals. Most of the chemicals detected at the site were metals, although a small number of organic chemicals were also detected. The variety of chemicals, the extent of elevated concentrations, and the widespread nature of contamination at the Site make it a highly complex site. Comparison of individual chemicals to TRVs does not capture the potential for combined effects. As such, risk assessment conclusions have conservatively identified the potential for synergistic effects, and recommended in certain cases the consideration in risk management of all detected chemicals.

Another uncertainty is the extrapolation of assumptions about the potential for adverse effects from individual organisms to populations or communities. The intent of this risk characterization, as set forth in the assessment endpoints, is to evaluate risks to populations and communities. It was generally assumed that if there is no potential for direct adverse effects to individual organisms then it is also unlikely for there to be the potential for direct adverse effects to populations or communities. Similarly, it was assumed that if there is the potential for adverse effects to individual organisms there is also the potential for adverse effects to populations or communities. Risks may have been overestimated by this latter assumption.

20. BERA SUMMARY and CONCLUSIONS

This document presents the Ecological Risk Assessment (ERA) conducted by EA Engineering, Science and Technology, Inc. (EA) for the Fort Buchanan Site (Site) located south of San Juan in Puerto Rico. The purpose of this assessment is to characterize and quantify potential environmental impacts from chemicals residual in soil, sediment and surface water from historic practices on Fort Buchanan. This document presents the following information as part of Steps 1 through 3 of the EPA 8-Step ERA process:

- an overall description of site history, location, and setting for Fort Buchanan;
- an overall CSM;
- an overall methodology for both the SLERA (Steps 1 and 2) and refined assessment as part of the BRAPF (Step 3),
- Site-specific CSMs, SLERA, and BRAPF for each of 14 RFI sites evaluated;
- a discussion of uncertainties associated with risk assessment; and
- conclusions which are presented in Section 16.

The conclusions of the ERA for each RFI Site are presented below.

20.1. BERA CONCLUSIONS FOR SITE 1

The SLERA and refined assessment conducted as part of the BRAPF for Site 1 form the basis for the following conclusions for each refined assessment endpoint:

- **Viability of Plant Communities -** Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to plants at Site 1 and are unlikely to pose risks now or in the future.
- **Viability of Soil Invertebrate Communities** - Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to soil invertebrates at Site 1 and are unlikely to pose risks now or in the future.
- **Viability of Wildlife Communities** - COPCs at Site 1 are unlikely to cause risk to wildlife. Concentrations of DDTr compounds were detected in surface soil and exposure estimates exceed no-effects benchmarks. However, DDTr exposures do not exceed low-effects benchmarks. Also, the site is smaller than the home ranges for most wildlife receptor, and the area provides poor quality habitat for foraging. No COPCs exceeded benchmarks in subsurface soil. Therefore, risks are unlikely under either current or future scenarios.

20.2. BERA CONCLUSIONS FOR SITE 2

The SLERA and refined assessment conducted as part of the BRAPF for Site 2 examined future potential risks from subsurface soils to terrestrial wildlife. This ERA finds the following conclusions:

- **Viability of Plant Communities -** There are seven metals (arsenic, chromium, cobalt, mercury, nickel, selenium, vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. However, based on the magnitude of exceedence, values for all metals but chromium are expected to fall below low effects levels. The mean EPC as well as more than half of the chromium and vanadium concentrations are within background. Information regarding local soils indicates that chromium, vanadium, and other metals are associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to plants at Site 2 under future scenarios.
- **Viability of Soil Invertebrate Communities** - There are four metals (arsenic, chromium, mercury, selenium) in subsurface soil with concentrations exceeding soil invertebrate benchmarks under the future exposure scenarios. Based on magnitude of exceedence, HQs for arsenic, mercury, and selenium are likely to fall below low effects levels. However, the mean EPC as well as more than half of the chromium and vanadium concentrations are within background. Information regarding local soils indicates that chromium, vanadium, and other metals are associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to soil invertebrates at Site 2under future scenarios.
- **Viability of Wildlife Communities -** Exposure estimates for cadmium, selenium, and vanadium exceed NOAELs. Vanadium is the only COPC for which exposure estimates exceed both LOAELs and background; it exceeds for a single wildlife receptor. There are many factors that decrease the expected risk from vanadium, including the low bioavailability of vanadium in soil; the fact that subsurface soils would not support habitat for wildlife unless amended or mixed, and the existing poor habitat quality of the site. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to wildlife at Site 2 under future scenarios.

20.3. BERA CONCLUSIONS FOR SITE 3

The SLERA and refined assessment conducted as part of the BRAPF for Site 3 examined future potential risks from subsurface soils to terrestrial wildlife. This ERA finds the following conclusions:

- **Viability of Plant Communities -** There are seven metals (aluminum, arsenic, chromium, cobalt, copper, manganese, selenium, thallium, and vanadium) in subsurface soil at Site 3 with concentrations exceeding plant benchmarks under the future exposure scenarios. HQs for arsenic, cobalt, mercury, nickel, and selenium are low and concentrations of these metals are expected to fall below low effects levels. Less than half of the detections of aluminum, cobalt, manganese, and thallium exceeded background. Information regarding local soils indicates that chromium, vanadium, and other metals are associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed

with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 3 do not pose risks to plants under future scenarios.

- **Viability of Soil Invertebrate Communities** - There are four metals (arsenic, chromium, manganese, and mercury) in subsurface soil at Site 3 with mean concentrations exceeding plant benchmarks under the future exposure scenarios. Mean concentrations of mercury do not exceed benchmarks, and maximum concentrations do not exceed background. HQs for arsenic and mercury are low and concentrations of these metals are expected to fall below low effects levels. Only 2 of the 8 detections of manganese exceed background. Information regarding local soils indicates that chromium is associated with plinthite soil naturally occurring in the subsurface which provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 3 do not pose risks to plants under future scenarios.
- **Viability of Wildlife Communities -** Mean exposure estimates for aluminum, thallium, and vanadium in subsurface soils at Site 3 exceed LOAELs and background. Area use factors drastically decrease exceedences, with all but one COPC for one receptor falling below 1. There are many factors that decrease the expected risk from vanadium, including the low bioavailability of vanadium in soil; the fact that subsurface soils would not support habitat for wildlife unless amended or mixed; the fact that the site is currently paved, which further decreases the likelihood of habitat restoration at the site; and the existing poor habitat quality of the site. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at site 3 do not pose risks to wildlife under future scenarios.

20.4. BERA Conclusions for Site 4

Based on the lack of any evidence of a release of PCBs from Site 4, the SLERA finds that there is no source, there are no complete exposure pathways, and therefore no risks to ecological receptors.

20.5. BERA Conclusions for Site 5

Based on the lack of any evidence of a release of PCBs from Site 5, the SLERA finds that there is no source, there are no complete exposure pathways, and therefore no risks to ecological receptors.

20.6. BERA Conclusions for Site 6

The SLERA and refined assessment conducted as part of the BRAPF for Site 6 form the basis for the following conclusions for each refined assessment endpoint:

- **Viability of Plant Communities -** Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to plants at Site 6 and are unlikely to pose risks now or in the future.

- **Viability of Soil Invertebrate Communities** - Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to soil invertebrates at Site 6 and are unlikely to pose risks now or in the future.
- **Viability of Wildlife Communities** - Based on a lack of exceedences in benchmark comparisons, the findings of the BRAPF are that COPCs do not pose a risk to wildlife at Site 6 and are unlikely to pose risks now or in the future.
- **Viability of Aquatic and Benthic Organism Communities** - Based on poor habitat which limits the potential receptors and physical constraints that limit potential exposure, COPCs at Site 6 do not pose a risk to for aquatic and benthic organisms at Site 6.

20.7. BERA Conclusions for Site 7

The SLERA and refined assessment conducted as part of the BRAPF for Site 7 form the basis for the following conclusions for each refined assessment endpoint:

- **Viability of Plant Communities -** Concentrations of aluminum, arsenic, chromium, manganese, mercury, selenium, or vanadium exceed benchmarks at Site 7. However, concentrations of arsenic manganese and surface soil in surface soil are expected to fall below low effects levels. Those chemicals with the highest exceedences are consistent with naturally occurring concentrations in soil as indicated by background and association with plintite soils. Habitat quality is more likely to limit plant communities than chemical stressors, and future scenarios would likely involve drastic changes to soil composition. Based on this information, COPCs in soil are considered not to pose a significant risk to plants at Site 7.
- **Viability of Soil Invertebrate Communities** - Concentrations of chromium, manganese, mercury, and selenium exceed benchmarks at Site 7. Manganese and mercury concentrations are below background. selenium exceedences are low and expected to be below low effects levels. Chromium toxicity is expected to be over-estimated based on information regarding local soils which may contain plinthite, a metal-rich material. However, habitat quality is more likely to limit soil invertebrate communities than chemical stressors, and future scenarios would likely involve drastic changes to soil composition. Based on this information, COPCs in soil are considered not to pose a significant risk to soil invertebrates at Site 7.
- **Viability of Wildlife Communities** – Based on the fact that the only COPCs with exposure estimates that exceed benchmarks demonstrate concentrations below background, COPCs at Site 7 are unlikely to pose risks to wildlife.

20.8. BERA Conclusions for Site 8

The SLERA and refined assessment conducted as part of the BRAPF for Site 8 examined future potential risks from subsurface soils to terrestrial wildlife. This ERA finds the following conclusions:

- **Viability of Plant Communities -** There are seven metals (aluminum, arsenic, chromium, cobalt, manganese, selenium, and vanadium) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. Based

on low magnitude of exceedence, concentrations of arsenic, cobalt, manganese, and selenium are also expected to fall below low effects levels. Concentrations of arsenic, chromium, and vanadium fall below background. For aluminum and manganese, only one of the four samples detected exceeded background. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil ate Site 8 do not pose risks to plants under future scenarios.

- **Viability of Soil Invertebrate Communities** - There are three metals (chromium, manganese, and mercury) in subsurface soil with concentrations exceeding plant benchmarks under the future exposure scenarios. Based on low magnitude of exceedence, concentrations of manganese and mercury are expected to fall below low effects levels. All chromium, all mercury, and all but one manganese detection fall below background. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposures under future scenarios would likely decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil do not pose risks to soil invertebrates under future scenarios.
- **Viability of Wildlife Communities -** Aluminum, manganese, selenium, and vanadium exceed NOAELs for wildlife. However, exposures for manganese and selenium fall below LOAELs, and exposures for aluminum and vanadium fall below background levels. Application of area use factors decreases exceedences, and it is likely that changes to subsurface soil necessary to make it a base for habitat would decrease exposures. Therefore, subsurface soils at Site 8 are considered unlikely to pose potential risks to wildlife if the site is exposed and re-vegetated.

20.9. BERA Conclusions for Site 9

The SLERA and refined assessment conducted as part of the BRAPF for Site 9 examined future potential risks from subsurface soils to terrestrial wildlife. This ERA finds the following conclusions:

- **Viability of Plant Communities -** Concentrations of aluminum, arsenic, chromium, cobalt, copper, manganese, mercury, selenium, and vanadium exceed benchmarks for plants. Of these, maximum HQs, for cobalt, copper, and mercury are low and their concentrations are expected to fall below low effects levels. Mean concentrations of arsenic are low and expected to fall below low effects levels. Concentrations of aluminum are below background. Soil types at Site 9 are likely to limit bioavailability of chromium and selenium. There is no current habitat for plants at Site 9. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 9 do not pose risks to plants under future exposure scenarios.
- **Viability of Soil Invertebrate Communities** - Concentrations of arsenic, chromium, copper, manganese, mercury, and selenium exceed benchmarks for soil invertebrates. Of these, maximum HQs for arsenic, copper, mercury, and selenium are low and their concentrations are expected to fall below low effects levels. Concentrations of aluminum

are below background. Only 1 or 2 of the 6 detections of copper, manganese, and mercury exceed background and soil types at Site 9 are likely to limit bioavailability of chromium. There is no current habitat for soil invertebrates at Site 9. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 9 do not pose risks to soil invertebrates under future exposure scenarios.

- **Viability of Wildlife Communities -** While wildlife exposures exceed no-effects benchmarks for aluminum, arsenic, manganese, selenium, and vanadium, none exceed both low-effects benchmarks and background. Consideration of area use factors, habitat quality, and changes that would occur to subsurface soil further decrease the likelihood of risk. Therefore, subsurface soils at Site 9 are considered unlikely to pose potential risks to wildlife if the site is exposed and re-vegetated. Future use assumptions are highly uncertain, and it expected that soil concentrations may decrease.

20.10. BERA Conclusions for Site 10

At Site 10, only two chemicals were detected in environmental media: acetone and carbon disulfide. Both chemicals are commonly produced by plants and microbes in natural environments and were detected at very low concentrations near reporting limits. Toxicity data for these chemicals indicate that they are relatively non-toxic to ecological receptors likely to be found at the site. Therefore it is highly unlikely that COPCs in soil at Site 10 pose risk to ecological receptors.

20.11. BERA Conclusions for Site 11

The SLERA and refined assessment conducted as part of the BRAPF for Site 11 examined future potential risks from subsurface soils to terrestrial wildlife. This ERA finds the following conclusions:

- **Viability of Plant Communities -** Concentrations of aluminum, arsenic, chromium, cobalt, manganese, selenium, and vanadium exceed benchmarks for soil invertebrates. Of these, maximum HQs for arsenic, cobalt, and selenium are low and their concentrations are expected to fall below low effects levels. Concentrations of aluminum are below background. Only 1 of the 4 detected concentrations of cobalt and manganese exceeded background and soil types at Site 11 are likely to limit bioavailability of chromium. There is no current habitat for plants at Site 11. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 11 do not pose risks to plants under future exposure scenarios.
- **Viability of Soil Invertebrate Communities** - Concentrations of arsenic, chromium, manganese, mercury, and selenium exceed benchmarks for soil invertebrates. Of these, maximum HQs for arsenic, manganese, mercury, and selenium are low and their concentrations are expected to fall below low effects levels. Concentrations of mercury are below background. Only 1 of the 4 detected concentrations of manganese exceeded

background and soil types at Site 11 are likely to limit bioavailability of chromium. There is no current habitat at Site 11. Subsurface soil provides a material unsuitable for establishment of habitat unless it is amended or mixed with other soil; therefore, exposure concentrations are likely to decrease. Therefore, the finding of the risk assessment is that chemicals in subsurface soil at Site 11 do not pose risks to soil invertebrates under future exposure scenarios.

- **Viability of Wildlife Communities -** Exposure estimates for aluminum, manganese, selenium, and vanadium exceed NOAEL-based TRVs for several feeding guilds under future exposure scenarios. Aluminum, manganese, and selenium exposures fall below either benchmarks or background levels, and vanadium exposures approach background when area use factors are considered. Vanadium bioavailability is expected to be limited by soil type, and therefore over-estimated in the risk assessment. Therefore, subsurface soils at Site 11 are considered unlikely to pose potential risks to wildlife if the site is exposed and re-vegetated. Future use assumptions are highly uncertain, and it expected that soil concentrations may decrease.

20.12. BERA Conclusions for Site 12

The SLERA and refined assessment conducted as part of the BRAPF for Site 12 form the basis for the following conclusions for each refined assessment endpoint:

- **Viability of Plant Communities -** Based on the fact that all chemicals with concentrations exceeding benchmarks have concentrations consistent with background, the findings of the BRAPF are that COPCs do not pose a risk to plants at Site 12.
- **Viability of Soil Invertebrate Communities** - Based on the fact that all chemicals with concentrations exceeding benchmarks have concentrations consistent with background, the findings of the BRAPF are that COPCs do not pose a risk to soil invertebrates at Site 12.
- **Viability of Wildlife Communities -** Aluminum, lead, and vanadium exceed no effects benchmarks under maximum case scenarios. However, exposures for all of these COPCs either fall below LOAEL-based TRVs or below background levels. Therefore, COPCs in subsurface soil, sediment, and surface water at Site 12 are considered unlikely to pose potential risks to wildlife.
- **Viability of Aquatic and Benthic Organism Communities -** Based on exceedence of benchmarks, arsenic, 4,4-DDE, 4,4-DDD, 4,4-DDT, dieldrin, and alpha-chlordane in sediment are identified as chemicals that may produce risks to aquatic and benthic organisms. There is some question whether concentrations of these chemicals in sediment may be associated with regional elevated concentrations in soil. This should be considered in risk management. Barium is identified as a chemical in surface water potentially driving risks to aquatic and benthic organisms. Raisk management should consider the limited quality of the stream habitat.

20.13. BERA Conclusions for Site 13

The SLERA and refined assessment conducted as part of the BRAPF for Site 13 form the basis for the following conclusions for each refined assessment endpoint:

- **Viability of Plant Communities -** Aluminum, chromium, lead, manganese, mercury, selenium, and vanadium in soils exceed benchmarks at Site 13. However, aluminum, chromium, selenium, and vanadium are unlikely to produce risks because they are consistent with natural background concentrations and/or expected to have low bioavailability in site soil types. Lead, manganese and mercury exceedences are driven by elevated concentrations at isolated locations and are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to plants at Site 13.
- **Viability of Soil Invertebrate Communities** - Chromium, manganese, mercury, and zinc in soils exceed benchmarks at Site 13. However, chromium and zinc are unlikely to produce risks because they are consistent with natural background concentrations and/or expected to have low bioavailability in site soil types. Manganese and mercury exceedences are driven by elevated concentrations at isolated locations and are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to soil invertebrates at Site 13.
- **Viability of Wildlife Communities –** Modeled doses of aluminum, lead, vanadium, and DDTr based exceed NOAELs for wildlife when calculated using maximum EPCs. However, doses based on mean EPCs are either below LOAELs or consistent with background concentrations. When home range is considered, risk levels decrease further. Based on this information, COPCs at Site 13 are unlikely to pose risks to wildlife.

20.14. BERA Conclusions for Site 15

The SLERA and refined assessment conducted as part of the BRAPF for Site 15 form the basis for the following conclusions for each refined assessment endpoint:

- **Viability of Plant Communities -** In summary, aluminum, arsenic, chromium, copper, manganese, selenium, thallium, vanadium, zinc in soils exceed benchmarks at Site 15. However, aluminum, arsenic, chromium, manganese, selenium, vanadium and zinc are unlikely to produce risks because they are consistent with natural background concentrations and/or expected to have low bioavailability in site soil types. Arsenic, copper, manganese, selenium, thallium, and zinc are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to plants at Site 15.
- **Viability of Soil Invertebrate Communities** - In summary, chromium, copper, manganese, mercury, selenium, and zinc in soils exceed benchmarks at Site 15. However, these metals are unlikely to produce risks because they are either consistent with natural background concentrations, expected to have low bioavailability in site soil types, or are not expected to exceed low effects levels. Based on this weight of evidence, COPCs in soil are considered not to pose a significant risk to soil invertebrates at Site 15.

- **Viability of Wildlife Communities –** Modeled doses of aluminum, thallium, vanadium, and zinc exceed NOAELs for wildlife when calculated using maximum EPCs. Doses based on mean EPCs for thallium and zinc fall below low effects levels and are unlikely to drive risks. Mean doses of aluminum and vanadium exceed LOAELs and are higher than background concentrations. When home range is considered, risk levels decrease by 95%, bringing exposures for aluminum below LOAELs and exposures for vanadium below LOAELs for all but one receptor. This is considered with the fact that vanadium is unlikely to be bioavailable in local soil types and that habitat quality is poor. Based on this information, COPCs at Site 15 are unlikely to pose risks to wildlife.

20.15. Uncertainties

A number of uncertainties are inherent in the assessment of risks and should be considered in interpretation of results. One of the greatest uncertainties inherent to the risk assessment is the assumption that effects on individuals, as indicated by benchmark exceedences, are indicative of population-level effects. Also, assumptions made in the screening level risk assessment are highly precautionary and may over-estimate risk, while assumptions made throughout the assessment require generalizations that may result in over- or under-estimated risks.

20.16. BERA Conclusions

There may be a potential for risks to terrestrial receptors at a number of the Fort Buchanan RFI Sites. However, in light of site-specific information, the precautionary nature of the assumptions made in the BERA, and expected future land uses, further efforts to characterize or manage these potential risks are considered unwarranted. Benthic organisms are potentially at risk from concentrations of arsenic and pesticides in sediment and barium in water at Site 12. Determination of background concentrations of arsenic in sediment is recommended in order to accurately conclude whether further characterization of the potential for risks to benthic organisms at this site is warranted.

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U.S. Environmental Protection Agency (EPA). 2007j. Ecological Soil Screening Levels for Pentachlorophenol. EPA Office of Solid Waste and Emergency Response (OSWER). OSWER Directive 9285.7-58.

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Figures

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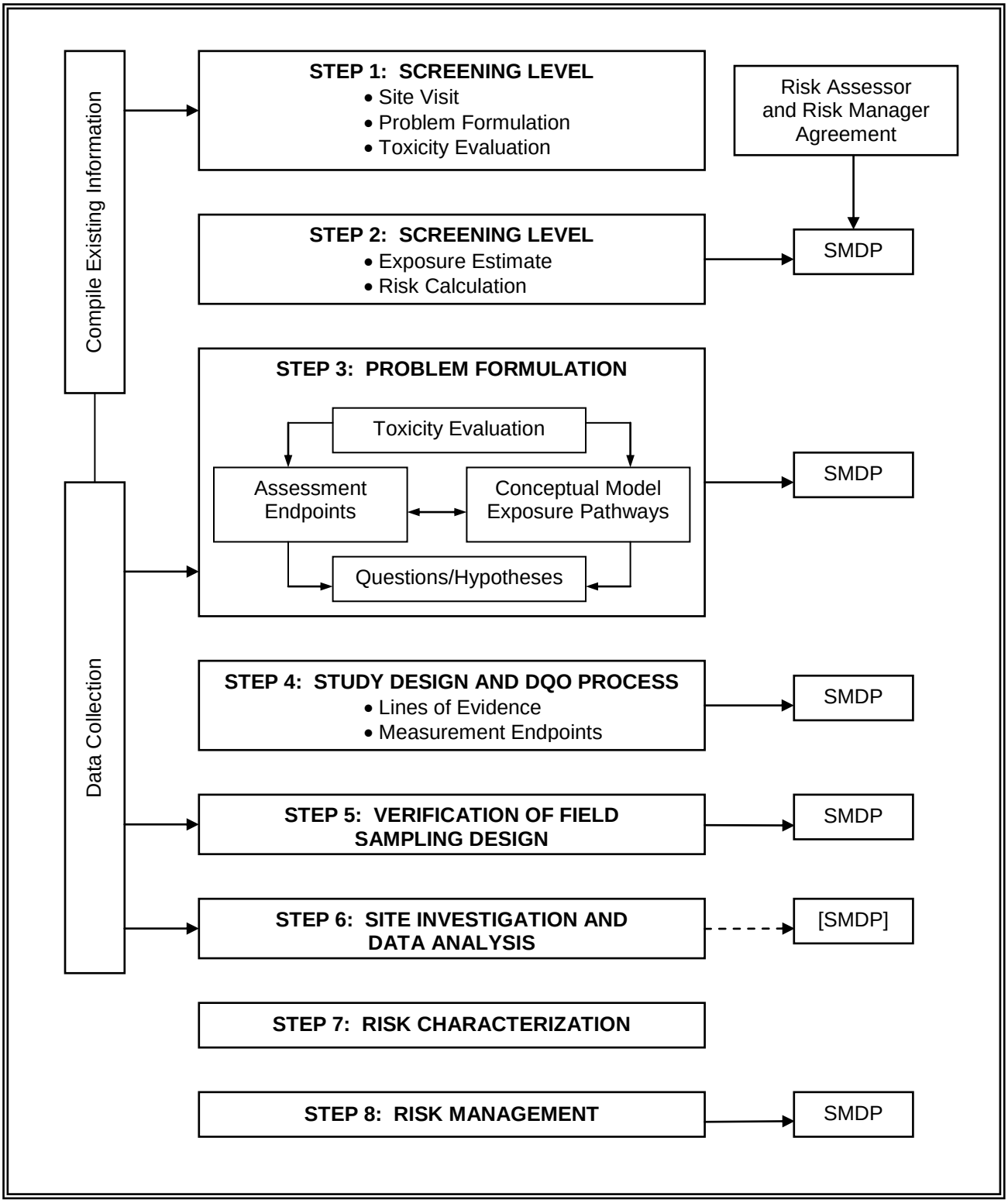
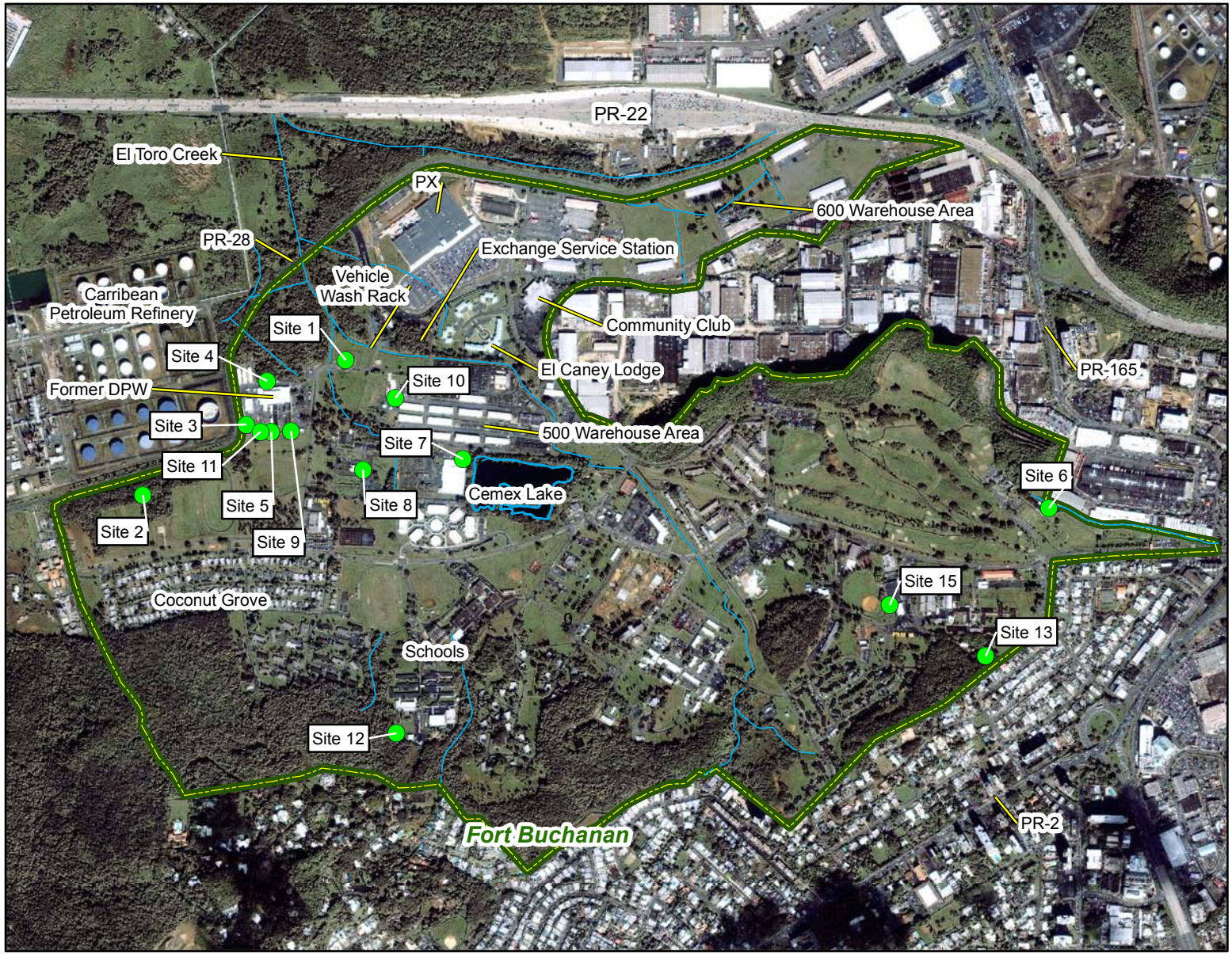
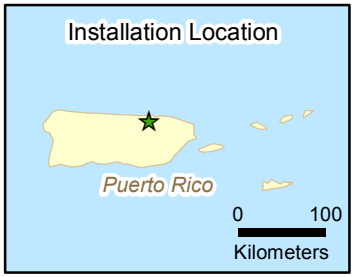
FIGURE 1-1 ECOLOGICAL RISK ASSESSMENT PROCESS FOR SUPERFUND
(USEPA 1999)







Legend

- Installation Boundary
- RFI Site
- Creek

Aerial Photograph, 2006

N
W E
S

0 270 540
Meters

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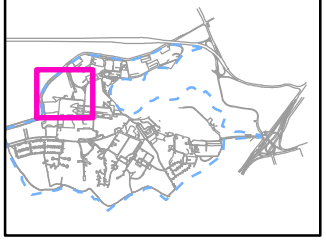
Fort Buchanan, Puerto Rico

Figure 1-2
Fort Buchanan Site Features and Locations of Site Wide RFI Sites

\\Edgewood\projects\Universal GIS\Buchanan\MXDs\RFI MXDs\SiteLocs_and_Features.mxd

Area Shown in Main Map



Legend

Soil Sample Location

Installation Boundary

0 37.5 75

Meters

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Site 1/SWMU 1

Old Hazardous Waste Containers

Figure 4-1
Soil Sample Locations
at Site 1/SWMU 1

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\Site1Risk.mxd

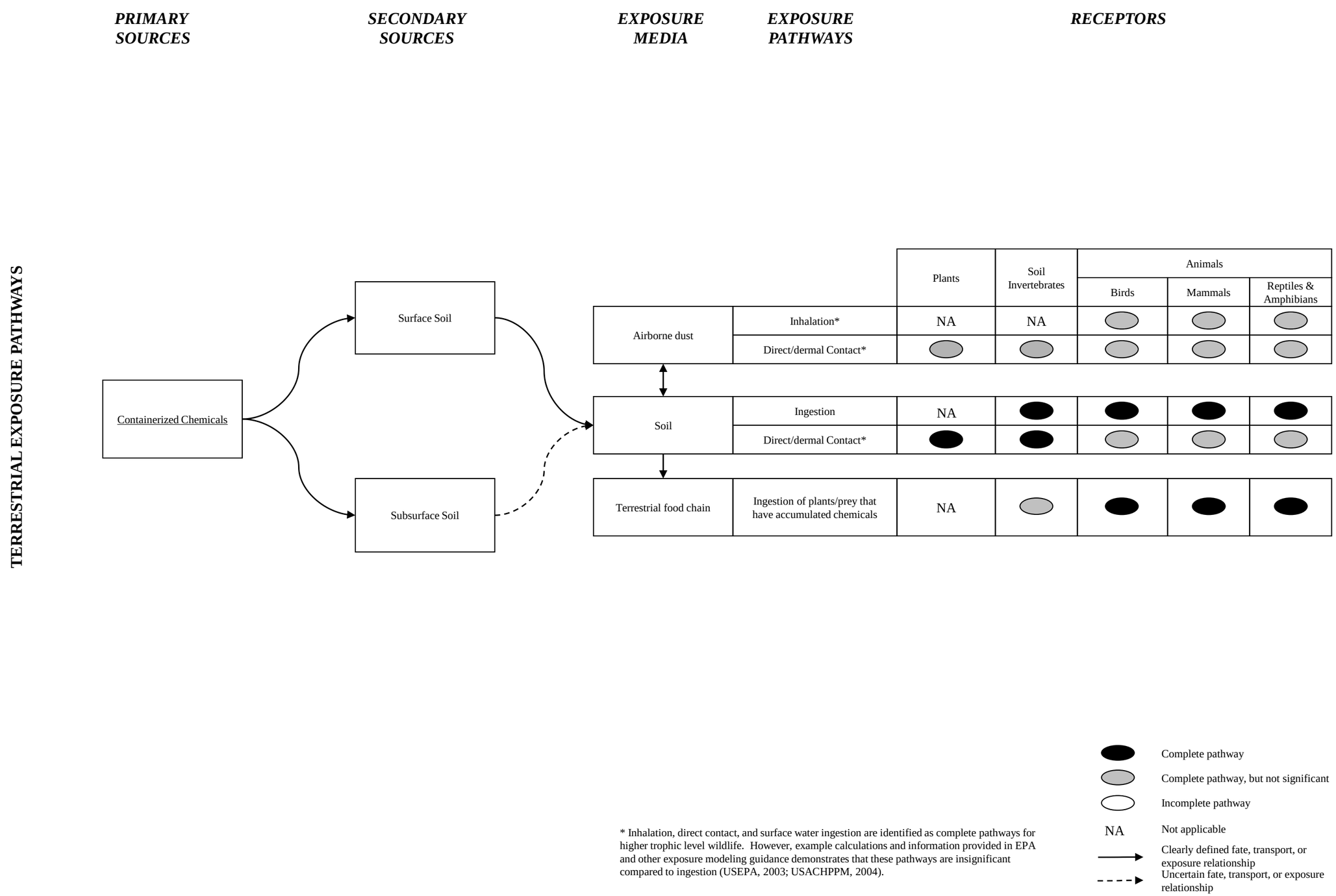
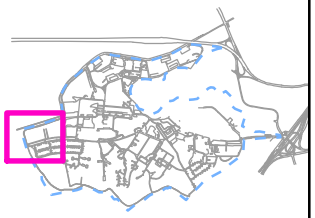


Figure 4-2 Conceptual Site Model for Site 1

Area Shown in Main Map



Legend

- Soil Boring Location
- Installation Boundary

0 35 70
Meters

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Site 2/SWMU 3
Pesticides and Chemicals Burial Trench

Figure 5-1
Soil Sample Locations
at Site 2/SWMU 3

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\Site2Risk.mxd

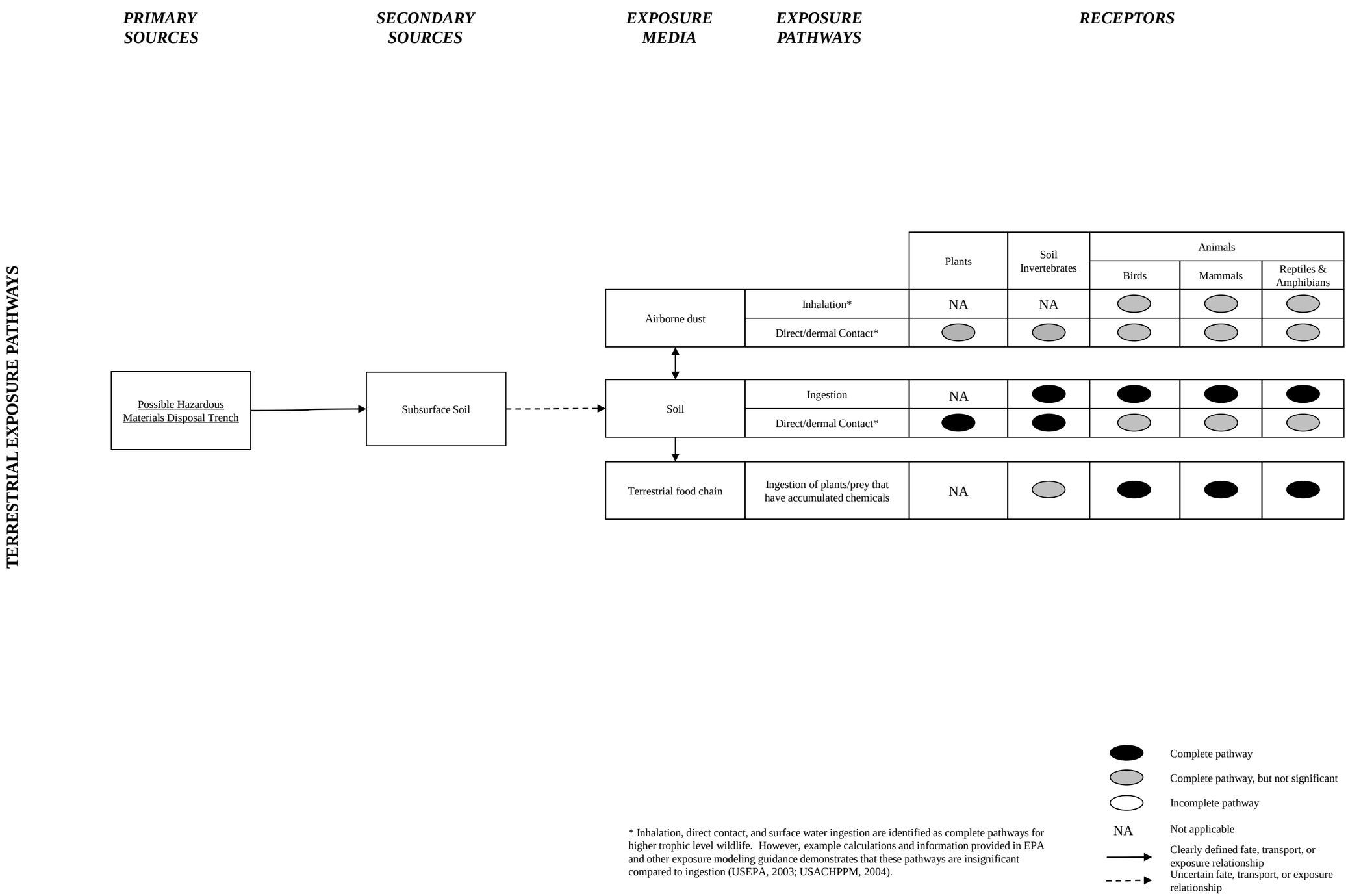
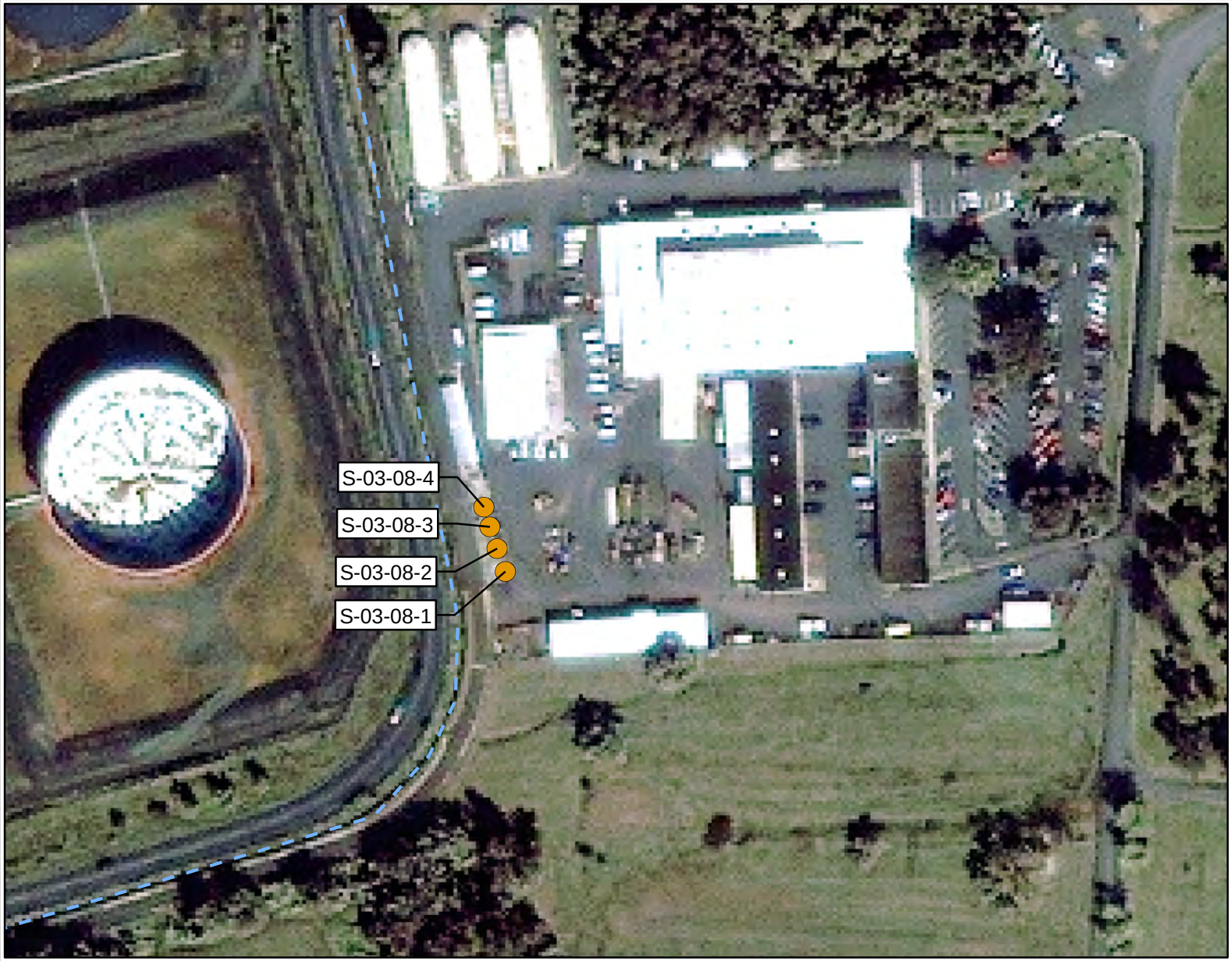
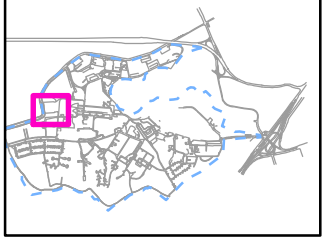


Figure 5-2 Conceptual Site Model for Site 2



Area Shown in Main Map



Legend

Soil Boring Location

Installation Boundary

Notes:

Site area is paved; all samples were collected from beneath asphalt.

0 20 40
Meters

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Site 3/SWMU 4
Spent Solvent Storage Area

Figure 6-1
Soil Sample Locations
at Site 3/SWMU 4

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\site3Risk.mxd

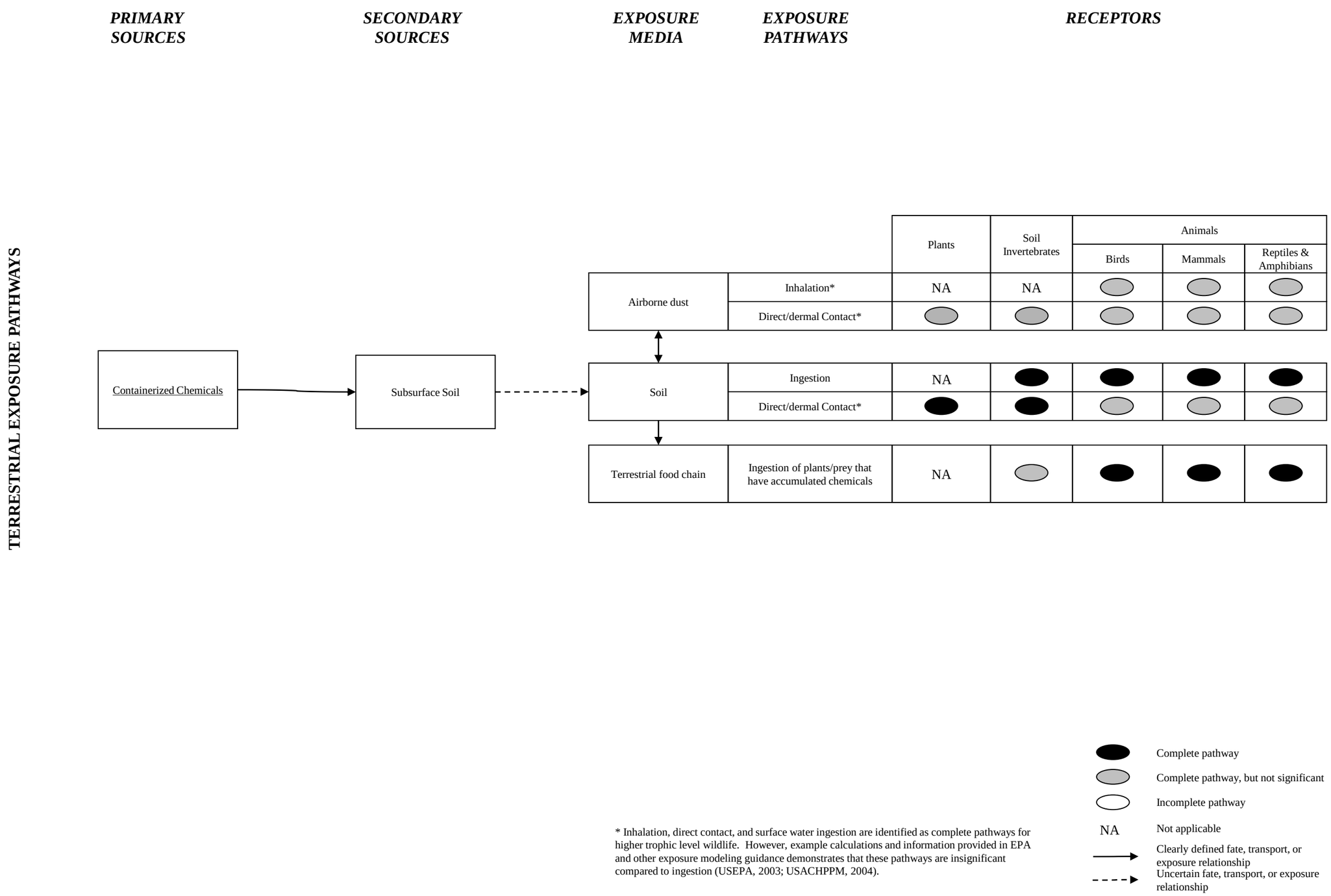
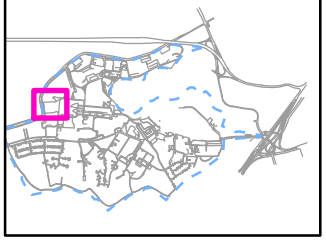


Figure 6-2 Conceptual Site Model for Site 3

Area Shown in Main Map



Legend

- Soil Sample Locations
- Installation Boundary

0 20 40
Meters

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Site 4/SWMU 5

PCB Transformer Storage Area

Figure 7-1
Soil Sample Locations
at Site 4/SWMU 5

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\Site4Risk.mxd

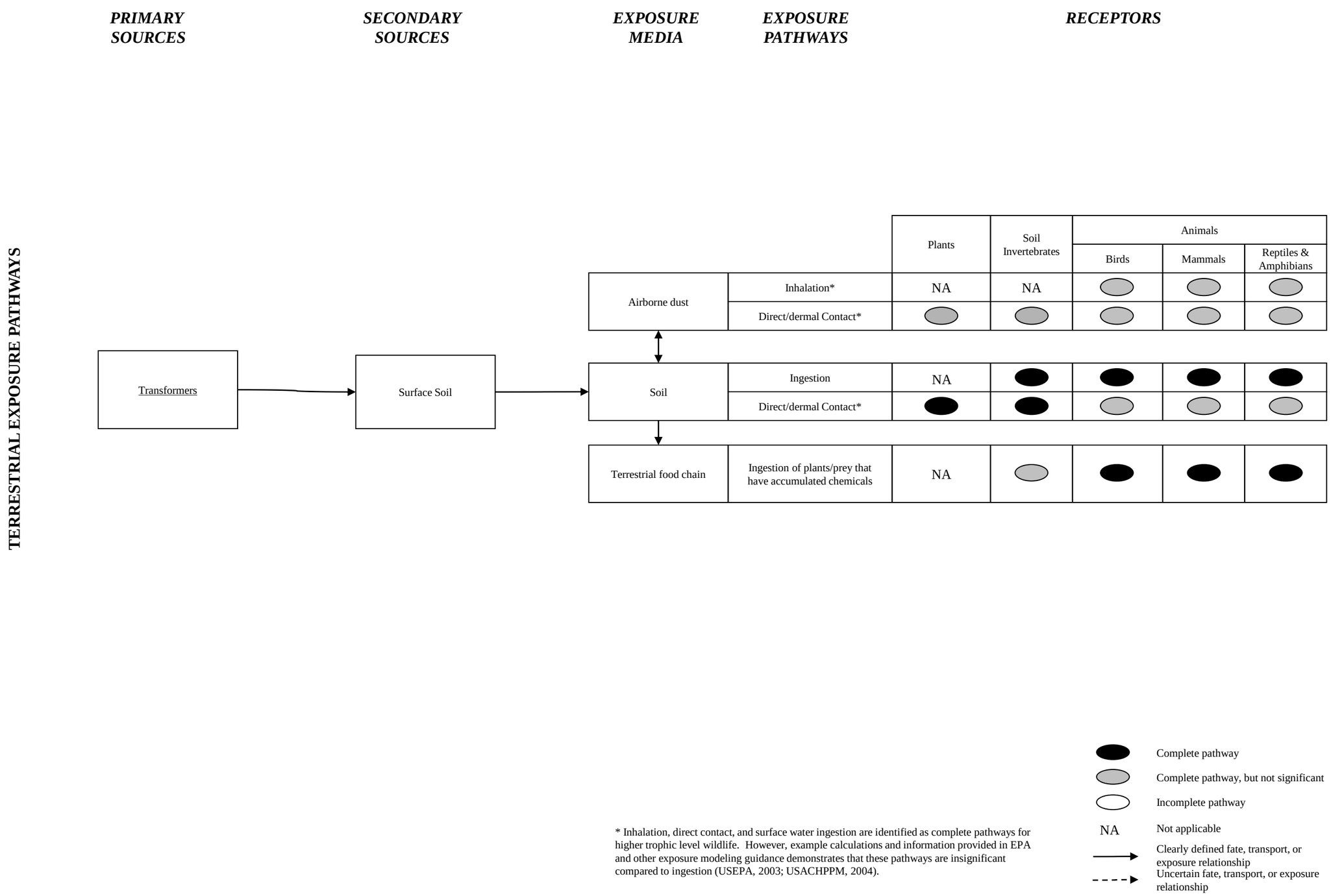
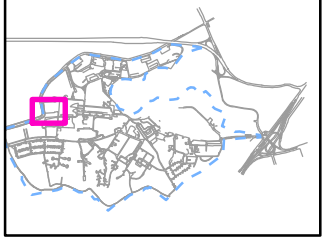


Figure 7-2 Conceptual Site Model for Site 4

Area Shown in Main Map



Legend

- Soil Sample Locations
- Installation Boundary

Notes:

Samples were collected from 1-2' and 2-4'. Site area is paved and all samples were collected from beneath asphalt.

0 10 20 40
Meters

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Fort Buchanan, Puerto Rico

Site 5/SWMU 6
PCB Transformer Storage Area #2

Figure 8-1
Soil Sample Locations
at Site 5/SWMU 6

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\site 5Risk.mxd

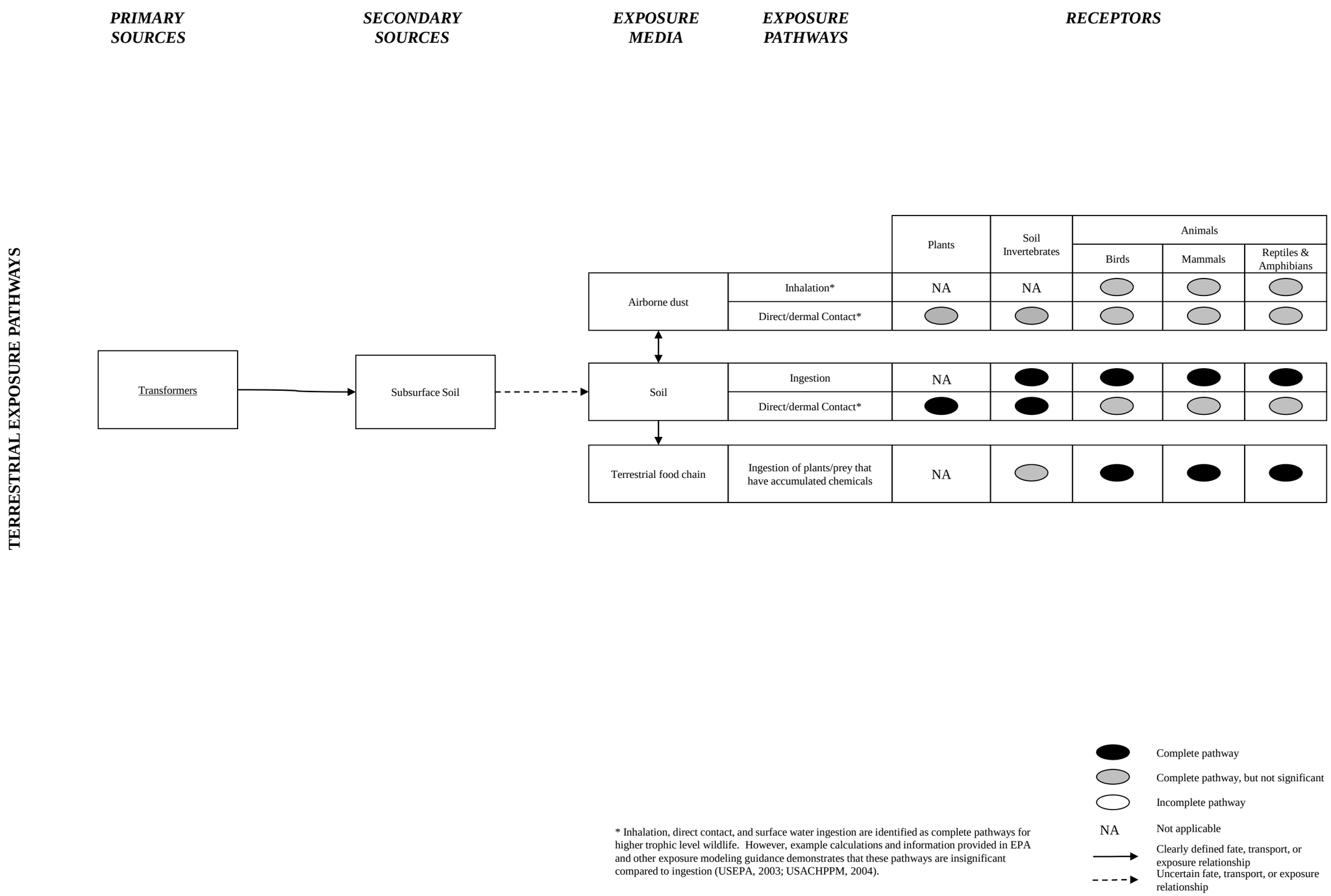
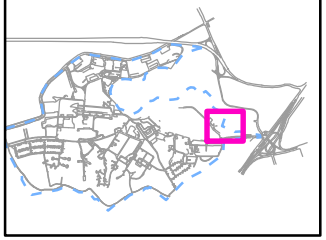


Figure 8-2 Conceptual Site Model for Site 5

Area Shown in Main Map



Legend

Sample Location

- Sediment
- Soil Boring
- Installation Boundary

0 20 40

Meters

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Site 6

Pesticide Storage Area

Figure 9-1
Soil and Sediment Sample Locations at Site 6

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\Site6Risk.mxd

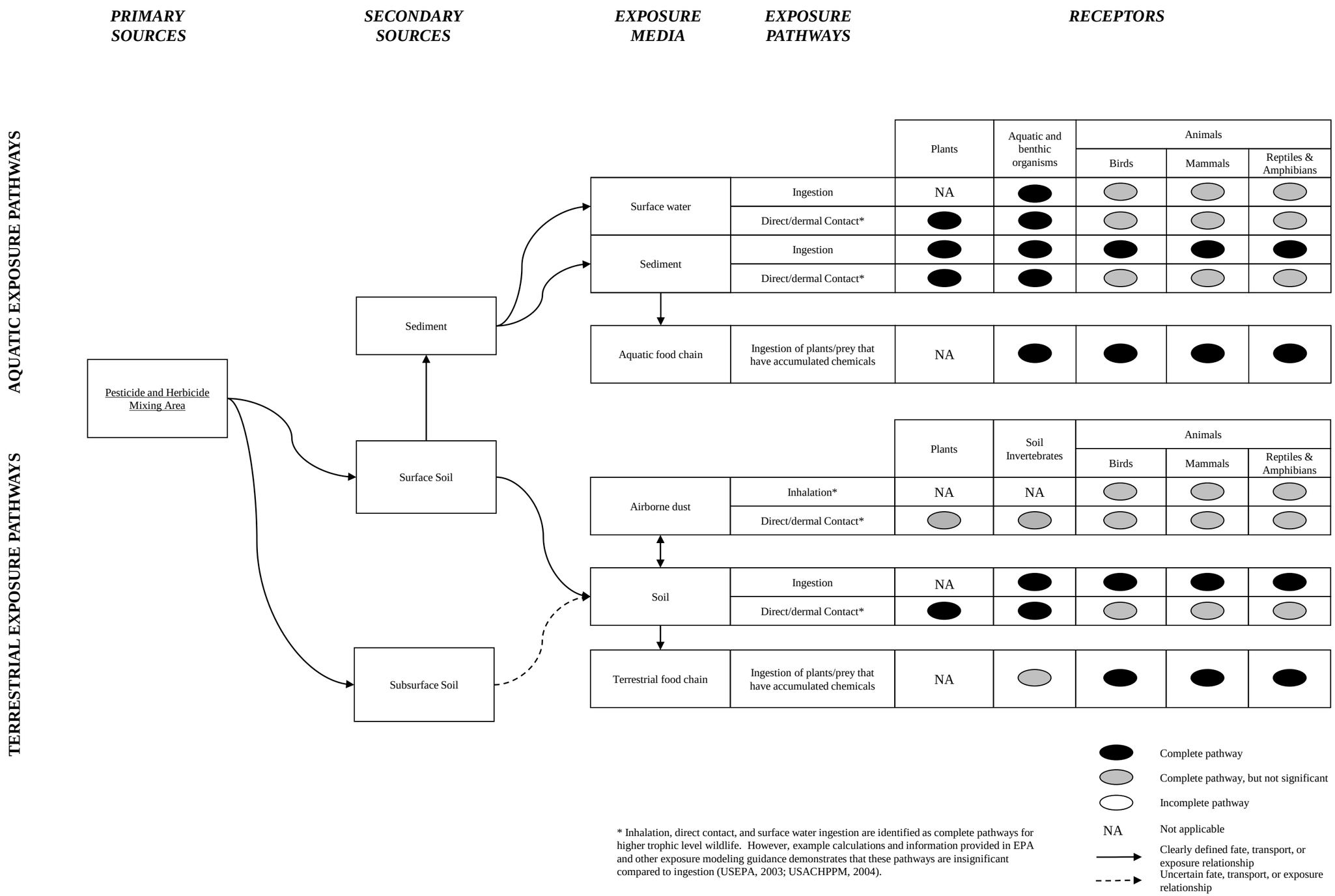
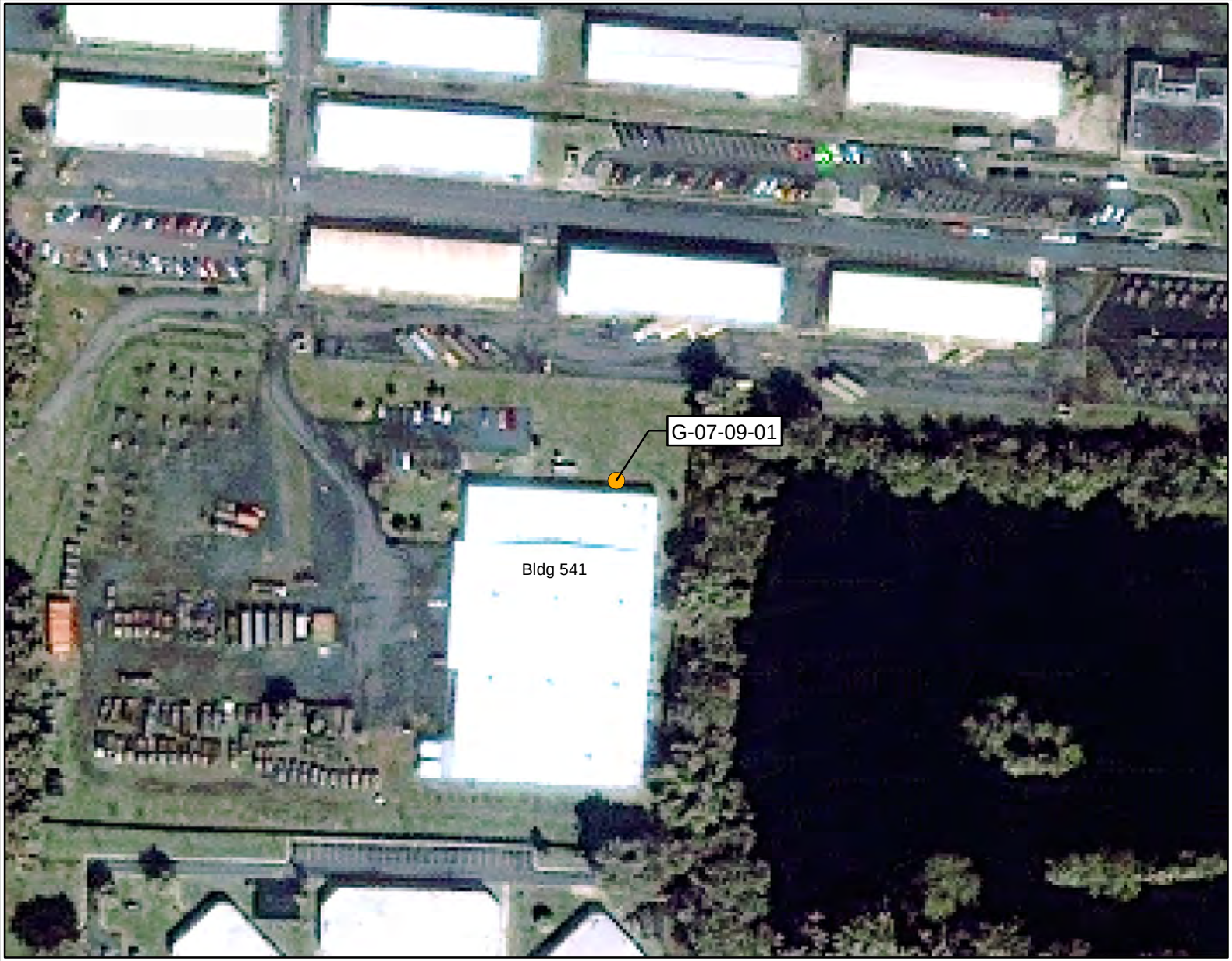
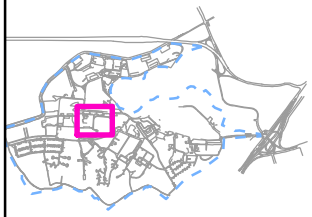


Figure 9-2 Conceptual Site Model for Site 6



Area Shown in Main Map



Legend

- Soil Boring Location

0 20 40
Meters

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Site 7
Building 541

Figure 10-1
Soil Sample Locations
at Site 7

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\site7Risk.mxd

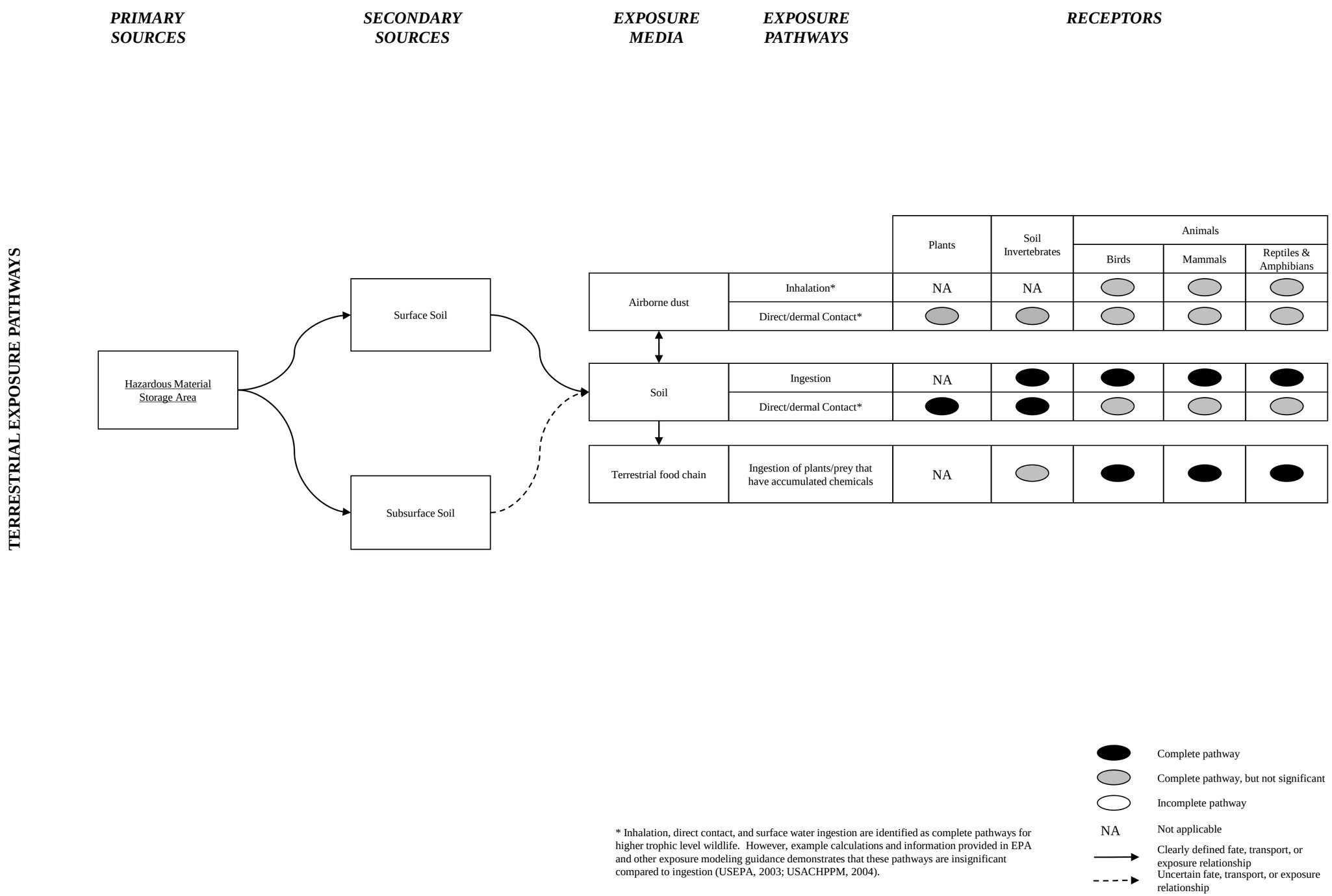
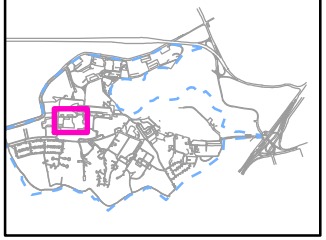


Figure 10-2 Conceptual Site Model for Site 7

Area Shown in Main Map



Legend

- Soil Sample Location
- Installation Boundary

0 10 20 40
Meters

N

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Site 8
Building S-563

Figure 11-1
Soil Sample Locations
at Site 8

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\Site8Risk.mxd

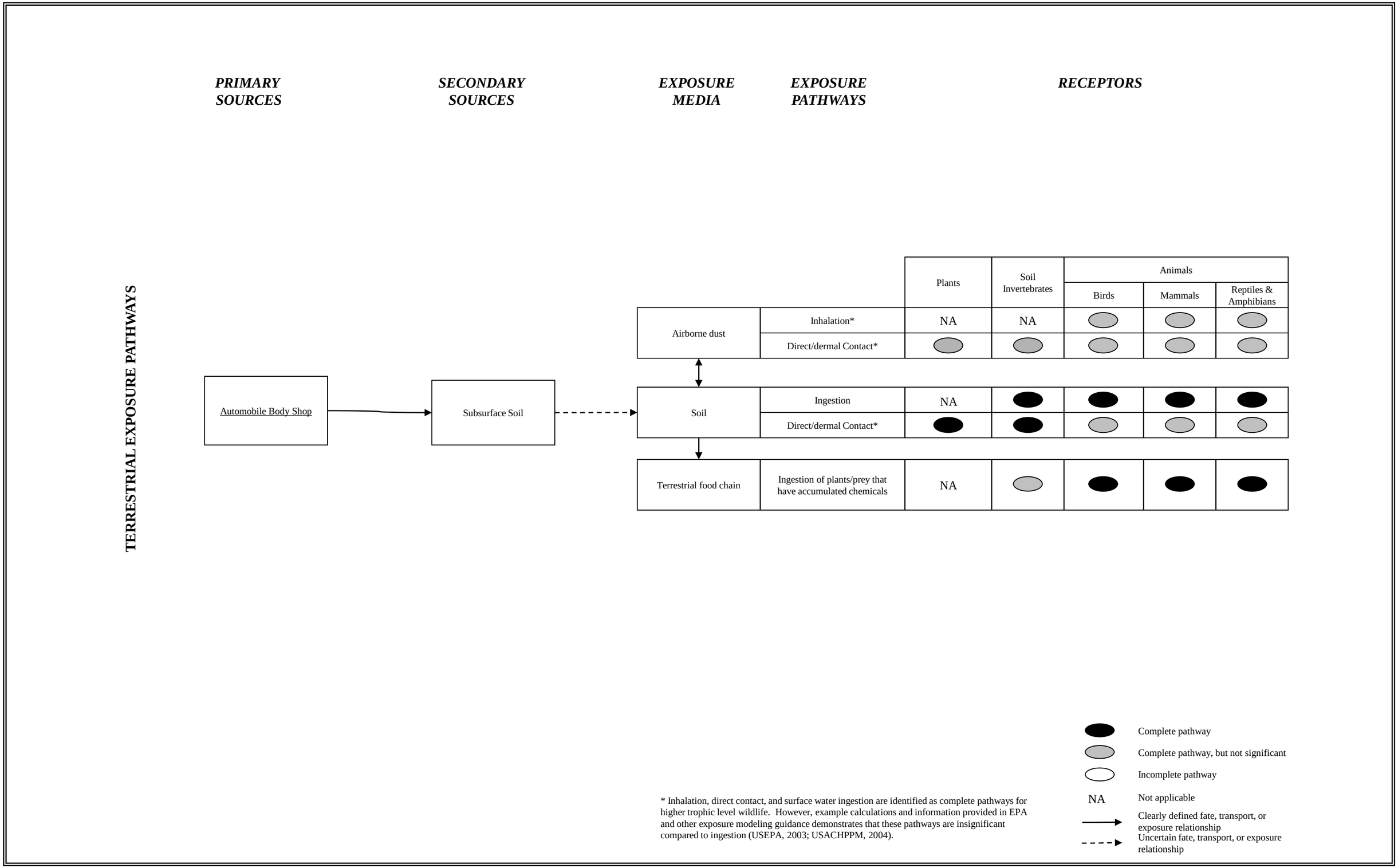
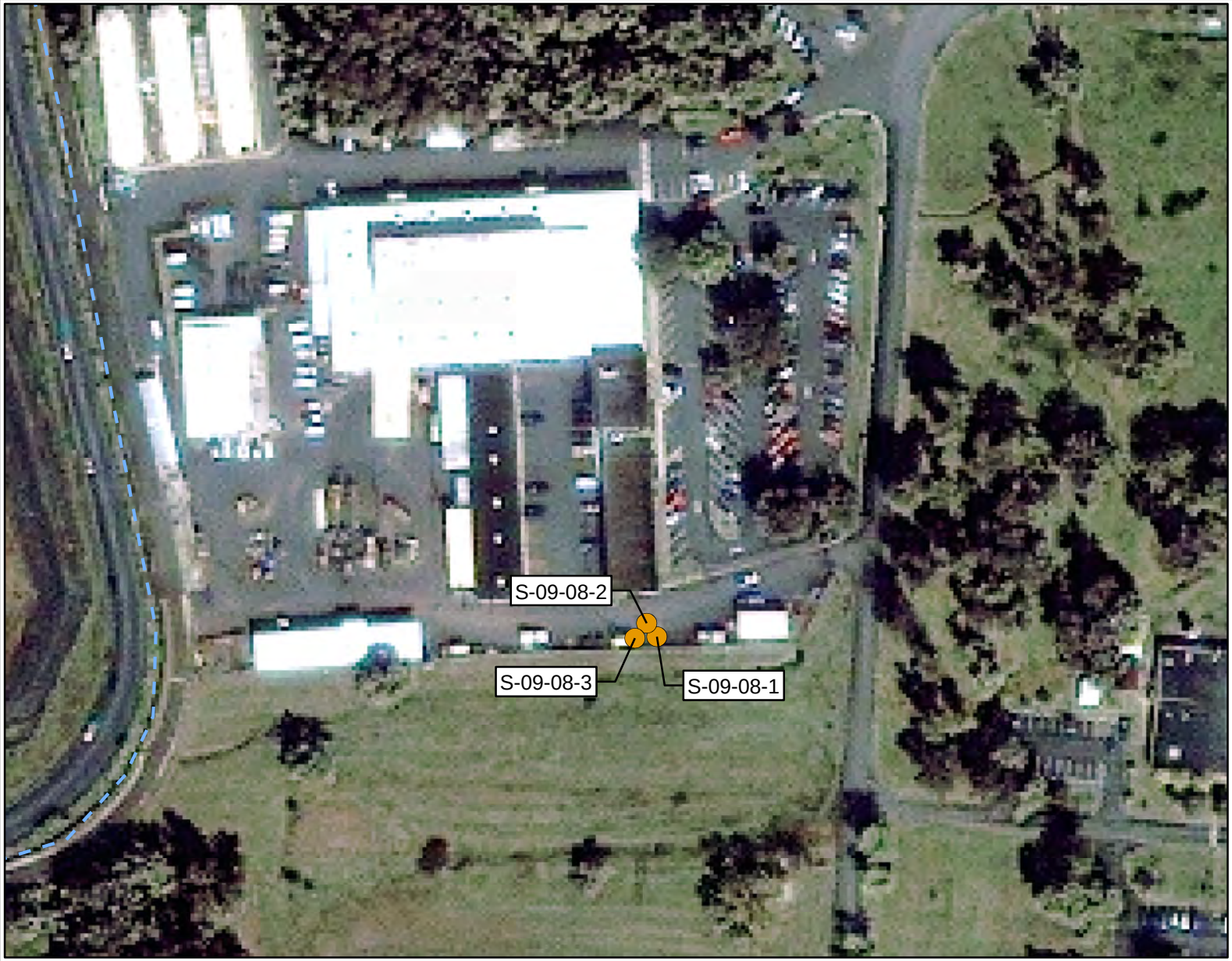
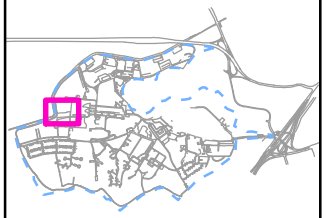


Figure 11-2 Conceptual Site Model for Site 8



Area Shown in Main Map



Legend

- Soil Boring Location
- Installation Boundary

0 10 20 40
Meters

N

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Site 9
Used Oil Staging Area

Figure 12-1
Soil Sample Locations
at Site 9

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\Site9Risk.mxd

TERRESTRIAL EXPOSURE PATHWAYS

PRIMARY SOURCES	*SECONDARY SOURCES*	*EXPOSURE MEDIA*	*EXPOSURE PATHWAYS*	*RECEPTORS*				
				Plants	Soil Invertebrates	Animals		
						Birds	Mammals	Reptiles & Amphibians
Used Oil Staging Area	Subsurface Soil	Airborne dust	Inhalation*	NA	NA	◯	◯	◯
			Direct/dermal Contact*	◯	◯	◯	◯	◯
		Soil	Ingestion	NA	●	●	●	●
			Direct/dermal Contact*	●	●	◯	◯	◯
		Terrestrial food chain	Ingestion of plants/prey that have accumulated chemicals	NA	◯	●	●	●

* Inhalation, direct contact, and surface water ingestion are identified as complete pathways for higher trophic level wildlife. However, example calculations and information provided in EPA and other exposure modeling guidance demonstrates that these pathways are insignificant compared to ingestion (USEPA, 2003; USACHPPM, 2004).

● Complete pathway

◯ Complete pathway, but not significant

○ Incomplete pathway

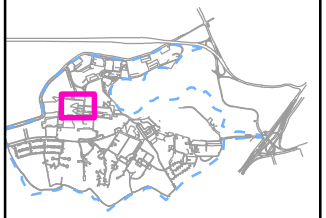
NA Not applicable

→ Clearly defined fate, transport, or exposure relationship

- - → Uncertain fate, transport, or exposure relationship

Figure 12-2 Conceptual Site Model for Site 9

Area Shown in Main Map



Legend

Soil Bore Location

0 10 20 40
Meters

N

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Site 10
65th Army Reserve Command Refueling Area

Figure 13-1
Soil Sample Locations
at Site 10

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\Site10Risk.mxd

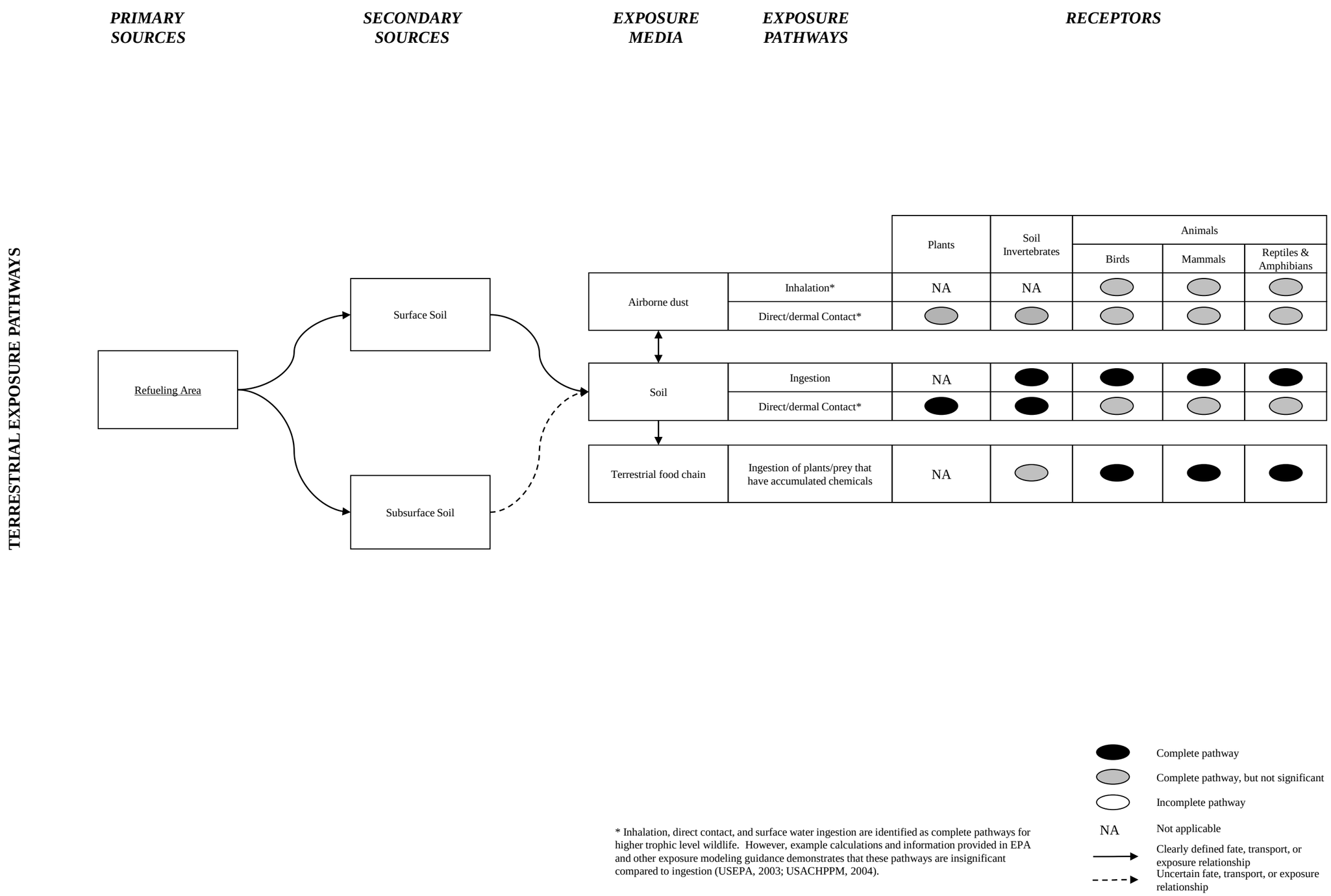
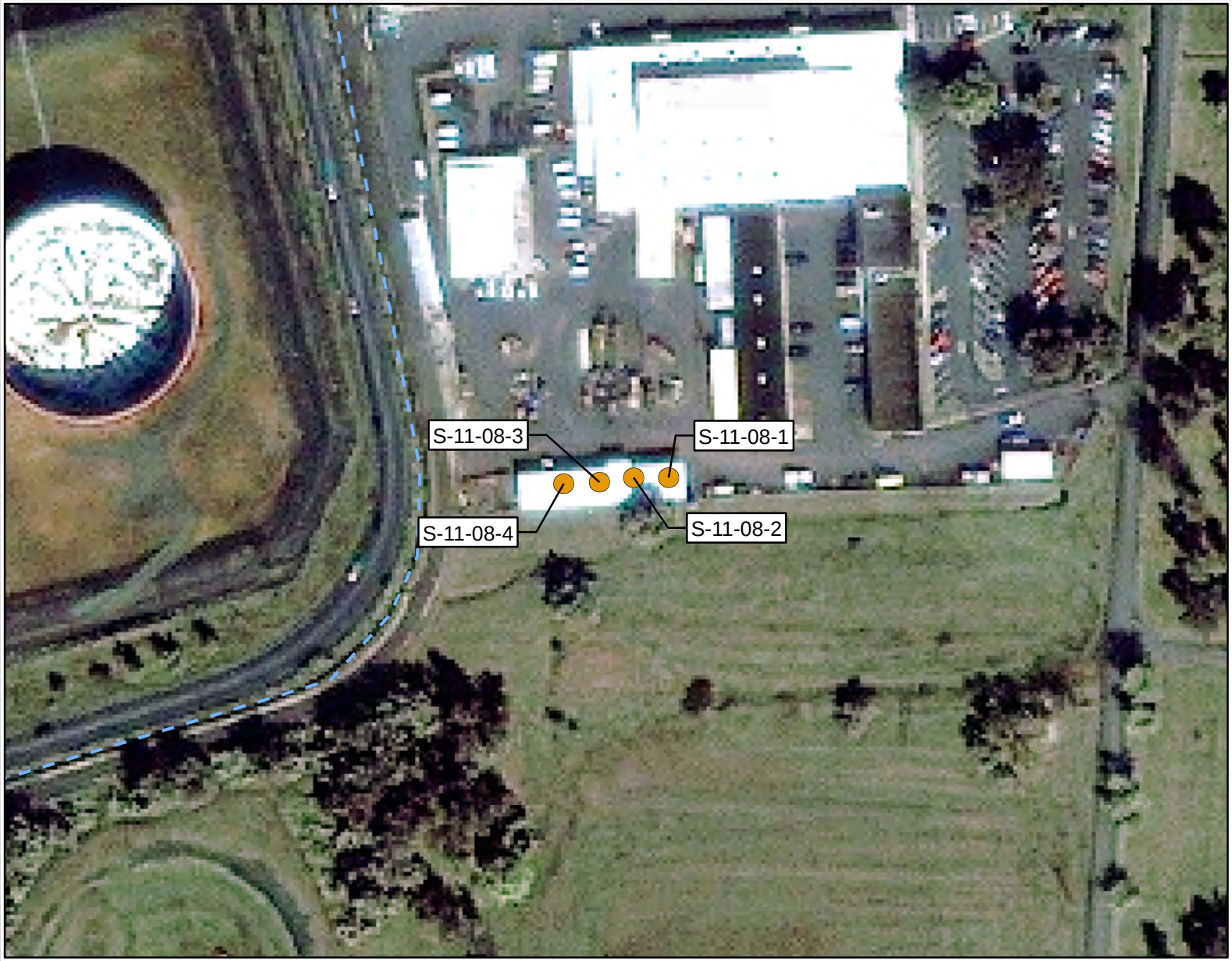
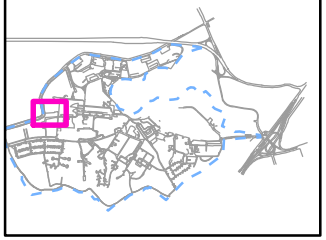


Figure 13-2 Conceptual Site Model for Site 10



Area Shown in Main Map



Legend

- Soil Boring Location
- Installation Boundary

0 10 20 40
Meters

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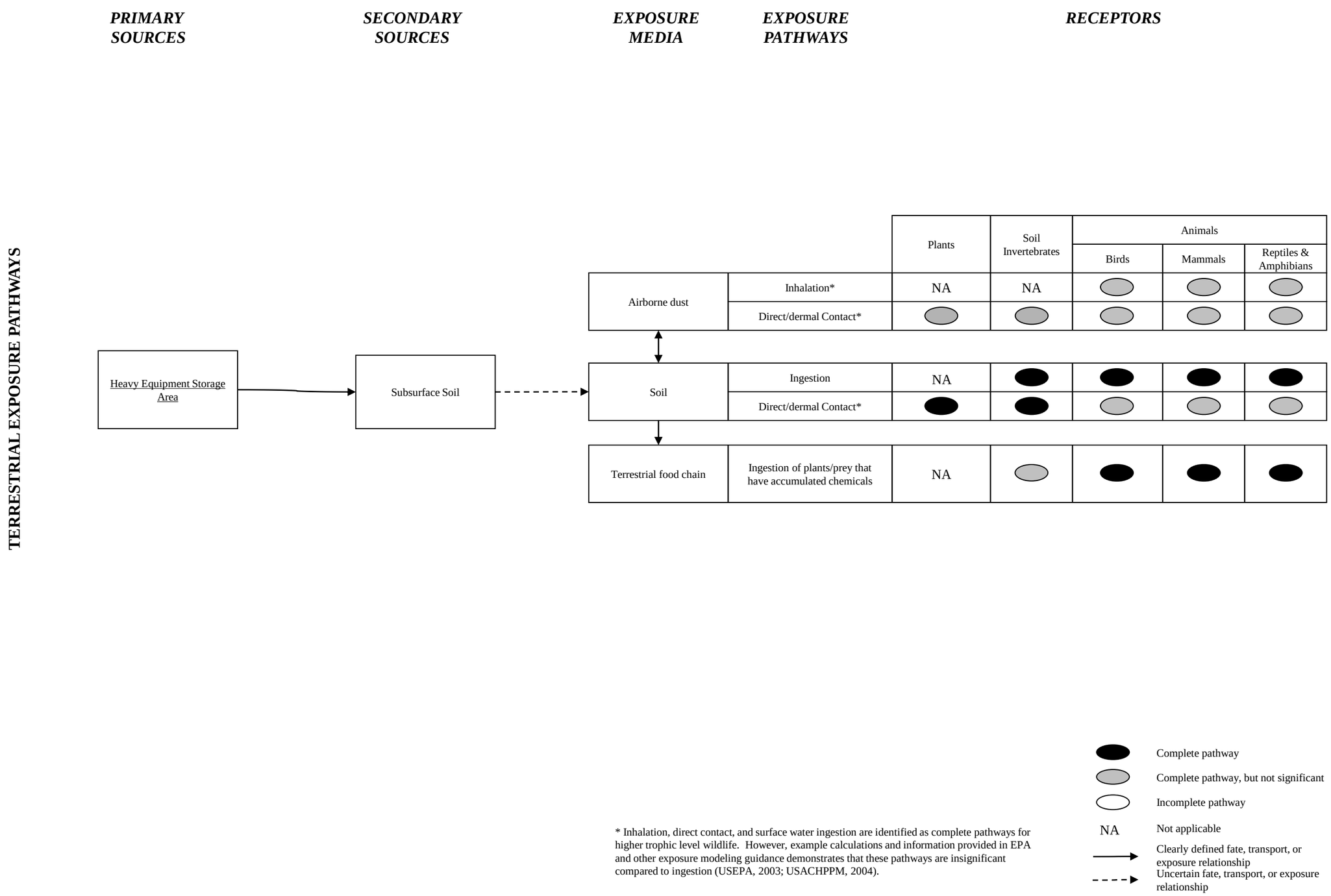
Site 11
Heavy Equipment Storage Area

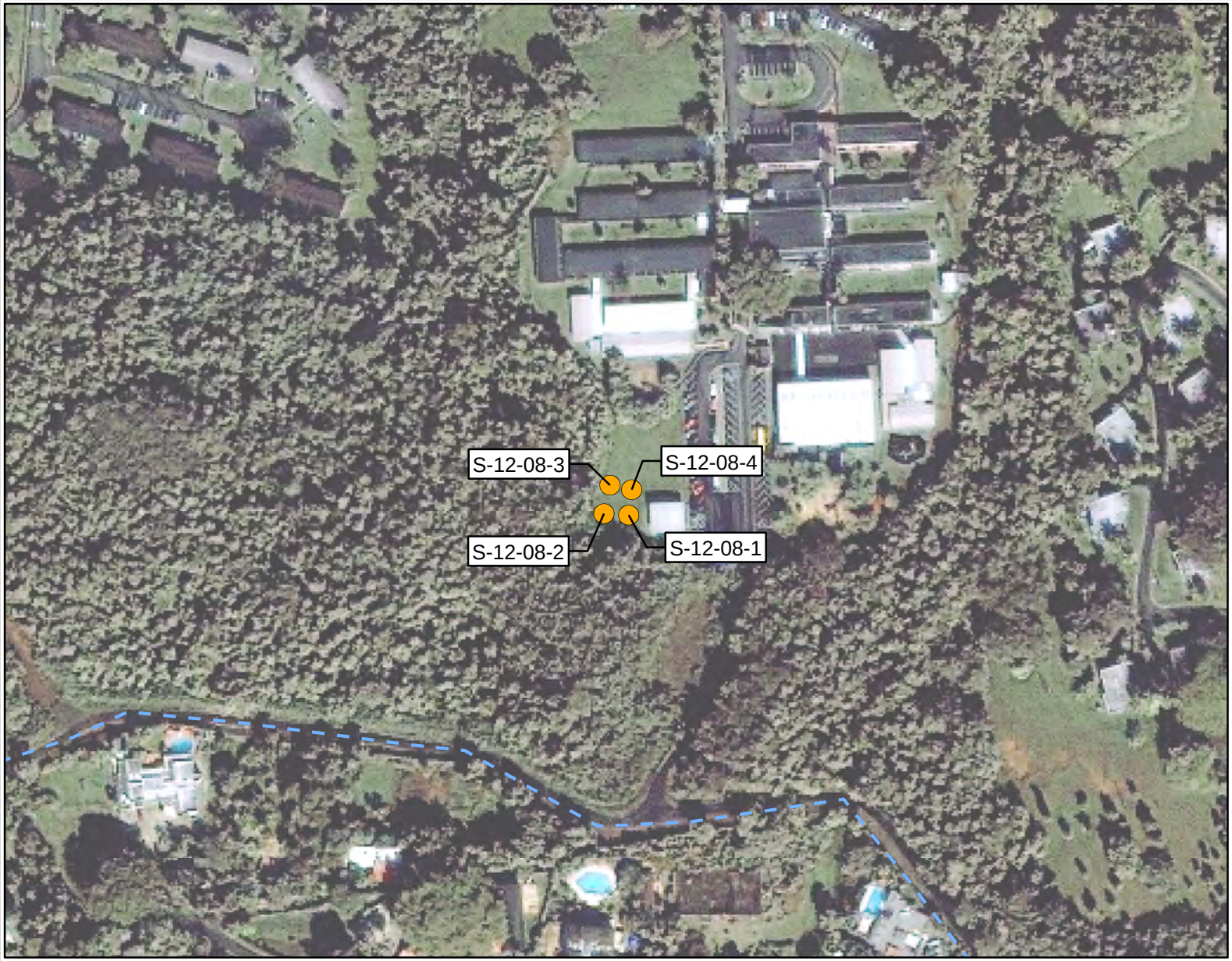
Figure 14-1
Soil Sample Locations
at Site 11

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\Site11Risk.mxd

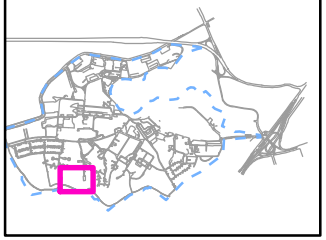


* Inhalation, direct contact, and surface water ingestion are identified as complete pathways for higher trophic level wildlife. However, example calculations and information provided in EPA and other exposure modeling guidance demonstrates that these pathways are insignificant compared to ingestion (USEPA, 2003; USACHPPM, 2004).

Figure 14-2 Conceptual Site Model for Site 11



Area Shown in Main Map



Legend

Sample Locations

Surface Soil

Installation Boundary

0 15 30 60

Meters

N

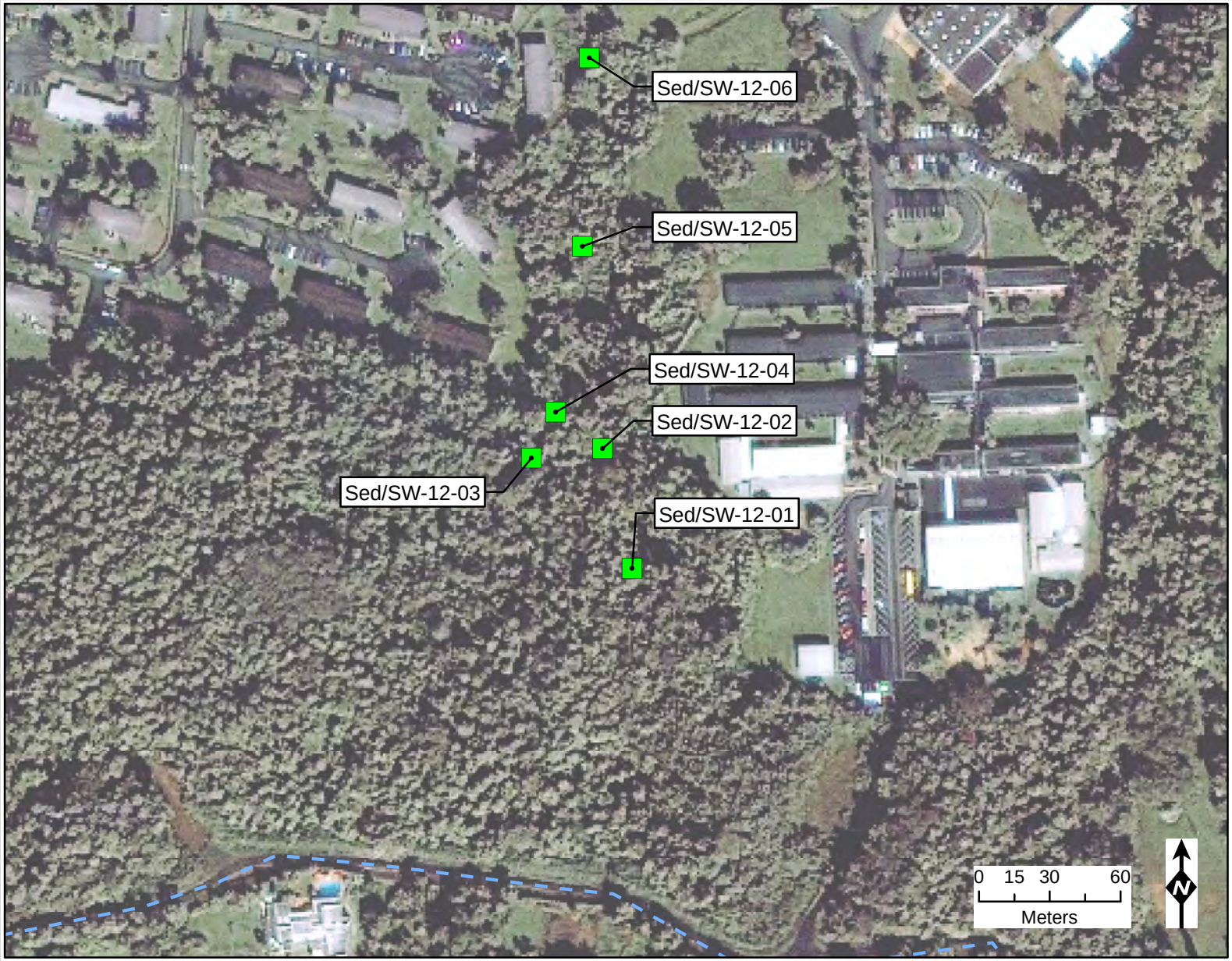
EA Engineering, Science, and Technology

Fort Buchanan, Puerto Rico

Site 12
Old Landfill

Figure 15-1
Soil Sample Locations
at Site 12

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\site12SORisk.mxd



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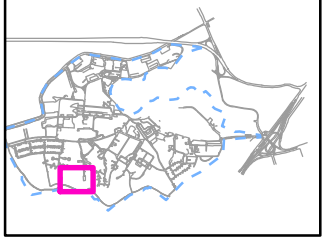


Legend

Sample Locations

- Sed/Surface Water
- Installation Boundary

Fort Buchanan, Puerto Rico

Site 12
Old Landfill

Figure 15-2
Sediment and Surface Water Sample Locations at Site 12

EA Engineering, Science, and Technology

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\site12SWSDRisk.mxd

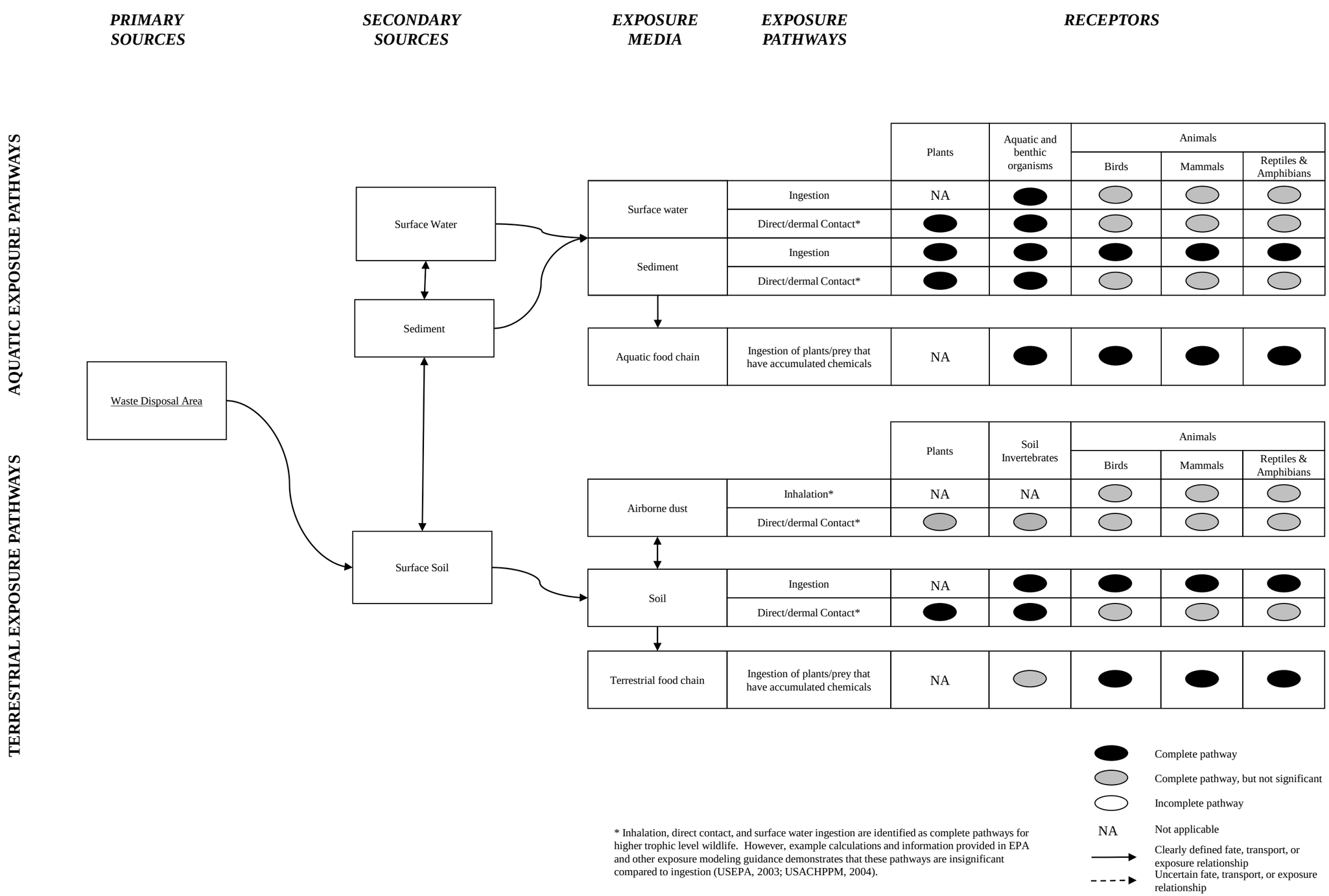
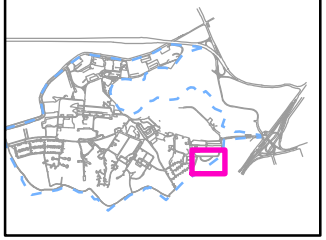


Figure 15-3 Conceptual Site Model for Site 12

Area Shown in Main Map



Legend

- Soil Boring Location
- Installation Boundary

0 10 20 40
Meters

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Fort Buchanan, Puerto Rico

Site 13
Potential Hazardous Material Burial Site

Figure 16-1
Soil Sample Locations
at Site 13

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\Site13Risk.mxd

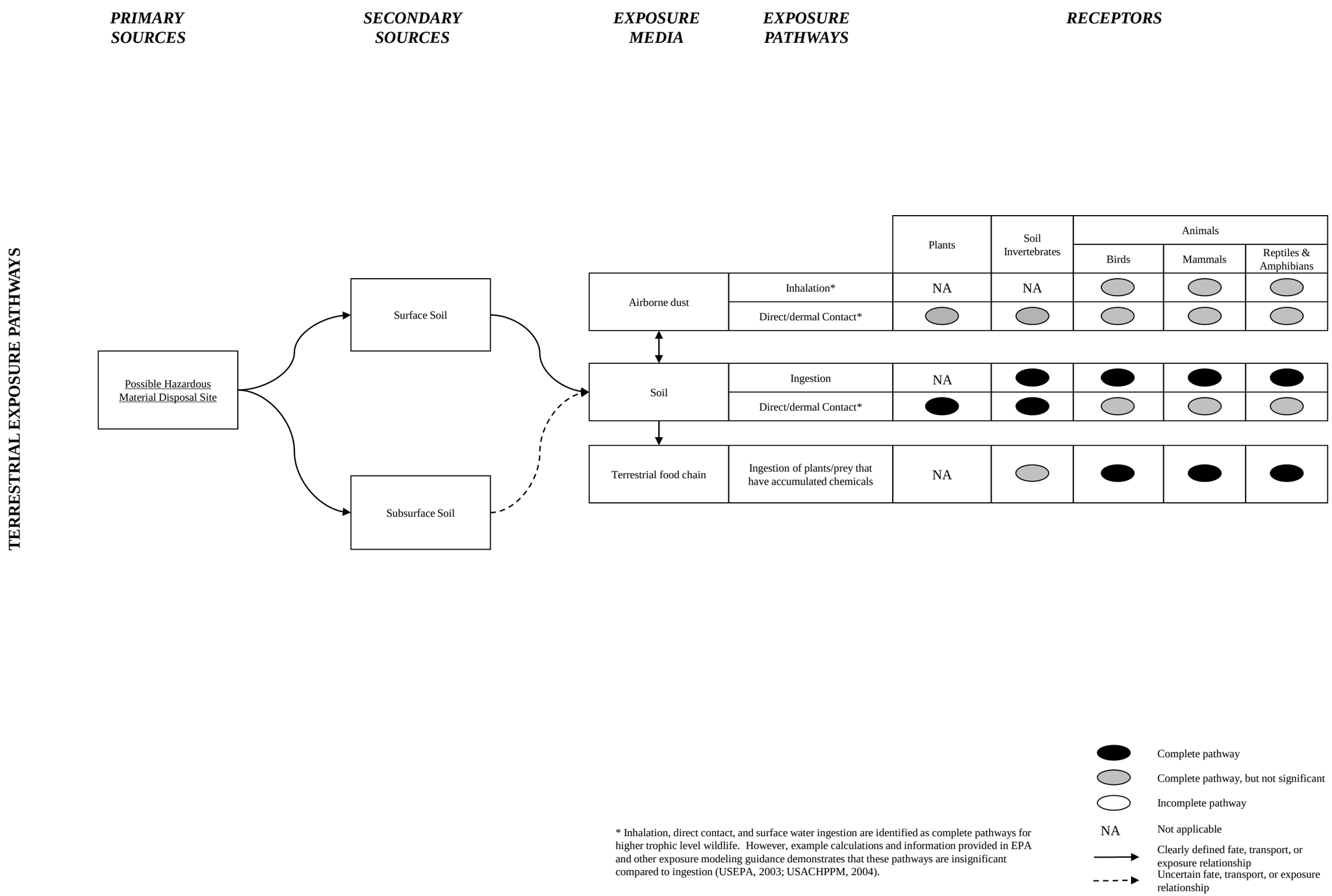
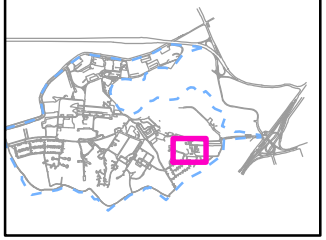


Figure 16-2 Conceptual Site Model for Site 13

Area Shown in Main Map



Legend

Soil Samples

0 10 20 40

Meters

EA Engineering, Science, and Technology

Fort Buchanan, Puerto Rico

Site 15
Building S-159

Figure 17-1
Soil Sample Locations
at Site 15

Path: \\LOVETONFEDERAL\GISData\PuertoRico\FtBuchanan\MXD\RFI_Revision\site15Risk.mxd

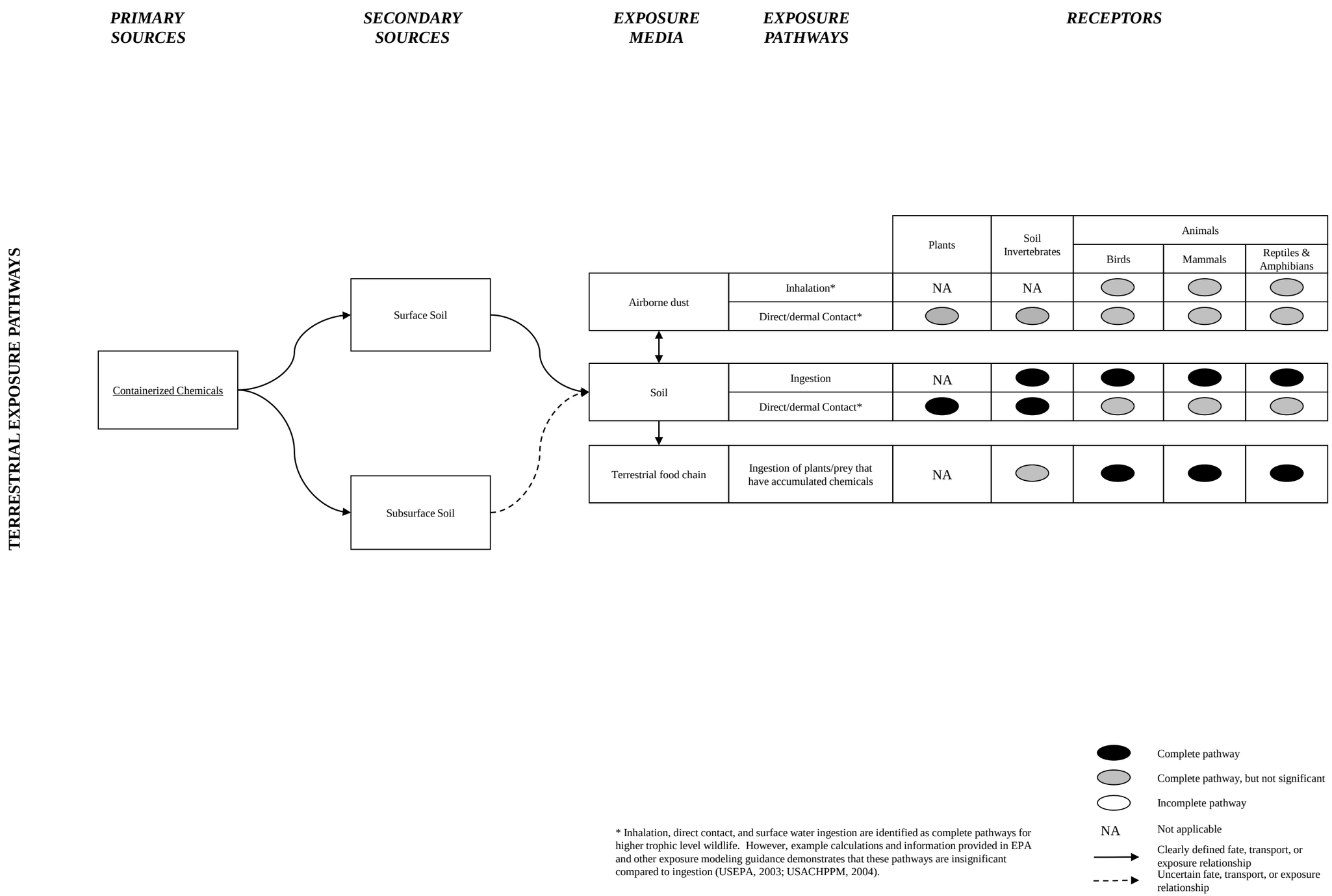


Figure 17-2 Conceptual Site Model for Site 15

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Tables

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Table 3-1
Groupings and Samples Used in the Ecological Risk Assessment of the Fort Buchanan Site

Site Location/Grouping	Media	Sample Location	Sample ID
Site 1	Subsurface Soil	S-01-01	S-01-08-01-2-4
Site 1	Subsurface Soil	S-01-02	S-01-08-02-2-4
Site 1	Subsurface Soil	S-01-03	S-01-08-03-2-4
Site 1	Subsurface Soil	S-01-04	S-01-08-04-2-4
Site 1	Surface Soil	S-01-01	S-01-08-01-0-2
Site 1	Surface Soil	S-01-02	S-01-08-02-0-2
Site 1	Surface Soil	S-01-03	S-01-08-03-0-2
Site 1	Surface Soil	S-01-04	S-01-08-04-0-2
Site 2	Subsurface Soil	S-02-01	S-03-06-01-4-8
Site 2	Subsurface Soil	S-02-01	S-03-06-01-20-24
Site 2	Subsurface Soil	S-02-02	S-03-06-02-4-8
Site 2	Subsurface Soil	S-02-02	S-03-06-02-26-28
Site 2	Subsurface Soil	S-02-03	S-03-06-03-4-8
Site 3	Subsurface Soil	S-03-01	S-03-08-01-1-2
Site 3	Subsurface Soil	S-03-01	S-03-08-01-2-4
Site 3	Subsurface Soil	S-03-02	S-03-08-02-1-2
Site 3	Subsurface Soil	S-03-02	S-03-08-02-2-4
Site 3	Subsurface Soil	S-03-03	S-03-08-03-1-2
Site 3	Subsurface Soil	S-03-03	S-03-08-03-2-4
Site 3	Subsurface Soil	S-03-04	08-OC-22-DP1
Site 3	Subsurface Soil	S-03-04	S-03-08-04-1-2
Site 3	Subsurface Soil	S-03-04	S-03-08-04-2-4
Site 3	Subsurface Soil	SB-03-01	SB-03-06-01-(20-24)
Site 3	Subsurface Soil	SB-03-01	SB-03-06-01-(4-8)
Site 3	Subsurface Soil	SB-03-02	SB-03-06-02-(26-28)
Site 3	Subsurface Soil	SB-03-02	SB-03-06-02-(4-8)
Site 3	Subsurface Soil	SB-03-03	SB-03-06-03-(20-22)
Site 3	Subsurface Soil	SB-03-03	SB-03-06-03-(4-8)
Site 3	Subsurface Soil	SB-03-04	SB-03-06-04-(37-36)
Site 3	Subsurface Soil	SB-03-04	SB-03-06-04-(4-8)
Site 4	Surface Soil	S-04-01	S-04-08-01-0-2
Site 4	Surface Soil	S-04-02	S-04-08-02-0-2
Site 4	Surface Soil	S-04-03	S-04-08-03-0-2
Site 4	Surface Soil	S-04-04	S-04-08-04-0-2
Site 4	Surface Soil	S-04-05	S-04-08-05-0-2
Site 4	Surface Soil	S-04-06	S-04-08-06-0-2
Site 5	Subsurface Soil	S-05-01	S-05-08-01-2-4
Site 5	Subsurface Soil	S-05-02	S-05-08-02-2-4
Site 5	Surface Soil	S-05-01	S-05-08-01-1-2
Site 5	Surface Soil	S-05-02	S-05-08-02-1-2
Site 6	Sediment	SED-06-01	SD-6-09-1
Site 6	Sediment	SED-06-01	SED-06-08-01
Site 6	Sediment	SED-06-02	SD-6-09-2
Site 6	Sediment	SED-06-02	SED-06-08-02
Site 6	Sediment	SED-06-03	SD-6-09-3
Site 6	Sediment	SED-06-03	SED-06-08-03
Site 6	Subsurface Soil	S-06-01	S-06-08-01-2-4
Site 6	Subsurface Soil	S-06-01	S-6-09-1-2-4
Site 6	Subsurface Soil	S-06-02	S-06-08-02-2-4
Site 6	Subsurface Soil	S-06-02	S-6-09-2-2-4
Site 6	Subsurface Soil	S-06-03	S-06-08-03-2-4
Site 6	Subsurface Soil	S-06-03	S-6-09-3-2-4
Site 6	Surface Soil	S-06-01	S-06-08-01-0-2
Site 6	Surface Soil	S-06-01	S-6-09-1-0-2
Site 6	Surface Soil	S-06-02	S-06-08-02-0-2
Site 6	Surface Soil	S-06-02	S-6-09-2-0-2
Site 6	Surface Soil	S-06-03	08-12-02-DP1
Site 6	Surface Soil	S-06-03	S-06-08-03-0-2
Site 6	Surface Soil	S-06-03	S-6-09-3-0-2
Site 7	Subsurface Soil	S-07-01	08-OC-23-DP1
Site 7	Subsurface Soil	S-07-01	S-07-08-01-2-4
Site 7	Surface Soil	S-07-01	S-07-08-01-0-2
Site 8	Subsurface Soil	S-08-01	S-08-08-01-2-4
Site 8	Subsurface Soil	S-08-01	S-08-08-01-4-6

Table 3-1
Groupings and Samples Used in the Ecological Risk Assessment of the Fort Buchanan Site

Site Location/Grouping	Media	Sample Location	Sample ID
Site 8	Subsurface Soil	S-08-02	S-08-08-02-1-2
Site 8	Subsurface Soil	S-08-02	S-08-09-02-4-6
Site 9	Subsurface Soil	S-09-01	S-09-08-01-2-4
Site 9	Subsurface Soil	S-09-01	S-09-08-01-4-6
Site 9	Subsurface Soil	S-09-02	S-09-08-02-2-4
Site 9	Subsurface Soil	S-09-02	S-09-08-02-4-6
Site 9	Subsurface Soil	S-09-03	08-OC-21-DP1
Site 9	Subsurface Soil	S-09-03	S-09-08-03-2-4
Site 9	Subsurface Soil	S-09-03	S-09-08-03-4-6

Table 3-2
U.S. Environmental Protection Agency Region 4 Ecological Screening Criteria

Chemical	Soil Criteria (mg/kg)	Sediment Criteria (mg/kg)	Surface Water Criteria (µg/L)
Inorganics			
Cyanide (Total)	9.00E-01	NA	5.20E+00
Metals			
Aluminum	5.00E+01	NA	8.70E+01
Antimony	3.50E+00	1.20E+01	1.60E+02
Arsenic	1.00E+01	7.24E+00	1.90E+02
Barium	1.65E+02	NA	NA
Beryllium	1.10E+00	NA	5.30E-01
Cadmium	1.60E+00	1.00E+00	6.60E-01
Calcium	NA	NA	NA
Chromium	4.00E-01	5.23E+01	1.17E+02
Cobalt	2.00E+01	NA	NA
Copper	4.00E+01	1.87E+01	6.54E+00
Iron	2.00E+02	NA	1.00E+03
Lead	5.00E+01	3.02E+01	1.32E+00
Magnesium	NA	NA	NA
Manganese	1.00E+02	NA	NA
Mercury	1.00E-01	1.30E-01	1.20E-02
Nickel	3.00E+01	1.59E+01	8.77E+01
Potassium	NA	NA	NA
Selenium	8.10E-01	NA	5.00E+00
Silver	2.00E+00	2.00E+00	1.20E-02
Sodium	NA	NA	NA
Thallium	1.00E+00	NA	4.00E+00
Tin	5.30E+01	NA	NA
Vanadium	2.00E+00	NA	NA
Zinc	5.00E+01	1.24E+02	5.89E+01
PAHs			
2-Methylnaphthalene	NA	3.30E-01	NA
Acenaphthylene	2.00E+01	3.30E-01	1.70E+01
Anthracene	1.00E-01	3.30E-01	NA
Benzo(a)Anthracene	NA	3.30E-01	NA
Benzo(a)Pyrene	1.00E-01	3.30E-01	NA
Benzo(b)Fluoranthene	NA	NA	NA
Benzo(g,h,i)Perylene	NA	NA	NA
Benzo(k)Fluoranthene	NA	NA	NA
Chrysene	NA	3.30E-01	NA
Dibenzo(a,h)Anthracene	NA	3.30E-01	NA
Fluoranthene	1.00E-01	3.30E-01	3.98E+01

Table 3-2
U.S. Environmental Protection Agency Region 4 Ecological Screening Criteria

Chemical	Soil Criteria (mg/kg)	Sediment Criteria (mg/kg)	Surface Water Criteria (µg/L)
Fluorene	NA	3.30E-01	3.90E+00
Indeno(1,2,3-Cd)Pyrene	NA	NA	NA
Naphthalene	1.00E-01	3.30E-01	6.20E+01
Phenanthrene	1.00E-01	3.30E-01	NA
Pyrene	1.00E-01	3.30E-01	NA
Total LMW PAHs	--	--	--
Total HMW PAHs	--	--	--
PCBs			
Aroclor-1260	NA	3.30E-02	1.40E-02
Pesticides			
4,4'-DDD	NA	3.30E-03	6.40E-03
4,4'-DDE	NA	3.30E-03	1.05E+01
4,4'-DDT	NA	3.30E-03	1.00E-03
DDTr	2.50E-03	3.30E-03	NA
Alpha-Chlordane	NA	1.70E-03	4.30E-03
Dieldrin	5.00E-04	3.30E-03	1.90E-03
Endosulfan I	NA	NA	5.60E-02
Heptachlor	NA	NA	3.80E-03
Heptachlor Epoxide	NA	NA	3.80E-03
trans-Chlordane	NA	1.70E-03	4.30E-03
Furans			
Dibenzofuran	NA	2.00E+03	3.70E+00
Herbicides			
2,4-D	NA	NA	NA
Dichlorprop	NA	NA	NA
SVOCs			
Bis(2-ethylhexyl)phthalate	NA	1.82E-01	NA
Pentachlorophenol	2.00E-03	NA	7.90E+00
VOCs			
1,1-dichloroethene	NA	NA	3.03E+02
2-Butanone	NA	NA	NA
Acetone	NA	NA	NA
Benzene	5.00E-02	5.00E+01	5.30E+01
Carbon disulfide	NA	NA	NA
Ethylbenzene	5.00E-02	5.00E+01	4.53E+02
Isobutyl alcohol	NA	NA	NA
Toluene	5.00E-02	5.00E+01	1.75E+02

Source: Region 4 Waste Management Division Freshwater Surface Water Screening Values for Hazardous Waste Sites. Accessed at http://www.epa.gov/region4/waste/ots/ecolbul.htm.

Notes:

NA = Screening Value not available

Surface water and sediment criteria for Alpha-chlordane and trans-Chlordane are the value for chlordane

Surface water criteria listed for Chromium is Chromium III. Criteria for Chromium IV is 11.0

Table 3-2
U.S. Environmental Protection Agency Region 4 Ecological Screening Criteria

Chemical	Soil Criteria (mg/kg)	Sediment Criteria (mg/kg)	Surface Water Criteria (µg/L)

Surface water criteria listed for Arsenic is Arsenic III.

Surface water and soil criteria for acenaphthylene are the values used for acenaphthene.

Table 3-3

Refined Assessment Endpoints and Representative Receptor Species for Ecological Risk Assessment of the Fort Buchanan Site

Assessment Endpoint	Representative Receptor Species	Receptor Groups Represented by this Species	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 15	Background Grouping
Viability of plant communities in fields, forests, and associated riparian habitats.	Multiple species	• Terrestrial plants	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Viability of soil invertebrate communities as resources for terrestrial wildlife.	Earthworm	• Invertebrates	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Viability of aquatic and benthic organism communities.	Multiple species	• Fish • Crustaceans • Benthic organisms						X						X			
Viability of wildlife communities, including a variety of feeding guilds and taxa likely to use site habitats.	Jamaican fruit bat (*Artibeus jamaicensis*)	• Bats (the only mammals native to Puerto Rico)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Ruddy quail-dove (*Geotrygon montana*)	• Song birds • Passerine birds	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Antillean ghost-faced bat (*Mormoops blainvillei*)	• Bats (the only mammals native to Puerto Rico)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Pearly-eyed thrasher (*Margarops fuscatus*)	• Song birds • Small omnivorous birds	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Red-tailed hawk (*Buteo jamaicensis*)	• Large carnivorous birds (i.e. hawks, falcons, eagles)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Great blue heron (*Ardea herodias*)	• Large piscivorous birds (i.e. osprey, herons, kingfishers)						X						X			

Table 3-4
Measurement Endpoints for Ecological Risk Assessment of the Fort Buchanan Site

Assessment Endpoint	Measurement Endpoint	On Site-Measurements/Exposure Point Concentrations (EPC)	Evaluation Method	Risk Indicators
Protection of terrestrial plant and soil invertebrate viability from impacts of COPCs in soil	Initial screening	• Soil concentrations measured at site in past and more recent sampling	• Direct comparison to the Region IV ecological screening values to define COPCs	• Chemicals defined as COPCs indicate the potential for risk
	Comparison of total soil concentrations to benchmarks	• Soil concentrations measured at site in past and more recent sampling - SLERA: Maximum Concentrations - Refined SLERA & BERA: Mean Concentrations	• Direct comparison of maximum soil concentrations to plant benchmarks (TRVs) • Direct comparison of mean soil concentrations and individual concentrations against TRVs • Plant benchmarks from 1) USEPA EcoSSLs 2) ORNL benchmarks (Efroymson et al., 1997a) • Direct comparison to background concentrations	• Exceedence of benchmarks indicates potential for risks • Exceedence of benchmarks and background indicates a more certain potential for risks
	Examination of vegetative communities on site for signs of stress such as chlorosis or bare areas.	• Species lists and observations from previous vegetation/habitat surveys • Observations of vegetative community distribution from aerial photographs	• Presence of signs of stress, such as bare areas	• Presence of signs of stress indicates potential impacts/risks
Protection of soil invertebrates exposed to COPCs in soil from adverse survival, growth and reproductive effects	Initial screening	• Soil concentrations measured at site in past and more recent sampling	• Direct comparison to the Region IV ecological screening values to define COPCs	• Chemicals defined as COPCs indicate the potential for risk
	Comparison of soil concentrations to benchmarks	• Soil concentrations measured at site in past and more recent sampling - SLERA: Maximum Concentrations - Refined SLERA & BERA: Mean Concentrations	• Direct comparison of maximum soil concentrations to invertebrate benchmarks • Direct comparison of mean soil concentrations and individual concentrations to invertebrate benchmarks • Invertebrate benchmarks from USEPA EcoSSLs; ORNL benchmarks (Efroymson et al., 1997b) • Direct comparison to background concentrations	• Exceedence of benchmarks indicates potential for risks • Exceedence of benchmarks and background indicates a more certain potential for risks
Protection of aquatic organisms exposed to COPCs in sediment and surface water from adverse survival, growth and reproductive effects	Initial screening	• Sediment and surface water concentrations measured at site in past and more recent sampling	• Direct comparison to the Region IV ecological screening values to define COPCs	• Chemicals defined as COPCs indicate the potential for risk
	Comparison of sediment and surface water concentrations to benchmarks	• Sediment and surface water concentrations measured at site in past and more recent sampling - SLERA: Maximum Concentrations - Refined SLERA & BERA: Mean Concentrations	• Compare maximum, mean, and individual sediment concentrations against benthic TRVs (consensus based benchmarks from literature-based studies) • Compare maximum, mean, and individual surface water concentrations against aquatic TRVs (consensus based benchmarks from literature-based studies)	• Exceedence of benchmarks indicates potential for risks • Exceedence of benchmarks and background indicates a more certain potential for risks
Protection of terrestrial mammals and birds to ensure that ingestion of COPCs in soil, surface water, and plants/prey do not have unacceptable impacts on survival, growth, and reproduction	Initial screening	• Soil and surface water concentrations measured at site in past and more recent sampling	• Direct comparison to the Region IV ecological screening values to define COPCs	• Chemicals defined as COPCs indicate the potential for risk
	Comparison of modeled food web doses to benchmarks	• Soil and surface water concentrations measured at site in past and more recent sampling - SLERA: Maximum Concentrations - Refined SLERABRAPF: Mean Concentrations • Plant food item tissue concentrations modeled using literature-based equations - SLERA: Maximum Concentrations - Refined SLERA & BRAPF: Mean Concentrations • Ingested dose based on literature-based exposure factors and uptake equations - SLERA: Maximum Dose - Refined SLERA & BRAPF: Mean Dose	• Calculate maximum case scenario doses using food web models and compare to no-effects benchmarks • Calculate mean case scenario doses and compare to no- and low-effects benchmarks • Mammal and bird dose-based benchmarks from 1) USEPA EcoSSL 2) ORNL benchmarks (Sample et al., 1998) 3) Additional literatue-based sources as relevant	• Exceedence of benchmarks indicates a potential for risks • Exceedence of low-effects benchmarks indicates a more certain potential for risks
	Comparison of modeled food web doses on site to modeled food web doses for background concentrations	• Soil and surface water concentrations measured at site and in background areas - Refined SLERA & BERA: Maximum and Mean Concentrations • Plant food item tissue concentrations modeled using literature-based equations - Refined SLERA & BERA: Maximum and Mean Concentrations • Ingested dose based on literature-based exposure factors and uptake equations - Refined SLERA & BERA: Maximum and Mean Dose	• Compare maximum and mean case scenario doses on-site to doses calculated for background areas	• Exceedence of both benchmarks and background indicates a more certain potential for risks

Table 3-4
Measurement Endpoints for Ecological Risk Assessment of the Fort Buchanan Site

Assessment Endpoint	Measurement Endpoint	On Site-Measurements/Exposure Point Concentrations (EPC)	Evaluation Method	Risk Indicators
Protection of aquatic-feeding birds, to ensure that ingestion of COPCs in sediment, surface water, and food do not have adverse impacts on survival, growth, and reproduction	Initial screening	• Sediment and surface water concentrations measured at site in past and more recent sampling	• Direct comparison to the Region IV ecological screening values to define COPCs	• Chemicals defined as COPCs indicate the potential for risk
	Comparison of modeled food web doses to benchmarks	• Sediment and surface water concentrations measured at site in past and more recent sampling - SLERA: Maximum Concentrations - Refined SLERA & BRAPF: Mean Concentrations • Aquatic food item tissue concentrations modeled using literature-based equations - SLERA: Maximum Concentrations - Refined SLERA & BRAPF: Mean Concentrations • Ingested dose based on literature-based exposure factors and uptake equations - SLERA: Maximum Dose - Refined SLERA & BRAPF: Mean Dose	• Calculate maximum case scenario doses using food web models and compare to no-effects benchmarks • Calculate mean case scenario doses and compare to no- and low-effects benchmarks • Bird dose-based benchmarks from 1) USEPA EcoSSL 2) ORNL benchmarks (Sample et al., 1998) 3) Additional literatue-based sources as relevant	• Exceedence of benchmarks indicates a potential for risks • Exceedence of low-effects benchmarks indicates a more certain potential for risks
	Comparison of modeled food web doses on site to modeled food web doses for background concentrations	• Sediment and surface water concentrations measured at site and in background areas - Refined SLERA & BRAPF: Maximum and Mean Concentrations • Plant food item tissue concentrations modeled using literature-based equations - Refined SLERA & BRAPF: Maximum and Mean Concentrations • Ingested dose based on literature-based exposure factors and uptake equations - Refined SLERA & BRAPF: Maximum and Mean Dose	• Compare maximum and mean case scenario doses on-site to doses calculated for background areas	• Exceedence of both benchmarks and background indicates a more certain potential for risks

Table 3-5
Wildlife Exposure Factors for Ecological Risk Assessment of the Fort Buchanan Site

Exposure Parameter	Value	Units	Notes
RUDDY QUAIL-DOVE (NORTHERN BOBWHITE)[1]			
Body Weight	0.19	kg	USEPA 1993
Food Ingestion Rate	0.01675	g dry wt./g-day	USEPA 1993, converted assuming 75% prey moisture (USACHPPM 2004)
Food Ingestion Rate	0.07	g wet wt./g-day	USEPA 1993
Incidental Soil Ingestion Rate	2	% of total mass of diet	As a default, ingestion rate is assumed to be 2.
Water Ingestion Rate	0.115	g/g-day	USEPA 1993[4]
JAMAICAN FRUIT BAT			
Body Weight	0.036-0.048	kg	Ortega and Castro-Arellano 2001[2]
Food Ingestion Rate	0.12080	kg dry wt./kg-day	USEPA 1993, Allometric eq. 3-7
Food Ingestion Rate	0.48320	kg wet wt./kg-day	USEPA 1993, converted assuming 75% prey moisture (USACHPPM 2004)
Incidental Soil Ingestion Rate	2	% of total mass of diet	As a default, ingestion rate is assumed to be 2.
Water Ingestion Rate	0.1357	L/kg-day	USEPA 1993, Allometric eq. 3-17
PEARLY-EYED THRASHER			
Body Weight	0.096	kg	Oberle 2000
Food Ingestion Rate	0.1323	kg dry wt./kg-day	USEPA 1993, Allometric eq.
Food Ingestion Rate	0.5292	kg wet wt./kg-day	USEPA 1993, converted assuming 75% prey moisture (USACHPPM 2004)
Incidental Soil Ingestion Rate	4.6	% of total mass of diet	Sample and Suter 1994; value is for American robin
Water Ingestion Rate	0.1281	L/kg-day	USEPA 1993, Allometric eq.
ANTILLEAN GHOST-FACED BAT (LITTLE BROWN BAT)[3]			
Body Weight	0.0075	kg	Sample et al. 1996
Food Ingestion Rate	0.083325	kg dry wt./kg-day	Sample et al. 1996, converted assuming 75% prey moisture (USACHPPM 2004)
Food Ingestion Rate	0.3333	kg wet wt./kg-day	Sample et al. 1996
Incidental Soil Ingestion Rate	0	% of total mass of diet	As an aerial insectivore, assumed to be negligible (Samlpe and Suter 1994)
Water Ingestion Rate	0.16	L/kg-day	Sample et al. 1996
RED-TAILED HAWK			
Body Weight	1.2	kg	USACHPPM, 2004
Food Ingestion Rate	0.0275	kg dry wt./kg-day	USACHPPM, 2004, converted assuming 75% prey moisture (USACHPPM 2004)
Food Ingestion Rate	0.11	kg wet wt./kg-day	USACHPPM, 2004
Incidental Soil Ingestion Rate	0	% of total mass of diet	Sample and Suter, 1994
Water Ingestion Rate	0.057	L/kg-day	USACHPPM, 2004

[1] While the northern bobwhite is an introduced species in Puerto Rico, it is comparable in body size and weight to the Ruddy quail-dove which is native in Puerto Rico. Because of this, the exposure data for the northern bobwhite will be used to evaluate risks to herbivorous birds.

[2] Average body weights were utilized in calculating EPA Exposure Factors Handbook food and water ingestion rates.

[3] While the little brown bat is not a native species in Puerto Rico, it is comparable in body size and weight to the Antillean ghost-faced bat which is native in Puerto Rico. Because of this, the exposure data for the little brown bat will be used to evaluate risks to insectivorous mammals.

[4] Value is the average of the water ingestion rate for males (0.10 g/g-day) and females (0.13 g/g-day)

Table 3-6
Uptake Models Relating Concentrations in Soil to Concentrations in Plants

Chemical	Food Item (Plant) Uptake			
	Uptake Model[A, B, C]	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Log K_{ow} [G]	Source
Inorganics				
Cyanide (Total)	Uptake Factor	8.00E-02	--	ORNL, 1998
Metals				
Aluminum	Uptake Factor	4.00E-03	--	Baes et al., 1984
Antimony	Uptake Factor	2.00E-01	--	Baes et al., 1984
Arsenic	Log Linear	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	--	ORNL, 1998
Barium	Uptake Factor	1.50E-01	--	Baes et al., 1984
Beryllium	Uptake Factor	1.00E-02	--	Baes et al., 1984
Cadmium	Log Linear	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	--	ORNL, 1998
Calcium	Uptake Factor	3.50E+00	--	Baes et al., 1984
Chromium	Uptake Factor	7.50E-03	--	Baes et al., 1984
Cobalt	Uptake Factor	2.00E-02	--	Baes et al., 1984
Copper	Log Linear	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil	--	ORNL, 1998
Iron	Uptake Factor	4.00E-03	--	Baes et al., 1984
Lead	Log Linear	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	--	ORNL, 1998
Magnesium	Uptake Factor	1.00E+00	--	Baes et al., 1984
Manganese	Uptake Factor	2.50E-01	--	Baes et al., 1984
Mercury	Log Linear	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	--	ORNL, 1998
Nickel	Log Linear	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	--	ORNL, 1998
Potassium	Uptake Factor	1.00E+00	--	Baes et al., 1984
Selenium	Log Linear	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	--	ORNL, 1998
Silver	Uptake Factor	4.00E-01	--	Baes et al., 1984
Sodium	Uptake Factor	7.50E-02	--	Baes et al., 1984
Thallium	Uptake Factor	4.00E-03	--	Baes et al., 1984
Tin	Uptake Factor	3.00E-02	--	Baes et al., 1984
Vanadium	Uptake Factor	5.50E-03	--	Baes et al., 1984
Zinc	Log Linear	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil	--	ORNL, 1998
PAHs				
2-Methylnaphthalene	Uptake Factor	2.27E-01	--	Regression from Travis and Arms, 1988
Acenaphthylene	Uptake Factor	2.10E-01	--	Regression from Travis and Arms, 1988
Anthracene	Uptake Factor	1.04E-01	--	Regression from Travis and Arms, 1988
Benzo(a)Anthracene	Uptake Factor	2.06E-02	--	Regression from Travis and Arms, 1988
Benzo(a)Pyrene	Uptake Factor	1.37E-02	--	Regression from Travis and Arms, 1988
Benzo(b)Fluoranthene	Uptake Factor	1.12E-02	--	Regression from Travis and Arms, 1988
Benzo(g,h,i)Perylene	Uptake Factor	6.02E-03	--	Regression from Travis and Arms, 1988
Benzo(k)Fluoranthene	Uptake Factor	1.12E-02	--	Regression from Travis and Arms, 1988
Chrysene	Uptake Factor	2.06E-02	--	Regression from Travis and Arms, 1988
Dibenzo(a,h)Anthracene	Uptake Factor	6.78E-03	--	Regression from Travis and Arms, 1988
Fluoranthene	Uptake Factor	5.33E-02	--	Regression from Travis and Arms, 1988
Fluorene	Uptake Factor	1.49E-01	--	Regression from Travis and Arms, 1988
Indeno(1,2,3-Cd)Pyrene	Uptake Factor	6.06E-03	--	Regression from Travis and Arms, 1988
Naphthalene	Uptake Factor	4.79E-01	--	Regression from Travis and Arms, 1988
Phenanthrene	Uptake Factor	1.02E-01	--	Regression from Travis and Arms, 1988
Pyrene	Uptake Factor	5.85E-02	--	Regression from Travis and Arms, 1988
Total LMW PAHs	NA	--	--	--
Total HMW PAHs	NA	--	--	--
PCBs				
Aroclor-1260	Uptake Factor	6.43E-04	8.27E+00	Regression from Travis and Arms, 1988
Pesticides				
4,4'-DDD	Uptake Factor	1.57E-02	5.87E+00	Regression from Travis and Arms, 1988
4,4'-DDE	Uptake Factor	1.32E-02	6.00E+00	Regression from Travis and Arms, 1988
4,4'-DDT	Uptake Factor	4.61E-03	6.79E+00	Regression from Travis and Arms, 1988
DDTr	NA	--	--	--
Alpha-Chlordane	Uptake Factor	9.33E-03	6.26E+00	Regression from Travis and Arms, 1988
Dieldrin	Uptake Factor	2.74E-02	5.45E+00	Regression from Travis and Arms, 1988
Endosulfan I	Uptake Factor	3.67E-01	3.50E+00	Regression from Travis and Arms, 1988

Table 3-6
Uptake Models Relating Concentrations in Soil to Concentrations in Plants

Chemical	Food Item (Plant) Uptake			
	Uptake Model[A, B, C]	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Log K_{ow} [G]	Source
Heptachlor	Uptake Factor	1.59E-02	5.86E+00	Regression from Travis and Arms, 1988
Heptachlor Epoxide	Uptake Factor	8.96E-02	4.56E+00	Regression from Travis and Arms, 1988
trans-Chlordane	Uptake Factor	9.33E-03	6.26E+00	Regression from Travis and Arms, 1988
Furans				
Dibenzofuran	Uptake Factor	1.61E-01	--	Regression from Travis and Arms, 1988
Herbicides				
2,4-D	Uptake Factor	9.20E-01	2.81E+00	Regression from Travis and Arms, 1988
Dichlorprop	Uptake Factor	4.03E-01	3.43E+00	Regression from Travis and Arms, 1988
SVOCs				
Bis(2-ethylhexyl)phthalate	Uptake Factor	4.30E-02	--	Regression from Travis and Arms, 1988
Pentachlorophenol	Uptake Factor	4.25E-02	5.12E+00	Regression from Travis and Arms, 1988
VOCs				
1,1-dichloroethene	Uptake Factor	2.27E+00	2.13E+00	Regression from Travis and Arms, 1988
2-Butanone	Uptake Factor	2.74E+01	2.60E-01	Regression from Travis and Arms, 1988
Acetone	Uptake Factor	5.33E+01	-2.40E-01	Regression from Travis and Arms, 1988
Benzene	Uptake Factor	2.27E+00	--	Regression from Travis and Arms, 1988
Carbon disulfide	Uptake Factor	2.93E+00	1.94E+00	Regression from Travis and Arms, 1988
Ethylbenzene	Uptake Factor	5.85E-01	--	Regression from Travis and Arms, 1988
Isobutyl alcohol	Uptake Factor	1.41E+01	7.60E-01	Regression from Travis and Arms, 1988, Log K_{ow} from TOXNET
Toluene	Uptake Factor	1.02E+00	--	Regression from Travis and Arms, 1988

A - Equation types:

Uptake Factor: [ConcBio] = m x [ConcSoil]

Log linear: [ConcBio] = 10b*[ConcSoil]m

B - Uptake factor for organics derived using the following equations from Travis & Arms, 1988 (equation 5, pg 273): Log Upf_p = 1.588 - (0.578)(Log K_{ow}

UpF_p = plant uptake factor

K_{ow} = octanol-water partitioning coefficient

Log K_{ow} values from Syracuse Research Corporation (http://www.srcinc.com/what-we-do/databaseforms.aspx?id=385)

C - Uptake factor for inorganics derived using the following equations from ORNL, 1998: ln(plant) = B0 + B1(ln(soil concentration))

B0 = Constituent-specific intercept based on tissue type

B1 = Constituent-specific slope based on tissue type

Data for B0 and B1 are presented in ORNL 1998, Table 7, pg. 22.

Log Kow for m, p-xylenes = average of m-xylene and p-xylene Log Kow

Table 3-7
Uptake Models Relating Concentrations in Soil to Concentrations in Soil Invertebrates

Chemical	Food Item (Worm) Uptake		
	Uptake Model[A, B, C]	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Source
Inorganics			
Cyanide (Total)	Uptake Factor	1.00E+00	Default
Metals			
Aluminum	Uptake Factor	1.18E-01	90% UF, Sample et al,
Antimony	Uptake Factor	1.00E+00	Default
Arsenic	Log Linear	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	Sample et al., 1998a
Barium	Uptake Factor	1.60E-01	90% UF, Sample et al,
Beryllium	Uptake Factor	1.18E+00	90% UF, Sample et al,
Cadmium	Log Linear	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	Sample et al., 1998a
Calcium	Uptake Factor	1.00E+00	Default
Chromium	Log Linear	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	Sample et al., 1998a
Cobalt	Uptake Factor	2.91E-01	90% UF, Sample et al,
Copper	Log Linear	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	Sample et al., 1998a
Iron	Uptake Factor	7.80E-02	90% UF, Sample et al,
Lead	Log Linear	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	Sample et al., 1998a
Magnesium	Uptake Factor	5.30E-01	90% UF, Sample et al,
Manganese	Log Linear	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	Default
Mercury	Log Linear	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	Sample et al., 1998a
Nickel	Log Linear	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	Sample et al., 1998a
Potassium	Uptake Factor	1.00E+00	Default
Selenium	Log Linear	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	Sample et al., 1998a
Silver	Uptake Factor	1.53E+01	90% UF, Sample et al,
Sodium	Uptake Factor	1.00E+00	Default
Thallium	Uptake Factor	1.00E+00	Default
Tin	Uptake Factor	1.00E+00	Default
Vanadium	Uptake Factor	8.80E-01	90% UF, Sample et al,
Zinc	Log Linear	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	Sample et al., 1998a
PAHs			
2-Methylnaphthalene	Uptake Factor	2.00E-01	Beyer and Stafford, 1993
Acenaphthylene	Uptake Factor	2.20E-01	Beyer and Stafford, 1993
Anthracene	Uptake Factor	3.20E-01	Beyer and Stafford, 1993
Benzo(a)Anthracene	Uptake Factor	2.70E-01	Beyer and Stafford, 1993
Benzo(a)Pyrene	Uptake Factor	3.40E-01	Beyer and Stafford, 1993
Benzo(b)Fluoranthene	Uptake Factor	2.10E-01	Beyer and Stafford, 1993
Benzo(g,h,i)Perylene	Uptake Factor	1.50E-01	Beyer and Stafford, 1993
Benzo(k)Fluoranthene	Uptake Factor	2.10E-01	Beyer and Stafford, 1993
Chrysene	Uptake Factor	4.40E-01	Beyer and Stafford, 1993
Dibenzo(a,h)Anthracene	Uptake Factor	4.90E-01	Beyer and Stafford, 1993
Fluoranthene	Uptake Factor	3.70E-01	Beyer and Stafford, 1993
Fluorene	Uptake Factor	2.00E-01	Beyer and Stafford, 1993
Indeno(1,2,3-Cd)Pyrene	Uptake Factor	4.10E-01	Beyer and Stafford, 1993
Naphthalene	Uptake Factor	2.10E-01	Beyer and Stafford, 1993
Phenanthrene	Uptake Factor	2.80E-01	Beyer and Stafford, 1993

Table 3-7
Uptake Models Relating Concentrations in Soil to Concentrations in Soil Invertebrates

Chemical	Food Item (Worm) Uptake		
	Uptake Model[A, B, C]	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Source
Pyrene	Uptake Factor	3.90E-01	Beyer and Stafford, 1993
Total LMW PAHs	NA	--	--
Total HMW PAHs	NA	--	--
PCBs			
Aroclor-1260	Log Linear	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	(PCB) Sample et al., 1998a
Pesticides			
4,4'-DDD	Uptake Factor	9.00E+00	Beyer, 1990
4,4'-DDE	Uptake Factor	9.00E+00	Beyer, 1990
4,4'-DDT	Uptake Factor	9.00E+00	Beyer, 1990
DDTr	NA	--	--
Alpha-Chlordane	Uptake Factor	1.00E+00	Default
Dieldrin	Uptake Factor	1.79E+00	Beyer and Gish, 1980
Endosulfan I	Uptake Factor	1.00E+00	Default
Heptachlor	Uptake Factor	4.00E-02	Gish and Hughes, 1982
Heptachlor Epoxide	Uptake Factor	4.00E-02	Gish and Hughes, 1982
trans-Chlordane	Uptake Factor	1.00E+00	Default
Furans			
Dibenzofuran	Uptake Factor	1.00E+00	Default
Herbicides			
2,4-D	Uptake Factor	1.00E+00	Default
Dichlorprop	Uptake Factor	1.00E+00	Default
SVOCs			
Bis(2-ethylhexyl)phthalate	Uptake Factor	1.00E+00	Default
Pentachlorophenol	Uptake Factor	1.00E+00	Default
VOCs			
1,1-dichloroethene	Uptake Factor	1.00E+00	Default
2-Butanone	Uptake Factor	1.00E+00	Default
Acetone	Uptake Factor	1.00E+00	Default
Benzene	Uptake Factor	1.00E+00	Default
Carbon disulfide	Uptake Factor	1.00E+00	Default
Ethylbenzene	Uptake Factor	1.00E+00	Default
Isobutyl alcohol	Uptake Factor	1.00E+00	Default
Toluene	Uptake Factor	1.00E+00	Default

A - The default uptake factor for chemicals were no information was available was assumed to be 1.
B - Equation types:
Uptake Factor: [ConcBio] = m x [ConcSoil]
Log linear: [ConcBio] = 10b*[ConcSoil]m
C - Uptake factor derived using the following equations from Sample, et. al, 1998a: ln(earthworm) = B0 + B1(ln(soil
B0 = Constituent-specific intercept based on tissue type
B1 = Constituent-specific slope based on tissue type
Data for B0 and B1 are presented in Sample, et. Al, 1998a, Table 12, pg. 33.

Table 3-8
Uptake Models Relating Doses ingested by Small Mammals to Concentrations in Small Mammals

Chemical	Food Item (Small Mammal) Uptake			
	Uptake Model[A, B, C]	BTF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Log K_{ow} [G]	Source
Inorganics				
Cyanide (Total)	Uptake Factor	1.00E+00	--	Default
Metals				
Aluminum	Uptake Factor	7.32E-02	--	Sample et al., 1998b
Antimony	Uptake Factor	2.12E-04	--	90%UF from Sample et al., 1998b
Arsenic	Log Linear	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	--	Sample et al., 1998b
Barium	Log Linear	ln(dry mammal conc, mg/kg) = (-1.412+0.7*ln(soil conc))	--	Sample et al., 1998b
Beryllium	Uptake Factor	2.12E-04	--	90%UF from Sample et al., 1998b
Cadmium	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	--	Sample et al., 1998b
Calcium	Uptake Factor	1.48E-04	--	90%UF from Sample et al., 1998b
Chromium	Log Linear	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	--	Sample et al., 1998b
Cobalt	Uptake Factor	1.00E-01	--	90%UF from Sample et al., 1998b
Copper	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	--	Sample et al., 1998b
Iron	Uptake Factor	4.24E-03	--	90% UF, Sample et al, 1998b
Lead	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	--	Sample et al., 1998b
Magnesium	Uptake Factor	1.06E-03	--	90% UF, Sample et al, 1998b
Manganese	Uptake Factor	5.87E-02	--	Sample et al., 1998b
Mercury	Uptake Factor	1.92E-01	--	Sample et al., 1998b
Nickel	Log Linear	ln(dry mammal conc, mg/kg) = (-0.2462+0.4658*ln(soil conc))	--	Sample et al., 1998b
Potassium	Uptake Factor	4.24E-03	--	90%UF from Sample et al., 1998b
Selenium	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	--	Sample et al., 1998b
Silver	Uptake Factor	5.01E-01	--	90% UF, Sample et al, 1998b
Sodium	Uptake Factor	1.17E-02	--	90% UF, Sample et al, 1998b
Thallium	Uptake Factor	1.23E-01	--	90%UF from Sample et al., 1998b
Tin	Uptake Factor	1.00E+00	--	Default
Vanadium	Uptake Factor	1.79E-01	--	Sample et al., 1998b
Zinc	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	--	Sample et al., 1998b
PAHs				
2-Methylnaphthalene	Uptake Factor	3.79E-05	--	Regression from Travis and Arms, 1988
Acenaphthylene	Uptake Factor	4.37E-05	--	Regression from Travis and Arms, 1988
Anthracene	Uptake Factor	1.54E-04	--	Regression from Travis and Arms, 1988
Benzo(a)Anthracene	Uptake Factor	2.77E-03	--	Regression from Travis and Arms, 1988
Benzo(a)Pyrene	Uptake Factor	5.73E-03	--	Regression from Travis and Arms, 1988
Benzo(b)Fluoranthene	Uptake Factor	8.27E-03	--	Regression from Travis and Arms, 1988
Benzo(g,h,i)Perylene	Uptake Factor	2.45E-02	--	Regression from Travis and Arms, 1988
Benzo(k)Fluoranthene	Uptake Factor	8.27E-03	--	Regression from Travis and Arms, 1988
Chrysene	Uptake Factor	2.77E-03	--	Regression from Travis and Arms, 1988
Dibenzo(a,h)Anthracene	Uptake Factor	2.02E-02	--	Regression from Travis and Arms, 1988
Fluoranthene	Uptake Factor	5.07E-04	--	Regression from Travis and Arms, 1988
Fluorene	Uptake Factor	8.11E-05	--	Regression from Travis and Arms, 1988
Indeno(1,2,3-Cd)Pyrene	Uptake Factor	2.47E-02	--	Regression from Travis and Arms, 1988
Naphthalene	Uptake Factor	1.00E-05	--	Regression from Travis and Arms, 1989
Phenanthrene	Uptake Factor	1.58E-04	--	Regression from Travis and Arms, 1988
Pyrene	Uptake Factor	4.29E-04	--	Regression from Travis and Arms, 1988
Total LMW PAHs	NA	--	--	--
Total HMW PAHs	NA	--	--	--

Table 3-8
Uptake Models Relating Doses ingested by Small Mammals to Concentrations in Small Mammals

Chemical	Food Item (Small Mammal) Uptake			
	Uptake Model[A, B, C]	BTF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Log K_{ow} [G]	Source
PCBs				
Aroclor-1260	Uptake Factor	1.36E+00	--	Regression from Travis and Arms, 1988
Pesticides				
4,4'-DDD	Uptake Factor	6.46E-03	--	Regression from Travis and Arms, 1988
4,4'-DDE	Uptake Factor	2.95E-03	--	Regression from Travis and Arms, 1988
4,4'-DDT	Uptake Factor	1.45E-02	--	Regression from Travis and Arms, 1988
DDTr	NA	--	--	--
Alpha-Chlordane	Uptake Factor	2.06E-03	--	Regression from Travis and Arms, 1988
Dieldrin	Uptake Factor	1.96E-04	--	Regression from Travis and Arms, 1988
Endosulfan I	Uptake Factor	3.53E-05	--	Regression from Travis and Arms, 1988
Heptachlor	Uptake Factor	1.01E-04	--	Regression from Travis and Arms, 1988
Heptachlor Epoxide	Uptake Factor	1.48E-03	--	Regression from Travis and Arms, 1988
trans-Chlordane	Uptake Factor	4.57E-02	6.26E+00	Regression from Travis and Arms, 1988
Furans				
Dibenzofuran	Uptake Factor	7.04E-05	--	Regression from Travis and Arms, 1988
Herbicides				
2,4-D	Uptake Factor	1.62E-05	2.81E+00	Regression from Travis and Arms, 1988
Dichlorprop	Uptake Factor	6.76E-05	3.43E+00	Regression from Travis and Arms, 1988
SVOCs				
Bis(2-ethylhexyl)phthalate	Uptake Factor	7.41E-04	--	Regression from Travis and Arms, 1988
Pentachlorophenol	Uptake Factor	3.31E-03	5.12E+00	Regression from Travis and Arms, 1988
VOCs				
1,1-dichloroethene	Uptake Factor	3.39E-06	2.13E+00	Regression from Travis and Arms, 1988
2-Butanone	Uptake Factor	7.78E-09	--	Regression from Travis and Arms, 1988
Acetone	Uptake Factor	2.21E-09	--	Regression from Travis and Arms, 1988
Benzene	Uptake Factor	6.19E-07	--	Regression from Travis and Arms, 1989
Carbon disulfide	Uptake Factor	8.04E-07	--	Regression from Travis and Arms, 1988
Ethylbenzene	Uptake Factor	7.00E-06	--	Regression from Travis and Arms, 1989
Isobutyl alcohol	Uptake Factor	1.45E-07	7.60E-01	Regression from Travis and Arms, 1988, Log K_{ow} from TOXNET
Toluene	Uptake Factor	1.75E-07	--	Regression from Travis and Arms, 1989

A - Equation types:
Uptake Factor:
Log linear:

B - Uptake factor derived using the following equations from Travis & Arms, 1988 (equation 2, pg. 272): Log UpF_{sm} = -7.6 + log Kow
UpF_{sm} = small mammal uptake factor
K_{ow} = octanol-water partitioning coefficient
Log K_{ow} values from Syracuse Research Corporation (http://www.syrres.com/esc/est_kowdemo.htm)

C - Uptake factor for organics derived using the following equations from Sample et al., 1998a: ln(whole body) = B0 + B1(ln(soil concentration))
B0 = Constituent-specific intercept based on tissue type
B1 = Constituent-specific slope based on tissue type
Data for B0 and B1 are presented in Sample et el., 1998a, Table 8, pg. 31-32.

Table 3-9
Uptake Models Relating Concentrations in Surface Water to Concentrations in Fish

Chemical	Food Item (Fish) Uptake		
	Uptake Model[A, B, C]	BAF/Equation (mg/L dry wt. to mg/kg dry wt.)	Source
Inorganics			
Cyanide (Total)	Uptake Factor	6.33E+02	From Table C-5 - EPA, 1999
Metals			
Aluminum	Uptake Factor	2.70E+00	From Table C-5 - EPA, 1999
Antimony	Uptake Factor	1.00E+00	Based on bluegill in Table 5 - EPA, 1980
Arsenic	Uptake Factor	4.00E+00	Based on bluegill in Table 5 - EPA, 1985a
Barium	Uptake Factor	4.00E+00	BCF from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=chem
Beryllium	Uptake Factor	6.20E+01	From Table C-5 - EPA, 1999
Cadmium	Uptake Factor	5.90E+01	Based on bluegill in Table 5 - EPA, 2001
Calcium	Uptake Factor	1.00E+00	Default
Chromium	Uptake Factor	2.00E+02	BCF from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=chem
Cobalt	Uptake Factor	1.00E+00	Default
Copper	Uptake Factor	4.64E+02	Based on fathead minnow in Table 5 - EPA, 2003
Iron	Uptake Factor	1.00E+00	Default
Lead	Uptake Factor	4.50E+01	Based on bluegill in Table 5 - EPA, 1985b
Magnesium	Uptake Factor	1.00E+00	Default
Manganese	Uptake Factor	4.00E+02	BCF from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=chem
Mercury	Uptake Factor	1.80E+03	Based on rainbow trout in Table 5 - EPA, 1985c
Nickel	Uptake Factor	2.70E+01	Based on rainbow trout/fathead minnow in Table 5 - EPA, 1986
Potassium	Uptake Factor	1.00E+00	Default
Selenium	Uptake Factor	2.42E+02	Based on bluegill in Table 5 - EPA, 1987a
Silver	Uptake Factor	8.77E+01	From Table C-5 - EPA, 1999
Sodium	Uptake Factor	1.00E+00	Default
Thallium	Uptake Factor	1.00E+03	BCF from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=chem
Tin	Uptake Factor	3.00E+03	BCF from http://rais.ornl.gov/cgi-bin/tools/TOX_search
Vanadium	Uptake Factor	1.00E+00	Default
Zinc	Uptake Factor	1.30E+01	Based on mummichog in Table 5 - EPA, 1987b
PAHs			
2-Methylnaphthalene	Uptake Factor	1.64E+02	Regression from BCFWIN Program
Acenaphthylene	Uptake Factor	1.85E+02	Regression from BCFWIN Program
Anthracene	Uptake Factor	4.01E+02	Regression from BCFWIN Program
Benzo(a)Anthracene	Uptake Factor	5.83E+02	OEHHA 2000
Benzo(a)Pyrene	Uptake Factor	5.83E+02	OEHHA 2000
Benzo(b)Fluoranthene	Uptake Factor	5.83E+02	OEHHA 2000
Benzo(g,h,i)Perylene	Uptake Factor	5.83E+02	OEHHA 2000
Benzo(k)Fluoranthene	Uptake Factor	5.83E+02	OEHHA 2000
Chrysene	Uptake Factor	5.83E+02	OEHHA 2000
Dibenzo(a,h)Anthracene	Uptake Factor	5.83E+02	OEHHA 2000
Fluoranthene	Uptake Factor	5.83E+02	OEHHA 2000
Fluorene	Uptake Factor	2.66E+02	Regression from BCFWIN Program
Indeno(1,2,3-Cd)Pyrene	Uptake Factor	5.83E+02	OEHHA 2000
Naphthalene	Uptake Factor	6.99E+01	Regression from BCFWIN Program
Phenanthrene	Uptake Factor	1.87E+03	Regression from BCFWIN Program
Pyrene	Uptake Factor	7.71E+02	Regression from BCFWIN Program
Total LMW PAHs	NA	--	--
Total HMW PAHs	NA	--	--
PCBs			
Aroclor-1260	Uptake Factor	1.23E+04	Regression from BCFWIN Program
Pesticides			

Table 3-9
Uptake Models Relating Concentrations in Surface Water to Concentrations in Fish

Chemical	Food Item (Fish) Uptake		
	Uptake Model[A, B, C]	BAF/Equation (mg/L dry wt. to mg/kg dry wt.)	Source
4,4'-DDD	Uptake Factor	4.36E+03	Regression from BCFWIN Program
4,4'-DDE	Uptake Factor	9.17E+03	Regression from BCFWIN Program
4,4'-DDT	Uptake Factor	1.68E+04	Regression from BCFWIN Program
DDTr	NA	--	--
Alpha-Chlordane	Uptake Factor	5.90E+03	Regression from BCFWIN Program
Dieldrin	Uptake Factor	1.25E+03	Regression from BCFWIN Program
Endosulfan I	Uptake Factor	1.56E+02	Regression from BCFWIN Program
Heptachlor	Uptake Factor	4.92E+03	Regression from BCFWIN Program
Heptachlor Epoxide	Uptake Factor	8.97E+02	Regression from BCFWIN Program
trans-Chlordane	Uptake Factor	5.90E+03	Regression from BCFBAF Program
Furans			
Dibenzofuran	Uptake Factor	1.00E+00	Default
Herbicides			
2,4-D	Uptake Factor	3.16E+00	Regression from BCFBAF Program
Dichlorprop	Uptake Factor	3.16E+00	Regression from BCFBAF Program
SVOCs			
Bis(2-ethylhexyl)phthalate	Uptake Factor	1.71E+03	Regression from BCFWIN Program
Pentachlorophenol	Uptake Factor	1.11E+03	Regression from BCFBAF Program
VOCs			
1,1-dichloroethene	Uptake Factor	1.18E+01	Regression from BCFBAF Program
2-Butanone	Uptake Factor	3.16E+00	Regression from BCFWIN Program
Acetone	Uptake Factor	3.16E+00	Regression from BCFWIN Program
Benzene	Uptake Factor	1.18E+01	Regression from BCFWIN Program
Carbon disulfide	Uptake Factor	8.85E+00	Regression from BCFWIN Program
Ethylbenzene	Uptake Factor	5.56E+01	Regression from BCFWIN Program
Isobutyl alcohol	Uptake Factor	1.00E+00	Default
Toluene	Uptake Factor	2.94E+01	Regression from BCFWIN Program

A - Equation types:
Uptake Factor:
B - EPA 2009, Uptake factor for organics derived using the BCF Win/BCFBAF Program from EPA
http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm
C - Uptake factor for inorganics from the following sources:
ORNL 2009, BCF from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=chem
ORNL 2009, BCF from http://rais.ornl.gov/cgi-bin/tools/TOX_search
EPA 1999, Table C-5
EPA 1980, Table 5 (bluegill)
EPA 1985a, Table 5
EPA 1985b, Table 5
EPA 1985c, Table 5
EPA 2000, Table 5
EPA 1984, Table 5
EPA 1986, Table 5
EPA 1987a, Table 5
EPA 1987b, Table 5

Table 3-10
Soil Toxicity Reference Values for Plants and Soil Invertebrates

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Toxicity Reference Value Source and Notes	Earthworm Toxicity Reference Value (mg/kg dry wt)	Toxicity Reference Value Source and Notes
Inorganics				
Cyanide (Total)	NA	---	NA	---
Metals				
Aluminum	5.00E+01	Efroymson et al. 1997a	NA	---
Antimony	5.00E+00	Efroymson et al. 1997a	7.80E+01	EPA, 2005a
Arsenic	1.80E+01	EcoSSL, 2005b	6.00E+01	Efroymson et al. 1997b
Barium	5.00E+02	Efroymson et al. 1997a	3.30E+02	EPA, 2005c
Beryllium	1.00E+01	Efroymson et al. 1997a	4.00E+01	EPA, 2005d
Cadmium	3.20E+01	EPA, 2005e	1.40E+02	EPA, 2005e
Calcium	NA	---	NA	---
Chromium	1.00E+00	Efroymson et al. 1997a	4.00E-01	Efroymson et al. 1997b
Cobalt	1.30E+01	EPA, 2005f	NA	---
Copper	7.00E+01	EPA, 2007a	8.00E+01	EPA, 2007a
Iron	NA	---	NA	---
Lead	1.20E+02	EPA, 2005g	1.70E+03	EPA, 2005g
Magnesium	NA	---	NA	---
Manganese	2.20E+02	EPA, 2007d	4.50E+02	EPA, 2007d
Mercury	3.00E-01	Efroymson et al. 1997a	1.00E-01	Efroymson et al. 1997b
Nickel	3.80E+01	EPA, 2007e	2.80E+02	EPA, 2007e
Potassium	NA	---	NA	---
Selenium	5.20E-01	EPA, 2007h	4.10E+00	EPA, 2007h
Silver	5.60E+02	EPA, 2006	NA	---
Sodium	NA	---	NA	---
Thallium	1.00E+00	Efroymson et al. 1997a	NA	---
Tin	5.00E+01	Efroymson et al. 1997a	NA	---
Vanadium	2.00E+00	Efroymson et al. 1997a	NA	---
Zinc	1.60E+02	EPA, 2007i	1.20E+02	EPA, 2007i
PAHs				
2-Methylnaphthalene	NA	---	NA	---
Acenaphthylene	NA	---	NA	---
Anthracene	NA	---	NA	---
Benzo(a)Anthracene	NA	---	NA	---
Benzo(a)Pyrene	NA	---	NA	---
Benzo(b)Fluoranthene	NA	---	NA	---
Benzo(g,h,i)Perylene	NA	---	NA	---
Benzo(k)Fluoranthene	NA	---	NA	---
Chrysene	NA	---	NA	---
Dibenzo(a,h)Anthracene	NA	---	NA	---
Fluoranthene	NA	---	NA	---
Fluorene	NA	---	3.00E+01	Efroymson et al. 1997a
Indeno(1,2,3-Cd)Pyrene	NA	---	NA	---
Naphthalene	NA	---	NA	---
Phenanthrene	NA	---	NA	---
Pyrene	NA	---	NA	---
Total LMW PAHs	2.00E+04	Efroymson et al. 1997a	2.90E+01	EPA, 2007g
Total HMW PAHs	2.00E+04	Efroymson et al. 1997a	1.80E+04	EPA, 2007g
PCBs				
Aroclor-1260	4.00E+04	Efroymson et al. 1997a	2.51E+03	Rhett et al 1989
Pesticides				
4,4'-DDD	NA	---	1.50E+03	Cathey, 1982

Table 3-10
Soil Toxicity Reference Values for Plants and Soil Invertebrates

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Toxicity Reference Value Source and Notes	Earthworm Toxicity Reference Value (mg/kg dry wt)	Toxicity Reference Value Source and Notes
4,4'-DDE	NA	---	1.50E+03	Cathey, 1982
4,4'-DDT	NA	---	1.50E+03	Cathey, 1982
DDTr	NA	---	1.50E+03	Cathey, 1982
Alpha-Chlordane	NA	---	NA	---
Dieldrin	NA	---	NA	---
Endosulfan I	NA	---	NA	---
Heptachlor	NA	---	NA	---
Heptachlor Epoxide	NA	---	NA	---
trans-Chlordane	NA	---	NA	---
Furans				
Dibenzofuran	NA	---	NA	---
Herbicides				
2,4-D	NA	---	NA	---
Dichlorprop	NA	---	NA	---
SVOCs				
Bis(2-ethylhexyl)phthalate	1.00E+05	Efroymson et al. 1997a	2.00E+05	Efroymson et al. 1997b
Pentachlorophenol	3.00E+00	Efroymson et al. 1997a	6.00E+00	Efroymson et al. 1997b
VOCs				
1,1-dichloroethene	NA	---	NA	---
2-Butanone	NA	---	NA	---
Acetone	NA	---	NA	---
Benzene	NA	---	NA	---
Carbon disulfide	NA	---	NA	---

Table 3-11
Sediment Toxicity Reference Values for Benthic Organism Exposures

Chemical	Sediment TRV (mg/kg dry wt.)	Source
Inorganics		
Cyanide (Total)	NA	---
Metals		
Aluminum	NA	---
Antimony	2.00E+00	Value is LEL from OMEE, 1993
Arsenic	9.79E+00	MacDonald et al. 2000
Barium	NA	---
Beryllium	NA	---
Cadmium	9.90E-01	MacDonald et al. 2000
Calcium	NA	---
Chromium	4.34E+01	MacDonald et al. 2000
Cobalt	NA	---
Copper	3.16E+01	MacDonald et al. 2000
Iron	2.00E+04	Value is TEL from MacDonald et al. 1996
Lead	3.58E+01	MacDonald et al. 2000
Magnesium	NA	---
Manganese	4.60E+02	Value is TEL from MacDonald et al. 1996
Mercury	1.80E-01	MacDonald et al. 2000
Nickel	2.27E+01	MacDonald et al. 2000
Potassium	NA	---
Selenium	NA	---
Silver	1.00E+00	Value is LEL from OMEE, 1993
Sodium	NA	---
Thallium	NA	---
Tin	NA	---
Vanadium	NA	---
Zinc	1.21E+02	MacDonald et al. 2000
PAHs		
2-Methylnaphthalene	NA	---
Acenaphthylene	NA	---
Anthracene	NA	---
Benzo(a)Anthracene	NA	---
Benzo(a)Pyrene	NA	---
Benzo(b)Fluoranthene	NA	---
Benzo(g,h,i)Perylene	NA	---
Benzo(k)Fluoranthene	NA	---
Chrysene	NA	---
Dibenzo(a,h)Anthracene	NA	---
Fluoranthene	NA	---
Fluorene	NA	---
Indeno(1,2,3-Cd)Pyrene	NA	---
Naphthalene	NA	---
Phenanthrene	NA	---
Pyrene	NA	---
Total LMW PAHs	1.60E+00	Value is TEC from MacDonald et al. 2000
Total HMW PAHs	1.60E+00	Value is TEC from MacDonald et al. 2000
PCBs		
Aroclor-1260	5.00E-03	Value is TEL from MacDonald et al. 1996
Pesticides		

Table 3-11
Sediment Toxicity Reference Values for Benthic Organism Exposures

Chemical	Sediment TRV (mg/kg dry wt.)	Source
4,4'-DDD	4.88E-03	MacDonald et al. 2000
4,4'-DDE	3.16E-03	MacDonald et al. 2000
4,4'-DDT	4.16E-03	MacDonald et al. 2000
DDTr	NA	---
Alpha-Chlordane	3.24E-03	MacDonald et al. 2000
Dieldrin	1.90E-03	MacDonald et al. 2000
Endosulfan I	2.90E-03	Value is ET from OSWER 1996; based on 1% organic carbon
Heptachlor	3.00E-04	MacDonald et al. 2000
Heptachlor Epoxide	2.47E-03	MacDonald et al. 2000
trans-Chlordane	3.24E-03	MacDonald et al. 2000
Furans		
Dibenzofuran	NA	---
Herbicides		
2,4-D	NA	---
Dichlorprop	NA	---
SVOCs		
Bis(2-ethylhexyl)phthalate	8.90E+02	Value is SQB calculated from Tier II secondary chronic value (Jones et al. 1997) assuming 1% OC
Pentachlorophenol	NA	---
VOCs		
1,1-dichloroethene	3.10E-02	Value is SQB calculated from Tier II secondary chronic value (Jones et al. 1997) assuming 1% OC
2-Butanone	2.90E+00	DiToro at al. 2000 assuming 1% OC
Acetone	2.30E+00	DiToro at al. 2000 assuming 1% OC
Benzene	NA	---
Carbon disulfide	8.50E-04	Value is SQB calculated from Tier II secondary chronic value (Jones et al. 1997) assuming 1% OC
Ethylbenzene	NA	---
Isobutyl alcohol	NA	---
Toluene	NA	---

NA - TRV not available

Table 3-12
Surface Water Toxicity Reference Values for Aquatic Organism Exposures

Chemical	Surface Water TRV (ug/L)	Source for Surface Water TRVs[1]
Inorganics		
Cyanide (Total)	5.20E+00	
Metals		
Aluminum	8.70E+01	
Antimony	3.00E+01	
Arsenic	1.50E+02	National Ambient Water Quality Criteria; Value for total arsenic
Barium	4.00E+00	Tier II value from Suter and Tsao 1996
Beryllium	5.30E+00	Value presented is the LOEL
Cadmium	6.40E-01	Hardness dependent criterion based on 400 mg/L hardness
Calcium	NA	---
Chromium	2.30E+02	Hardness dependent criterion based on 400 mg/L hardness (value for chromium III)
Cobalt	2.30E+01	Tier II value from Suter and Tsao 1996
Copper	2.90E+01	Hardness dependent criterion based on 400 mg/L hardness
Iron	1.00E+03	
Lead	4.70E+01	Hardness dependent criterion based on 400 mg/L hardness
Magnesium	NA	---
Manganese	1.20E+02	Tier II value from Suter and Tsao 1996
Mercury	7.70E-01	Value for total mercury (organic & inorganic)
Nickel	1.68E+02	Hardness dependent criterion based on 400 mg/L hardness
Potassium	NA	---
Selenium	4.60E+00	Value reflects the use of a conversion factor (0.922) suggested by USEPA (1999) to convert total metal to dissolved metal criterion
Silver	3.49E+01	Hardness dependent criterion based on 400 mg/L hardness
Sodium	NA	---
Thallium	4.00E+01	Value presented is the LOEL
Tin	7.30E+01	Tier II value from Suter and Tsao 1996
Vanadium	2.00E+01	Tier II value from Suter and Tsao 1996
Zinc	3.80E+02	Hardness dependent criterion based on 400 mg/L hardness
PAHs		
2-Methylnaphthalene	NA	---
Acenaphthylene	NA	---
Anthracene	NA	---
Benzo(a)Anthracene	NA	---
Benzo(a)Pyrene	NA	---
Benzo(b)Fluoranthene	NA	---
Benzo(g,h,i)Perylene	NA	---
Benzo(k)Fluoranthene	NA	---
Chrysene	NA	---
Dibenzo(a,h)Anthracene	NA	---
Fluoranthene	NA	---
Fluorene	NA	---
Indeno(1,2,3-Cd)Pyrene	NA	---
Naphthalene	NA	---
Phenanthrene	NA	---
Pyrene	NA	---
Total LMW PAHs	NA	---
Total HMW PAHs	NA	---
PCBs		
Aroclor-1260	1.40E-02	
Pesticides		
4,4'-DDD	1.10E-02	Tier II value from Suter and Tsao 1996
4,4'-DDE	NA	---
4,4'-DDT	1.00E-03	

Table 3-12
Surface Water Toxicity Reference Values for Aquatic Organism Exposures

Chemical	Surface Water TRV (ug/L)	Source for Surface Water TRVs[1]
DDTr	NA	---
Alpha-Chlordane	4.30E-03	Value for chlordane
Dieldrin	5.60E-02	
Endosulfan I	5.60E-02	
Heptachlor	3.80E-03	
Heptachlor Epoxide	3.80E-03	
trans-Chlordane	4.30E-03	Value for chlordane
Furans		
Dibenzofuran	NA	---
Herbicides		
2,4-D	NA	---
Dichlorprop	NA	---
SVOCs		
Bis(2-ethylhexyl)phthalate	1.60E+02	Value presented is the LOEL
Pentachlorophenol	1.50E+01	
VOCs		
1,1-dichloroethene	2.50E+01	Tier II value from Suter and Tsao 1996
2-Butanone	1.40E+04	Tier II value from Suter and Tsao 1996
Acetone	1.50E+03	Tier II value from Suter and Tsao 1996
Benzene	NA	---
Carbon disulfide	9.20E-01	Tier II value from Suter and Tsao 1996
Ethylbenzene	NA	---
Isobutyl alcohol	NA	---
Toluene	NA	---

1 - Unless otherwise noted, values are from National Ambient Water Quality Criteria.
NA - TRV not available

Table 3-13
Dose-based Toxicity Reference Values for Mammals

Chemical	Mammalian NOAEL (mg/kg-bw day)	Mammalian NOAEL Source and Notes	Mammalian LOAEL (mg/kg-bw day)	Mammalian LOAEL Source and Notes
Inorganics				
Cyanide (Total)	6.87E+01	ORNL, 1996	NA	---
Metals				
Aluminum	1.93E+00	ORNL, 1996	1.93E+01	ORNL, 1996
Antimony	5.90E-02	EcoSSL, 2005a	1.25E+00	ORNL, 1996
Arsenic	1.04E+00	EcoSSL, 2005b	1.26E+00	ORNL, 1996
Barium	5.18E+01	EcoSSL, 2005c	4.36E+02	Derived from Data in EcoSSL, 2005c
Beryllium	5.32E-01	EcoSSL, 2005d	NA	---
Cadmium	7.70E-01	EcoSSL, 2005e	1.00E+01	ORNL, 1996
Calcium	NA	---	NA	---
Chromium	2.40E+00	EcoSSL (trivalent), 2008a	1.31E+01	ORNL, 1996
Cobalt	7.33E+00	EcoSSL, 2005f	1.18E+02	Derived from Data in EcoSSL, 2005f
Copper	5.60E+00	EcoSSL, 2007a	1.54E+01	ORNL, 1996
Iron	NA	---	NA	---
Lead	4.70E+00	EcoSSL, 2005g	8.00E+01	ORNL, 1996
Magnesium	NA	---	NA	---
Manganese	5.15E+01	EcoSSL, 2007d	2.84E+02	ORNL, 1996
Mercury	1.32E+01	ORNL, 1996	NA	---
Nickel	1.70E+00	EcoSSL, 2007e	8.00E+01	ORNL, 1996
Potassium	NA	---	NA	---
Selenium	1.43E-01	EcoSSL, 2007h	3.30E-01	ORNL, 1996
Silver	6.02E+00	EcoSSL, 2006	1.16E+02	Derived from Data in EcoSSL, 2006
Sodium	NA	---	NA	---
Thallium	7.40E-03	ORNL, 1996	7.40E-02	ORNL, 1996
Tin	2.34E+01	ORNL, 1996	3.50E+01	ORNL, 1996
Vanadium	4.16E+00	EcoSSL, 2005h	8.31E+00	Sanchez et al., 1991 (study from EcoSSL used to derive NOAEL)
Zinc	7.54E+01	EcoSSL, 2007i	3.20E+02	ORNL, 1996
PAHs				
2-Methylnaphthalene	NA	---	NA	---
Acenaphthylene	NA	---	NA	---
Anthracene	NA	---	NA	---
Benzo(a)Anthracene	NA	---	NA	---
Benzo(a)Pyrene	1.00E+00	ORNL, 1996	1.00E+01	ORNL, 1996
Benzo(b)Fluoranthene	NA	---	NA	---
Benzo(g,h,i)Perylene	NA	---	NA	---
Benzo(k)Fluoranthene	NA	---	NA	---
Chrysene	NA	---	NA	---
Dibenzo(a,h)Anthracene	NA	---	NA	---
Fluoranthene	NA	---	NA	---
Fluorene	NA	---	NA	---
Indeno(1,2,3-Cd)Pyrene	NA	---	NA	---
Naphthalene	NA	---	NA	---
Phenanthrene	NA	---	NA	---
Pyrene	NA	---	NA	---
Total LMW PAHs	6.56E+01	EcoSSL, 2007g	4.34E+02	Derived from data in EcoSSL, 2007g
Total HMW PAHs	6.15E-01	EcoSSL, 2007g	1.08E+01	Derived from data in EcoSSL, 2007g
PCBs				
Aroclor-1260	1.00E-02	ORNL, 1996 (based on lowest aroclor value)	1.00E-01	ORNL, 1996 (based on lowest aroclor value)
Pesticides				
4,4'-DDD	1.47E-01	EcoSSL, 2007c	4.00E+00	ORNL, 1996
4,4'-DDE	1.47E-01	EcoSSL, 2007c	4.00E+00	ORNL, 1996
4,4'-DDT	1.47E-01	EcoSSL, 2007c	4.00E+00	ORNL, 1996
DDTr	1.47E-01	EcoSSL, 2007c	4.00E+00	ORNL, 1996
Alpha-Chlordane	4.60E+00	ORNL, 1996	9.20E+00	ORNL, 1996 (based on chlordane)
Dieldrin	1.50E-02	EcoSSL, 2007b	2.00E-01	ORNL, 1996
Endosulfan I	1.50E-01	ORNL, 1996	NA	---
Heptachlor	1.00E-01	ORNL, 1996	1.00E+00	ORNL, 1996
Heptachlor Epoxide	1.00E-01	ORNL, 1996	1.00E+00	ORNL, 1996 (based on heptachlor)
trans-Chlordane	4.60E+00	ORNL, 1996	9.20E+00	ORNL, 1996 (based on chlordane)
Furans				
Dibenzofuran	NA	---	NA	---
Herbicides				
2,4-D	NA	---	NA	---
Dichlorprop	NA	---	NA	---
SVOCs				

Table 3-13
Dose-based Toxicity Reference Values for Mammals

Chemical	Mammalian NOAEL (mg/kg-bw day)	Mammalian NOAEL Source and Notes	Mammalian LOAEL (mg/kg-bw day)	Mammalian LOAEL Source and Notes
Bis(2-ethylhexyl)phthalate	1.83E+01	ORNL, 1996	1.83E+02	ORNL, 1996
Pentachlorophenol	2.40E-01	ORNL, 1996	2.40E+00	ORNL, 1996
VOCs				
1,1-dichloroethene	2.50E+00	ORNL, 1996	NA	---
2-Butanone	NA	---	NA	---
Acetone	1.00E+01	ORNL, 1996	5.00E+01	ORNL, 1996
Benzene	2.64E+01	ORNL, 1996	2.64E+02	ORNL, 1996
Carbon disulfide	NA	---	NA	---
Ethylbenzene	NA	---	NA	---
Isobutyl alcohol	NA	---	NA	---
Toluene	2.60E+01	ORNL, 1996	2.60E+02	ORNL, 1996

NA - TRV not available

Table 3-14
Dose-based Toxicity Reference Values for Birds

Chemical	Avian NOAEL (mg/kg-bw day)	Avian NOAEL Source and Notes	Avian LOAEL (mg/kg-bw day)	Avian LOAEL Source and Notes
Inorganics				
Cyanide (Total)	NA	---	NA	---
Metals				
Aluminum	1.10E+02	ORNL, 1996	NA	---
Antimony	5.10E+00	EcoSSL, 2005a	1.28E+01	ORNL, 1996
Arsenic	2.24E+00	EcoSSL, 2005b	7.40E+00	ORNL, 1996
Barium	2.08E+01	ORNL, 1996	4.17E+01	ORNL, 1996
Beryllium	NA	---	NA	---
Cadmium	1.45E+00	EcoSSL, 2005e	2.00E+01	ORNL, 1996
Calcium	NA	---	NA	---
Chromium	2.66E+00	EcoSSL (trivalent), 2008a	5.00E+00	ORNL, 1996
Cobalt	7.61E+00	EcoSSL, 2005f	2.67E+01	Derived from Data in EcoSSL, 2005f
Copper	4.05E+00	EcoSSL, 2007a	6.17E+01	ORNL, 1996
Iron	NA	---	NA	---
Lead	1.63E+00	EcoSSL, 2005g	1.13E+01	ORNL, 1996
Magnesium	NA	---	NA	---
Manganese	9.97E+02	ORNL, 1996	NA	---
Mercury	4.50E-01	ORNL, 1996	9.00E-01	ORNL, 1996
Nickel	7.74E+01	ORNL, 1996	1.07E+02	ORNL, 1996
Potassium	NA	---	NA	---
Selenium	5.00E-01	ORNL, 1996	1.00E+00	ORNL, 1996
Silver	2.02E+00	EcoSSL, 2006	6.05E+01	Derived from Data in EcoSSL, 2006
Sodium	NA	---	NA	---
Thallium	3.50E-01	Derived	NA	---
Tin	6.80E+00	ORNL, 1996	1.69E+01	ORNL, 1996
Vanadium	3.44E-01	EcoSSL, 2005h	6.88E-01	Hill, 1979 (study from EcoSSL used to derive NOAEL)
Zinc	6.61E+01	EcoSSL, 2007i	1.31E+02	ORNL, 1996
PAHs				
2-Methylnaphthalene	NA	---	NA	---
Acenaphthylene	NA	---	NA	---
Anthracene	NA	---	NA	---
Benzo(a)Anthracene	NA	---	NA	---
Benzo(a)Pyrene	NA	---	NA	---
Benzo(b)Fluoranthene	NA	---	NA	---
Benzo(g,h,i)Perylene	NA	---	NA	---
Benzo(k)Fluoranthene	NA	---	NA	---
Chrysene	NA	---	NA	---
Dibenzo(a,h)Anthracene	NA	---	NA	---
Fluoranthene	NA	---	NA	---
Fluorene	NA	---	NA	---
Indeno(1,2,3-Cd)Pyrene	NA	---	NA	---
Naphthalene	NA	---	NA	---
Phenanthrene	NA	---	NA	---
Pyrene	NA	---	NA	---
Total LMW PAHs	3.37E+00	ORNL, 1996	3.37E+01	ORNL, 1996
Total HMW PAHs	3.37E+00	ORNL, 1996	3.37E+01	ORNL, 1996
PCBs				
Aroclor-1260	1.80E-01	ORNL, 1996	9.88E+01	ORNL, 1996
Pesticides				

Table 3-14
Dose-based Toxicity Reference Values for Birds

Chemical	Avian NOAEL (mg/kg-bw day)	Avian NOAEL Source and Notes	Avian LOAEL (mg/kg-bw day)	Avian LOAEL Source and Notes
4,4'-DDD	2.27E-01	EcoSSL, 2007c	2.27E+00	Cecil et al., 1978 (study from EcoSSL used to derive NOAEL)
4,4'-DDE	2.27E-01	EcoSSL, 2007c	2.27E+00	Cecil et al., 1978 (study from EcoSSL used to derive NOAEL)
4,4'-DDT	2.27E-01	EcoSSL, 2007c	2.27E+00	Cecil et al., 1978 (study from EcoSSL used to derive NOAEL)
DDTr	2.27E-01	EcoSSL, 2007c	2.27E+00	Cecil et al., 1978 (study from EcoSSL used to derive NOAEL)
Alpha-Chlordane	2.10E+00	ORNL, 1996	1.07E+01	ORNL, 1996 (based on chlordane)
Dieldrin	7.09E-02	EcoSSL, 2007b	1.00E+01	ORNL, 1996
Endosulfan I	1.00E+01	ORNL, 1996	NA	---
Heptachlor	9.90E-01	Derived	NA	---
Heptachlor Epoxide	9.90E-01	Derived	NA	---
trans-Chlordane	2.10E+00	ORNL, 1996	1.07E+01	ORNL, 1996 (based on chlordane)
Furans				
Dibenzofuran	NA	---	NA	---
Herbicides				
2,4-D	NA	---	NA	---
Dichlorprop	NA	---	NA	---
SVOCs				
Bis(2-ethylhexyl)phthalate	1.10E+00	ORNL, 1996	7.63E+02	ORNL, 1996
Pentachlorophenol	6.73E+00	EcoSSL, 2007j	NA	---
VOCs				
1,1-dichloroethene	NA	---	NA	---
2-Butanone	NA	---	NA	---
Acetone	NA	---	NA	---
Benzene	NA	---	NA	---
Carbon disulfide	NA	---	NA	---
Ethylbenzene	NA	---	NA	---
Isobutyl alcohol	NA	---	NA	---
Toluene	NA	---	NA	---

NA - TRV not available

Table 3-15
Upper Prediction Limits of Background Data Fort Buchanan, Puerto Rico

Analyte	Frequency of Detection	Chemical Concentration		95% UPL
		Average	Maximum	
Metals (mg/kg)				
Aluminum	30/30	23063	34000	30027
Antimony	1/30	0.939	2.2	1
Arsenic	30/30	16.3	47.1	43.9
Barium	30/30	61.8	118	102
Beryllium	30/30	0.368	0.77	0.647
Cadmium	25/30	0.614	3.05	0.858
Calcium	30/30	27905	117000	105848
Chromium	30/30	43.8	89.7	69.8
Cobalt	30/30	11.1	28	16.6
Copper	30/30	43	111	83.7
Iron	30/30	30169	54300	47064
Lead	30/30	27.5	152	27.5
Magnesium	30/30	2997	8920	5131
Manganese	30/30	706.5	1280	1184
Mercury	30/30	0.184	1.1	0.32
Nickel	30/30	14.3	42.3	23.0
Potassium	30/30	848	1710	1459
Selenium	1/30	0.933	1	1
Silver	3/30	0.81	2	0.22
Sodium	20/30	165	271	238
Thallium	2/30	1.01	1.1	1.1
Vanadium	30/30	96.1	176	145
Zinc	30/30	84.2	603	81.0
Pesticides (mg/kg)				
4,4-DDD	1/12	0.502	0.0422	0.00051
4,4-DDE	6/12	0.65	0.0556	0.00337
4,4-DDT	6/12	0.198	0.0177	0.00265
alpha-Chlordane	1/12	0.009	0.00123	0.00064
Endosulfan II	1/12	0.0082	0.00118	0.00065
Endosulfan Sulfate	1/12	0.0022	0.00086	0.0009
trans-Chlordane	1/12	0.0085	0.00109	0.00051

UPL = Upper Prediction Limit calculated with EPA ProUCL.

Table 3-16
Comparison of Site Sizes and Receptor Home Range Size

Species	Source	Foraging Area/ Home Range (acres)	Site 1 (within roads)		Site 1 (within fence)		Site 2 (along trench)		Site 3		Site 4		Site 5		Sit
			Acres	Area Use Factor	Acres	Area Use Factor	Acres	Area Use Factor	Acres	Area Use Factor	Acres	Area Use Factor	Acres	Area Use Factor	Acres
Jamaican Fruit Bat	**Distance travelled from Bianconi et al. 2006**	**2.79E+02**	1.84	**0.66%**	0.55	**0.20%**	6.32	**2.26%**	0.17	**0.06%**	0.39	**0.14%**	0.19	**0.07%**	2.41
Antillean Ghost-Faced Bat	**Orange-bellied bat foraging area from Weinbeer and Kalko 2004**	**6.18E+01**	1.84	**2.98%**	0.55	**0.90%**	6.32	**10.23%**	0.17	**0.28%**	0.39	**0.63%**	0.19	**0.30%**	2.41
Ruddy Quail-Dove	**Bridled Quail-Dove home range from Chipley 1991**	**1.09E+01**	1.84	**16.92%**	0.55	**5.10%**	6.32	**58.13%**	0.17	**1.58%**	0.39	**3.59%**	0.19	**1.71%**	2.41
Pearly-Eyed Thrasher	Post-breeding median home range from Beltran et al. 2010	4.42E+01	1.84	4.16%	0.55	**1.25%**	6.32	**14.29%**	0.17	**0.39%**	0.39	**0.88%**	0.19	**0.42%**	2.41
	Egg state median home range from Beltran et al. 2010	4.94E+00	1.84	37.23%	0.55	**11.21%**	6.32	**127.88%**	0.17	**3.48%**	0.39	**7.89%**	0.19	**3.76%**	2.41
	Nestling state median home range from Beltran et al. 2010	1.24E+00	1.84	148.92%	0.55	**44.84%**	6.32	**511.52%**	0.17	**13.92%**	0.39	**31.57%**	0.19	**15.05%**	2.41
	Breeding median home range from Beltran et al. 2010	5.19E+00	1.84	35.46%	0.55	**10.68%**	6.32	**121.79%**	0.17	**3.31%**	0.39	**7.52%**	0.19	**3.58%**	2.41
	Average home range (calculated).	**1.39E+01**	**1.84**	**13.24%**	0.55	**3.99%**	6.32	**45.47%**	0.17	**1.24%**	0.39	**2.81%**	0.19	**1.34%**	2.41
Red-Tailed Hawk	Home range from Andersen and Rongstand 1989	2.38E+03	1.84	0.08%	0.55	**0.02%**	6.32	**0.27%**	0.17	**0.01%**	0.39	**0.02%**	0.19	**0.01%**	2.41
	Mean summer home range from Craighead and Craighead 1956	5.66E+02	1.84	0.33%	0.55	**0.10%**	6.32	**1.12%**	0.17	**0.03%**	0.39	**0.07%**	0.19	**0.03%**	2.41
	Average home range (calculated).	1.48E+03	1.84	0.12%	0.55	**0.04%**	6.32	**0.43%**	0.17	**0.01%**	0.39	**0.03%**	0.19	**0.01%**	2.41
Great Blue Heron	Mean winter feeding territory from Bayer 1978	2.08E+01	1.84	8.86%	0.55	**2.67%**	6.32	**30.45%**	0.17	**0.83%**	0.39	**1.88%**	0.19	**0.90%**	2.41
	Mean fall feeding territory from Bayer 1978	1.48E+00	1.84	124.10%	0.55	**37.37%**	6.32	**426.27%**	0.17	**11.60%**	0.39	**26.30%**	0.19	**12.55%**	2.41
	Average home range (calculated).	**1.11E+01**	**1.84**	**16.55%**	0.55	**4.98%**	6.32	**56.84%**	0.17	**1.55%**	0.39	**3.51%**	0.19	**1.67%**	2.41

Table 3-16
Comparison of Site Sizes and Receptor Home Range Size

Species	Source	Foraging Area/ Home Range (acres)	e 6	Site 7		Site 8		Site 9		Site 10		Site 11		Site 12	
			Area Use Factor	Acres	Area Use Factor	Acres	Area Use Factor	Acres	Area Use Factor	Acres	Area Use Factor	Acres	Area Use Factor	Acres	Area Use Factor
Jamaican Fruit Bat	**Distance travelled from Bianconi et al. 2006**	**2.79E+02**	**0.86%**	0.06	**0.02%**	0.51	**0.18%**	0.15	**0.05%**	0.37	**0.13%**	0.37	**0.13%**	10.50	**3.76%**
Antillean Ghost-Faced Bat	**Orange-bellied bat foraging area from Weinbeer and Kalko 2004**	**6.18E+01**	**3.90%**	0.06	**0.10%**	0.51	**0.83%**	0.15	**0.25%**	0.37	**0.60%**	0.37	**0.60%**	10.50	**17.00%**
Ruddy Quail-Dove	**Bridled Quail-Dove home range from Chipley 1991**	**1.09E+01**	**22.17%**	0.06	**0.59%**	0.51	**4.69%**	0.15	**1.41%**	0.37	**3.40%**	0.37	**3.42%**	10.50	**96.57%**
Pearly-Eyed Thrasher	Post-breeding median home range from Beltran et al. 2010	4.42E+01	**5.45%**	0.06	**0.15%**	0.51	**1.15%**	0.15	**0.35%**	0.37	**0.84%**	0.37	**0.84%**	10.50	**23.74%**
	Egg state median home range from Beltran et al. 2010	4.94E+00	**48.76%**	0.06	**1.30%**	0.51	**10.32%**	0.15	**3.10%**	0.37	**7.49%**	0.37	**7.53%**	10.50	**212.46%**
	Nestling state median home range from Beltran et al. 2010	1.24E+00	**195.06%**	0.06	**5.20%**	0.51	**41.28%**	0.15	**12.38%**	0.37	**29.95%**	0.37	**30.11%**	10.50	**849.84%**
	Breeding median home range from Beltran et al. 2010	5.19E+00	**46.44%**	0.06	**1.24%**	0.51	**9.83%**	0.15	**2.95%**	0.37	**7.13%**	0.37	**7.17%**	10.50	**202.34%**
	Average home range (calculated).	**1.39E+01**	**17.34%**	0.06	**0.46%**	0.51	**3.67%**	0.15	**1.10%**	0.37	**2.66%**	0.37	**2.68%**	10.50	**75.54%**
Red-Tailed Hawk	Home range from Andersen and Rongstand 1989	2.38E+03	**0.10%**	0.06	**0.00%**	0.51	**0.02%**	0.15	**0.01%**	0.37	**0.02%**	0.37	**0.02%**	10.50	**0.44%**
	Mean summer home range from Craighead and Craighead 1956	5.66E+02	**0.43%**	0.06	**0.01%**	0.51	**0.09%**	0.15	**0.03%**	0.37	**0.07%**	0.37	**0.07%**	10.50	**1.86%**
	Average home range (calculated).	1.48E+03	**0.16%**	0.06	**0.00%**	0.51	**0.03%**	0.15	**0.01%**	0.37	**0.03%**	0.37	**0.03%**	10.50	**0.71%**
Great Blue Heron	Mean winter feeding territory from Bayer 1978	2.08E+01	**11.61%**	0.06	**0.31%**	0.51	**2.46%**	0.15	**0.74%**	0.37	**1.78%**	0.37	**1.79%**	10.50	**50.59%**
	Mean fall feeding territory from Bayer 1978	1.48E+00	**162.55%**	0.06	**4.34%**	0.51	**34.40%**	0.15	**10.32%**	0.37	**24.96%**	0.37	**25.09%**	10.50	**708.20%**
	Average home range (calculated).	**1.11E+01**	**21.67%**	0.06	**0.58%**	0.51	**4.59%**	0.15	**1.38%**	0.37	**3.33%**	0.37	**3.35%**	10.50	**94.43%**

Table 3-16
Comparison of Site Sizes and Receptor Home Range Size

Species	Source	Foraging Area/ Home Range (acres)	Site 13		Site 15	
			Acres	Area Use Factor	Acres	Area Use Factor
Jamaican Fruit Bat	**Distance travelled from Bianconi et al. 2006**	**2.79E+02**	1.58	**0.57%**	0.59	**0.21%**
Antillean Ghost-Faced Bat	**Orange-bellied bat foraging area from Weinbeer and Kalko 2004**	**6.18E+01**	1.58	**2.56%**	0.59	**0.95%**
Ruddy Quail-Dove	**Bridled Quail-Dove home range from Chipley 1991**	**1.09E+01**	1.58	**14.53%**	0.59	**5.38%**
Pearly-Eyed Thrasher	Post-breeding median home range from Beltran et al. 2010	4.42E+01	1.58	**3.57%**	0.59	**1.32%**
	Egg state median home range from Beltran et al. 2010	4.94E+00	1.58	**31.97%**	0.59	**11.84%**
	Nestling state median home range from Beltran et al. 2010	1.24E+00	1.58	**127.88%**	0.59	**47.35%**
	Breeding median home range from Beltran et al. 2010	5.19E+00	1.58	**30.45%**	0.59	**11.27%**
	Average home range (calculated).	**1.39E+01**	1.58	**11.37%**	0.59	**4.21%**
Red-Tailed Hawk	Home range from Andersen and Rongstand 1989	2.38E+03	1.58	**0.07%**	0.59	**0.02%**
	Mean summer home range from Craighead and Craighead 1956	5.66E+02	1.58	**0.28%**	0.59	**0.10%**
	Average home range (calculated).	1.48E+03	1.58	**0.11%**	0.59	**0.04%**
Great Blue Heron	Mean winter feeding territory from Bayer 1978	2.08E+01	1.58	**7.61%**	0.59	**2.82%**
	Mean fall feeding territory from Bayer 1978	1.48E+00	1.58	**106.57%**	0.59	**39.46%**
	Average home range (calculated).	**1.11E+01**	1.58	**14.21%**	0.59	**5.26%**

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Table 4-1
Detection Comparison to Region 4 Screening Levels
for the Site 1 Exposure Grouping

Analyte	Surface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
PAHs					
Acenaphthylene	1/4	8.41E-03	2.40E-03	2.00E+01	NO
Anthracene	1/4	2.50E-02	1.93E-02	1.00E-01	NO
Benzo(a)Anthracene	4/4	2.77E-01	1.22E-01	NA	YES
Benzo(a)Pyrene	3/4	4.21E-01	1.68E-01	1.00E-01	YES
Benzo(b)Fluoranthene	3/4	4.30E-01	1.80E-01	NA	YES
Benzo(g,h,i)Perylene	3/4	2.85E-01	1.13E-01	NA	YES
Benzo(k)Fluoranthene	3/4	3.81E-01	1.47E-01	NA	YES
Chrysene	3/4	3.66E-01	1.42E-01	NA	YES
Dibenzo(a,h)Anthracene	2/4	9.30E-02	2.76E-02	NA	YES
Fluoranthene	3/4	2.69E-01	1.26E-01	1.00E-01	YES
Indeno(1,2,3-Cd)Pyrene	3/4	2.58E-01	1.01E-01	NA	YES
Phenanthrene	3/4	5.49E-02	2.96E-02	1.00E-01	NO
Pyrene	3/4	3.04E-01	1.38E-01	1.00E-01	YES
Total LMW PAHs	--	3.57E-01	1.77E-01	--	YES
Total HMW PAHs	--	2.82E+00	1.14E+00	--	YES
PCBs					
Aroclor-1260	2/4	9.11E-02	4.32E-02	NA	YES
Pesticides					
4,4'-DDD	3/4	5.26E-02	2.94E-02	NA	YES
4,4'-DDE	4/4	9.70E-01	2.77E-01	NA	YES
4,4'-DDT	4/4	5.17E-01	2.20E-01	NA	YES
DDTr	--	--	--	--	--
Alpha-Chlordane	3/4	1.21E-02	5.82E-03	NA	YES
Dieldrin	1/4	3.30E-03	1.36E-03	5.00E-04	YES
VOCs					
Acetone	3/4	1.43E-02	6.70E-03	NA	YES

Table 4-2
Detection Comparison to Region 4 Screening Levels
for the Site 1 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
PAHs					
Benzo(a)Anthracene	1/4	6.82E-02	1.72E-02	NA	YES
Benzo(a)Pyrene	1/4	7.34E-02	1.88E-02	1.00E-01	NO
Benzo(b)Fluoranthene	1/4	9.65E-02	2.53E-02	NA	YES
Benzo(g,h,i)Perylene	1/4	5.32E-02	1.38E-02	NA	YES
Benzo(k)Fluoranthene	1/4	8.83E-02	2.26E-02	NA	YES
Chrysene	1/4	6.41E-02	1.64E-02	NA	YES
Dibenzo(a,h)Anthracene	1/4	1.83E-02	4.99E-03	NA	YES
Fluoranthene	1/4	9.31E-02	3.78E-02	1.00E-01	NO
Indeno(1,2,3-Cd)Pyrene	1/4	4.84E-02	1.26E-02	NA	YES
Phenanthrene	1/4	3.13E-02	8.16E-03	1.00E-01	NO
Pyrene	1/4	8.95E-02	3.64E-02	1.00E-01	NO
Total LMW PAHs	--	1.24E-01	4.59E-02	--	NO
Total HMW PAHs	--	6.00E-01	1.68E-01	--	YES
Pesticides					
4,4'-DDD	2/4	4.30E-03	1.66E-03	NA	YES
4,4'-DDE	2/4	2.73E-02	7.98E-03	NA	YES
4,4'-DDT	2/4	9.10E-03	4.64E-03	NA	YES
DDTr	--	--	--	--	--
Alpha-Chlordane	1/4	2.50E-03	1.00E-03	NA	YES
SVOCs					
Pentachlorophenol	1/4	3.70E-03	1.75E-03	2.00E-03	YES
VOCs					
1,1-dichloroethene	1/4	6.10E-04	5.20E-04	NA	YES
Acetone	2/4	1.34E-01	4.17E-02	NA	YES
Carbon disulfide	1/4	1.10E-03	6.28E-04	NA	YES

Table 4-3
Frequency of Detection and Exposure Point Concentrations
for the Site 1 Exposure Grouping

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
PAHs			
Acenaphthylene	1/4	8.41E-03	2.40E-03
Anthracene	1/4	2.50E-02	1.93E-02
Benzo(a)Anthracene	4/4	2.77E-01	1.22E-01
Benzo(a)Pyrene	3/4	4.21E-01	1.68E-01
Benzo(b)Fluoranthene	3/4	4.30E-01	1.80E-01
Benzo(g,h,i)Perylene	3/4	2.85E-01	1.13E-01
Benzo(k)Fluoranthene	3/4	3.81E-01	1.47E-01
Chrysene	3/4	3.66E-01	1.42E-01
Dibenzo(a,h)Anthracene	2/4	9.30E-02	2.76E-02
Fluoranthene	3/4	2.69E-01	1.26E-01
Indeno(1,2,3-Cd)Pyrene	3/4	2.58E-01	1.01E-01
Phenanthrene	3/4	5.49E-02	2.96E-02
Pyrene	3/4	3.04E-01	1.38E-01
Total LMW PAHs	--	3.57E-01	1.77E-01
Total HMW PAHs	--	2.82E+00	1.14E+00
PCBs			
Aroclor-1260	2/4	9.11E-02	4.32E-02
Pesticides			
4,4'-DDD	3/4	5.26E-02	2.94E-02
4,4'-DDE	4/4	9.70E-01	2.77E-01
4,4'-DDT	4/4	5.17E-01	2.20E-01
DDTr	--	--	--
Alpha-Chlordane	3/4	1.21E-02	5.82E-03
Dieldrin	1/4	3.30E-03	1.36E-03
VOCs			
Acetone	3/4	1.43E-02	6.70E-03

Table 4-4
Frequency of Detection and Exposure Point Concentrations
for the Site 1 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
PAHs			
Benzo(a)Anthracene	1/4	6.82E-02	1.72E-02
Benzo(a)Pyrene	1/4	7.34E-02	1.88E-02
Benzo(b)Fluoranthene	1/4	9.65E-02	2.53E-02
Benzo(g,h,i)Perylene	1/4	5.32E-02	1.38E-02
Benzo(k)Fluoranthene	1/4	8.83E-02	2.26E-02
Chrysene	1/4	6.41E-02	1.64E-02
Dibenzo(a,h)Anthracene	1/4	1.83E-02	4.99E-03
Fluoranthene	1/4	9.31E-02	3.78E-02
Indeno(1,2,3-Cd)Pyrene	1/4	4.84E-02	1.26E-02
Phenanthrene	1/4	3.13E-02	8.16E-03
Pyrene	1/4	8.95E-02	3.64E-02
Total LMW PAHs	--	1.24E-01	4.59E-02
Total HMW PAHs	--	6.00E-01	1.68E-01
Pesticides			
4,4'-DDD	2/4	4.30E-03	1.66E-03
4,4'-DDE	2/4	2.73E-02	7.98E-03
4,4'-DDT	2/4	9.10E-03	4.64E-03
DDTr	--	--	--
Alpha-Chlordane	1/4	2.50E-03	1.00E-03
SVOCs			
Pentachlorophenol	1/4	3.70E-03	1.75E-03
VOCs			
1,1-dichloroethene	1/4	6.10E-04	5.20E-04
Acetone	2/4	1.34E-01	4.17E-02
Carbon disulfide	1/4	1.10E-03	6.28E-04

Table 4-5
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 1 Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
PAHs						
Total LMW PAHs	2.00E+04	3.57E-01	1.79E-05	1.77E-01	8.87E-06	--
Total HMW PAHs	2.00E+04	2.82E+00	1.41E-04	1.14E+00	5.69E-05	--
PCBs						
Aroclor-1260	4.00E+04	9.11E-02	2.28E-06	4.32E-02	1.08E-06	--
Pesticides						
4,4'-DDD	NA	5.26E-02	--	2.94E-02	--	5.10E-04
4,4'-DDE	NA	9.70E-01	--	2.77E-01	--	3.37E-03
4,4'-DDT	NA	5.17E-01	--	2.20E-01	--	2.65E-03
DDTr	NA	--	--	--	--	--
Alpha-Chlordane	NA	1.21E-02	--	5.82E-03	--	6.40E-04
Dieldrin	NA	3.30E-03	--	1.36E-03	--	--
VOCs						
Acetone	NA	1.43E-02	--	6.70E-03	--	--

Table 4-6
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 1 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
PAHs						
Benzo(a)Anthracene	NA	6.82E-02	--	1.72E-02	--	--
Benzo(a)Pyrene	NA	7.34E-02	--	1.88E-02	--	--
Benzo(b)Fluoranthene	NA	9.65E-02	--	2.53E-02	--	--
Benzo(g,h,i)Perylene	NA	5.32E-02	--	1.38E-02	--	--
Benzo(k)Fluoranthene	NA	8.83E-02	--	2.26E-02	--	--
Chrysene	NA	6.41E-02	--	1.64E-02	--	--
Dibenzo(a,h)Anthracene	NA	1.83E-02	--	4.99E-03	--	--
Fluoranthene	NA	9.31E-02	--	3.78E-02	--	--
Indeno(1,2,3-Cd)Pyrene	NA	4.84E-02	--	1.26E-02	--	--
Phenanthrene	NA	3.13E-02	--	8.16E-03	--	--
Pyrene	NA	8.95E-02	--	3.64E-02	--	--
Total LMW PAHs	2.00E+04	1.24E-01	6.22E-06	4.59E-02	2.30E-06	--
Total HMW PAHs	2.00E+04	6.00E-01	3.00E-05	1.68E-01	8.41E-06	--
Pesticides						
4,4'-DDD	NA	4.30E-03	--	1.66E-03	--	5.10E-04
4,4'-DDE	NA	2.73E-02	--	7.98E-03	--	3.37E-03
4,4'-DDT	NA	9.10E-03	--	4.64E-03	--	2.65E-03
DDTr	--	--	--	--	--	--
Alpha-Chlordane	NA	2.50E-03	--	1.00E-03	--	6.40E-04
SVOCs						
Pentachlorophenol	3.00E+00	3.70E-03	1.23E-03	1.75E-03	5.83E-04	--
VOCs						
1,1-dichloroethene	NA	6.10E-04	--	5.20E-04	--	--
Acetone	NA	1.34E-01	--	4.17E-02	--	--
Carbon disulfide	NA	1.10E-03	--	6.28E-04	--	--

Table 4-7
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 1 Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
PAHs						
Total LMW PAHs	2.90E+01	3.57E-01	1.23E-02	1.77E-01	6.12E-03	--
Total HMW PAHs	1.80E+04	2.82E+00	1.56E-04	1.14E+00	6.32E-05	--
PCBs						
Aroclor-1260	2.51E+03	9.11E-02	3.63E-05	4.32E-02	1.72E-05	--
Pesticides						
4,4'-DDD	1.50E+03	5.26E-02	3.51E-05	2.94E-02	1.96E-05	5.10E-04
4,4'-DDE	1.50E+03	9.70E-01	6.47E-04	2.77E-01	1.85E-04	3.37E-03
4,4'-DDT	1.50E+03	5.17E-01	3.45E-04	2.20E-01	1.47E-04	2.65E-03
DDTr	1.50E+03	--	--	--	--	--
Alpha-Chlordane	NA	1.21E-02	--	5.82E-03	--	6.40E-04
Dieldrin	NA	3.30E-03	--	1.36E-03	--	--
VOCs						
Acetone	NA	1.43E-02	--	6.70E-03	--	--

Table 4-8
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 1 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
PAHs						
Benzo(a)Anthracene	NA	6.82E-02	--	1.72E-02	--	--
Benzo(a)Pyrene	NA	7.34E-02	--	1.88E-02	--	--
Benzo(b)Fluoranthene	NA	9.65E-02	--	2.53E-02	--	--
Benzo(g,h,i)Perylene	NA	5.32E-02	--	1.38E-02	--	--
Benzo(k)Fluoranthene	NA	8.83E-02	--	2.26E-02	--	--
Chrysene	NA	6.41E-02	--	1.64E-02	--	--
Dibenzo(a,h)Anthracene	NA	1.83E-02	--	4.99E-03	--	--
Fluoranthene	NA	9.31E-02	--	3.78E-02	--	--
Indeno(1,2,3-Cd)Pyrene	NA	4.84E-02	--	1.26E-02	--	--
Phenanthrene	NA	3.13E-02	--	8.16E-03	--	--
Pyrene	NA	8.95E-02	--	3.64E-02	--	--
Total LMW PAHs	2.90E+01	1.24E-01	4.29E-03	4.59E-02	1.58E-03	--
Total HMW PAHs	1.80E+04	6.00E-01	3.33E-05	1.68E-01	9.34E-06	--
Pesticides						
4,4'-DDD	1.50E+03	4.30E-03	2.87E-06	1.66E-03	1.11E-06	5.10E-04
4,4'-DDE	1.50E+03	2.73E-02	1.82E-05	7.98E-03	5.32E-06	3.37E-03
4,4'-DDT	1.50E+03	9.10E-03	6.07E-06	4.64E-03	3.10E-06	2.65E-03
DDTr	--	--	--	--	--	--
Alpha-Chlordane	NA	2.50E-03	--	1.00E-03	--	6.40E-04
SVOCs						
Pentachlorophenol	6.00E+00	3.70E-03	6.17E-04	1.75E-03	2.92E-04	--
VOCs						
1,1-dichloroethene	NA	6.10E-04	--	5.20E-04	--	--
Acetone	NA	1.34E-01	--	4.17E-02	--	--
Carbon disulfide	NA	1.10E-03	--	6.28E-04	--	--

Table 4-9
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 1 Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
PAHs								
Acenaphthylene	NA	NA	2.34E-04	1.54E-04	6.68E-05	4.40E-05	0.00E+00	0.00E+00
Anthracene	NA	NA	3.74E-04	6.67E-04	2.88E-04	5.13E-04	0.00E+00	0.00E+00
Benzo(a)Anthracene	NA	NA	1.36E-03	6.23E-03	5.98E-04	2.74E-03	0.00E+00	0.00E+00
Benzo(a)Pyrene	1.00E+00	1.00E+01	1.71E-03	1.19E-02	6.83E-04	4.75E-03	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NA	NA	1.62E-03	7.52E-03	6.78E-04	3.15E-03	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NA	NA	8.96E-04	3.56E-03	3.54E-04	1.41E-03	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NA	NA	1.44E-03	6.67E-03	5.56E-04	2.58E-03	0.00E+00	0.00E+00
Chrysene	NA	NA	1.80E-03	1.34E-02	6.94E-04	5.19E-03	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NA	NA	3.01E-04	3.80E-03	8.94E-05	1.13E-03	0.00E+00	0.00E+00
Fluoranthene	NA	NA	2.38E-03	8.29E-03	1.12E-03	3.89E-03	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NA	NA	8.12E-04	8.81E-03	3.18E-04	3.45E-03	0.00E+00	0.00E+00
Phenanthrene	NA	NA	8.09E-04	1.28E-03	4.37E-04	6.91E-04	0.00E+00	0.00E+00
Pyrene	NA	NA	2.88E-03	9.88E-03	1.31E-03	4.49E-03	0.00E+00	0.00E+00
Total LMW PAHs	6.56E+01	4.34E+02	3.80E-03	1.04E-02	1.91E-03	5.13E-03	0.00E+00	0.00E+00
Total HMW PAHs	6.15E-01	1.08E+01	1.88E-02	1.44E-01	7.81E-03	5.78E-02	0.00E+00	0.00E+00
PCBs								
Aroclor-1260	1.00E-02	1.00E-01	2.27E-04	1.31E-02	1.08E-04	4.75E-03	0.00E+00	0.00E+00
Pesticides								
4,4'-DDD	1.47E-01	4.00E+00	2.27E-04	3.94E-02	1.27E-04	2.21E-02	1.82E-04	3.16E-02
4,4'-DDE	1.47E-01	4.00E+00	3.89E-03	7.27E-01	1.11E-03	2.08E-01	2.23E-04	4.17E-02
4,4'-DDT	1.47E-01	4.00E+00	1.54E-03	3.88E-01	6.54E-04	1.65E-01	5.26E-05	1.33E-02
DDTr	1.47E-01	4.00E+00	5.65E-03	1.15E+00	1.89E-03	3.95E-01	4.57E-04	8.66E-02
Alpha-Chlordane	4.60E+00	9.20E+00	4.29E-05	1.01E-03	2.06E-05	4.85E-04	4.36E-06	1.02E-04
Dieldrin	1.50E-02	2.00E-01	1.89E-05	4.92E-04	7.77E-06	2.02E-04	0.00E+00	0.00E+00
VOCs								
Acetone	1.00E+01	5.00E+01	9.21E-02	1.19E-03	4.32E-02	5.58E-04	0.00E+00	0.00E+00

Table 4-10
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 1 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
PAHs								
Benzo(a)Anthracene	NA	NA	3.34E-04	1.53E-03	8.46E-05	3.88E-04	0.00E+00	0.00E+00
Benzo(a)Pyrene	1.00E+00	1.00E+01	2.99E-04	2.08E-03	7.66E-05	5.33E-04	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NA	NA	3.64E-04	1.69E-03	9.54E-05	4.43E-04	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NA	NA	1.67E-04	6.65E-04	4.35E-05	1.73E-04	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NA	NA	3.33E-04	1.55E-03	8.52E-05	3.96E-04	0.00E+00	0.00E+00
Chrysene	NA	NA	3.14E-04	2.35E-03	8.03E-05	6.00E-04	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NA	NA	5.92E-05	7.47E-04	1.61E-05	2.04E-04	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NA	NA	1.52E-04	1.65E-03	3.96E-05	4.30E-04	0.00E+00	0.00E+00
Phenanthrene	NA	NA	4.61E-04	7.30E-04	1.20E-04	1.90E-04	0.00E+00	0.00E+00
Pyrene	NA	NA	8.49E-04	2.91E-03	3.45E-04	1.18E-03	0.00E+00	0.00E+00
Total HMW PAHs	6.15E-01	1.08E+01	1.42E-03	1.52E-02	4.60E-04	4.35E-03	0.00E+00	0.00E+00
Pesticides								
4,4'-DDD	1.47E-01	4.00E+00	1.85E-05	3.22E-03	7.15E-06	1.24E-03	1.82E-04	3.16E-02
4,4'-DDE	1.47E-01	4.00E+00	1.09E-04	2.05E-02	3.20E-05	5.99E-03	2.23E-04	4.17E-02
4,4'-DDT	1.47E-01	4.00E+00	2.70E-05	6.82E-03	1.38E-05	3.48E-03	5.26E-05	1.33E-02
DDTr	1.47E-01	4.00E+00	1.55E-04	3.05E-02	5.30E-05	1.07E-02	4.57E-04	8.66E-02
Alpha-Chlordane	4.60E+00	9.20E+00	8.86E-06	2.08E-04	3.55E-06	8.35E-05	4.36E-06	1.02E-04
SVOCs								
Pentachlorophenol	2.40E-01	2.40E+00	2.79E-05	3.08E-04	1.32E-05	1.46E-04	0.00E+00	0.00E+00
VOCs								
1,1-dichloroethene	2.50E+00	NA	1.69E-04	5.08E-05	1.44E-04	4.33E-05	0.00E+00	0.00E+00
Acetone	1.00E+01	5.00E+01	8.63E-01	1.12E-02	2.68E-01	3.47E-03	0.00E+00	0.00E+00
Carbon disulfide	NA	NA	3.92E-04	9.17E-05	2.24E-04	5.23E-05	0.00E+00	0.00E+00

Table 4-11
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 1 Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
PAHs											
Acenaphthylene	NA	NA	3.24E-05	2.96E-04	1.01E-08	9.26E-06	8.45E-05	2.89E-09	0.00E+00	0.00E+00	0.00E+00
Anthracene	NA	NA	5.19E-05	1.21E-03	1.06E-07	4.00E-05	9.32E-04	8.15E-08	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Anthracene	NA	NA	1.88E-04	1.16E-02	2.11E-05	8.29E-05	5.10E-03	9.29E-06	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Pyrene	NA	NA	2.38E-04	2.15E-02	6.63E-05	9.47E-05	8.57E-03	2.64E-05	0.00E+00	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NA	NA	2.25E-04	1.46E-02	9.78E-05	9.40E-05	6.09E-03	4.09E-05	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NA	NA	1.24E-04	7.39E-03	1.92E-04	4.91E-05	2.92E-03	7.60E-05	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NA	NA	1.99E-04	1.29E-02	8.66E-05	7.71E-05	4.99E-03	3.35E-05	0.00E+00	0.00E+00	0.00E+00
Chrysene	NA	NA	2.49E-04	2.35E-02	2.79E-05	9.63E-05	9.10E-03	1.08E-05	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NA	NA	4.17E-05	6.59E-03	5.17E-05	1.24E-05	1.96E-03	1.54E-05	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	NA	NA	3.30E-04	1.48E-02	3.75E-06	1.55E-04	6.94E-03	1.76E-06	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NA	NA	1.13E-04	1.56E-02	1.75E-04	4.41E-05	6.10E-03	6.87E-05	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	NA	NA	1.12E-04	2.37E-03	2.39E-07	6.06E-05	1.28E-03	1.29E-07	0.00E+00	0.00E+00	0.00E+00
Pyrene	NA	NA	4.00E-04	1.75E-02	3.59E-06	1.82E-04	7.97E-03	1.63E-06	0.00E+00	0.00E+00	0.00E+00
Total LMW PAHs	3.37E+00	3.37E+01	5.27E-04	1.87E-02	4.11E-06	2.65E-04	9.23E-03	1.97E-06	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	3.37E+00	3.37E+01	2.61E-03	2.45E-01	1.73E-03	1.08E-03	9.87E-02	2.83E-04	0.00E+00	0.00E+00	0.00E+00
PCBs											
Aroclor-1260	1.80E-01	9.88E+01	3.15E-05	2.13E-02	3.41E-03	1.49E-05	7.80E-03	1.62E-03	0.00E+00	0.00E+00	0.00E+00
Pesticides											
4,4'-DDD	2.27E-01	2.27E+00	3.14E-05	6.29E-02	9.34E-06	1.76E-05	3.52E-02	5.23E-06	2.52E-05	5.05E-02	7.50E-06
4,4'-DDE	2.27E-01	2.27E+00	5.39E-04	1.16E+00	7.87E-05	1.54E-04	3.32E-01	2.25E-05	3.09E-05	6.65E-02	4.51E-06
4,4'-DDT	2.27E-01	2.27E+00	2.13E-04	6.19E-01	2.06E-04	9.07E-05	2.63E-01	8.77E-05	7.30E-06	2.12E-02	7.06E-06
DDTr	2.27E-01	2.27E+00	7.84E-04	1.84E+00	2.94E-04	2.62E-04	6.30E-01	1.15E-04	6.34E-05	1.38E-01	1.91E-05
Alpha-Chlordane	2.10E+00	1.07E+01	5.94E-06	1.67E-03	6.85E-07	2.86E-06	8.05E-04	3.30E-07	6.04E-07	1.70E-04	6.97E-08
Dieldrin	7.09E-02	1.00E+01	2.62E-06	8.02E-04	1.78E-08	1.08E-06	3.30E-04	7.32E-09	0.00E+00	0.00E+00	0.00E+00
VOCs											
Acetone	NA	NA	1.28E-02	1.98E-03	8.69E-13	5.98E-03	9.27E-04	4.07E-13	0.00E+00	0.00E+00	0.00E+00

Table 4-12
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 1 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
PAHs											
Benzo(a)Anthracene	NA	NA	4.64E-05	2.85E-03	5.20E-06	1.17E-05	7.21E-04	1.31E-06	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Pyrene	NA	NA	4.14E-05	3.75E-03	1.16E-05	1.06E-05	9.61E-04	2.97E-06	0.00E+00	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NA	NA	5.04E-05	3.27E-03	2.19E-05	1.32E-05	8.57E-04	5.75E-06	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NA	NA	2.32E-05	1.38E-03	3.58E-05	6.03E-06	3.59E-04	9.32E-06	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NA	NA	4.61E-05	2.99E-03	2.01E-05	1.18E-05	7.66E-04	5.14E-06	0.00E+00	0.00E+00	0.00E+00
Chrysene	NA	NA	4.36E-05	4.12E-03	4.88E-06	1.11E-05	1.05E-03	1.25E-06	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NA	NA	8.21E-06	1.30E-03	1.02E-05	2.24E-06	3.53E-04	2.77E-06	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NA	NA	2.11E-05	2.92E-03	3.29E-05	5.50E-06	7.60E-04	8.55E-06	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	NA	NA	6.40E-05	1.35E-03	1.36E-07	1.67E-05	3.52E-04	3.55E-08	0.00E+00	0.00E+00	0.00E+00
Pyrene	NA	NA	1.18E-04	5.16E-03	1.06E-06	4.78E-05	2.10E-03	4.29E-07	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	3.37E+00	3.37E+01	1.97E-04	2.41E-02	1.44E-04	6.38E-05	6.90E-03	3.75E-05	0.00E+00	0.00E+00	0.00E+00
Pesticides											
4,4'-DDD	2.27E-01	2.27E+00	2.57E-06	5.15E-03	7.64E-07	9.92E-07	1.99E-03	2.95E-07	2.52E-05	5.05E-02	7.50E-06
4,4'-DDE	2.27E-01	2.27E+00	1.52E-05	3.27E-02	2.21E-06	4.44E-06	9.55E-03	6.48E-07	3.09E-05	6.65E-02	4.51E-06
4,4'-DDT	2.27E-01	2.27E+00	3.75E-06	1.09E-02	3.63E-06	1.91E-06	5.56E-03	1.85E-06	7.30E-06	2.12E-02	7.06E-06
DDTr	2.27E-01	2.27E+00	2.15E-05	4.87E-02	6.61E-06	7.34E-06	1.71E-02	2.79E-06	6.34E-05	1.38E-01	1.91E-05
Alpha-Chlordane	2.10E+00	1.07E+01	1.23E-06	3.46E-04	1.42E-07	4.92E-07	1.39E-04	5.68E-08	6.04E-07	1.70E-04	6.97E-08
SVOCs											
Pentachlorophenol	6.73E+00	NA	3.87E-06	5.12E-04	3.37E-07	1.83E-06	2.42E-04	1.59E-07	0.00E+00	0.00E+00	0.00E+00
VOCs											
1,1-dichloroethene	NA	NA	2.34E-05	8.44E-05	5.68E-11	2.00E-05	7.20E-05	4.85E-11	0.00E+00	0.00E+00	0.00E+00
Acetone	NA	NA	1.20E-01	1.85E-02	8.14E-12	3.72E-02	5.76E-03	2.53E-12	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	NA	NA	5.43E-05	1.52E-04	2.43E-11	3.10E-05	8.68E-05	1.39E-11	0.00E+00	0.00E+00	0.00E+00

Table 5-1
Detection Comparison to Region 4 Screening Levels
for the Site 2 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Inorganics					
Cyanide (Total)	1/8	6.60E-02	2.08E-02	9.00E-01	NO
Metals					
Arsenic	5/8	6.18E+01	2.55E+01	1.00E+01	YES
Barium	1/8	8.34E+01	3.51E+01	1.65E+02	NO
Beryllium	1/8	8.20E-01	1.76E+00	1.10E+00	NO
Cadmium	2/8	1.80E+00	1.02E+00	1.60E+00	YES
Chromium	8/8	1.09E+02	4.82E+01	4.00E-01	YES
Cobalt	3/8	3.77E+01	1.08E+01	2.00E+01	YES
Copper	7/8	5.44E+01	3.45E+01	4.00E+01	YES
Lead	4/8	9.30E+00	5.98E+00	5.00E+01	NO
Mercury	6/8	3.80E-01	1.26E-01	1.00E-01	YES
Nickel	5/8	3.98E+01	1.46E+01	3.00E+01	YES
Selenium	1/8	4.40E+00	4.04E+00	8.10E-01	YES
Vanadium	7/8	2.02E+02	9.73E+01	2.00E+00	YES
Zinc	8/8	8.87E+01	4.37E+01	5.00E+01	YES
PAHs					
2-Methylnaphthalene	1/8	1.63E+00	2.05E-01	NA	YES
Acenaphthylene	1/8	5.34E-02	2.52E-02	2.00E+01	NO
Anthracene	1/8	3.92E-02	1.89E-02	1.00E-01	NO
Benzo(a)Anthracene	1/8	2.91E-02	3.86E-03	NA	YES
Chrysene	1/8	1.91E-02	2.79E-03	NA	YES
Fluoranthene	1/8	9.09E-02	2.40E-02	1.00E-01	NO
Fluorene	1/8	1.45E-01	3.25E-02	NA	YES
Naphthalene	1/8	1.51E+00	1.89E-01	1.00E-01	YES
Phenanthrene	1/8	8.33E-02	1.08E-02	1.00E-01	NO
Pyrene	1/8	7.36E-02	2.16E-02	1.00E-01	NO
Total LMW PAHs	--	3.55E+00	5.05E-01	--	YES
Total HMW PAHs	--	1.22E-01	2.82E-02	--	YES
Pesticides					
4,4'-DDE	1/8	2.80E-03	7.06E-04	NA	YES
DDTr	--	--	--	--	--
Furans					
Dibenzofuran	1/8	3.04E-02	2.06E-02	NA	YES
SVOCs					
Bis(2-ethylhexyl)phthalate	3/8	7.23E-02	5.99E-02	NA	YES
VOCs					
Acetone	1/5	1.25E-02	4.58E-03	NA	YES
Benzene	1/8	1.04E+00	1.30E-01	5.00E-02	YES

Table 5-1
Detection Comparison to Region 4 Screening Levels
for the Site 2 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Ethylbenzene	1/8	1.86E+01	2.33E+00	5.00E-02	YES
Isobutyl alcohol	1/1	6.51E+01	6.51E+01	NA	YES

Table 5-2
Frequency of Detection and Exposure Point Concentrations
for the Site 2 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Arsenic	5/8	6.18E+01	2.55E+01
Cadmium	2/8	1.80E+00	1.02E+00
Chromium	8/8	1.09E+02	4.82E+01
Cobalt	3/8	3.77E+01	1.08E+01
Copper	7/8	5.44E+01	3.45E+01
Mercury	6/8	3.80E-01	1.26E-01
Nickel	5/8	3.98E+01	1.46E+01
Selenium	1/8	4.40E+00	4.04E+00
Vanadium	7/8	2.02E+02	9.73E+01
Zinc	8/8	8.87E+01	4.37E+01
PAHs			
2-Methylnaphthalene	1/8	1.63E+00	2.05E-01
Acenaphthylene	1/8	5.34E-02	2.52E-02
Anthracene	1/8	3.92E-02	1.89E-02
Benzo(a)Anthracene	1/8	2.91E-02	3.86E-03
Chrysene	1/8	1.91E-02	2.79E-03
Fluoranthene	1/8	9.09E-02	2.40E-02
Fluorene	1/8	1.45E-01	3.25E-02
Naphthalene	1/8	1.51E+00	1.89E-01
Phenanthrene	1/8	8.33E-02	1.08E-02
Pyrene	1/8	7.36E-02	2.16E-02
Total LMW PAHs	--	3.55E+00	5.05E-01
Total HMW PAHs	--	1.22E-01	2.82E-02
Pesticides			
4,4'-DDE	1/8	2.80E-03	7.06E-04
DDTr	--	--	--
Furans			
Dibenzofuran	1/8	3.04E-02	2.06E-02
SVOCs			
Bis(2-ethylhexyl)phthalate	3/8	7.23E-02	5.99E-02
VOCs			
Acetone	1/5	1.25E-02	4.58E-03
Benzene	1/8	1.04E+00	1.30E-01
Ethylbenzene	1/8	1.86E+01	2.33E+00
Isobutyl alcohol	1/1	6.51E+01	6.51E+01

Table 5-3
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 2 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Arsenic	1.80E+01	6.18E+01	3.43E+00	2.55E+01	1.42E+00	4.39E+01
Cadmium	3.20E+01	1.80E+00	5.63E-02	1.02E+00	3.20E-02	8.58E-01
Chromium	1.00E+00	1.09E+02	1.09E+02	4.82E+01	4.82E+01	6.98E+01
Cobalt	1.30E+01	3.77E+01	2.90E+00	1.08E+01	8.34E-01	1.66E+01
Copper	7.00E+01	5.44E+01	7.77E-01	3.45E+01	4.92E-01	8.37E+01
Mercury	3.00E-01	3.80E-01	1.27E+00	1.26E-01	4.18E-01	3.20E-01
Nickel	3.80E+01	3.98E+01	1.05E+00	1.46E+01	3.84E-01	2.30E+01
Selenium	5.20E-01	4.40E+00	8.46E+00	4.04E+00	7.78E+00	1.00E+00
Vanadium	2.00E+00	2.02E+02	1.01E+02	9.73E+01	4.86E+01	1.45E+02
Zinc	1.60E+02	8.87E+01	5.54E-01	4.37E+01	2.73E-01	8.10E+01
PAHs						
Total LMW PAHs	2.00E+04	3.55E+00	1.78E-04	5.05E-01	2.53E-05	--
Total HMW PAHs	2.00E+04	1.22E-01	6.09E-06	2.82E-02	1.41E-06	--
Pesticides						
4,4'-DDE	NA	2.80E-03	--	7.06E-04	--	3.37E-03
DDTr	NA	--	--	--	--	--
Furans						
Dibenzofuran	NA	3.04E-02	--	2.06E-02	--	--
SVOCs						
Bis(2-ethylhexyl)phthalate	1.00E+05	7.23E-02	7.23E-07	5.99E-02	5.99E-07	--
VOCs						
Acetone	NA	1.25E-02	--	4.58E-03	--	--
Benzene	NA	1.04E+00	--	1.30E-01	--	--
Ethylbenzene	NA	1.86E+01	--	2.33E+00	--	--
Isobutyl alcohol	NA	6.51E+01	--	6.51E+01	--	--

Table 5-4
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 2 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Arsenic	6.00E+01	6.18E+01	1.03E+00	2.55E+01	4.25E-01	4.39E+01
Cadmium	1.40E+02	1.80E+00	1.29E-02	1.02E+00	7.31E-03	8.58E-01
Chromium	4.00E-01	1.09E+02	2.73E+02	4.82E+01	1.20E+02	6.98E+01
Cobalt	NA	3.77E+01	--	1.08E+01	--	1.66E+01
Copper	8.00E+01	5.44E+01	6.80E-01	3.45E+01	4.31E-01	8.37E+01
Mercury	1.00E-01	3.80E-01	3.80E+00	1.26E-01	1.26E+00	3.20E-01
Nickel	2.80E+02	3.98E+01	1.42E-01	1.46E+01	5.21E-02	2.30E+01
Selenium	4.10E+00	4.40E+00	1.07E+00	4.04E+00	9.86E-01	1.00E+00
Vanadium	NA	2.02E+02	--	9.73E+01	--	1.45E+02
Zinc	1.20E+02	8.87E+01	7.39E-01	4.37E+01	3.64E-01	8.10E+01
PAHs						
Total LMW PAHs	2.90E+01	3.55E+00	1.22E-01	5.05E-01	1.74E-02	--
Total HMW PAHs	1.80E+04	1.22E-01	6.77E-06	2.82E-02	1.57E-06	--
Pesticides						
4,4'-DDE	1.50E+03	2.80E-03	1.87E-06	7.06E-04	4.71E-07	3.37E-03
DDTr	1.50E+03	--	#VALUE!	--	#VALUE!	--
Furans						
Dibenzofuran	NA	3.04E-02	--	2.06E-02	--	--
SVOCs						
Bis(2-ethylhexyl)phthalate	2.00E+05	7.23E-02	3.62E-07	5.99E-02	2.99E-07	--
VOCs						
Acetone	NA	1.25E-02	--	4.58E-03	--	--
Benzene	NA	1.04E+00	--	1.30E-01	--	--
Ethylbenzene	NA	1.86E+01	--	2.33E+00	--	--
Isobutyl alcohol	NA	6.51E+01	--	6.51E+01	--	--

Table 5-5
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 2 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Inorganics								
Cyanide (Total)	6.87E+01	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Metals								
Arsenic	1.04E+00	1.26E+00	3.18E-01	3.70E-01	1.64E-01	1.98E-01	1.19E-01	1.44E-01
Cadmium	7.70E-01	1.00E+01	1.08E-01	1.10E+00	7.85E-02	7.03E-01	5.90E-02	4.68E-01
Chromium	2.40E+00	1.31E+01	3.62E-01	7.27E-01	1.60E-01	7.68E-01	1.46E-01	7.73E-01
Cobalt	7.33E+00	1.18E+02	1.82E-01	9.14E-01	5.24E-02	2.63E-01	5.36E-02	2.69E-01
Copper	5.60E+00	1.54E+01	1.27E+00	1.28E+00	1.03E+00	1.13E+00	1.14E+00	1.20E+00
Mercury	1.32E+01	NA	2.73E-02	3.75E-02	1.47E-02	3.29E-02	1.82E-02	3.44E-02
Nickel	1.70E+00	8.00E+01	3.02E-01	1.26E+00	1.32E-01	1.64E+00	1.30E-01	1.65E+00
Selenium	1.43E-01	3.30E-01	3.25E-01	2.29E-01	2.97E-01	2.15E-01	5.91E-02	7.35E-02
Vanadium	4.16E+00	8.31E+00	6.22E-01	1.48E+01	3.00E-01	7.13E+00	2.96E-01	7.05E+00
Zinc	7.54E+01	3.20E+02	7.25E+00	3.10E+01	4.85E+00	2.46E+01	7.04E+00	3.05E+01
PAHs								
2-Methylnaphthalene	NA	NA	4.87E-02	2.72E-02	6.12E-03	3.41E-03	0.00E+00	0.00E+00
Acenaphthylene	NA	NA	1.48E-03	9.79E-04	6.99E-04	4.61E-04	0.00E+00	0.00E+00
Anthracene	NA	NA	5.87E-04	1.05E-03	2.83E-04	5.04E-04	0.00E+00	0.00E+00
Benzo(a)Anthracene	NA	NA	1.43E-04	6.55E-04	1.89E-05	8.68E-05	0.00E+00	0.00E+00
Chrysene	NA	NA	9.37E-05	7.00E-04	1.37E-05	1.02E-04	0.00E+00	0.00E+00
Fluoranthene	NA	NA	8.05E-04	2.80E-03	2.12E-04	7.40E-04	0.00E+00	0.00E+00
Fluorene	NA	NA	2.95E-03	2.42E-03	6.62E-04	5.42E-04	0.00E+00	0.00E+00
Naphthalene	NA	NA	9.11E-02	2.64E-02	1.14E-02	3.31E-03	0.00E+00	0.00E+00
Phenanthrene	NA	NA	1.23E-03	1.94E-03	1.59E-04	2.52E-04	0.00E+00	0.00E+00
Pyrene	NA	NA	6.98E-04	2.39E-03	2.05E-04	7.01E-04	0.00E+00	0.00E+00
Total LMW PAHs	6.56E+01	4.34E+02	1.47E-01	6.28E-02	1.95E-02	9.22E-03	0.00E+00	0.00E+00
Total HMW PAHs	6.15E-01	1.08E+01	9.34E-04	3.75E-03	2.37E-04	8.90E-04	0.00E+00	0.00E+00
Pesticides								
4,4'-DDE	1.47E-01	4.00E+00	1.12E-05	2.10E-03	2.83E-06	5.30E-04	2.23E-04	4.17E-02
DDTr	1.47E-01	4.00E+00	1.12E-05	2.10E-03	2.83E-06	5.30E-04	4.57E-04	8.66E-02
Furans								
Dibenzofuran	NA	NA	6.64E-04	2.53E-03	4.49E-04	1.71E-03	0.00E+00	0.00E+00
SVOCs								
Bis(2-ethylhexyl)phthalate	1.83E+01	1.83E+02	5.50E-04	6.02E-03	4.56E-04	4.99E-03	0.00E+00	0.00E+00
VOCs								
Acetone	1.00E+01	5.00E+01	8.05E-02	1.04E-03	2.95E-02	3.82E-04	0.00E+00	0.00E+00
Benzene	2.64E+01	2.64E+02	2.88E-01	8.67E-02	3.61E-02	1.09E-02	0.00E+00	0.00E+00
Ethylbenzene	NA	NA	1.36E+00	1.55E+00	1.70E-01	1.94E-01	0.00E+00	0.00E+00
Isobutyl alcohol	NA	NA	1.11E+02	5.42E+00	1.11E+02	5.42E+00	0.00E+00	0.00E+00

Table 5-6
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 2 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Arsenic	2.24E+00	7.40E+00	4.41E-02	9.63E-01	6.32E-03	2.27E-02	4.70E-01	3.06E-03	1.65E-02	3.28E-01	2.12E-03
Cadmium	1.45E+00	2.00E+01	1.49E-02	1.76E+00	2.38E-02	1.09E-02	1.12E+00	1.81E-02	8.18E-03	7.47E-01	1.41E-02
Chromium	2.66E+00	5.00E+00	5.02E-02	1.82E+00	2.00E-01	2.22E-02	1.51E+00	1.10E-01	2.02E-02	1.49E+00	1.02E-01
Cobalt	7.61E+00	2.67E+01	2.53E-02	1.68E+00	1.04E-01	7.26E-03	4.83E-01	2.98E-02	7.44E-03	4.95E-01	3.05E-02
Copper	4.05E+00	6.17E+01	1.76E-01	2.36E+00	3.77E-01	1.43E-01	2.01E+00	3.53E-01	1.58E-01	2.17E+00	3.65E-01
Mercury	4.50E-01	9.00E-01	3.78E-03	6.19E-02	2.01E-03	2.04E-03	5.30E-02	6.63E-04	2.52E-03	5.58E-02	9.72E-04
Nickel	7.74E+01	1.07E+02	4.18E-02	2.25E+00	1.20E-01	1.83E-02	2.69E+00	7.49E-02	1.80E-02	2.71E+00	7.42E-02
Selenium	5.00E-01	1.00E+00	4.51E-02	3.90E-01	3.17E-02	4.11E-02	3.66E-01	3.07E-02	8.19E-03	1.22E-01	1.77E-02
Vanadium	3.44E-01	6.88E-01	8.63E-02	2.47E+01	9.94E-01	4.15E-02	1.19E+01	4.79E-01	4.10E-02	1.18E+01	4.73E-01
Zinc	6.61E+01	1.31E+02	1.00E+00	4.98E+01	3.35E+00	6.73E-01	3.93E+01	3.18E+00	9.76E-01	4.90E+01	3.34E+00
PAHs											
2-Methylnaphthalene	NA	NA	6.76E-03	5.30E-02	1.70E-06	8.49E-04	6.66E-03	2.13E-07	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	NA	NA	2.06E-04	1.88E-03	6.42E-08	9.70E-05	8.86E-04	3.03E-08	0.00E+00	0.00E+00	0.00E+00
Anthracene	NA	NA	8.14E-05	1.90E-03	1.66E-07	3.93E-05	9.15E-04	8.00E-08	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Anthracene	NA	NA	1.98E-05	1.22E-03	2.22E-06	2.62E-06	1.61E-04	2.94E-07	0.00E+00	0.00E+00	0.00E+00
Chrysene	NA	NA	1.30E-05	1.23E-03	1.45E-06	1.90E-06	1.79E-04	2.12E-07	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	NA	NA	1.12E-04	5.00E-03	1.27E-06	2.95E-05	1.32E-03	3.34E-07	0.00E+00	0.00E+00	0.00E+00
Fluorene	NA	NA	4.09E-04	4.72E-03	3.24E-07	9.18E-05	1.06E-03	7.25E-08	0.00E+00	0.00E+00	0.00E+00
Naphthalene	NA	NA	1.26E-02	5.11E-02	4.15E-07	1.58E-03	6.41E-03	5.21E-08	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	NA	NA	1.70E-04	3.59E-03	3.62E-07	2.21E-05	4.66E-04	4.69E-08	0.00E+00	0.00E+00	0.00E+00
Pyrene	NA	NA	9.68E-05	4.25E-03	8.68E-07	2.84E-05	1.24E-03	2.55E-07	0.00E+00	0.00E+00	0.00E+00
Total LMW PAHs	3.37E+00	3.37E+01	2.04E-02	1.21E-01	4.30E-06	2.71E-03	1.77E-02	8.30E-07	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	3.37E+00	3.37E+01	1.30E-04	6.69E-03	4.54E-06	3.29E-05	1.59E-03	7.61E-07	0.00E+00	0.00E+00	0.00E+00
Pesticides											
4,4'-DDE	2.27E-01	2.27E+00	1.56E-06	3.35E-03	2.27E-07	3.93E-07	8.45E-04	5.73E-08	3.09E-05	6.65E-02	4.51E-06
DDTr	2.27E-01	2.27E+00	1.56E-06	3.35E-03	2.27E-07	3.93E-07	8.45E-04	5.73E-08	6.34E-05	1.38E-01	1.91E-05
Furans											
Dibenzofuran	NA	NA	9.21E-05	4.21E-03	5.88E-08	6.23E-05	2.84E-03	3.98E-08	0.00E+00	0.00E+00	0.00E+00
SVOCs											
Bis(2-ethylhexyl)phthalate	1.10E+00	7.63E+02	7.63E-05	1.00E-02	1.47E-06	6.32E-05	8.29E-03	1.22E-06	0.00E+00	0.00E+00	0.00E+00
VOCs											
Acetone	NA	NA	1.12E-02	1.73E-03	7.60E-13	4.09E-03	6.34E-04	2.78E-13	0.00E+00	0.00E+00	0.00E+00
Benzene	NA	NA	4.00E-02	1.44E-01	1.77E-08	5.01E-03	1.80E-02	2.22E-09	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	NA	NA	1.89E-01	2.57E+00	3.58E-06	2.36E-02	3.22E-01	4.48E-07	0.00E+00	0.00E+00	0.00E+00
Isobutyl alcohol	NA	NA	1.54E+01	9.01E+00	2.59E-07	1.54E+01	9.01E+00	2.59E-07	0.00E+00	0.00E+00	0.00E+00

Table 6-1
Detection Comparison to Region 4 Screening Levels
for the Site 3 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Inorganics					
Cyanide (Total)	2/8	5.30E-01	1.79E-01	9.00E-01	NO
Metals					
Aluminum	8/8	3.22E+04	2.68E+04	5.00E+01	YES
Antimony	5/8	1.20E+00	7.20E-01	3.50E+00	NO
Arsenic	8/8	1.22E+02	6.34E+01	1.00E+01	YES
Barium	8/8	1.42E+02	4.92E+01	1.65E+02	NO
Beryllium	6/8	4.10E-01	1.84E-01	1.10E+00	NO
Cadmium	8/8	8.00E-01	4.91E-01	1.60E+00	NO
Calcium	8/8	1.34E+04	4.49E+03	NA	YES
Chromium	8/8	1.67E+02	1.03E+02	4.00E-01	YES
Cobalt	8/8	4.53E+01	1.63E+01	2.00E+01	YES
Copper	8/8	7.33E+01	5.58E+01	4.00E+01	YES
Iron	8/8	9.53E+04	6.34E+04	2.00E+02	YES
Lead	8/8	1.99E+01	1.00E+01	5.00E+01	NO
Magnesium	8/8	1.01E+04	2.68E+03	NA	YES
Manganese	8/8	1.28E+04	2.66E+03	1.00E+02	YES
Mercury	7/8	2.00E-01	6.20E-02	1.00E-01	YES
Nickel	8/8	3.62E+01	2.07E+01	3.00E+01	YES
Potassium	8/8	7.75E+02	3.39E+02	NA	YES
Selenium	7/8	3.70E+00	1.91E+00	8.10E-01	YES
Silver	7/8	3.00E+00	1.72E+00	2.00E+00	YES
Sodium	8/8	6.15E+02	1.82E+02	NA	YES
Thallium	7/8	4.00E+00	1.32E+00	1.00E+00	YES
Tin	8/8	4.50E+00	3.42E+00	5.30E+01	NO
Vanadium	8/8	2.91E+02	1.76E+02	2.00E+00	YES
Zinc	8/8	7.22E+01	4.93E+01	5.00E+01	YES
Pesticides					
4,4'-DDD	1/8	9.27E-02	1.19E-02	NA	YES
4,4'-DDE	1/8	1.61E-02	2.48E-03	NA	YES
4,4'-DDT	3/8	2.41E-02	4.48E-03	NA	YES
DDTr	--	--	--	--	--
Alpha-Chlordane	3/8	2.21E-01	3.48E-02	NA	YES
Dieldrin	1/8	9.00E-03	1.49E-03	5.00E-04	YES
Endosulfan I	1/8	2.60E-03	7.10E-04	NA	YES
Heptachlor	1/8	6.29E-02	8.36E-03	NA	YES
Herbicides					
Dichlorprop	1/8	1.17E-01	2.63E-02	NA	YES
SVOCs					

Table 6-1
Detection Comparison to Region 4 Screening Levels
for the Site 3 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Pentachlorophenol	2/8	5.78E-02	1.11E-02	2.00E-03	YES
VOCs					
Acetone	2/8	2.39E-02	5.33E-03	NA	YES
Carbon disulfide	1/8	4.30E-04	5.08E-04	NA	YES

Table 6-2
Frequency of Detection and Exposure Point Concentrations
for the Site 3 (Subsurface Soil) Exposure Grouping

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Aluminum	8/8	3.22E+04	2.68E+04
Arsenic	8/8	1.22E+02	6.34E+01
Calcium	8/8	1.34E+04	4.49E+03
Chromium	8/8	1.67E+02	1.03E+02
Cobalt	8/8	4.53E+01	1.63E+01
Copper	8/8	7.33E+01	5.58E+01
Iron	8/8	9.53E+04	6.34E+04
Magnesium	8/8	1.01E+04	2.68E+03
Manganese	8/8	1.28E+04	2.66E+03
Mercury	7/8	2.00E-01	6.20E-02
Nickel	8/8	3.62E+01	2.07E+01
Potassium	8/8	7.75E+02	3.39E+02
Selenium	7/8	3.70E+00	1.91E+00
Silver	7/8	3.00E+00	1.72E+00
Sodium	8/8	6.15E+02	1.82E+02
Thallium	7/8	4.00E+00	1.32E+00
Vanadium	8/8	2.91E+02	1.76E+02
Zinc	8/8	7.22E+01	4.93E+01
Pesticides			
4,4'-DDD	1/8	9.27E-02	1.19E-02
4,4'-DDE	1/8	1.61E-02	2.48E-03
4,4'-DDT	3/8	2.41E-02	4.48E-03
DDTr	--	--	--
Alpha-Chlordane	3/8	2.21E-01	3.48E-02
Dieldrin	1/8	9.00E-03	1.49E-03
Endosulfan I	1/8	2.60E-03	7.10E-04
Heptachlor	1/8	6.29E-02	8.36E-03
Herbicides			
Dichlorprop	1/8	1.17E-01	2.63E-02
SVOCs			
Pentachlorophenol	2/8	5.78E-02	1.11E-02
VOCs			
Acetone	2/8	2.39E-02	5.33E-03
Carbon disulfide	1/8	4.30E-04	5.08E-04

Table 6-3
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 3 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	3.22E+04	6.44E+02	2.68E+04	5.36E+02	3.00E+04
Arsenic	1.80E+01	1.22E+02	6.78E+00	6.34E+01	3.52E+00	4.39E+01
Calcium	NA	1.34E+04	--	4.49E+03	--	1.06E+05
Chromium	1.00E+00	1.67E+02	1.67E+02	1.03E+02	1.03E+02	6.98E+01
Cobalt	1.30E+01	4.53E+01	3.48E+00	1.63E+01	1.25E+00	1.66E+01
Copper	7.00E+01	7.33E+01	1.05E+00	5.58E+01	7.96E-01	8.37E+01
Iron	NA	9.53E+04	--	6.34E+04	--	4.71E+04
Magnesium	NA	1.01E+04	--	2.68E+03	--	5.13E+03
Manganese	2.20E+02	1.28E+04	5.82E+01	2.66E+03	1.21E+01	1.18E+03
Mercury	3.00E-01	2.00E-01	6.67E-01	6.20E-02	2.07E-01	3.20E-01
Nickel	3.80E+01	3.62E+01	9.53E-01	2.07E+01	5.44E-01	2.30E+01
Potassium	NA	7.75E+02	--	3.39E+02	--	1.46E+03
Selenium	5.20E-01	3.70E+00	7.12E+00	1.91E+00	3.67E+00	1.00E+00
Silver	5.60E+02	3.00E+00	5.36E-03	1.72E+00	3.08E-03	2.20E-01
Sodium	NA	6.15E+02	--	1.82E+02	--	2.38E+02
Thallium	1.00E+00	4.00E+00	4.00E+00	1.32E+00	1.32E+00	1.10E+00
Vanadium	2.00E+00	2.91E+02	1.46E+02	1.76E+02	8.82E+01	1.45E+02
Zinc	1.60E+02	7.22E+01	4.51E-01	4.93E+01	3.08E-01	8.10E+01
Pesticides						
4,4'-DDD	NA	9.27E-02	--	1.19E-02	--	5.10E-04
4,4'-DDE	NA	1.61E-02	--	2.48E-03	--	3.37E-03
4,4'-DDT	NA	2.41E-02	--	4.48E-03	--	2.65E-03
DDTr	NA	--	--	--	--	--
Alpha-Chlordane	NA	2.21E-01	--	3.48E-02	--	6.40E-04
Dieldrin	NA	9.00E-03	--	1.49E-03	--	--
Endosulfan I	NA	2.60E-03	--	7.10E-04	--	--
Heptachlor	NA	6.29E-02	--	8.36E-03	--	--
Herbicides						
Dichlorprop	NA	1.17E-01	--	2.63E-02	--	--
SVOCs						
Pentachlorophenol	3.00E+00	5.78E-02	1.93E-02	1.11E-02	3.69E-03	--
VOCs						
Acetone	NA	2.39E-02	--	5.33E-03	--	--
Carbon disulfide	NA	4.30E-04	--	5.08E-04	--	--

Table 6-4
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 3 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	3.22E+04	--	2.68E+04	--	3.00E+04
Arsenic	6.00E+01	1.22E+02	2.03E+00	6.34E+01	1.06E+00	4.39E+01
Calcium	NA	1.34E+04	--	4.49E+03	--	1.06E+05
Chromium	4.00E-01	1.67E+02	4.18E+02	1.03E+02	2.57E+02	6.98E+01
Cobalt	NA	4.53E+01	--	1.63E+01	--	1.66E+01
Copper	8.00E+01	7.33E+01	9.16E-01	5.58E+01	6.97E-01	8.37E+01
Iron	NA	9.53E+04	--	6.34E+04	--	4.71E+04
Magnesium	NA	1.01E+04	--	2.68E+03	--	5.13E+03
Manganese	4.50E+02	1.28E+04	2.84E+01	2.66E+03	5.92E+00	1.18E+03
Mercury	1.00E-01	2.00E-01	2.00E+00	6.20E-02	6.20E-01	3.20E-01
Nickel	2.80E+02	3.62E+01	1.29E-01	2.07E+01	7.39E-02	2.30E+01
Potassium	NA	7.75E+02	--	3.39E+02	--	1.46E+03
Selenium	4.10E+00	3.70E+00	9.02E-01	1.91E+00	4.66E-01	1.00E+00
Silver	NA	3.00E+00	--	1.72E+00	--	2.20E-01
Sodium	NA	6.15E+02	--	1.82E+02	--	2.38E+02
Thallium	NA	4.00E+00	--	1.32E+00	--	1.10E+00
Vanadium	NA	2.91E+02	--	1.76E+02	--	1.45E+02
Zinc	1.20E+02	7.22E+01	6.02E-01	4.93E+01	4.11E-01	8.10E+01
Pesticides						
4,4'-DDD	1.50E+03	9.27E-02	6.18E-05	1.19E-02	7.93E-06	5.10E-04
4,4'-DDE	1.50E+03	1.61E-02	1.07E-05	2.48E-03	1.65E-06	3.37E-03
4,4'-DDT	1.50E+03	2.41E-02	1.61E-05	4.48E-03	2.99E-06	2.65E-03
DDTr	1.50E+03	--	#VALUE!	--	#VALUE!	--
Alpha-Chlordane	NA	2.21E-01	--	3.48E-02	--	6.40E-04
Dieldrin	NA	9.00E-03	--	1.49E-03	--	--
Endosulfan I	NA	2.60E-03	--	7.10E-04	--	--
Heptachlor	NA	6.29E-02	--	8.36E-03	--	--
Herbicides						
Dichlorprop	NA	1.17E-01	--	2.63E-02	--	--
SVOCs						
Pentachlorophenol	6.00E+00	5.78E-02	9.63E-03	1.11E-02	1.85E-03	--
VOCs						
Acetone	NA	2.39E-02	--	5.33E-03	--	--
Carbon disulfide	NA	4.30E-04	--	5.08E-04	--	--

Table 6-5
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 3 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Metals								
Aluminum	1.93E+00	1.93E+01	9.34E+01	3.17E+02	7.77E+01	2.64E+02	6.70E+01	2.27E+02
Arsenic	1.04E+00	1.26E+00	5.42E-01	5.98E-01	3.24E-01	3.77E-01	1.19E-01	1.44E-01
Calcium	NA	NA	5.70E+03	1.12E+03	1.91E+03	3.74E+02	1.19E+04	2.32E+03
Chromium	2.40E+00	1.31E+01	5.55E-01	7.07E-01	3.41E-01	7.30E-01	1.46E-01	7.73E-01
Cobalt	7.33E+00	1.18E+02	2.19E-01	1.10E+00	7.87E-02	3.95E-01	5.36E-02	2.69E-01
Copper	5.60E+00	1.54E+01	1.46E+00	1.38E+00	1.28E+00	1.29E+00	1.14E+00	1.20E+00
Iron	NA	NA	2.76E+02	6.19E+02	1.84E+02	4.12E+02	8.76E+01	1.96E+02
Magnesium	NA	NA	1.24E+03	4.46E+02	3.31E+02	1.18E+02	3.70E+02	1.32E+02
Manganese	5.15E+01	2.84E+02	4.17E+02	2.35E+01	8.69E+01	8.05E+00	2.31E+01	3.26E+00
Mercury	1.32E+01	NA	1.91E-02	3.48E-02	9.98E-03	3.03E-02	1.82E-02	3.44E-02
Nickel	1.70E+00	8.00E+01	2.79E-01	1.30E+00	1.76E-01	1.50E+00	1.30E-01	1.65E+00
Potassium	NA	NA	9.55E+01	6.46E+01	4.17E+01	2.82E+01	1.04E+02	7.07E+01
Selenium	1.43E-01	3.30E-01	2.69E-01	2.02E-01	1.30E-01	1.24E-01	5.91E-02	7.35E-02
Silver	6.02E+00	1.16E+02	1.52E-01	3.82E+00	8.74E-02	2.20E+00	4.11E-02	1.03E+00
Sodium	NA	NA	7.06E+00	5.12E+01	2.09E+00	1.52E+01	1.89E+00	1.37E+01
Thallium	7.40E-03	7.40E-02	1.16E-02	3.33E-01	3.83E-03	1.10E-01	2.93E-03	8.42E-02
Vanadium	4.16E+00	8.31E+00	8.96E-01	2.13E+01	5.44E-01	1.29E+01	2.96E-01	7.05E+00
Zinc	7.54E+01	3.20E+02	6.45E+00	2.90E+01	5.20E+00	2.56E+01	7.04E+00	3.05E+01
Pesticides								
4,4'-DDD	1.47E-01	4.00E+00	3.99E-04	6.95E-02	5.12E-05	8.92E-03	1.82E-04	3.16E-02
4,4'-DDE	1.47E-01	4.00E+00	6.45E-05	1.21E-02	9.93E-06	1.86E-03	2.23E-04	4.17E-02
4,4'-DDT	1.47E-01	4.00E+00	7.16E-05	1.81E-02	1.33E-05	3.36E-03	5.26E-05	1.33E-02
DDTr	1.47E-01	4.00E+00	5.36E-04	9.97E-02	7.45E-05	1.41E-02	4.57E-04	8.66E-02
Alpha-Chlordane	4.60E+00	9.20E+00	7.83E-04	1.84E-02	1.23E-04	2.90E-03	4.36E-06	1.02E-04
Dieldrin	1.50E-02	2.00E-01	5.15E-05	1.34E-03	8.50E-06	2.21E-04	0.00E+00	0.00E+00
Endosulfan I	1.50E-01	NA	1.22E-04	2.17E-04	3.32E-05	5.92E-05	0.00E+00	0.00E+00
Heptachlor	1.00E-01	1.00E+00	2.73E-04	2.10E-04	3.62E-05	2.79E-05	0.00E+00	0.00E+00
Herbicides								
Dichlorprop	NA	NA	5.98E-03	9.75E-03	1.34E-03	2.19E-03	0.00E+00	0.00E+00
SVOCs								
Pentachlorophenol	2.40E-01	2.40E+00	4.37E-04	4.82E-03	8.37E-05	9.23E-04	0.00E+00	0.00E+00
VOCs								
Acetone	1.00E+01	5.00E+01	1.54E-01	1.99E-03	3.43E-02	4.44E-04	0.00E+00	0.00E+00
Carbon disulfide	NA	NA	1.53E-04	3.58E-05	1.81E-04	4.23E-05	0.00E+00	0.00E+00

Table 6-6
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 3 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Aluminum	1.10E+02	NA	1.29E+01	6.99E+02	6.48E+01	1.08E+01	5.82E+02	5.40E+01	9.29E+00	5.01E+02	4.65E+01
Arsenic	2.24E+00	7.40E+00	7.52E-02	1.69E+00	1.10E-02	4.50E-02	9.84E-01	6.45E-03	1.65E-02	3.28E-01	2.12E-03
Calcium	NA	NA	7.90E+02	1.85E+03	5.45E-02	2.65E+02	6.22E+02	1.83E-02	1.64E+03	3.86E+03	1.14E-01
Chromium	2.66E+00	5.00E+00	7.69E-02	2.14E+00	2.73E-01	4.73E-02	1.78E+00	1.91E-01	2.02E-02	1.49E+00	1.02E-01
Cobalt	7.61E+00	2.67E+01	3.04E-02	2.02E+00	1.25E-01	1.09E-02	7.26E-01	4.48E-02	7.44E-03	4.95E-01	3.05E-02
Copper	4.05E+00	6.17E+01	2.02E-01	2.64E+00	3.94E-01	1.78E-01	2.38E+00	3.79E-01	1.58E-01	2.17E+00	3.65E-01
Iron	NA	NA	3.83E+01	1.56E+03	1.11E+01	2.55E+01	1.04E+03	7.39E+00	1.21E+01	4.95E+02	3.52E+00
Magnesium	NA	NA	1.73E+02	7.70E+02	2.94E-01	4.58E+01	2.04E+02	7.82E-02	5.13E+01	2.29E+02	8.75E-02
Manganese	9.97E+02	NA	5.79E+01	1.15E+02	2.07E+01	1.20E+01	2.90E+01	4.30E+00	3.20E+00	9.47E+00	1.14E+00
Mercury	4.50E-01	9.00E-01	2.64E-03	5.64E-02	1.06E-03	1.38E-03	4.85E-02	3.27E-04	2.52E-03	5.58E-02	9.72E-04
Nickel	7.74E+01	1.07E+02	3.87E-02	2.28E+00	1.14E-01	2.44E-02	2.50E+00	8.81E-02	1.80E-02	2.71E+00	7.42E-02
Potassium	NA	NA	1.32E+01	1.07E+02	9.04E-02	5.79E+00	4.69E+01	3.95E-02	1.45E+01	1.17E+02	9.89E-02
Selenium	5.00E-01	1.00E+00	3.73E-02	3.43E-01	2.97E-02	1.80E-02	2.09E-01	2.31E-02	8.19E-03	1.22E-01	1.77E-02
Silver	2.02E+00	6.05E+01	2.11E-02	6.09E+00	4.13E-02	1.21E-02	3.50E+00	2.37E-02	5.70E-03	1.64E+00	1.12E-02
Sodium	NA	NA	9.79E-01	8.51E+01	1.98E-01	2.89E-01	2.52E+01	5.85E-02	2.63E-01	2.28E+01	5.31E-02
Thallium	3.50E-01	NA	1.61E-03	5.54E-01	1.35E-02	5.31E-04	1.83E-01	4.47E-03	4.06E-04	1.40E-01	3.42E-03
Vanadium	3.44E-01	6.88E-01	1.24E-01	3.56E+01	1.43E+00	7.54E-02	2.16E+01	8.69E-01	4.10E-02	1.18E+01	4.73E-01
Zinc	6.61E+01	1.31E+02	8.94E-01	4.65E+01	3.30E+00	7.21E-01	4.09E+01	3.21E+00	9.76E-01	4.90E+01	3.34E+00
Pesticides											
4,4'-DDD	2.27E-01	2.27E+00	5.54E-05	1.11E-01	1.65E-05	7.10E-06	1.42E-02	2.11E-06	2.52E-05	5.05E-02	7.50E-06
4,4'-DDE	2.27E-01	2.27E+00	8.95E-06	1.93E-02	1.31E-06	1.38E-06	2.96E-03	2.01E-07	3.09E-05	6.65E-02	4.51E-06
4,4'-DDT	2.27E-01	2.27E+00	9.93E-06	2.88E-02	9.61E-06	1.85E-06	5.36E-03	1.79E-06	7.30E-06	2.12E-02	7.06E-06
DDTr	2.27E-01	2.27E+00	7.43E-05	1.59E-01	2.74E-05	1.03E-05	2.26E-02	4.10E-06	6.34E-05	1.38E-01	1.91E-05
Alpha-Chlordane	2.10E+00	1.07E+01	1.09E-04	3.06E-02	1.25E-05	1.71E-05	4.82E-03	1.97E-06	6.04E-07	1.70E-04	6.97E-08
Dieldrin	7.09E-02	1.00E+01	7.15E-06	2.19E-03	4.85E-08	1.18E-06	3.61E-04	8.00E-09	0.00E+00	0.00E+00	0.00E+00
Endosulfan I	1.00E+01	NA	1.69E-05	3.60E-04	2.52E-09	4.61E-06	9.82E-05	6.89E-10	0.00E+00	0.00E+00	0.00E+00
Heptachlor	9.90E-01	NA	3.78E-05	7.16E-04	1.75E-07	5.02E-06	9.51E-05	2.32E-08	0.00E+00	0.00E+00	0.00E+00
Herbicides											
Dichlorprop	NA	NA	8.29E-04	1.62E-02	2.18E-07	1.86E-04	3.63E-03	4.88E-08	0.00E+00	0.00E+00	0.00E+00
SVOCs											
Pentachlorophenol	6.73E+00	NA	6.05E-05	8.00E-03	5.26E-06	1.16E-05	1.53E-03	1.01E-06	0.00E+00	0.00E+00	0.00E+00
VOCs											
Acetone	NA	NA	2.13E-02	3.31E-03	1.45E-12	4.76E-03	7.38E-04	3.24E-13	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	NA	NA	2.12E-05	5.95E-05	9.51E-12	2.51E-05	7.02E-05	1.12E-11	0.00E+00	0.00E+00	0.00E+00

Table 9-1
Detection Comparison to Region 4 Screening Levels
for the Site 6 Exposure Grouping

Analyte	Surface Soil				Sediment				Selection of Chemicals of Potential Concern	
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats	Aquatic Habitats
Pesticides										
4,4'-DDD	1/3	1.70E-03	7.35E-04	NA	0/3	0.00E+00	0.00E+00	3.30E-03	YES	NO
4,4'-DDE	1/3	9.80E-03	3.53E-03	NA	1/3	6.90E-03	2.75E-03	3.30E-03	YES	YES
DDTr	--	--	--	--	--	--	--	--	--	--
Alpha-Chlordane	1/3	6.70E-03	2.54E-03	NA	2/3	6.90E-02	2.87E-02	1.70E-03	YES	YES
Heptachlor Epoxide	0/0	0.00E+00	0.00E+00	NA	1/3	4.10E-03	1.72E-03	NA	NO	YES
SVOCs										
Pentachlorophenol	3/3	5.15E-03	3.72E-03	2.00E-03	0/3	0.00E+00	0.00E+00	NA	YES	NO

Table 9-2
Detection Comparison to Region 4 Screening Levels
for the Site 6 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Pesticides					
Alpha-Chlordane	1/3	1.68E-02	5.95E-03	NA	YES
SVOCs					
Pentachlorophenol	2/3	1.40E-02	7.87E-03	2.00E-03	YES

Table 9-3
Frequency of Detection and Exposure Point Concentrations
for the Site 6 Exposure Grouping

Analyte	Surface Soil			Sediment		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Pesticides						
4,4'-DDD	1/3	1.70E-03	7.35E-04	NO COPC	NO COPC	NO COPC
4,4'-DDE	1/3	9.80E-03	3.53E-03	1/3	6.90E-03	2.75E-03
DDTr	--	--	--	--	--	--
Alpha-Chlordane	1/3	6.70E-03	2.54E-03	2/3	6.90E-02	2.87E-02
Heptachlor Epoxide	NO COPC	NO COPC	NO COPC	1/3	4.10E-03	1.72E-03
SVOCs						
Pentachlorophenol	3/3	5.15E-03	3.72E-03	NO COPC	NO COPC	NO COPC

Table 9-4
Frequency of Detection and Exposure Point Concentrations
for the Site 6 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Pesticides			
Alpha-Chlordane	1/3	1.68E-02	5.95E-03
SVOCs			
Pentachlorophenol	2/3	1.40E-02	7.87E-03

Table 9-5
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 6 Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Pesticides						
4,4'-DDD	NA	1.70E-03	--	7.35E-04	--	5.10E-04
4,4'-DDE	NA	9.80E-03	--	3.53E-03	--	3.37E-03
DDTr	NA	--	--	--	--	--
Alpha-Chlordane	NA	6.70E-03	--	2.54E-03	--	6.40E-04
SVOCs						
Pentachlorophenol	3.00E+00	5.15E-03	1.72E-03	3.72E-03	1.24E-03	--

Table 9-6
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 6 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Pesticides						
Alpha-Chlordane	NA	1.68E-02	--	5.95E-03	--	6.40E-04
SVOCs						
Pentachlorophenol	3.00E+00	1.40E-02	4.67E-03	7.87E-03	2.62E-03	--

Table 9-7
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 6 Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Pesticides						
4,4'-DDD	1.50E+03	1.70E-03	1.13E-06	7.35E-04	4.90E-07	5.10E-04
4,4'-DDE	1.50E+03	9.80E-03	6.53E-06	3.53E-03	2.35E-06	3.37E-03
DDTr	1.50E+03	--	--	--	--	--
Alpha-Chlordane	NA	6.70E-03	--	2.54E-03	--	6.40E-04
SVOCs						
Pentachlorophenol	6.00E+00	5.15E-03	8.58E-04	3.72E-03	6.19E-04	--

Table 9-8
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 6 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Pesticides						
Alpha-Chlordane	NA	1.68E-02	--	5.95E-03	--	6.40E-04
SVOCs						
Pentachlorophenol	6.00E+00	1.40E-02	2.33E-03	7.87E-03	1.31E-03	--

Table 9-9
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 6 Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Pesticides								
4,4'-DDD	1.47E-01	4.00E+00	7.33E-06	1.27E-03	3.17E-06	5.51E-04	1.82E-04	3.16E-02
4,4'-DDE	1.47E-01	4.00E+00	3.93E-05	7.35E-03	1.41E-05	2.64E-03	2.23E-04	4.17E-02
DDTr	1.47E-01	4.00E+00	4.66E-05	8.62E-03	1.73E-05	3.20E-03	4.57E-04	8.66E-02
Alpha-Chlordane	4.60E+00	9.20E+00	2.37E-05	5.58E-04	9.00E-06	2.12E-04	4.36E-06	1.02E-04
SVOCs								
Pentachlorophenol	2.40E-01	2.40E+00	3.89E-05	4.29E-04	2.81E-05	3.10E-04	0.00E+00	0.00E+00

Table 9-10
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 6 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Pesticides								
Alpha-Chlordane	4.60E+00	9.20E+00	5.95E-05	1.40E-03	2.11E-05	4.96E-04	4.36E-06	1.02E-04
SVOCs								
Pentachlorophenol	2.40E-01	2.40E+00	1.06E-04	1.17E-03	5.94E-05	6.55E-04	0.00E+00	0.00E+00

Table 9-11
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 6 Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario				Mean Case Scenario				Background Mean Case Scenario			
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Piscivorous Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Piscivorous Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Piscivorous Birds (mg/kg-bw day)
Pesticides														
4,4'-DDD	2.27E-01	2.27E+00	1.02E-06	2.03E-03	3.02E-07	0.00E+00	4.39E-07	8.80E-04	1.31E-07	0.00E+00	2.52E-05	5.05E-02	7.50E-06	0.00E+00
4,4'-DDE	2.27E-01	2.27E+00	5.45E-06	1.17E-02	7.95E-07	6.21E-06	1.96E-06	4.22E-03	2.86E-07	2.47E-06	3.09E-05	6.65E-02	4.51E-06	0.00E+00
DDTr	2.27E-01	2.27E+00	6.46E-06	1.38E-02	1.10E-06	6.21E-06	2.40E-06	5.10E-03	4.17E-07	2.47E-06	6.34E-05	1.38E-01	1.91E-05	0.00E+00
Alpha-Chlordane	2.10E+00	1.07E+01	3.29E-06	9.27E-04	3.80E-07	6.21E-05	1.25E-06	3.51E-04	1.44E-07	2.58E-05	6.04E-07	1.70E-04	6.97E-08	0.00E+00
SVOCs														
Pentachlorophenol	6.73E+00	NA	5.39E-06	7.13E-04	4.69E-07	0.00E+00	3.89E-06	5.14E-04	3.38E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 9-12
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 6 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Pesticides											
Alpha-Chlordane	2.10E+00	1.07E+01	8.25E-06	2.32E-03	9.52E-07	2.92E-06	8.23E-04	3.37E-07	6.04E-07	1.70E-04	6.97E-08
SVOCs											
Pentachlorophenol	6.73E+00	NA	1.47E-05	1.94E-03	1.27E-06	8.24E-06	1.09E-03	7.16E-07	0.00E+00	0.00E+00	0.00E+00

Table 9-13
Comparison of Exposure Point Concentrations (EPCs) in Sediment to Benthic Organism Toxicity Reference Values for the Site 6 Exposure Grouping

Chemical	Sediment Toxicity Reference Value (mg/kg)	Frequency of Detection	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC
Pesticides						
4,4'-DDE	0.00316	1/3	6.90E-03	2.18E+00	2.75E-03	8.69E-01
DDTr	NA	--	--	--	--	--
Alpha-Chlordane	0.00324	2/3	6.90E-02	2.13E+01	2.87E-02	8.85E+00
Heptachlor Epoxide	0.00247	1/3	4.10E-03	1.66E+00	1.72E-03	6.98E-01

Table 10-1
Detection Comparison to Region 4 Screening Levels
for the Site 7 Exposure Grouping

Analyte	Surface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Inorganics					
Cyanide (Total)	1/1	2.00E-01	2.00E-01	9.00E-01	NO
Metals					
Aluminum	1/1	2.52E+04	2.52E+04	5.00E+01	YES
Antimony	1/1	1.10E+00	1.10E+00	3.50E+00	NO
Arsenic	1/1	4.38E+01	4.38E+01	1.00E+01	YES
Barium	1/1	2.34E+01	2.34E+01	1.65E+02	NO
Beryllium	1/1	3.20E-01	3.20E-01	1.10E+00	NO
Cadmium	1/1	7.70E-01	7.70E-01	1.60E+00	NO
Calcium	1/1	3.79E+04	3.79E+04	NA	YES
Chromium	1/1	1.02E+02	1.02E+02	4.00E-01	YES
Cobalt	1/1	6.60E+00	6.60E+00	2.00E+01	NO
Copper	1/1	4.59E+01	4.59E+01	4.00E+01	YES
Iron	1/1	4.26E+04	4.26E+04	2.00E+02	YES
Lead	1/1	3.93E+01	3.93E+01	5.00E+01	NO
Magnesium	1/1	1.25E+03	1.25E+03	NA	YES
Manganese	1/1	5.78E+02	5.78E+02	1.00E+02	YES
Mercury	1/1	1.20E-01	1.20E-01	1.00E-01	YES
Nickel	1/1	1.72E+01	1.72E+01	3.00E+01	NO
Potassium	1/1	5.91E+02	5.91E+02	NA	YES
Selenium	1/1	1.70E+00	1.70E+00	8.10E-01	YES
Sodium	1/1	8.70E+01	8.70E+01	NA	YES
Tin	1/1	3.60E+00	3.60E+00	5.30E+01	NO
Vanadium	1/1	1.63E+02	1.63E+02	2.00E+00	YES
Zinc	1/1	7.36E+01	7.36E+01	5.00E+01	YES
PAHs					
Benzo(a)Anthracene	1/1	1.32E-02	1.32E-02	NA	YES
Chrysene	1/1	7.61E-03	7.61E-03	NA	YES
Total HMW PAHs	--	2.08E-02	2.08E-02	--	YES
Pesticides					
4,4'-DDD	1/1	2.42E-02	2.42E-02	NA	YES
4,4'-DDE	1/1	3.41E-02	3.41E-02	NA	YES
4,4'-DDT	1/1	4.08E-02	4.08E-02	NA	YES
DDTr	0/0	0.00E+00	0.00E+00	2.50E-03	NO
Dieldrin	1/1	4.40E-03	4.40E-03	5.00E-04	YES
VOCs					
Acetone	1/1	2.03E-02	2.03E-02	NA	YES

Table 10-2
Detection Comparison to Region 4 Screening Levels
for the Site 7 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Metals					
Aluminum	1/1	1.02E+04	1.02E+04	5.00E+01	YES
Arsenic	1/1	7.55E+00	7.55E+00	1.00E+01	NO
Barium	1/1	1.48E+01	1.48E+01	1.65E+02	NO
Beryllium	1/1	1.75E-01	1.75E-01	1.10E+00	NO
Cadmium	1/1	3.40E-01	3.40E-01	1.60E+00	NO
Calcium	1/1	2.19E+05	2.19E+05	NA	YES
Chromium	1/1	1.47E+01	1.47E+01	4.00E-01	YES
Cobalt	1/1	6.05E+00	6.05E+00	2.00E+01	NO
Copper	1/1	1.59E+01	1.59E+01	4.00E+01	NO
Iron	1/1	1.44E+04	1.44E+04	2.00E+02	YES
Lead	1/1	1.35E+00	1.35E+00	5.00E+01	NO
Magnesium	1/1	2.70E+03	2.70E+03	NA	YES
Manganese	1/1	3.61E+02	3.61E+02	1.00E+02	YES
Mercury	1/1	3.01E+00	3.01E+00	1.00E-01	YES
Nickel	1/1	6.95E+00	6.95E+00	3.00E+01	NO
Potassium	1/1	1.15E+03	1.15E+03	NA	YES
Selenium	1/1	5.70E+00	5.70E+00	8.10E-01	YES
Sodium	1/1	6.98E+01	6.98E+01	NA	YES
Tin	1/1	2.05E+00	2.05E+00	5.30E+01	NO
Vanadium	1/1	3.86E+01	3.86E+01	2.00E+00	YES
Zinc	1/1	1.92E+01	1.92E+01	5.00E+01	NO
VOCs					
1,1-dichloroethene	1/1	1.10E-03	1.10E-03	NA	YES
Acetone	1/1	3.70E-03	3.70E-03	NA	YES

Table 10-3
Frequency of Detection and Exposure Point Concentrations
for the Site 7 Exposure Grouping

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Aluminum	1/1	2.52E+04	2.52E+04
Arsenic	1/1	4.38E+01	4.38E+01
Calcium	1/1	3.79E+04	3.79E+04
Chromium	1/1	1.02E+02	1.02E+02
Copper	1/1	4.59E+01	4.59E+01
Iron	1/1	4.26E+04	4.26E+04
Magnesium	1/1	1.25E+03	1.25E+03
Manganese	1/1	5.78E+02	5.78E+02
Mercury	1/1	1.20E-01	1.20E-01
Potassium	1/1	5.91E+02	5.91E+02
Selenium	1/1	1.70E+00	1.70E+00
Sodium	1/1	8.70E+01	8.70E+01
Vanadium	1/1	1.63E+02	1.63E+02
Zinc	1/1	7.36E+01	7.36E+01
PAHs			
Benzo(a)Anthracene	1/1	1.32E-02	1.32E-02
Chrysene	1/1	7.61E-03	7.61E-03
Total HMW PAHs	--	2.08E-02	2.08E-02
Pesticides			
4,4'-DDD	1/1	2.42E-02	2.42E-02
4,4'-DDE	1/1	3.41E-02	3.41E-02
4,4'-DDT	1/1	4.08E-02	4.08E-02
DDTr	--	--	--
Dieldrin	1/1	4.40E-03	4.40E-03
VOCs			
Acetone	1/1	2.03E-02	2.03E-02

Table 10-4
Frequency of Detection and Exposure Point Concentrations
for the Site 7 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Aluminum	1/1	1.02E+04	1.02E+04
Calcium	1/1	2.19E+05	2.19E+05
Chromium	1/1	1.47E+01	1.47E+01
Iron	1/1	1.44E+04	1.44E+04
Magnesium	1/1	2.70E+03	2.70E+03
Manganese	1/1	3.61E+02	3.61E+02
Mercury	1/1	3.01E+00	3.01E+00
Potassium	1/1	1.15E+03	1.15E+03
Selenium	1/1	5.70E+00	5.70E+00
Sodium	1/1	6.98E+01	6.98E+01
Vanadium	1/1	3.86E+01	3.86E+01
VOCs			
1,1-dichloroethene	1/1	1.10E-03	1.10E-03
Acetone	1/1	3.70E-03	3.70E-03

Table 10-5
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 7 Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	2.52E+04	5.04E+02	2.52E+04	5.04E+02	3.00E+04
Arsenic	1.80E+01	4.38E+01	2.43E+00	4.38E+01	2.43E+00	4.39E+01
Calcium	NA	3.79E+04	--	3.79E+04	--	1.06E+05
Chromium	1.00E+00	1.02E+02	1.02E+02	1.02E+02	1.02E+02	6.98E+01
Copper	7.00E+01	4.59E+01	6.56E-01	4.59E+01	6.56E-01	8.37E+01
Iron	NA	4.26E+04	--	4.26E+04	--	4.71E+04
Magnesium	NA	1.25E+03	--	1.25E+03	--	5.13E+03
Manganese	2.20E+02	5.78E+02	2.63E+00	5.78E+02	2.63E+00	1.18E+03
Mercury	3.00E-01	1.20E-01	4.00E-01	1.20E-01	4.00E-01	3.20E-01
Potassium	NA	5.91E+02	--	5.91E+02	--	1.46E+03
Selenium	5.20E-01	1.70E+00	3.27E+00	1.70E+00	3.27E+00	1.00E+00
Sodium	NA	8.70E+01	--	8.70E+01	--	2.38E+02
Vanadium	2.00E+00	1.63E+02	8.15E+01	1.63E+02	8.15E+01	1.45E+02
Zinc	1.60E+02	7.36E+01	4.60E-01	7.36E+01	4.60E-01	8.10E+01
PAHs						
Total HMW PAHs	2.00E+04	2.08E-02	1.04E-06	2.08E-02	1.04E-06	--
Pesticides						
4,4'-DDD	NA	2.42E-02	--	2.42E-02	--	5.10E-04
4,4'-DDE	NA	3.41E-02	--	3.41E-02	--	3.37E-03
4,4'-DDT	NA	4.08E-02	--	4.08E-02	--	2.65E-03
DDTr	NA	--	--	--	--	--
Dieldrin	NA	4.40E-03	--	4.40E-03	--	--
VOCs						
Acetone	NA	2.03E-02	--	2.03E-02	--	--

Table 10-6
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 7 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	1.02E+04	2.04E+02	1.02E+04	2.04E+02	3.00E+04
Calcium	NA	2.19E+05	--	2.19E+05	--	1.06E+05
Chromium	1.00E+00	1.47E+01	1.47E+01	1.47E+01	1.47E+01	6.98E+01
Iron	NA	1.44E+04	--	1.44E+04	--	4.71E+04
Magnesium	NA	2.70E+03	--	2.70E+03	--	5.13E+03
Manganese	2.20E+02	3.61E+02	1.64E+00	3.61E+02	1.64E+00	1.18E+03
Mercury	3.00E-01	3.01E+00	1.00E+01	3.01E+00	1.00E+01	3.20E-01
Potassium	NA	1.15E+03	--	1.15E+03	--	1.46E+03
Selenium	5.20E-01	5.70E+00	1.10E+01	5.70E+00	1.10E+01	1.00E+00
Sodium	NA	6.98E+01	--	6.98E+01	--	2.38E+02
Vanadium	2.00E+00	3.86E+01	1.93E+01	3.86E+01	1.93E+01	1.45E+02
VOCs						
1,1-dichloroethene	NA	1.10E-03	--	1.10E-03	--	--
Acetone	NA	3.70E-03	--	3.70E-03	--	--

Table 10-7
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 7 Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	2.52E+04	--	2.52E+04	--	3.00E+04
Arsenic	6.00E+01	4.38E+01	7.30E-01	4.38E+01	7.30E-01	4.39E+01
Calcium	NA	3.79E+04	--	3.79E+04	--	1.06E+05
Chromium	4.00E-01	1.02E+02	2.55E+02	1.02E+02	2.55E+02	6.98E+01
Copper	8.00E+01	4.59E+01	5.74E-01	4.59E+01	5.74E-01	8.37E+01
Iron	NA	4.26E+04	--	4.26E+04	--	4.71E+04
Magnesium	NA	1.25E+03	--	1.25E+03	--	5.13E+03
Manganese	4.50E+02	5.78E+02	1.28E+00	5.78E+02	1.28E+00	1.18E+03
Mercury	1.00E-01	1.20E-01	1.20E+00	1.20E-01	1.20E+00	3.20E-01
Potassium	NA	5.91E+02	--	5.91E+02	--	1.46E+03
Selenium	4.10E+00	1.70E+00	4.15E-01	1.70E+00	4.15E-01	1.00E+00
Sodium	NA	8.70E+01	--	8.70E+01	--	2.38E+02
Vanadium	NA	1.63E+02	--	1.63E+02	--	1.45E+02
Zinc	1.20E+02	7.36E+01	6.13E-01	7.36E+01	6.13E-01	8.10E+01
PAHs						
Total HMW PAHs	1.80E+04	2.08E-02	1.16E-06	2.08E-02	1.16E-06	--
Pesticides						
4,4'-DDD	1.50E+03	2.42E-02	1.61E-05	2.42E-02	1.61E-05	--
4,4'-DDE	1.50E+03	3.41E-02	2.27E-05	3.41E-02	2.27E-05	--
4,4'-DDT	1.50E+03	4.08E-02	2.72E-05	4.08E-02	2.72E-05	--
DDTr	1.50E+03	--	--	--	--	--
Dieldrin	NA	4.40E-03	--	4.40E-03	--	--
VOCs						
Acetone	NA	2.03E-02	--	2.03E-02	--	--

Table 10-8
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 7 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	1.02E+04	--	1.02E+04	--	3.00E+04
Calcium	NA	2.19E+05	--	2.19E+05	--	1.06E+05
Chromium	4.00E-01	1.47E+01	3.68E+01	1.47E+01	3.68E+01	6.98E+01
Iron	NA	1.44E+04	--	1.44E+04	--	4.71E+04
Magnesium	NA	2.70E+03	--	2.70E+03	--	5.13E+03
Manganese	4.50E+02	3.61E+02	8.01E-01	3.61E+02	8.01E-01	1.18E+03
Mercury	1.00E-01	3.01E+00	3.01E+01	3.01E+00	3.01E+01	3.20E-01
Potassium	NA	1.15E+03	--	1.15E+03	--	1.46E+03
Selenium	4.10E+00	5.70E+00	1.39E+00	5.70E+00	1.39E+00	1.00E+00
Sodium	NA	6.98E+01	--	6.98E+01	--	2.38E+02
Vanadium	NA	3.86E+01	--	3.86E+01	--	1.45E+02
VOCs						
1,1-dichloroethene	NA	1.10E-03	--	1.10E-03	--	--
Acetone	NA	3.70E-03	--	3.70E-03	--	--

Table 10-9
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 7 Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Metals								
Aluminum	1.93E+00	1.93E+01	***7.31E+01***	***2.48E+02***	***7.31E+01***	***2.48E+02***	***6.70E+01***	***2.27E+02***
Arsenic	1.04E+00	1.26E+00	2.45E-01	2.90E-01	2.45E-01	2.90E-01	1.19E-01	1.44E-01
Calcium	NA	NA	1.61E+04	3.16E+03	1.61E+04	3.16E+03	1.19E+04	2.32E+03
Chromium	2.40E+00	1.31E+01	3.39E-01	7.31E-01	3.39E-01	7.31E-01	1.46E-01	7.73E-01
Copper	5.60E+00	1.54E+01	1.18E+00	1.22E+00	1.18E+00	1.22E+00	1.14E+00	1.20E+00
Iron	NA	NA	1.24E+02	2.77E+02	1.24E+02	2.77E+02	8.76E+01	1.96E+02
Magnesium	NA	NA	1.54E+02	5.52E+01	1.54E+02	5.52E+01	3.70E+02	1.32E+02
Manganese	5.15E+01	2.84E+02	1.89E+01	2.84E+00	1.89E+01	2.84E+00	2.31E+01	3.26E+00
Mercury	1.32E+01	NA	1.44E-02	3.27E-02	1.44E-02	3.27E-02	1.82E-02	3.44E-02
Potassium	NA	NA	7.28E+01	4.92E+01	7.28E+01	4.92E+01	1.04E+02	7.07E+01
Selenium	1.43E-01	3.30E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01	5.91E-02	7.35E-02
Sodium	NA	NA	9.98E-01	7.25E+00	9.98E-01	7.25E+00	1.89E+00	1.37E+01
Vanadium	4.16E+00	8.31E+00	5.02E-01	***1.20E+01***	5.02E-01	***1.20E+01***	2.96E-01	*7.05E+00*
Zinc	7.54E+01	3.20E+02	6.52E+00	2.92E+01	6.52E+00	2.92E+01	7.04E+00	3.05E+01
PAHs								
Benzo(a)Anthracene	NA	NA	6.47E-05	2.97E-04	6.47E-05	2.97E-04	0.00E+00	0.00E+00
Chrysene	NA	NA	3.73E-05	2.79E-04	3.73E-05	2.79E-04	0.00E+00	0.00E+00
Total HMW PAHs	6.15E-01	1.08E+01	1.02E-04	5.76E-04	1.02E-04	5.76E-04	0.00E+00	0.00E+00
Pesticides								
4,4'-DDD	1.47E-01	4.00E+00	1.04E-04	1.81E-02	1.04E-04	1.81E-02	1.82E-04	3.16E-02
4,4'-DDE	1.47E-01	4.00E+00	1.37E-04	2.56E-02	1.37E-04	2.56E-02	2.23E-04	4.17E-02
4,4'-DDT	1.47E-01	4.00E+00	1.21E-04	3.06E-02	1.21E-04	3.06E-02	5.26E-05	1.33E-02
DDTr	--	4.00E+00	3.62E-04	7.43E-02	3.62E-04	7.43E-02	4.57E-04	8.66E-02
Dieldrin	1.50E-02	2.00E-01	2.52E-05	6.56E-04	2.52E-05	6.56E-04	0.00E+00	0.00E+00
VOCs								
Acetone	1.00E+01	5.00E+01	**1.31E-01**	1.69E-03	**1.31E-01**	1.69E-03	0.00E+00	0.00E+00

Table 10-10
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 7 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Metals								
Aluminum	1.93E+00	1.93E+01	2.95E+01	1.00E+02	2.95E+01	1.00E+02	6.70E+01	2.27E+02
Calcium	NA	NA	9.29E+04	1.82E+04	9.29E+04	1.82E+04	1.19E+04	2.32E+03
Chromium	2.40E+00	1.31E+01	4.88E-02	8.32E-01	4.88E-02	8.32E-01	1.46E-01	7.73E-01
Iron	NA	NA	4.16E+01	9.33E+01	4.16E+01	9.33E+01	8.76E+01	1.96E+02
Magnesium	NA	NA	3.32E+02	1.19E+02	3.32E+02	1.19E+02	3.70E+02	1.32E+02
Manganese	5.15E+01	2.84E+02	1.18E+01	2.06E+00	1.18E+01	2.06E+00	2.31E+01	3.26E+00
Mercury	1.32E+01	NA	8.85E-02	4.79E-02	8.85E-02	4.79E-02	1.82E-02	3.44E-02
Potassium	NA	NA	1.42E+02	9.58E+01	1.42E+02	9.58E+01	1.04E+02	7.07E+01
Selenium	1.43E-01	3.30E-01	4.33E-01	2.77E-01	4.33E-01	2.77E-01	5.91E-02	7.35E-02
Sodium	NA	NA	8.01E-01	5.82E+00	8.01E-01	5.82E+00	1.89E+00	1.37E+01
Vanadium	4.16E+00	8.31E+00	1.19E-01	2.83E+00	1.19E-01	2.83E+00	2.96E-01	7.05E+00
VOCs								
1,1-dichloroethene	2.50E+00	NA	3.05E-04	9.17E-05	3.05E-04	9.17E-05	0.00E+00	0.00E+00
Acetone	1.00E+01	5.00E+01	2.38E-02	3.08E-04	2.38E-02	3.08E-04	0.00E+00	0.00E+00

Table 10-11
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 7 Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Aluminum	1.10E+02	NA	1.01E+01	5.47E+02	5.07E+01	1.01E+01	5.47E+02	5.07E+01	9.29E+00	5.01E+02	4.65E+01
Arsenic	2.24E+00	7.40E+00	3.39E-02	7.27E-01	4.77E-03	3.39E-02	7.27E-01	4.77E-03	1.65E-02	3.28E-01	2.12E-03
Calcium	NA	NA	2.23E+03	5.24E+03	1.54E-01	2.23E+03	5.24E+03	1.54E-01	1.64E+03	3.86E+03	1.14E-01
Chromium	2.66E+00	5.00E+00	4.70E-02	1.78E+00	1.90E-01	4.70E-02	1.78E+00	1.90E-01	2.02E-02	1.49E+00	1.02E-01
Copper	4.05E+00	6.17E+01	1.63E-01	2.22E+00	3.68E-01	1.63E-01	2.22E+00	3.68E-01	1.58E-01	2.17E+00	3.65E-01
Iron	NA	NA	1.71E+01	6.99E+02	4.97E+00	1.71E+01	6.99E+02	4.97E+00	1.21E+01	4.95E+02	3.52E+00
Magnesium	NA	NA	2.14E+01	9.53E+01	3.64E-02	2.14E+01	9.53E+01	3.64E-02	5.13E+01	2.29E+02	8.75E-02
Manganese	9.97E+02	NA	2.61E+00	8.02E+00	9.33E-01	2.61E+00	8.02E+00	9.33E-01	3.20E+00	9.47E+00	1.14E+00
Mercury	4.50E-01	9.00E-01	1.99E-03	5.27E-02	6.34E-04	1.99E-03	5.27E-02	6.34E-04	2.52E-03	5.58E-02	9.72E-04
Potassium	NA	NA	1.01E+01	8.18E+01	6.89E-02	1.01E+01	8.18E+01	6.89E-02	1.45E+01	1.17E+02	9.89E-02
Selenium	5.00E-01	1.00E+00	1.58E-02	1.91E-01	2.22E-02	1.58E-02	1.91E-01	2.22E-02	8.19E-03	1.22E-01	1.77E-02
Sodium	NA	NA	1.38E-01	1.20E+01	2.80E-02	1.38E-01	1.20E+01	2.80E-02	2.63E-01	2.28E+01	5.31E-02
Vanadium	3.44E-01	6.88E-01	6.96E-02	2.00E+01	8.02E-01	6.96E-02	2.00E+01	8.02E-01	4.10E-02	1.18E+01	4.73E-01
Zinc	6.61E+01	1.31E+02	9.04E-01	4.68E+01	3.30E+00	9.04E-01	4.68E+01	3.30E+00	9.76E-01	4.90E+01	3.34E+00
PAHs											
Benzo(a)Anthracene	NA	NA	8.98E-06	5.52E-04	1.01E-06	8.98E-06	5.52E-04	1.01E-06	0.00E+00	0.00E+00	0.00E+00
Chrysene	NA	NA	5.18E-06	4.89E-04	5.80E-07	5.18E-06	4.89E-04	5.80E-07	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	3.37E+00	3.37E+01	1.42E-05	1.04E-03	1.59E-06	1.42E-05	1.04E-03	1.59E-06	0.00E+00	0.00E+00	0.00E+00
Pesticides											
4,4'-DDD	2.27E-01	2.27E+00	1.45E-05	2.90E-02	4.30E-06	1.45E-05	2.90E-02	4.30E-06	2.52E-05	5.05E-02	7.50E-06
4,4'-DDE	2.27E-01	2.27E+00	1.90E-05	4.08E-02	2.77E-06	1.90E-05	4.08E-02	2.77E-06	3.09E-05	6.65E-02	4.51E-06
4,4'-DDT	2.27E-01	2.27E+00	1.68E-05	4.88E-02	1.63E-05	1.68E-05	4.88E-02	1.63E-05	7.30E-06	2.12E-02	7.06E-06
DDTr	--	2.27E+00	5.02E-05	1.19E-01	2.33E-05	5.02E-05	1.19E-01	2.33E-05	6.34E-05	1.38E-01	1.91E-05
Dieldrin	7.09E-02	1.00E+01	3.49E-06	1.07E-03	2.37E-08	3.49E-06	1.07E-03	2.37E-08	0.00E+00	0.00E+00	0.00E+00
VOCs											
Acetone	NA	NA	1.81E-02	2.81E-03	1.23E-12	1.81E-02	2.81E-03	1.23E-12	0.00E+00	0.00E+00	0.00E+00

Table 10-12
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 7 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Aluminum	1.10E+02	NA	4.09E+00	2.21E+02	2.05E+01	4.09E+00	2.21E+02	2.05E+01	9.29E+00	5.01E+02	4.65E+01
Calcium	NA	NA	1.29E+04	3.02E+04	8.89E-01	1.29E+04	3.02E+04	8.89E-01	1.64E+03	3.86E+03	1.14E-01
Chromium	2.66E+00	5.00E+00	6.77E-03	1.41E+00	4.59E-02	6.77E-03	1.41E+00	4.59E-02	2.02E-02	1.49E+00	1.02E-01
Iron	NA	NA	5.77E+00	2.35E+02	1.67E+00	5.77E+00	2.35E+02	1.67E+00	1.21E+01	4.95E+02	3.52E+00
Magnesium	NA	NA	4.60E+01	2.05E+02	7.86E-02	4.60E+01	2.05E+02	7.86E-02	5.13E+01	2.29E+02	8.75E-02
Manganese	9.97E+02	NA	1.63E+00	5.46E+00	5.82E-01	1.63E+00	5.46E+00	5.82E-01	3.20E+00	9.47E+00	1.14E+00
Mercury	4.50E-01	9.00E-01	1.23E-02	9.43E-02	1.59E-02	1.23E-02	9.43E-02	1.59E-02	2.52E-03	5.58E-02	9.72E-04
Potassium	NA	NA	1.96E+01	1.59E+02	1.34E-01	1.96E+01	1.59E+02	1.34E-01	1.45E+01	1.17E+02	9.89E-02
Selenium	5.00E-01	1.00E+00	6.00E-02	4.74E-01	3.49E-02	6.00E-02	4.74E-01	3.49E-02	8.19E-03	1.22E-01	1.77E-02
Sodium	NA	NA	1.11E-01	9.66E+00	2.25E-02	1.11E-01	9.66E+00	2.25E-02	2.63E-01	2.28E+01	5.31E-02
Vanadium	3.44E-01	6.88E-01	1.65E-02	4.72E+00	1.90E-01	1.65E-02	4.72E+00	1.90E-01	4.10E-02	1.18E+01	4.73E-01
VOCs											
1,1-dichloroethene	NA	NA	4.23E-05	1.52E-04	1.03E-10	4.23E-05	1.52E-04	1.03E-10	0.00E+00	0.00E+00	0.00E+00
Acetone	NA	NA	3.30E-03	5.12E-04	2.25E-13	3.30E-03	5.12E-04	2.25E-13	0.00E+00	0.00E+00	0.00E+00

Table 11-1
Detection Comparison to Region 4 Screening Levels
for the Site 8 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Metals					
Aluminum	4/4	3.18E+04	2.59E+04	5.00E+01	YES
Arsenic	4/4	3.37E+01	1.96E+01	1.00E+01	YES
Barium	4/4	1.56E+02	1.10E+02	1.65E+02	NO
Beryllium	4/4	5.80E-01	4.65E-01	1.10E+00	NO
Cadmium	4/4	4.20E-01	3.28E-01	1.60E+00	NO
Calcium	4/4	1.38E+05	4.06E+04	NA	YES
Chromium	4/4	6.63E+01	5.84E+01	4.00E-01	YES
Cobalt	4/4	5.66E+01	2.40E+01	2.00E+01	YES
Copper	4/4	6.11E+01	4.65E+01	4.00E+01	YES
Iron	4/4	4.94E+04	3.29E+04	2.00E+02	YES
Lead	4/4	2.77E+01	1.33E+01	5.00E+01	NO
Magnesium	4/4	3.85E+03	2.41E+03	NA	YES
Manganese	4/4	2.05E+03	7.41E+02	1.00E+02	YES
Mercury	4/4	1.50E-01	8.88E-02	1.00E-01	YES
Nickel	4/4	2.05E+01	1.42E+01	3.00E+01	NO
Potassium	4/4	9.64E+02	8.13E+02	NA	YES
Selenium	2/4	2.50E+00	1.07E+00	8.10E-01	YES
Silver	3/4	1.50E+00	7.23E-01	2.00E+00	NO
Sodium	4/4	2.17E+02	1.64E+02	NA	YES
Thallium	3/4	6.50E-01	3.20E-01	1.00E+00	NO
Tin	3/3	2.90E+00	2.73E+00	5.30E+01	NO
Vanadium	4/4	1.39E+02	9.60E+01	2.00E+00	YES
Zinc	4/4	9.06E+01	6.82E+01	5.00E+01	YES
VOCs					
2-Butanone	2/4	1.51E-02	9.58E-02	NA	YES
Acetone	3/4	1.84E-01	1.63E-01	NA	YES
Carbon disulfide	3/4	3.00E-03	2.20E-02	NA	YES

Table 11-2
Frequency of Detection and Exposure Point Concentrations
for the Site 8 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Aluminum	4/4	3.18E+04	2.59E+04
Arsenic	4/4	3.37E+01	1.96E+01
Calcium	4/4	1.38E+05	4.06E+04
Chromium	4/4	6.63E+01	5.84E+01
Cobalt	4/4	5.66E+01	2.40E+01
Copper	4/4	6.11E+01	4.65E+01
Iron	4/4	4.94E+04	3.29E+04
Magnesium	4/4	3.85E+03	2.41E+03
Manganese	4/4	2.05E+03	7.41E+02
Mercury	4/4	1.50E-01	8.88E-02
Potassium	4/4	9.64E+02	8.13E+02
Selenium	2/4	2.50E+00	1.07E+00
Sodium	4/4	2.17E+02	1.64E+02
Vanadium	4/4	1.39E+02	9.60E+01
Zinc	4/4	9.06E+01	6.82E+01
VOCs			
2-Butanone	2/4	1.51E-02	9.58E-02
Acetone	3/4	1.84E-01	1.63E-01
Carbon disulfide	3/4	3.00E-03	2.20E-02

Table 11-3
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 8 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	3.18E+04	6.36E+02	2.59E+04	5.19E+02	3.00E+04
Arsenic	1.80E+01	3.37E+01	1.87E+00	1.96E+01	1.09E+00	4.39E+01
Calcium	NA	1.38E+05	--	4.06E+04	--	1.06E+05
Chromium	1.00E+00	6.63E+01	6.63E+01	5.84E+01	5.84E+01	6.98E+01
Cobalt	1.30E+01	5.66E+01	4.35E+00	2.40E+01	1.85E+00	1.66E+01
Copper	7.00E+01	6.11E+01	8.73E-01	4.65E+01	6.65E-01	8.37E+01
Iron	NA	4.94E+04	--	3.29E+04	--	4.71E+04
Magnesium	NA	3.85E+03	--	2.41E+03	--	5.13E+03
Manganese	2.20E+02	2.05E+03	9.32E+00	7.41E+02	3.37E+00	1.18E+03
Mercury	3.00E-01	1.50E-01	5.00E-01	8.88E-02	2.96E-01	3.20E-01
Potassium	NA	9.64E+02	--	8.13E+02	--	1.46E+03
Selenium	5.20E-01	2.50E+00	4.81E+00	1.07E+00	2.06E+00	1.00E+00
Sodium	NA	2.17E+02	--	1.64E+02	--	2.38E+02
Vanadium	2.00E+00	1.39E+02	6.95E+01	9.60E+01	4.80E+01	1.45E+02
Zinc	1.60E+02	9.06E+01	5.66E-01	6.82E+01	4.26E-01	8.10E+01
VOCs						
2-Butanone	NA	1.51E-02	--	9.58E-02	--	--
Acetone	NA	1.84E-01	--	1.63E-01	--	--
Carbon disulfide	NA	3.00E-03	--	2.20E-02	--	--

Table 11-4
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 8 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	3.18E+04	--	2.59E+04	--	3.00E+04
Arsenic	6.00E+01	3.37E+01	5.62E-01	1.96E+01	3.27E-01	4.39E+01
Calcium	NA	1.38E+05	--	4.06E+04	--	1.06E+05
Chromium	4.00E-01	6.63E+01	1.66E+02	5.84E+01	1.46E+02	6.98E+01
Cobalt	NA	5.66E+01	--	2.40E+01	--	1.66E+01
Copper	8.00E+01	6.11E+01	7.64E-01	4.65E+01	5.82E-01	8.37E+01
Iron	NA	4.94E+04	--	3.29E+04	--	4.71E+04
Magnesium	NA	3.85E+03	--	2.41E+03	--	5.13E+03
Manganese	4.50E+02	2.05E+03	4.56E+00	7.41E+02	1.65E+00	1.18E+03
Mercury	1.00E-01	1.50E-01	1.50E+00	8.88E-02	8.88E-01	3.20E-01
Potassium	NA	9.64E+02	--	8.13E+02	--	1.46E+03
Selenium	4.10E+00	2.50E+00	6.10E-01	1.07E+00	2.62E-01	1.00E+00
Sodium	NA	2.17E+02	--	1.64E+02	--	2.38E+02
Vanadium	NA	1.39E+02	--	9.60E+01	--	1.45E+02
Zinc	1.20E+02	9.06E+01	7.55E-01	6.82E+01	5.68E-01	8.10E+01
VOCs						
2-Butanone	NA	1.51E-02	--	9.58E-02	--	--
Acetone	NA	1.84E-01	--	1.63E-01	--	--
Carbon disulfide	NA	3.00E-03	--	2.20E-02	--	--

Table 11-5
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 8 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Metals								
Aluminum	1.93E+00	1.93E+01	9.22E+01	3.13E+02	7.52E+01	2.55E+02	6.70E+01	2.27E+02
Arsenic	1.04E+00	1.26E+00	2.01E-01	2.41E-01	1.36E-01	1.64E-01	1.19E-01	1.44E-01
Calcium	NA	NA	5.87E+04	1.15E+04	1.72E+04	3.38E+03	1.19E+04	2.32E+03
Chromium	2.40E+00	1.31E+01	2.20E-01	7.52E-01	1.94E-01	7.58E-01	1.46E-01	7.73E-01
Cobalt	7.33E+00	1.18E+02	2.73E-01	1.37E+00	1.16E-01	5.83E-01	5.36E-02	2.69E-01
Copper	5.60E+00	1.54E+01	1.34E+00	1.32E+00	1.18E+00	1.23E+00	1.14E+00	1.20E+00
Iron	NA	NA	1.43E+02	3.21E+02	9.55E+01	2.14E+02	8.76E+01	1.96E+02
Magnesium	NA	NA	4.74E+02	1.70E+02	2.97E+02	1.07E+02	3.70E+02	1.32E+02
Manganese	5.15E+01	2.84E+02	6.69E+01	6.73E+00	2.42E+01	3.36E+00	2.31E+01	3.26E+00
Mercury	1.32E+01	NA	1.63E-02	3.36E-02	1.22E-02	3.16E-02	1.82E-02	3.44E-02
Potassium	NA	NA	1.19E+02	8.03E+01	1.00E+02	6.78E+01	1.04E+02	7.07E+01
Selenium	1.43E-01	3.30E-01	1.75E-01	1.51E-01	6.88E-02	8.14E-02	6.37E-02	7.73E-02
Sodium	NA	NA	2.49E+00	1.81E+01	1.88E+00	1.37E+01	1.89E+00	1.37E+01
Vanadium	4.16E+00	NA	4.28E-01	1.02E+01	2.96E-01	7.04E+00	2.96E-01	7.05E+00
Zinc	7.54E+01	3.20E+02	7.34E+00	3.13E+01	6.24E+00	2.85E+01	7.04E+00	3.05E+01
VOCs								
2-Butanone	NA	NA	5.00E-02	1.26E-03	3.17E-01	7.98E-03	0.00E+00	0.00E+00
Acetone	1.00E+01	5.00E+01	1.19E+00	1.53E-02	1.05E+00	1.36E-02	0.00E+00	0.00E+00
Carbon disulfide	NA	NA	1.07E-03	2.50E-04	7.83E-03	1.83E-03	0.00E+00	0.00E+00

Table 11-6
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 8 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Aluminum	1.10E+02	NA	1.28E+01	6.90E+02	6.40E+01	1.04E+01	5.62E+02	5.22E+01	9.29E+00	5.01E+02	4.65E+01
Arsenic	2.24E+00	7.40E+00	2.79E-02	5.88E-01	3.85E-03	1.88E-02	3.80E-01	2.47E-03	1.65E-02	3.28E-01	2.12E-03
Calcium	NA	NA	8.14E+03	1.91E+04	5.62E-01	2.39E+03	5.61E+03	1.65E-01	1.64E+03	3.86E+03	1.14E-01
Chromium	2.66E+00	5.00E+00	3.05E-02	1.60E+00	1.39E-01	2.69E-02	1.56E+00	1.26E-01	2.02E-02	1.49E+00	1.02E-01
Cobalt	7.61E+00	2.67E+01	3.79E-02	2.52E+00	1.56E-01	1.61E-02	1.07E+00	6.61E-02	7.44E-03	4.95E-01	3.05E-02
Copper	4.05E+00	6.17E+01	1.86E-01	2.46E+00	3.84E-01	1.64E-01	2.23E+00	3.69E-01	1.58E-01	2.17E+00	3.65E-01
Iron	NA	NA	1.99E+01	8.10E+02	5.76E+00	1.32E+01	5.40E+02	3.84E+00	1.21E+01	4.95E+02	3.52E+00
Magnesium	NA	NA	6.58E+01	2.93E+02	1.12E-01	4.12E+01	1.84E+02	7.03E-02	5.13E+01	2.29E+02	8.75E-02
Manganese	9.97E+02	NA	9.27E+00	2.32E+01	3.31E+00	3.35E+00	9.85E+00	1.20E+00	3.20E+00	9.47E+00	1.14E+00
Mercury	4.50E-01	9.00E-01	2.25E-03	5.43E-02	7.92E-04	1.69E-03	5.07E-02	4.69E-04	2.52E-03	5.58E-02	9.72E-04
Potassium	NA	NA	1.65E+01	1.33E+02	1.12E-01	1.39E+01	1.13E+02	9.48E-02	1.45E+01	1.17E+02	9.89E-02
Selenium	5.00E-01	1.00E+00	2.42E-02	2.55E-01	2.56E-02	9.55E-03	1.36E-01	1.86E-02	8.84E-03	1.29E-01	1.81E-02
Sodium	NA	NA	3.45E-01	3.00E+01	6.98E-02	2.61E-01	2.27E+01	5.28E-02	2.63E-01	2.28E+01	5.31E-02
Vanadium	3.44E-01	NA	5.94E-02	1.70E+01	6.84E-01	4.10E-02	1.18E+01	4.72E-01	4.10E-02	1.18E+01	4.73E-01
Zinc	6.61E+01	1.31E+02	1.02E+00	5.02E+01	3.35E+00	8.66E-01	4.56E+01	3.28E+00	9.76E-01	4.90E+01	3.34E+00
VOCs											
2-Butanone	NA	NA	6.93E-03	2.09E-03	3.23E-12	4.40E-02	1.33E-02	2.05E-11	0.00E+00	0.00E+00	0.00E+00
Acetone	NA	NA	1.64E-01	2.55E-02	1.12E-11	1.45E-01	2.25E-02	9.89E-12	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	NA	NA	1.48E-04	4.15E-04	6.63E-11	1.09E-03	3.04E-03	4.86E-10	0.00E+00	0.00E+00	0.00E+00

Table 12-1
Detection Comparison to Region 4 Screening Levels
for the Site 9 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Inorganics					
Cyanide (Total)	2/6	5.90E-01	1.90E-01	9.00E-01	NO
Metals					
Aluminum	6/6	2.28E+04	2.01E+04	5.00E+01	YES
Antimony	1/6	3.50E-01	3.50E-01	3.50E+00	NO
Arsenic	6/6	1.89E+02	1.01E+02	1.00E+01	YES
Barium	6/6	1.84E+02	4.75E+01	1.65E+02	YES
Beryllium	6/6	6.80E-01	3.76E-01	1.10E+00	NO
Cadmium	6/6	1.05E+00	6.09E-01	1.60E+00	NO
Calcium	6/6	1.53E+04	3.71E+03	NA	YES
Chromium	6/6	1.63E+02	9.42E+01	4.00E-01	YES
Cobalt	6/6	1.04E+02	2.78E+01	2.00E+01	YES
Copper	6/6	8.78E+01	5.39E+01	4.00E+01	YES
Iron	6/6	1.23E+05	7.48E+04	2.00E+02	YES
Lead	6/6	2.29E+01	1.10E+01	5.00E+01	NO
Magnesium	6/6	4.23E+02	3.24E+02	NA	YES
Manganese	6/6	7.15E+03	1.73E+03	1.00E+02	YES
Mercury	6/6	4.40E-01	1.06E-01	1.00E-01	YES
Nickel	6/6	1.70E+01	9.95E+00	3.00E+01	NO
Potassium	6/6	6.19E+02	4.62E+02	NA	YES
Selenium	6/6	1.07E+01	4.37E+00	8.10E-01	YES
Silver	1/6	1.30E+00	1.30E+00	2.00E+00	NO
Sodium	6/6	4.35E+01	3.61E+01	NA	YES
Thallium	0/0	0.00E+00	0.00E+00	1.00E+00	NO
Tin	6/6	1.90E+00	1.57E+00	5.30E+01	NO
Vanadium	6/6	2.22E+02	1.81E+02	2.00E+00	YES
Zinc	6/6	6.77E+01	3.96E+01	5.00E+01	YES
VOCs					
Acetone	1/6	1.06E-02	1.06E-02	NA	YES
Toluene	2/6	1.70E-03	6.35E-04	5.00E-02	NO

Table 12-2
Frequency of Detection and Exposure Point Concentrations
for the Site 9 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Aluminum	6/6	2.28E+04	2.01E+04
Arsenic	6/6	1.89E+02	1.01E+02
Barium	6/6	1.84E+02	4.75E+01
Calcium	6/6	1.53E+04	3.71E+03
Chromium	6/6	1.63E+02	9.42E+01
Cobalt	6/6	1.04E+02	2.78E+01
Copper	6/6	8.78E+01	5.39E+01
Iron	6/6	1.23E+05	7.48E+04
Magnesium	6/6	4.23E+02	3.24E+02
Manganese	6/6	7.15E+03	1.73E+03
Mercury	6/6	4.40E-01	1.06E-01
Potassium	6/6	6.19E+02	4.62E+02
Selenium	6/6	1.07E+01	4.37E+00
Sodium	6/6	4.35E+01	3.61E+01
Vanadium	6/6	2.22E+02	1.81E+02
Zinc	6/6	6.77E+01	3.96E+01
VOCs			
Acetone	1/6	1.06E-02	1.06E-02

Table 12-3
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 9 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	2.28E+04	4.55E+02	2.01E+04	4.02E+02	3.00E+04
Arsenic	1.80E+01	1.89E+02	1.05E+01	1.01E+02	5.59E+00	4.39E+01
Barium	5.00E+02	1.84E+02	3.68E-01	4.75E+01	9.50E-02	1.02E+02
Calcium	NA	1.53E+04	--	3.71E+03	--	1.06E+05
Chromium	1.00E+00	1.63E+02	1.63E+02	9.42E+01	9.42E+01	6.98E+01
Cobalt	1.30E+01	1.04E+02	8.00E+00	2.78E+01	2.14E+00	1.66E+01
Copper	7.00E+01	8.78E+01	1.25E+00	5.39E+01	7.70E-01	8.37E+01
Iron	NA	1.23E+05	--	7.48E+04	--	4.71E+04
Magnesium	NA	4.23E+02	--	3.24E+02	--	5.13E+03
Manganese	2.20E+02	7.15E+03	3.25E+01	1.73E+03	7.86E+00	1.18E+03
Mercury	3.00E-01	4.40E-01	1.47E+00	1.06E-01	3.53E-01	3.20E-01
Potassium	NA	6.19E+02	--	4.62E+02	--	1.46E+03
Selenium	5.20E-01	1.07E+01	2.06E+01	4.37E+00	8.40E+00	1.00E+00
Sodium	NA	4.35E+01	--	3.61E+01	--	2.38E+02
Vanadium	2.00E+00	2.22E+02	1.11E+02	1.81E+02	9.07E+01	1.45E+02
Zinc	1.60E+02	6.77E+01	4.23E-01	3.96E+01	2.47E-01	8.10E+01
VOCs						
Acetone	NA	1.06E-02	--	1.06E-02	--	--

Table 12-4
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 9 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	2.28E+04	--	2.01E+04	--	3.00E+04
Arsenic	6.00E+01	1.89E+02	3.14E+00	1.01E+02	1.68E+00	4.39E+01
Barium	3.30E+02	1.84E+02	5.58E-01	4.75E+01	1.44E-01	1.02E+02
Calcium	NA	1.53E+04	--	3.71E+03	--	1.06E+05
Chromium	4.00E-01	1.63E+02	4.08E+02	9.42E+01	2.36E+02	6.98E+01
Cobalt	NA	1.04E+02	--	2.78E+01	--	1.66E+01
Copper	8.00E+01	8.78E+01	1.10E+00	5.39E+01	6.74E-01	8.37E+01
Iron	NA	1.23E+05	--	7.48E+04	--	4.71E+04
Magnesium	NA	4.23E+02	--	3.24E+02	--	5.13E+03
Manganese	4.50E+02	7.15E+03	1.59E+01	1.73E+03	3.84E+00	1.18E+03
Mercury	1.00E-01	4.40E-01	4.40E+00	1.06E-01	1.06E+00	3.20E-01
Potassium	NA	6.19E+02	--	4.62E+02	--	1.46E+03
Selenium	4.10E+00	1.07E+01	2.61E+00	4.37E+00	1.07E+00	1.00E+00
Sodium	NA	4.35E+01	--	3.61E+01	--	2.38E+02
Vanadium	NA	2.22E+02	--	1.81E+02	--	1.45E+02
Zinc	1.20E+02	6.77E+01	5.64E-01	3.96E+01	3.30E-01	8.10E+01
VOCs						
Acetone	NA	1.06E-02	--	1.06E-02	--	--

Table 12-5
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 9 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Metals								
Aluminum	1.93E+00	1.93E+01	6.60E+01	2.24E+02	5.82E+01	1.97E+02	6.70E+01	2.27E+02
Arsenic	1.04E+00	1.26E+00	7.72E-01	8.13E-01	4.65E-01	5.22E-01	1.19E-01	1.44E-01
Barium	5.18E+01	4.36E+02	3.78E+00	2.45E+00	9.75E-01	6.33E-01	1.27E+00	8.24E-01
Calcium	NA	NA	6.51E+03	1.27E+03	1.58E+03	3.09E+02	1.19E+04	2.32E+03
Chromium	2.40E+00	1.31E+01	5.41E-01	7.08E-01	3.13E-01	7.35E-01	1.46E-01	7.73E-01
Cobalt	7.33E+00	1.18E+02	5.03E-01	2.52E+00	1.34E-01	6.74E-01	5.36E-02	2.69E-01
Copper	5.60E+00	1.54E+01	1.59E+00	1.45E+00	1.27E+00	1.27E+00	1.14E+00	1.20E+00
Iron	NA	NA	3.57E+02	7.99E+02	2.17E+02	4.86E+02	8.76E+01	1.96E+02
Magnesium	NA	NA	5.21E+01	1.87E+01	3.99E+01	1.43E+01	3.70E+02	1.32E+02
Manganese	5.15E+01	2.84E+02	2.33E+02	1.58E+01	5.64E+01	5.99E+00	2.31E+01	3.26E+00
Mercury	1.32E+01	NA	2.96E-02	3.82E-02	1.34E-02	3.23E-02	1.82E-02	3.44E-02
Potassium	NA	NA	7.63E+01	5.16E+01	5.69E+01	3.85E+01	1.04E+02	7.07E+01
Selenium	1.43E-01	3.30E-01	8.65E-01	4.39E-01	3.23E-01	2.28E-01	6.37E-02	7.73E-02
Sodium	NA	NA	4.99E-01	3.62E+00	4.15E-01	3.01E+00	1.89E+00	1.37E+01
Vanadium	4.16E+00	NA	6.84E-01	1.63E+01	5.58E-01	1.33E+01	2.96E-01	7.05E+00
Zinc	7.54E+01	3.20E+02	6.22E+00	2.84E+01	4.59E+00	2.38E+01	7.04E+00	3.05E+01
VOCs								
Acetone	1.00E+01	5.00E+01	6.83E-02	8.83E-04	6.83E-02	8.83E-04	0.00E+00	0.00E+00

Table 12-6
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 9 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Aluminum	1.10E+02	NA	9.15E+00	4.94E+02	4.58E+01	8.07E+00	4.36E+02	4.04E+01	9.29E+00	5.01E+02	4.65E+01
Arsenic	2.24E+00	7.40E+00	1.07E-01	2.44E+00	1.58E-02	6.45E-02	1.44E+00	9.42E-03	1.65E-02	3.28E-01	2.12E-03
Barium	2.08E+01	4.17E+01	5.24E-01	5.01E+00	2.58E-01	1.35E-01	1.29E+00	9.99E-02	1.76E-01	1.68E+00	1.20E-01
Calcium	NA	NA	9.02E+02	2.12E+03	6.23E-02	2.19E+02	5.14E+02	1.51E-02	1.64E+03	3.86E+03	1.14E-01
Chromium	2.66E+00	5.00E+00	7.51E-02	2.12E+00	2.68E-01	4.34E-02	1.74E+00	1.79E-01	2.02E-02	1.49E+00	1.02E-01
Cobalt	7.61E+00	2.67E+01	6.97E-02	4.64E+00	2.86E-01	1.86E-02	1.24E+00	7.65E-02	7.44E-03	4.95E-01	3.05E-02
Copper	4.05E+00	6.17E+01	2.20E-01	2.84E+00	4.04E-01	1.75E-01	2.35E+00	3.77E-01	1.58E-01	2.17E+00	3.65E-01
Iron	NA	NA	4.94E+01	2.02E+03	1.43E+01	3.01E+01	1.23E+03	8.72E+00	1.21E+01	4.95E+02	3.52E+00
Magnesium	NA	NA	7.23E+00	3.22E+01	1.23E-02	5.53E+00	2.47E+01	9.44E-03	5.13E+01	2.29E+02	8.75E-02
Manganese	9.97E+02	NA	3.23E+01	6.86E+01	1.15E+01	7.82E+00	2.00E+01	2.79E+00	3.20E+00	9.47E+00	1.14E+00
Mercury	4.50E-01	9.00E-01	4.11E-03	6.33E-02	2.32E-03	1.86E-03	5.19E-02	5.60E-04	2.52E-03	5.58E-02	9.72E-04
Potassium	NA	NA	1.06E+01	8.57E+01	7.22E-02	7.89E+00	6.39E+01	5.38E-02	1.45E+01	1.17E+02	9.89E-02
Selenium	5.00E-01	1.00E+00	1.20E-01	7.63E-01	4.43E-02	4.47E-02	3.88E-01	3.16E-02	8.84E-03	1.29E-01	1.81E-02
Sodium	NA	NA	6.92E-02	6.02E+00	1.40E-02	5.75E-02	5.00E+00	1.16E-02	2.63E-01	2.28E+01	5.31E-02
Vanadium	3.44E-01	NA	9.48E-02	2.72E+01	1.09E+00	7.74E-02	2.22E+01	8.92E-01	4.10E-02	1.18E+01	4.73E-01
Zinc	6.61E+01	1.31E+02	8.62E-01	4.55E+01	3.28E+00	6.37E-01	3.81E+01	3.16E+00	9.76E-01	4.90E+01	3.34E+00
VOCs											
Acetone	NA	NA	9.47E-03	1.47E-03	6.44E-13	9.47E-03	1.47E-03	6.44E-13	0.00E+00	0.00E+00	0.00E+00

Table 13-1
Detection Comparison to Region 4 Screening Levels
for the Site 10 Exposure Grouping

Analyte	Surface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
VOCs					
Acetone	2/3	4.11E-02	1.93E-02	NA	YES

Table 13-2
Detection Comparison to Region 4 Screening Levels
for the Site 10 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
VOCs					
Acetone	3/3	6.97E-02	4.36E-02	NA	YES
Carbon disulfide	2/3	1.30E-03	8.93E-04	NA	YES

Table 13-3
Frequency of Detection and Exposure Point Concentrations
for the Site 10 Exposure Grouping

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
VOCs			
Acetone	2/3	4.11E-02	1.93E-02

Table 13-4
Frequency of Detection and Exposure Point Concentrations
for the Site 10 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
VOCs			
Acetone	3/3	6.97E-02	4.36E-02
Carbon disulfide	2/3	1.30E-03	8.93E-04

Table 13-5
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 10 Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
VOCs						
Acetone	NA	4.11E-02	--	1.93E-02	--	--

Table 13-6
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 10 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
VOCs						
Acetone	NA	6.97E-02	--	4.36E-02	--	--
Carbon disulfide	NA	1.30E-03	--	8.93E-04	--	--

Table 13-7
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 10 Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
VOCs						
Acetone	NA	4.11E-02	--	1.93E-02	--	--

Table 13-8
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 10 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
VOCs						
Acetone	NA	6.97E-02	--	4.36E-02	--	--
Carbon disulfide	NA	1.30E-03	--	8.93E-04	--	--

Table 13-9
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 10 Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
VOCs								
Acetone	1.00E+01	5.00E+01	**2.65E-01**	3.42E-03	**1.24E-01**	1.61E-03	0.00E+00	0.00E+00

Table 13-10
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 10 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
VOCs								
Acetone	1.00E+01	5.00E+01	4.49E-01	5.81E-03	2.81E-01	3.63E-03	0.00E+00	0.00E+00
Carbon disulfide	NA	NA	4.63E-04	1.08E-04	3.18E-04	7.44E-05	0.00E+00	0.00E+00

Table 13-11
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 10 Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
VOCs											
Acetone	NA	NA	3.67E-02	5.69E-03	2.50E-12	1.72E-02	2.67E-03	1.17E-12	0.00E+00	0.00E+00	0.00E+00

Table 13-12
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 10 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
VOCs											
Acetone	NA	NA	6.22E-02	9.64E-03	4.24E-12	3.89E-02	6.03E-03	2.65E-12	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	NA	NA	6.42E-05	1.80E-04	2.87E-11	4.41E-05	1.24E-04	1.98E-11	0.00E+00	0.00E+00	0.00E+00

Table 14-1
Detection Comparison to Region 4 Screening Levels
for the Site 11 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Inorganics					
Cyanide (Total)	1/4	5.30E-01	1.94E-01	9.00E-01	NO
Metals					
Aluminum	4/4	2.39E+04	2.24E+04	5.00E+01	YES
Antimony	2/4	9.60E-01	4.93E-01	3.50E+00	NO
Arsenic	4/4	1.19E+02	7.81E+01	1.00E+01	YES
Barium	4/4	4.93E+01	1.85E+01	1.65E+02	NO
Beryllium	4/4	5.60E-01	4.91E-01	1.10E+00	NO
Cadmium	4/4	8.90E-01	6.68E-01	1.60E+00	NO
Calcium	4/4	1.39E+04	6.75E+03	NA	YES
Chromium	4/4	1.40E+02	1.01E+02	4.00E-01	YES
Cobalt	4/4	2.37E+01	1.03E+01	2.00E+01	YES
Copper	4/4	5.81E+01	5.56E+01	4.00E+01	YES
Iron	4/4	7.00E+04	5.88E+04	2.00E+02	YES
Lead	4/4	1.52E+01	1.09E+01	5.00E+01	NO
Magnesium	4/4	1.43E+03	6.04E+02	NA	YES
Manganese	4/4	3.04E+03	9.15E+02	1.00E+02	YES
Mercury	4/4	2.65E-01	1.34E-01	1.00E-01	YES
Nickel	4/4	1.50E+01	1.25E+01	3.00E+01	NO
Potassium	4/4	5.18E+02	4.32E+02	NA	YES
Selenium	4/4	4.30E+00	2.58E+00	8.10E-01	YES
Sodium	4/4	9.78E+01	6.22E+01	NA	YES
Tin	4/4	2.50E+00	2.33E+00	5.30E+01	NO
Vanadium	4/4	2.41E+02	1.88E+02	2.00E+00	YES
Zinc	4/4	5.78E+01	4.49E+01	5.00E+01	YES
VOCs					
Acetone	3/4	5.23E-02	3.56E-02	NA	YES
Toluene	1/4	6.60E-04	4.39E-04	5.00E-02	NO

Table 14-2
Frequency of Detection and Exposure Point Concentrations
for the Site 11 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Aluminum	4/4	2.39E+04	2.24E+04
Arsenic	4/4	1.19E+02	7.81E+01
Calcium	4/4	1.39E+04	6.75E+03
Chromium	4/4	1.40E+02	1.01E+02
Cobalt	4/4	2.37E+01	1.03E+01
Copper	4/4	5.81E+01	5.56E+01
Iron	4/4	7.00E+04	5.88E+04
Magnesium	4/4	1.43E+03	6.04E+02
Manganese	4/4	3.04E+03	9.15E+02
Mercury	4/4	2.65E-01	1.34E-01
Potassium	4/4	5.18E+02	4.32E+02
Selenium	4/4	4.30E+00	2.58E+00
Sodium	4/4	9.78E+01	6.22E+01
Vanadium	4/4	2.41E+02	1.88E+02
Zinc	4/4	5.78E+01	4.49E+01
VOCs			
Acetone	3/4	5.23E-02	3.56E-02

Table 14-3
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 11 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	2.39E+04	4.78E+02	2.24E+04	4.49E+02	3.00E+04
Arsenic	1.80E+01	1.19E+02	6.61E+00	7.81E+01	4.34E+00	4.39E+01
Calcium	NA	1.39E+04	--	6.75E+03	--	1.06E+05
Chromium	1.00E+00	1.40E+02	1.40E+02	1.01E+02	1.01E+02	6.98E+01
Cobalt	1.30E+01	2.37E+01	1.82E+00	1.03E+01	7.93E-01	1.66E+01
Copper	7.00E+01	5.81E+01	8.30E-01	5.56E+01	7.94E-01	8.37E+01
Iron	NA	7.00E+04	--	5.88E+04	--	4.71E+04
Magnesium	NA	1.43E+03	--	6.04E+02	--	5.13E+03
Manganese	2.20E+02	3.04E+03	1.38E+01	9.15E+02	4.16E+00	1.18E+03
Mercury	3.00E-01	2.65E-01	8.83E-01	1.34E-01	4.48E-01	3.20E-01
Potassium	NA	5.18E+02	--	4.32E+02	--	1.46E+03
Selenium	5.20E-01	4.30E+00	8.27E+00	2.58E+00	4.95E+00	1.00E+00
Sodium	NA	9.78E+01	--	6.22E+01	--	2.38E+02
Vanadium	2.00E+00	2.41E+02	1.21E+02	1.88E+02	9.41E+01	1.45E+02
Zinc	1.60E+02	5.78E+01	3.61E-01	4.49E+01	2.81E-01	8.10E+01
VOCs						
Acetone	NA	5.23E-02	--	3.56E-02	--	--

Table 14-4
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 11 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	2.39E+04	--	2.24E+04	--	3.00E+04
Arsenic	6.00E+01	1.19E+02	1.98E+00	7.81E+01	1.30E+00	4.39E+01
Calcium	NA	1.39E+04	--	6.75E+03	--	1.06E+05
Chromium	4.00E-01	1.40E+02	3.50E+02	1.01E+02	2.51E+02	6.98E+01
Cobalt	NA	2.37E+01	--	1.03E+01	--	1.66E+01
Copper	8.00E+01	5.81E+01	7.26E-01	5.56E+01	6.95E-01	8.37E+01
Iron	NA	7.00E+04	--	5.88E+04	--	4.71E+04
Magnesium	NA	1.43E+03	--	6.04E+02	--	5.13E+03
Manganese	4.50E+02	3.04E+03	6.76E+00	9.15E+02	2.03E+00	1.18E+03
Mercury	1.00E-01	2.65E-01	2.65E+00	1.34E-01	1.34E+00	3.20E-01
Potassium	NA	5.18E+02	--	4.32E+02	--	1.46E+03
Selenium	4.10E+00	4.30E+00	1.05E+00	2.58E+00	6.28E-01	1.00E+00
Sodium	NA	9.78E+01	--	6.22E+01	--	2.38E+02
Vanadium	NA	2.41E+02	--	1.88E+02	--	1.45E+02
Zinc	1.20E+02	5.78E+01	4.82E-01	4.49E+01	3.74E-01	8.10E+01
VOCs						
Acetone	NA	5.23E-02	--	3.56E-02	--	--

Table 14-5
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 11 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Metals								
Aluminum	1.93E+00	1.93E+01	6.93E+01	2.35E+02	6.50E+01	2.20E+02	6.70E+01	2.27E+02
Arsenic	1.04E+00	1.26E+00	5.32E-01	5.87E-01	3.81E-01	4.36E-01	1.19E-01	1.44E-01
Calcium	NA	NA	5.92E+03	1.16E+03	2.87E+03	5.62E+02	1.19E+04	2.32E+03
Chromium	2.40E+00	1.31E+01	4.65E-01	7.15E-01	3.34E-01	7.31E-01	1.46E-01	7.73E-01
Cobalt	7.33E+00	1.18E+02	1.15E-01	5.75E-01	4.98E-02	2.50E-01	5.36E-02	2.69E-01
Copper	5.60E+00	1.54E+01	1.31E+00	1.30E+00	1.28E+00	1.29E+00	1.14E+00	1.20E+00
Iron	NA	NA	2.03E+02	4.55E+02	1.70E+02	3.82E+02	8.76E+01	1.96E+02
Magnesium	NA	NA	1.76E+02	6.32E+01	7.44E+01	2.67E+01	3.70E+02	1.32E+02
Manganese	5.15E+01	2.84E+02	9.92E+01	8.81E+00	2.99E+01	3.88E+00	2.31E+01	3.26E+00
Mercury	1.32E+01	NA	2.23E-02	3.59E-02	1.53E-02	3.32E-02	1.82E-02	3.44E-02
Potassium	NA	NA	6.38E+01	4.31E+01	5.32E+01	3.60E+01	1.04E+02	7.07E+01
Selenium	1.43E-01	3.30E-01	3.17E-01	2.25E-01	1.80E-01	1.55E-01	5.91E-02	7.35E-02
Sodium	NA	NA	1.12E+00	8.15E+00	7.14E-01	5.18E+00	1.89E+00	1.37E+01
Vanadium	4.16E+00	8.31E+00	7.42E-01	1.77E+01	5.80E-01	1.38E+01	2.96E-01	7.05E+00
Zinc	7.54E+01	3.20E+02	5.69E+00	2.70E+01	4.93E+00	2.48E+01	7.04E+00	3.05E+01
VOCs								
Acetone	1.00E+01	5.00E+01	3.37E-01	4.36E-03	2.29E-01	2.96E-03	0.00E+00	0.00E+00

Table 14-6
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 11 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Aluminum	1.10E+02	NA	9.61E+00	5.19E+02	4.81E+01	9.01E+00	4.87E+02	4.51E+01	9.29E+00	5.01E+02	4.65E+01
Arsenic	2.24E+00	7.40E+00	7.37E-02	1.66E+00	1.08E-02	5.28E-02	1.17E+00	7.65E-03	1.65E-02	3.28E-01	2.12E-03
Calcium	NA	NA	8.20E+02	1.93E+03	5.66E-02	3.98E+02	9.34E+02	2.75E-02	1.64E+03	3.86E+03	1.14E-01
Chromium	2.66E+00	5.00E+00	6.45E-02	1.99E+00	2.40E-01	4.63E-02	1.77E+00	1.88E-01	2.02E-02	1.49E+00	1.02E-01
Cobalt	7.61E+00	2.67E+01	1.59E-02	1.06E+00	6.52E-02	6.91E-03	4.60E-01	2.84E-02	7.44E-03	4.95E-01	3.05E-02
Copper	4.05E+00	6.17E+01	1.82E-01	2.42E+00	3.81E-01	1.78E-01	2.38E+00	3.79E-01	1.58E-01	2.17E+00	3.65E-01
Iron	NA	NA	2.81E+01	1.15E+03	8.16E+00	2.36E+01	9.64E+02	6.85E+00	1.21E+01	4.95E+02	3.52E+00
Magnesium	NA	NA	2.44E+01	1.09E+02	4.17E-02	1.03E+01	4.60E+01	1.76E-02	5.13E+01	2.29E+02	8.75E-02
Manganese	9.97E+02	NA	1.37E+01	3.25E+01	4.91E+00	4.14E+00	1.17E+01	1.48E+00	3.20E+00	9.47E+00	1.14E+00
Mercury	4.50E-01	9.00E-01	3.09E-03	5.87E-02	1.40E-03	2.12E-03	5.35E-02	7.09E-04	2.52E-03	5.58E-02	9.72E-04
Potassium	NA	NA	8.84E+00	7.16E+01	6.03E-02	7.38E+00	5.98E+01	5.04E-02	1.45E+01	1.17E+02	9.89E-02
Selenium	5.00E-01	1.00E+00	4.40E-02	3.84E-01	3.14E-02	2.50E-02	2.61E-01	2.59E-02	8.19E-03	1.22E-01	1.77E-02
Sodium	NA	NA	1.56E-01	1.35E+01	3.15E-02	9.90E-02	8.61E+00	2.00E-02	2.63E-01	2.28E+01	5.31E-02
Vanadium	3.44E-01	6.88E-01	1.03E-01	2.95E+01	1.19E+00	8.04E-02	2.31E+01	9.27E-01	4.10E-02	1.18E+01	4.73E-01
Zinc	6.61E+01	1.31E+02	7.88E-01	4.32E+01	3.25E+00	6.83E-01	3.97E+01	3.19E+00	9.76E-01	4.90E+01	3.34E+00
VOCs											
Acetone	NA	NA	4.67E-02	7.24E-03	3.18E-12	3.18E-02	4.92E-03	2.16E-12	0.00E+00	0.00E+00	0.00E+00

Table 15-1
Detection Comparison to Region 4 Screening Levels
for the Site 12 Exposure Grouping

Analyte	Surface Soil				Sediment				Surface Water (Total)				Surface Water (Dissolved)				Selection of Chemicals of Potential Concern	
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Frequency	Maximum (µg/L)	Mean (µg/L)	Region 4 Screening Criteria (µg/L)	Frequency	Maximum (µg/L)	Mean (µg/L)	Region 4 Screening Criteria (µg/L)	Terrestrial Habitats	Aquatic Habitats
Metals																		
Aluminum	4/4	1.91E+04	1.79E+04	5.00E+01	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	8.70E+01	0/0	0.00E+00	0.00E+00	8.70E+01	YES	NO
Arsenic	4/4	7.90E+00	7.56E+00	1.00E+01	6/6	3.58E+01	2.38E+01	7.24E+00	3/6	8.90E+01	2.15E+01	1.90E+02	3/6	5.90E+00	4.90E+00	1.90E+02	NO	YES
Barium	4/4	5.65E+01	4.79E+01	1.65E+02	6/6	2.31E+02	1.28E+02	NA	6/6	5.89E+02	2.34E+02	NA	6/6	1.13E+02	1.00E+02	NA	NO	YES
Beryllium	4/4	3.10E-01	2.38E-01	1.10E+00	6/6	4.10E-01	2.50E-01	NA	1/6	4.80E-01	4.13E-01	5.30E-01	0/0	0.00E+00	0.00E+00	5.30E-01	NO	YES
Cadmium	3/4	1.30E+00	6.35E-01	1.60E+00	6/6	7.20E-01	4.28E-01	1.00E+00	0/0	0.00E+00	0.00E+00	6.60E-01	0/0	0.00E+00	0.00E+00	6.60E-01	NO	NO
Calcium	4/4	5.48E+04	2.08E+04	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	YES	NO
Chromium	4/4	2.72E+01	2.35E+01	4.00E-01	6/6	2.45E+01	1.96E+01	5.23E+01	5/6	8.30E+00	2.82E+00	1.17E+02	1/6	3.40E+00	1.23E+00	1.17E+02	YES	NO
Cobalt	4/4	9.40E+00	8.28E+00	2.00E+01	6/6	1.52E+01	8.84E+00	NA	4/6	9.50E+00	4.58E+00	NA	0/0	0.00E+00	0.00E+00	NA	NO	YES
Copper	4/4	3.47E+01	3.19E+01	4.00E+01	6/6	2.89E+01	1.86E+01	1.87E+01	5/6	4.64E+01	2.00E+01	6.54E+00	2/6	3.80E+00	2.95E+00	6.54E+00	NO	YES
Iron	4/4	2.34E+04	2.16E+04	2.00E+02	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	1.00E+03	0/0	0.00E+00	0.00E+00	1.00E+03	YES	NO
Lead	4/4	4.27E+01	2.55E+01	5.00E+01	6/6	2.21E+01	1.03E+01	3.02E+01	3/6	6.90E+00	4.12E+00	1.32E+00	1/6	3.00E+00	2.83E+00	1.32E+00	NO	YES
Magnesium	4/4	3.24E+03	2.32E+03	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	YES	NO
Manganese	4/4	4.06E+02	3.73E+02	1.00E+02	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	YES	NO
Mercury	4/4	1.50E-01	1.03E-01	1.00E-01	6/6	1.40E-01	8.23E-02	1.30E-01	6/6	1.20E-01	6.18E-02	1.20E-02	6/6	6.80E-02	4.94E-02	1.20E-02	YES	YES
Nickel	4/4	1.07E+01	7.78E+00	3.00E+01	6/6	8.20E+00	5.60E+00	1.59E+01	3/6	5.30E+00	3.35E+00	8.77E+01	0/0	0.00E+00	0.00E+00	8.77E+01	NO	NO
Potassium	4/4	8.55E+02	7.46E+02	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	YES	NO
Selenium	0/0	0.00E+00	0.00E+00	8.10E-01	6/6	3.50E+00	2.55E+00	NA	2/6	7.90E+00	6.50E+00	5.00E+00	0/0	0.00E+00	0.00E+00	5.00E+00	NO	YES
Silver	1/4	3.10E-01	2.31E-01	2.00E+00	2/6	6.90E-01	3.17E-01	2.00E+00	1/6	1.40E+00	1.07E+00	1.20E-02	1/6	1.40E+00	1.07E+00	1.20E-02	NO	YES
Sodium	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	NO	NO
Thallium	0/0	0.00E+00	0.00E+00	1.00E+00	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	4.00E+00	0/0	0.00E+00	0.00E+00	4.00E+00	NO	NO
Tin	0/0	0.00E+00	0.00E+00	5.30E+01	6/6	3.50E+00	2.42E+00	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	NO	YES
Vanadium	4/4	7.76E+01	6.85E+01	2.00E+00	6/6	5.62E+01	4.03E+01	NA	6/6	2.32E+01	8.17E+00	NA	2/6	2.10E+00	1.87E+00	NA	YES	YES
Zinc	4/4	7.80E+01	5.08E+01	5.00E+01	6/6	8.05E+01	4.83E+01	1.24E+02	6/6	4.06E+01	1.83E+01	5.89E+01	5/6	6.10E+00	4.47E+00	5.89E+01	YES	NO
PAHs																		
Anthracene	0/0	1.00E+01	5.00E+00	1.00E-01	1/6	8.48E-02	2.97E-02	3.30E-01	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	NO	NO
Benzo(a)Anthracene	1/4	2.18E-02	5.67E-03	NA	1/6	2.25E-01	3.78E-02	3.30E-01	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	YES	NO
Benzo(a)Pyrene	1/4	1.47E-02	4.19E-03	1.00E-01	1/6	1.22E-01	2.11E-02	3.30E-01	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	NO	NO
Benzo(b)Fluoranthene	1/4	1.98E-02	6.26E-03	NA	1/6	1.74E-01	3.10E-02	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	YES	YES
Benzo(g,h,i)Perylene	0/0	0.00E+00	0.00E+00	NA	1/6	6.28E-02	1.14E-02	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	NO	YES
Benzo(k)Fluoranthene	1/4	1.62E-02	4.63E-03	NA	1/6	5.26E-02	9.67E-03	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	YES	YES
Chrysene	1/4	1.89E-02	5.11E-03	NA	1/6	1.50E-01	2.56E-02	3.30E-01	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	YES	NO
Dibenzo(a,h)Anthracene	0/0	0.00E+00	0.00E+00	NA	1/6	2.56E-02	4.96E-03	3.30E-01	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	NO	NO
Fluoranthene	1/4	3.39E-02	2.06E-02	1.00E-01	2/6	4.14E-01	8.58E-02	3.30E-01	0/0	0.00E+00	0.00E+00	3.98E+01	0/0	0.00E+00	0.00E+00	3.98E+01	NO	YES
Indeno(1,2,3-Cd)Pyrene	0/0	0.00E+00	0.00E+00	NA	1/6	6.38E-02	1.15E-02	NA	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	NO	YES
Phenanthrene	1/4	2.85E-02	7.50E-03	1.00E-01	2/6	2.51E-01	4.67E-02	3.30E-01	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	NO	NO
Pyrene	1/4	2.82E-02	1.89E-02	1.00E-01	2/6	3.44E-01	7.37E-02	3.30E-01	0/0	0.00E+00	0.00E+00	NA	0/0	0.00E+00	0.00E+00	NA	NO	YES
Total LMW PAHs	--	2.01E+01	1.00E+01	--	--	4.99E-01	1.16E-01	--	--	0.00E+00	0.00E+00	--	--	0.00E+00	0.00E+00	--	NO	YES
Total HMW PAHs	--	1.20E-01	4.48E-02	--	--	1.47E+00	2.73E-01	--	--	0.00E+00	0.00E+00	--	--	0.00E+00	0.00E+00	--	YES	YES
Pesticides																		
4,4'-DDD	0/0	0.00E+00	0.00E+00	NA	1/6	2.74E-01	4.72E-02	3.30E-03	0/0	0.00E+00	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	6.40E-03	NO	YES
4,4'-DDE	1/4	2.20E-03	8.93E-04	NA	1/6	3.41E-02	7.20E-03	3.30E-03	1/6	2.70E-02	5.99E-03	1.05E+01	1/6	2.70E-02	5.99E-03	1.05E+01	YES	YES
4,4'-DDT	2/4	3.70E-03	1.69E-03	NA	2/6	1.20E-02	4.70E-03	3.30E-03	0/0	0.00E+00	0.00E+00	1.00E-03	0/0	0.00E+00	0.00E+00	1.00E-03	YES	YES
DDTr	--	--	--	2.50E-03	--	--	--	3.30E-03	--	--	--	NA	--	--	--	NA	YES	YES
Alpha-Chlordane	0/0	0.00E+00	0.00E+00	NA	1/6	5.52E-02	1.09E-02	1.70E-03	0/0	0.00E+00	0.00E+00	4.30E-03	0/0	0.00E+00	0.00E+00	4.30E-03	NO	YES
Dieldrin	0/0	0.00E+00	0.00E+00	5.00E-04	1/6	1.16E-02	3.47E-03	3.30E-03	0/0	0.00E+00	0.00E+00	1.90E-03	0/0	0.00E+00	0.00E+00	1.90E-03	NO	YES
SVOCs																		
Bis(2-ethylhexyl)phthalate	1/4	5.63E-02	5.81E-02	NA	0/0	0.00E+00	0.00E+00	1.82E-01	1/6	1.70E+00	8.51E-01	NA	1/6	1.70E+00	8.51E-01	NA	YES	YES

Table 15-2
Frequency of Detection and Exposure Point Concentrations
for the Site 12 Exposure Grouping

Analyte	Surface Soil			Surface Water Accessible for Drinking by Wildlife (Total Concentrations)			Sediment			Surface Water (Total Concentration)			Surface Water (Dissolved Concentration)		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Frequency	Maximum (mg/L)	Mean (mg/L)	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Frequency	Maximum (µg/L)	Mean (µg/L)	Frequency	Maximum (µg/L)	Mean (µg/L)
Metals															
Aluminum	4/4	1.91E+04	1.79E+04	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Arsenic	4/4	7.90E+00	7.56E+00	3/6	8.90E-02	2.15E-02	6/6	3.58E+01	2.38E+01	3/6	8.90E+01	2.15E+01	3/6	5.90E+00	4.90E+00
Barium	4/4	5.65E+01	4.79E+01	6/6	5.89E-01	2.34E-01	6/6	2.31E+02	1.28E+02	6/6	5.89E+02	2.34E+02	6/6	1.13E+02	1.00E+02
Beryllium	4/4	3.10E-01	2.38E-01	1/6	4.80E-04	4.13E-04	6/6	4.10E-01	2.50E-01	1/6	4.80E-01	4.13E-01	0/0	0.00E+00	0.00E+00
Cadmium	3/4	1.30E+00	6.35E-01	0/0	0.00E+00	0.00E+00	6/6	7.20E-01	4.28E-01	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Calcium	4/4	5.48E+04	2.08E+04	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Chromium	4/4	2.72E+01	2.35E+01	5/6	8.30E-03	2.82E-03	6/6	2.45E+01	1.96E+01	5/6	8.30E+00	2.82E+00	1/6	3.40E+00	1.23E+00
Cobalt	4/4	9.40E+00	8.28E+00	4/6	9.50E-03	4.58E-03	6/6	1.52E+01	8.84E+00	4/6	9.50E+00	4.58E+00	0/0	0.00E+00	0.00E+00
Copper	4/4	3.47E+01	3.19E+01	5/6	4.64E-02	2.00E-02	6/6	2.89E+01	1.86E+01	5/6	4.64E+01	2.00E+01	2/6	3.80E+00	2.95E+00
Iron	4/4	2.34E+04	2.16E+04	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Lead	4/4	4.27E+01	2.55E+01	3/6	6.90E-03	4.12E-03	6/6	2.21E+01	1.03E+01	3/6	6.90E+00	4.12E+00	1/6	3.00E+00	2.83E+00
Magnesium	4/4	3.24E+03	2.32E+03	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Manganese	4/4	4.06E+02	3.73E+02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Mercury	4/4	1.50E-01	1.03E-01	6/6	1.20E-04	6.18E-05	6/6	1.40E-01	8.23E-02	6/6	1.20E-01	6.18E-02	6/6	6.80E-02	4.94E-02
Potassium	4/4	8.55E+02	7.46E+02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Selenium	0/0	0.00E+00	0.00E+00	2/6	7.90E-03	6.50E-03	6/6	3.50E+00	2.55E+00	2/6	7.90E+00	6.50E+00	0/0	0.00E+00	0.00E+00
Silver	1/4	3.10E-01	2.31E-01	1/6	1.40E-03	1.07E-03	2/6	6.90E-01	3.17E-01	1/6	1.40E+00	1.07E+00	1/6	1.40E+00	1.07E+00
Tin	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	6/6	3.50E+00	2.42E+00	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Vanadium	4/4	7.76E+01	6.85E+01	6/6	2.32E-02	8.17E-03	6/6	5.62E+01	4.03E+01	6/6	2.32E+01	8.17E+00	2/6	2.10E+00	1.87E+00
Zinc	4/4	7.80E+01	5.08E+01	6/6	4.06E-02	1.83E-02	6/6	8.05E+01	4.83E+01	6/6	4.06E+01	1.83E+01	5/6	6.10E+00	4.47E+00
PAHs															
Anthracene	0/0	1.00E+01	5.00E+00	0/0	0.00E+00	0.00E+00	1/6	8.48E-02	2.97E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Benzo(a)Anthracene	1/4	2.18E-02	5.67E-03	0/0	0.00E+00	0.00E+00	1/6	2.25E-01	3.78E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Benzo(a)Pyrene	1/4	1.47E-02	4.19E-03	0/0	0.00E+00	0.00E+00	1/6	1.22E-01	2.11E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	1/4	1.98E-02	6.26E-03	0/0	0.00E+00	0.00E+00	1/6	1.74E-01	3.10E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	1/6	6.28E-02	1.14E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	1/4	1.62E-02	4.63E-03	0/0	0.00E+00	0.00E+00	1/6	5.26E-02	9.67E-03	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Chrysene	1/4	1.89E-02	5.11E-03	0/0	0.00E+00	0.00E+00	1/6	1.50E-01	2.56E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	1/6	2.56E-02	4.96E-03	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Fluoranthene	1/4	3.39E-02	2.06E-02	0/0	0.00E+00	0.00E+00	2/6	4.14E-01	8.58E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	1/6	6.38E-02	1.15E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Phenanthrene	1/4	2.85E-02	7.50E-03	0/0	0.00E+00	0.00E+00	2/6	2.51E-01	4.67E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Pyrene	1/4	2.82E-02	1.89E-02	0/0	0.00E+00	0.00E+00	2/6	3.44E-01	7.37E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Total LMW PAHs	--	2.01E+01	1.00E+01	--	0.00E+00	0.00E+00	--	4.99E-01	1.16E-01	--	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00
Total HMW PAHs	--	1.20E-01	4.48E-02	--	0.00E+00	0.00E+00	--	1.47E+00	2.73E-01	--	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00
Pesticides															
4,4'-DDD	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	1/6	2.74E-01	4.72E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
4,4'-DDE	1/4	2.20E-03	8.93E-04	1/6	2.70E-05	5.99E-06	1/6	3.41E-02	7.20E-03	1/6	2.70E-02	5.99E-03	1/6	2.70E-02	5.99E-03
4,4'-DDT	2/4	3.70E-03	1.69E-03	0/0	0.00E+00	0.00E+00	2/6	1.20E-02	4.70E-03	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
DDTr	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alpha-Chlordane	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	1/6	5.52E-02	1.09E-02	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
Dieldrin	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00	1/6	1.16E-02	3.47E-03	0/0	0.00E+00	0.00E+00	0/0	0.00E+00	0.00E+00
SVOCs															
Bis(2-ethylhexyl)phthalate	1/4	5.63E-02	5.81E-02	1/6	1.70E-03	8.51E-04	0/0	0.00E+00	0.00E+00	1/6	1.70E+00	8.51E-01	1/6	1.70E+00	8.51E-01

Table 15-3
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 12 Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	1.91E+04	3.82E+02	1.79E+04	3.57E+02	3.00E+04
Arsenic	1.80E+01	7.90E+00	4.39E-01	7.56E+00	4.20E-01	4.39E+01
Barium	5.00E+02	5.65E+01	1.13E-01	4.79E+01	9.58E-02	1.02E+02
Beryllium	1.00E+01	3.10E-01	3.10E-02	2.38E-01	2.38E-02	6.47E-01
Cadmium	3.20E+01	1.30E+00	4.06E-02	6.35E-01	1.98E-02	8.58E-01
Calcium	NA	5.48E+04	--	2.08E+04	--	1.06E+05
Chromium	1.00E+00	2.72E+01	2.72E+01	2.35E+01	2.35E+01	6.98E+01
Cobalt	1.30E+01	9.40E+00	7.23E-01	8.28E+00	6.37E-01	1.66E+01
Copper	7.00E+01	3.47E+01	4.96E-01	3.19E+01	4.56E-01	8.37E+01
Iron	NA	2.34E+04	--	2.16E+04	--	4.71E+04
Lead	1.20E+02	4.27E+01	3.55E-01	2.55E+01	2.13E-01	2.75E+01
Magnesium	NA	3.24E+03	--	2.32E+03	--	5.13E+03
Manganese	2.20E+02	4.06E+02	1.85E+00	3.73E+02	1.69E+00	1.18E+03
Mercury	3.00E-01	1.50E-01	5.00E-01	1.03E-01	3.44E-01	3.20E-01
Potassium	NA	8.55E+02	--	7.46E+02	--	1.46E+03
Silver	5.60E+02	3.10E-01	5.54E-04	2.31E-01	4.13E-04	2.20E-01
Vanadium	2.00E+00	7.76E+01	3.88E+01	6.85E+01	3.42E+01	1.45E+02
Zinc	1.60E+02	7.80E+01	4.88E-01	5.08E+01	3.18E-01	8.10E+01
PAHs						
Total LMW PAHs	2.00E+04	2.01E+01	1.00E-03	1.00E+01	5.01E-04	--
Total HMW PAHs	2.00E+04	1.20E-01	5.98E-06	4.48E-02	2.24E-06	--
PCBs						
Aroclor-1260	4.00E+04	NO COPC	--	NO COPC	--	--
Pesticides						
4,4'-DDD	NA	0.00E+00	--	0.00E+00	--	5.10E-04
4,4'-DDE	NA	2.20E-03	--	8.93E-04	--	3.37E-03
4,4'-DDT	NA	3.70E-03	--	1.69E-03	--	2.65E-03
DDTr	NA	--	--	--	--	--
Alpha-Chlordane	NA	0.00E+00	--	0.00E+00	--	6.40E-04
Dieldrin	NA	0.00E+00	--	0.00E+00	--	--
SVOCs						
Bis(2-ethylhexyl)phthalate	1.00E+05	5.63E-02	5.63E-07	5.81E-02	5.81E-07	--

Table 15-4
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 12 Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	1.91E+04	--	1.79E+04	--	3.00E+04
Arsenic	6.00E+01	7.90E+00	1.32E-01	7.56E+00	1.26E-01	4.39E+01
Barium	3.30E+02	5.65E+01	1.71E-01	4.79E+01	1.45E-01	1.02E+02
Beryllium	4.00E+01	3.10E-01	7.75E-03	2.38E-01	5.94E-03	6.47E-01
Cadmium	1.40E+02	1.30E+00	9.29E-03	6.35E-01	4.54E-03	8.58E-01
Calcium	NA	5.48E+04	--	2.08E+04	--	1.06E+05
Chromium	4.00E-01	2.72E+01	6.80E+01	2.35E+01	5.87E+01	6.98E+01
Cobalt	NA	9.40E+00	--	8.28E+00	--	1.66E+01
Copper	8.00E+01	3.47E+01	4.34E-01	3.19E+01	3.99E-01	8.37E+01
Iron	NA	2.34E+04	--	2.16E+04	--	4.71E+04
Lead	1.70E+03	4.27E+01	2.51E-02	2.55E+01	1.50E-02	2.75E+01
Magnesium	NA	3.24E+03	--	2.32E+03	--	5.13E+03
Manganese	4.50E+02	4.06E+02	9.02E-01	3.73E+02	8.28E-01	1.18E+03
Mercury	1.00E-01	1.50E-01	1.50E+00	1.03E-01	1.03E+00	3.20E-01
Potassium	NA	8.55E+02	--	7.46E+02	--	1.46E+03
Selenium	4.10E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00
Silver	NA	3.10E-01	--	2.31E-01	--	2.20E-01
Vanadium	NA	7.76E+01	--	6.85E+01	--	1.45E+02
Zinc	1.20E+02	7.80E+01	6.50E-01	5.08E+01	4.23E-01	8.10E+01
PAHs						
Total LMW PAHs	2.90E+01	2.01E+01	6.92E-01	1.00E+01	3.46E-01	--
Total HMW PAHs	1.80E+04	1.20E-01	6.64E-06	4.48E-02	2.49E-06	--
PCBs						
Aroclor-1260	2.51E+03	NO COPC	--	NO COPC	--	--
Pesticides						
4,4'-DDD	1.50E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10E-04
4,4'-DDE	1.50E+03	2.20E-03	1.47E-06	8.93E-04	5.95E-07	3.37E-03
4,4'-DDT	1.50E+03	3.70E-03	2.47E-06	1.69E-03	1.13E-06	2.65E-03
DDTr	1.50E+03	--	#VALUE!	--	#VALUE!	--
Alpha-Chlordane	NA	0.00E+00	--	0.00E+00	--	6.40E-04
Dieldrin	NA	0.00E+00	--	0.00E+00	--	--
SVOCs						
Bis(2-ethylhexyl)phthalate	2.00E+05	5.63E-02	2.82E-07	5.81E-02	2.90E-07	--

Table 15-5
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 12 Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Predatory Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Predatory Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Predatory Mammals (mg/kg-bw day)
Metals											
Aluminum	1.93E+00	1.93E+01	5.54E+01	1.88E+02	NA	5.18E+01	1.76E+02	NA	6.70E+01	2.27E+02	NA
Arsenic	1.04E+00	1.26E+00	8.40E-02	1.01E-01	NA	7.28E-02	8.74E-02	NA	1.19E-01	1.44E-01	NA
Barium	5.18E+01	4.36E+02	1.24E+00	8.47E-01	NA	1.02E+00	6.76E-01	NA	1.27E+00	8.24E-01	NA
Beryllium	5.32E-01	NA	1.19E-03	3.06E-02	NA	9.17E-04	2.34E-02	NA	1.33E-03	3.62E-02	NA
Cadmium	7.70E-01	1.00E+01	8.97E-02	8.50E-01	NA	6.01E-02	4.81E-01	NA	5.90E-02	4.68E-01	NA
Calcium	NA	NA	2.33E+04	4.57E+03	NA	8.86E+03	1.74E+03	NA	1.19E+04	2.32E+03	NA
Chromium	2.40E+00	1.31E+01	9.15E-02	8.00E-01	NA	7.84E-02	8.07E-01	NA	1.46E-01	7.73E-01	NA
Cobalt	7.33E+00	1.18E+02	4.67E-02	2.29E-01	NA	4.06E-02	2.01E-01	NA	5.36E-02	2.69E-01	NA
Copper	5.60E+00	1.54E+01	1.04E+00	1.14E+00	NA	1.00E+00	1.11E+00	NA	1.14E+00	1.20E+00	NA
Iron	NA	NA	6.78E+01	1.52E+02	NA	6.25E+01	1.40E+02	NA	8.76E+01	1.96E+02	NA
Lead	4.70E+00	8.00E+01	3.67E-01	1.39E+00	NA	2.59E-01	9.16E-01	NA	2.72E-01	9.72E-01	NA
Magnesium	NA	NA	3.99E+02	1.43E+02	NA	2.86E+02	1.03E+02	NA	3.70E+02	1.32E+02	NA
Manganese	5.15E+01	2.84E+02	1.32E+01	2.23E+00	NA	1.22E+01	2.10E+00	NA	2.31E+01	3.26E+00	NA
Mercury	1.32E+01	NA	1.63E-02	3.36E-02	NA	1.32E-02	3.22E-02	NA	1.82E-02	3.44E-02	NA
Potassium	NA	NA	1.05E+02	7.12E+01	NA	9.19E+01	6.22E+01	NA	1.04E+02	7.07E+01	NA
Selenium	1.43E-01	3.30E-01	#NUM!	1.26E-03	NA	#NUM!	1.04E-03	NA	5.91E-02	7.35E-02	NA
Silver	6.02E+00	1.16E+02	1.59E-02	3.95E-01	NA	1.19E-02	2.95E-01	NA	4.11E-02	1.03E+00	NA
Tin	2.34E+01	3.50E+01	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA
Vanadium	4.16E+00	8.31E+00	2.42E-01	5.69E+00	NA	2.12E-01	5.02E+00	NA	2.96E-01	7.05E+00	NA
Zinc	7.54E+01	3.20E+02	6.74E+00	2.98E+01	NA	5.29E+00	2.59E+01	NA	7.04E+00	3.05E+01	NA
PAHs											
Anthracene	NA	NA	1.50E-01	2.67E-01	NA	7.49E-02	1.33E-01	NA	0.00E+00	0.00E+00	NA
Benzo(a)Anthracene	NA	NA	1.07E-04	4.90E-04	NA	2.78E-05	1.27E-04	NA	0.00E+00	0.00E+00	NA
Benzo(a)Pyrene	1.00E+00	1.00E+01	5.98E-05	4.16E-04	NA	1.71E-05	1.19E-04	NA	0.00E+00	0.00E+00	NA
Benzo(b)Fluoranthene	NA	NA	7.46E-05	3.46E-04	NA	2.36E-05	1.10E-04	NA	0.00E+00	0.00E+00	NA
Benzo(g,h,i)Perylene	NA	NA	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA
Benzo(k)Fluoranthene	NA	NA	6.11E-05	2.83E-04	NA	1.75E-05	8.11E-05	NA	0.00E+00	0.00E+00	NA
Chrysene	NA	NA	9.27E-05	6.93E-04	NA	2.51E-05	1.87E-04	NA	0.00E+00	0.00E+00	NA
Dibenzo(a,h)Anthracene	NA	NA	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA
Fluoranthene	NA	NA	3.00E-04	1.05E-03	NA	1.82E-04	6.35E-04	NA	0.00E+00	0.00E+00	NA
Indeno(1,2,3-Cd)Pyrene	NA	NA	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA
Phenanthrene	NA	NA	4.20E-04	6.65E-04	NA	1.10E-04	1.75E-04	NA	0.00E+00	0.00E+00	NA
Pyrene	NA	NA	2.67E-04	9.16E-04	NA	1.79E-04	6.15E-04	NA	0.00E+00	0.00E+00	NA
Total LMW PAHs	6.56E+01	4.34E+02	1.51E-01	2.68E-01	NA	7.52E-02	1.34E-01	NA	0.00E+00	0.00E+00	NA
Total HMW PAHs	6.15E-01	1.08E+01	6.63E-04	3.15E-03	NA	2.90E-04	1.24E-03	NA	0.00E+00	0.00E+00	NA
Pesticides											
4,4'-DDD	1.47E-01	4.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA	1.82E-04	3.16E-02	NA
4,4'-DDE	1.47E-01	4.00E+00	1.25E-05	1.65E-03	NA	4.39E-06	6.70E-04	NA	2.23E-04	4.17E-02	NA
4,4'-DDT	1.47E-01	4.00E+00	1.10E-05	2.77E-03	NA	5.02E-06	1.27E-03	NA	5.26E-05	1.33E-02	NA
DDTr	1.47E-01	4.00E+00	2.35E-05	4.43E-03	NA	9.41E-06	1.94E-03	NA	4.57E-04	8.66E-02	NA
Alpha-Chlordane	4.60E+00	9.20E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA	4.36E-06	1.02E-04	NA
Dieldrin	1.50E-02	2.00E-01	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	NA
SVOCs											
Bis(2-ethylhexyl)phthalate	1.83E+01	1.83E+02	6.59E-04	4.96E-03	NA	5.57E-04	4.98E-03	NA	0.00E+00	0.00E+00	NA

Table 15-6
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 12 Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario				Mean Case Scenario				Background Mean Case Scenario			
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Piscivorous Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Piscivorous Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Piscivorous Birds (mg/kg-bw day)
Metals														
Aluminum	1.10E+02	NA	7.68E+00	4.14E+02	3.84E+01	0.00E+00	7.18E+00	3.88E+02	3.60E+01	0.00E+00	9.29E+00	5.01E+02	4.65E+01	0.00E+00
Arsenic	2.24E+00	7.40E+00	2.02E-02	1.97E-01	6.25E-03	5.22E-02	1.22E-02	1.82E-01	2.35E-03	2.62E-02	1.65E-02	3.28E-01	2.12E-03	0.00E+00
Barium	2.08E+01	4.17E+01	2.29E-01	1.62E+00	1.46E-01	3.40E-01	1.63E-01	1.34E+00	1.14E-01	1.68E-01	1.76E-01	1.68E+00	1.20E-01	0.00E+00
Beryllium	NA	NA	2.11E-04	5.03E-02	2.92E-05	1.73E-03	1.67E-04	3.86E-02	2.49E-05	1.40E-03	1.85E-04	5.97E-02	2.15E-06	0.00E+00
Cadmium	1.45E+00	2.00E+01	1.24E-02	1.36E+00	2.03E-02	6.48E-04	8.33E-03	7.67E-01	1.43E-02	3.85E-04	8.18E-03	7.47E-01	1.41E-02	0.00E+00
Calcium	NA	NA	3.23E+03	7.58E+03	2.23E-01	0.00E+00	1.23E+03	2.88E+03	8.48E-02	0.00E+00	1.64E+03	3.86E+03	1.14E-01	0.00E+00
Chromium	2.66E+00	5.00E+00	1.35E-02	1.43E+00	7.26E-02	9.71E-02	1.11E-02	1.42E+00	6.49E-02	4.31E-02	2.02E-02	1.49E+00	1.02E-01	0.00E+00
Cobalt	7.61E+00	2.67E+01	7.39E-03	4.20E-01	2.64E-02	1.45E-02	6.07E-03	3.70E-01	2.30E-02	8.37E-03	7.44E-03	4.95E-01	3.05E-02	0.00E+00
Copper	4.05E+00	6.17E+01	1.49E-01	2.02E+00	3.56E-01	9.97E-01	1.41E-01	1.96E+00	3.51E-01	4.34E-01	1.58E-01	2.17E+00	3.65E-01	0.00E+00
Iron	NA	NA	9.41E+00	3.84E+02	2.73E+00	0.00E+00	8.66E+00	3.54E+02	2.51E+00	0.00E+00	1.21E+01	4.95E+02	3.52E+00	0.00E+00
Lead	1.63E+00	1.13E+01	5.15E-02	2.46E+00	1.56E-01	3.42E-02	3.63E-02	1.61E+00	1.25E-01	1.78E-02	3.77E-02	1.71E+00	1.28E-01	0.00E+00
Magnesium	NA	NA	5.54E+01	2.47E+02	9.44E-02	0.00E+00	3.97E+01	1.77E+02	6.77E-02	0.00E+00	5.13E+01	2.29E+02	8.75E-02	0.00E+00
Manganese	9.97E+02	NA	1.84E+00	6.01E+00	6.55E-01	0.00E+00	1.69E+00	5.61E+00	6.02E-01	0.00E+00	3.20E+00	9.47E+00	1.14E+00	0.00E+00
Mercury	4.50E-01	9.00E-01	2.27E-03	5.43E-02	7.99E-04	9.85E-03	1.84E-03	5.17E-02	5.49E-04	5.09E-03	2.52E-03	5.58E-02	9.72E-04	0.00E+00
Potassium	NA	NA	1.46E+01	1.18E+02	9.97E-02	0.00E+00	1.27E+01	1.03E+02	8.70E-02	0.00E+00	1.45E+01	1.17E+02	9.89E-02	0.00E+00
Selenium	5.00E-01	1.00E+00	9.09E-04	1.01E-03	#NUM!	8.95E-02	7.48E-04	8.33E-04	#NUM!	7.34E-02	8.19E-03	1.22E-01	1.77E-02	0.00E+00
Silver	2.02E+00	6.05E+01	2.34E-03	6.30E-01	4.35E-03	6.21E-03	1.75E-03	4.70E-01	3.25E-03	4.54E-03	5.70E-03	1.64E+00	1.12E-02	0.00E+00
Tin	6.80E+00	1.69E+01	0.00E+00	0.00E+00	0.00E+00	3.15E-03	0.00E+00	0.00E+00	0.00E+00	2.18E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	3.44E-01	6.88E-01	3.58E-02	9.51E+00	3.83E-01	5.27E-02	3.02E-02	8.39E+00	3.38E-01	3.70E-02	4.10E-02	1.18E+01	4.73E-01	0.00E+00
Zinc	6.61E+01	1.31E+02	9.39E-01	4.77E+01	3.32E+00	9.80E-02	7.35E-01	4.14E+01	3.22E+00	5.50E-02	9.76E-01	4.90E+01	3.34E+00	0.00E+00
PAHs														
Anthracene	NA	NA	2.08E-02	4.84E-01	4.24E-05	7.63E-05	1.04E-02	2.42E-01	2.12E-05	2.67E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Anthracene	NA	NA	1.48E-05	9.11E-04	1.66E-06	2.03E-04	3.85E-06	2.37E-04	4.32E-07	3.40E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Pyrene	NA	NA	8.30E-06	7.51E-04	2.32E-06	1.10E-04	2.37E-06	2.14E-04	6.60E-07	1.90E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NA	NA	1.03E-05	6.71E-04	4.50E-06	1.57E-04	3.27E-06	2.12E-04	1.42E-06	2.79E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NA	NA	0.00E+00	0.00E+00	0.00E+00	5.65E-05	0.00E+00	0.00E+00	0.00E+00	1.02E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NA	NA	8.47E-06	5.49E-04	3.68E-06	4.73E-05	2.42E-06	1.57E-04	1.05E-06	8.70E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	NA	NA	1.29E-05	1.22E-03	1.44E-06	1.35E-04	3.48E-06	3.29E-04	3.89E-07	2.30E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NA	NA	0.00E+00	0.00E+00	0.00E+00	2.30E-05	0.00E+00	0.00E+00	0.00E+00	4.47E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	NA	NA	4.16E-05	1.87E-03	4.73E-07	3.73E-04	2.53E-05	1.13E-03	2.87E-07	7.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NA	NA	0.00E+00	0.00E+00	0.00E+00	5.74E-05	0.00E+00	0.00E+00	0.00E+00	1.03E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	NA	NA	5.82E-05	1.23E-03	1.24E-07	2.26E-04	1.53E-05	3.23E-04	3.26E-08	4.21E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pyrene	NA	NA	3.71E-05	1.63E-03	3.33E-07	3.10E-04	2.49E-05	1.09E-03	2.23E-07	6.63E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total LMW PAHs	3.37E+00	3.37E+01	2.09E-02	4.87E-01	4.29E-05	6.75E-04	1.04E-02	2.44E-01	2.15E-05	1.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	3.37E+00	3.37E+01	9.19E-05	5.72E-03	1.39E-05	1.10E-03	4.03E-05	2.24E-03	4.18E-06	2.04E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pesticides														
4,4'-DDD	2.27E-01	2.27E+00	0.00E+00	0.00E+00	0.00E+00	2.47E-04	0.00E+00	0.00E+00	0.00E+00	4.24E-05	2.52E-05	5.05E-02	7.50E-06	0.00E+00
4,4'-DDE	2.27E-01	2.27E+00	4.33E-06	2.64E-03	1.72E-06	1.12E-02	1.19E-06	1.07E-03	4.14E-07	2.48E-03	3.09E-05	6.65E-02	4.51E-06	0.00E+00
4,4'-DDT	2.27E-01	2.27E+00	1.52E-06	4.43E-03	1.48E-06	1.08E-05	6.96E-07	2.02E-03	6.73E-07	4.23E-06	7.30E-06	2.12E-02	7.06E-06	0.00E+00
DDTr	2.27E-01	2.27E+00	5.85E-06	7.06E-03	3.19E-06	1.14E-02	1.88E-06	3.09E-03	#VALUE!	2.53E-03	6.34E-05	1.38E-01	1.91E-05	0.00E+00
Alpha-Chlordane	2.10E+00	1.07E+01	0.00E+00	0.00E+00	0.00E+00	4.97E-05	0.00E+00	0.00E+00	0.00E+00	9.84E-06	6.04E-07	1.70E-04	6.97E-08	0.00E+00
Dieldrin	7.09E-02	1.00E+01	0.00E+00	0.00E+00	0.00E+00	1.04E-05	0.00E+00	0.00E+00	0.00E+00	3.12E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SVOCs														
Bis(2-ethylhexyl)phthalate	1.10E+00	7.63E+02	2.55E-04	8.01E-03	9.80E-05	1.31E-01	1.59E-04	8.15E-03	4.97E-05	6.55E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 15-7
Comparison of Exposure Point Concentrations (EPCs) in Surface Water to Aquatic Organism Toxicity Reference Values for the Site 12 Exposure Grouping

Chemical	Surface Water Toxicity Reference Value (µg/L)	Dissolved Concentrations					Total Concentrations			
		Frequency of Detection	Maximum EPC (µg/L)	HQ for Maximum EPC	Mean EPC (µg/L)	HQ for Mean EPC	Maximum EPC (µg/L)	HQ for Maximum EPC	Mean EPC (µg/L)	HQ for Mean EPC
Metals										
Arsenic	1.50E+02	3/6	5.90E+00	3.93E-02	4.90E+00	3.27E-02	8.90E+01	5.93E-01	2.15E+01	1.43E-01
Barium	4.00E+00	6/6	1.13E+02	2.83E+01	1.00E+02	2.51E+01	5.89E+02	1.47E+02	2.34E+02	5.85E+01
Beryllium	5.30E+00	0/0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.80E-01	9.06E-02	4.13E-01	7.80E-02
Chromium	2.30E+02	1/6	3.40E+00	1.48E-02	1.23E+00	5.36E-03	8.30E+00	3.61E-02	2.82E+00	1.23E-02
Cobalt	2.30E+01	0/0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.50E+00	4.13E-01	4.58E+00	1.99E-01
Copper	2.90E+01	2/6	3.80E+00	1.31E-01	2.95E+00	1.02E-01	4.64E+01	1.60E+00	2.00E+01	6.88E-01
Lead	4.70E+01	1/6	3.00E+00	6.38E-02	2.83E+00	6.03E-02	6.90E+00	1.47E-01	4.12E+00	8.76E-02
Mercury	7.70E-01	6/6	6.80E-02	8.83E-02	4.94E-02	6.42E-02	1.20E-01	1.56E-01	6.18E-02	8.03E-02
Selenium	4.60E+00	0/0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.90E+00	1.72E+00	6.50E+00	1.41E+00
Silver	3.49E+01	1/6	1.40E+00	4.01E-02	1.07E+00	3.06E-02	1.40E+00	4.01E-02	1.07E+00	3.06E-02
Vanadium	2.00E+01	2/6	2.10E+00	1.05E-01	1.87E+00	9.33E-02	2.32E+01	1.16E+00	8.17E+00	4.08E-01
Zinc	3.80E+02	5/6	6.10E+00	1.61E-02	4.47E+00	1.18E-02	4.06E+01	1.07E-01	1.83E+01	4.82E-02
Pesticides										
4,4'-DDE	NA	1/6	2.70E-02	--	5.99E-03	--	2.70E-02	--	5.99E-03	--
DDTr	NA	--	--	--	--	--	--	--	--	--
SVOCs										
Bis(2-ethylhexyl)phthalate	1.60E+02	1/6	1.70E+00	1.06E-02	8.51E-01	5.32E-03	1.70E+00	1.06E-02	8.51E-01	5.32E-03

Table 15-8
Comparison of Exposure Point Concentrations (EPCs) in Sediment to Benthic Organism Toxicity Reference Values for the Site 12 Exposure Grouping

Chemical	Sediment Toxicity Reference Value (mg/kg)	Frequency of Detection	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC
Metals						
Arsenic	9.79E+00	6/6	3.58E+01	3.66E+00	2.38E+01	2.43E+00
Barium	NA	6/6	2.31E+02	--	1.28E+02	--
Beryllium	NA	6/6	4.10E-01	--	2.50E-01	--
Cadmium	9.90E-01	6/6	7.20E-01	7.27E-01	4.28E-01	4.32E-01
Chromium	4.34E+01	6/6	2.45E+01	5.65E-01	1.96E+01	4.52E-01
Cobalt	NA	6/6	1.52E+01	--	8.84E+00	--
Copper	3.16E+01	6/6	2.89E+01	9.15E-01	1.86E+01	5.90E-01
Lead	3.58E+01	6/6	2.21E+01	6.17E-01	1.03E+01	2.88E-01
Mercury	1.80E-01	6/6	1.40E-01	7.78E-01	8.23E-02	4.57E-01
Selenium	NA	6/6	3.50E+00	--	2.55E+00	--
Silver	1.00E+00	2/6	6.90E-01	6.90E-01	3.17E-01	3.17E-01
Tin	NA	6/6	3.50E+00	--	2.42E+00	--
Vanadium	NA	6/6	5.62E+01	--	4.03E+01	--
Zinc	1.21E+02	6/6	8.05E+01	6.65E-01	4.83E+01	3.99E-01
PAHs						
Total LMW PAHs	1.60E+00	--	4.99E-01	3.12E-01	1.16E-01	7.22E-02
Total HMW PAHs	1.60E+00	--	1.47E+00	9.19E-01	2.73E-01	1.71E-01
Pesticides						
4,4'-DDD	0.00488	1/6	2.74E-01	5.61E+01	4.72E-02	9.66E+00
4,4'-DDE	0.00316	1/6	3.41E-02	1.08E+01	7.20E-03	2.28E+00
4,4'-DDT	0.00416	2/6	1.20E-02	2.88E+00	4.70E-03	1.13E+00
DDTr	NA	--	--	--	--	--
Alpha-Chlordane	0.00324	1/6	5.52E-02	1.70E+01	1.09E-02	3.37E+00
Dieldrin	0.0019	1/6	1.16E-02	6.11E+00	3.47E-03	1.82E+00

Table 16-1
Detection Comparison to Region 4 Screening Levels
for the Site 13 Exposure Grouping

Analyte	Surface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Inorganics					
Cyanide (Total)	3/7	2.20E-01	9.66E-02	9.00E-01	NO
Metals					
Aluminum	7/7	2.21E+04	1.65E+04	5.00E+01	YES
Antimony	6/7	1.40E+00	5.81E-01	3.50E+00	NO
Arsenic	7/7	1.46E+01	8.17E+00	1.00E+01	YES
Barium	7/7	9.33E+01	5.56E+01	1.65E+02	NO
Beryllium	7/7	7.80E-01	2.81E-01	1.10E+00	NO
Cadmium	2/7	4.20E-01	1.33E-01	1.60E+00	NO
Calcium	7/7	1.84E+04	1.17E+04	NA	YES
Chromium	7/7	3.31E+01	1.86E+01	4.00E-01	YES
Cobalt	7/7	1.84E+01	1.12E+01	2.00E+01	NO
Copper	7/7	4.65E+01	2.35E+01	4.00E+01	YES
Iron	7/7	2.73E+04	1.95E+04	2.00E+02	YES
Lead	7/7	5.62E+02	1.12E+02	5.00E+01	YES
Magnesium	7/7	4.55E+03	2.31E+03	NA	YES
Manganese	7/7	1.23E+03	6.44E+02	1.00E+02	YES
Mercury	6/7	4.10E-01	2.01E-01	1.00E-01	YES
Nickel	7/7	1.38E+01	6.49E+00	3.00E+01	NO
Potassium	7/7	2.27E+03	9.09E+02	NA	YES
Selenium	7/7	2.80E+00	1.45E+00	8.10E-01	YES
Silver	1/7	2.70E-01	1.51E-01	2.00E+00	NO
Sodium	7/7	2.50E+02	1.58E+02	NA	YES
Thallium	2/7	9.90E-01	3.06E-01	1.00E+00	NO
Tin	7/7	3.90E+00	3.16E+00	5.30E+01	NO
Vanadium	7/7	8.65E+01	4.61E+01	2.00E+00	YES
Zinc	7/7	1.41E+02	5.50E+01	5.00E+01	YES
PAHs					
Benzo(g,h,i)Perylene	1/7	3.25E-02	5.23E-03	NA	YES
Total HMW PAHs	--	3.25E-02	5.23E-03	--	YES
Pesticides					
4,4'-DDD	1/7	6.72E-02	9.82E-03	NA	YES
4,4'-DDE	1/7	4.69E-01	6.73E-02	NA	YES
4,4'-DDT	2/7	5.43E-01	7.88E-02	NA	YES
DDTr	--	--	--	--	--
Alpha-Chlordane	1/7	1.56E-02	2.64E-03	NA	YES
Dieldrin	1/7	4.10E-03	8.50E-04	5.00E-04	YES
Herbicides					
2,4-D	1/7	2.88E-01	4.99E-02	NA	YES

Table 16-1
Detection Comparison to Region 4 Screening Levels
for the Site 13 Exposure Grouping

Analyte	Surface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
SVOCs					
Pentachlorophenol	6/7	1.10E-01	2.92E-02	2.00E-03	YES
VOCs					
1,1-dichloroethene	4/7	2.10E-03	1.24E-03	NA	YES
Acetone	1/7	1.44E-01	2.28E-02	NA	YES

Table 16-2
Detection Comparison to Region 4 Screening Levels
for the Site 13 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Metals					
Aluminum	1/1	1.82E+04	1.82E+04	5.00E+01	YES
Antimony	1/1	6.45E-01	6.45E-01	3.50E+00	NO
Arsenic	1/1	1.66E+01	1.66E+01	1.00E+01	YES
Barium	1/1	6.01E+01	6.01E+01	1.65E+02	NO
Beryllium	1/1	2.35E-01	2.35E-01	1.10E+00	NO
Cadmium	1/1	4.05E-01	4.05E-01	1.60E+00	NO
Calcium	1/1	4.64E+04	4.64E+04	NA	YES
Chromium	1/1	2.95E+01	2.95E+01	4.00E-01	YES
Cobalt	1/1	1.34E+01	1.34E+01	2.00E+01	NO
Copper	1/1	4.19E+01	4.19E+01	4.00E+01	YES
Iron	1/1	2.55E+04	2.55E+04	2.00E+02	YES
Lead	1/1	1.28E+02	1.28E+02	5.00E+01	YES
Magnesium	1/1	2.91E+03	2.91E+03	NA	YES
Manganese	1/1	7.53E+02	7.53E+02	1.00E+02	YES
Mercury	1/1	3.25E-01	3.25E-01	1.00E-01	YES
Nickel	1/1	1.16E+01	1.16E+01	3.00E+01	NO
Potassium	1/1	7.12E+02	7.12E+02	NA	YES
Selenium	1/1	1.90E+00	1.90E+00	8.10E-01	YES
Sodium	1/1	1.26E+02	1.26E+02	NA	YES
Tin	1/1	3.65E+00	3.65E+00	5.30E+01	NO
Vanadium	1/1	7.17E+01	7.17E+01	2.00E+00	YES
Zinc	1/1	1.14E+02	1.14E+02	5.00E+01	YES
PAHs					
Acenaphthylene	1/1	1.37E-02	1.37E-02	2.00E+01	NO
Benzo(a)Anthracene	1/1	8.03E-02	8.03E-02	NA	YES
Benzo(a)Pyrene	1/1	8.78E-02	8.78E-02	1.00E-01	NO
Benzo(b)Fluoranthene	1/1	1.74E-01	1.74E-01	NA	YES
Benzo(g,h,i)Perylene	1/1	2.47E-02	2.47E-02	NA	YES
Benzo(k)Fluoranthene	1/1	1.18E-01	1.18E-01	NA	YES
Chrysene	1/1	1.06E-01	1.06E-01	NA	YES
Dibenzo(a,h)Anthracene	1/1	1.25E-02	1.25E-02	NA	YES
Fluoranthene	1/1	1.12E-01	1.12E-01	1.00E-01	YES
Indeno(1,2,3-Cd)Pyrene	1/1	2.91E-02	2.91E-02	NA	YES
Pyrene	1/1	1.09E-01	1.09E-01	1.00E-01	YES
Total LMW PAHs	--	1.26E-01	1.26E-01	--	YES
Total HMW PAHs	--	7.41E-01	7.41E-01	--	YES
Pesticides					
4,4'-DDD	1/1	2.26E-02	2.26E-02	NA	YES

Table 16-2
Detection Comparison to Region 4 Screening Levels
for the Site 13 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
4,4'-DDE	1/1	3.65E-01	3.65E-01	NA	YES
4,4'-DDT	1/1	1.36E-01	1.36E-01	NA	YES
DDTr	--	--	--	--	--
Alpha-Chlordane	1/1	7.10E-03	7.10E-03	NA	YES
SVOCs					
Bis(2-ethylhexyl)phthalate	1/1	6.25E-02	6.25E-02	NA	YES
Pentachlorophenol	1/1	5.70E-03	5.70E-03	2.00E-03	YES
VOCs					
1,1-dichloroethene	1/1	1.20E-03	1.20E-03	NA	YES

Table 16-3
Frequency of Detection and Exposure Point Concentrations
for the Site 13 Exposure Grouping

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Aluminum	7/7	2.21E+04	1.65E+04
Arsenic	7/7	1.46E+01	8.17E+00
Calcium	7/7	1.84E+04	1.17E+04
Chromium	7/7	3.31E+01	1.86E+01
Copper	7/7	4.65E+01	2.35E+01
Iron	7/7	2.73E+04	1.95E+04
Lead	7/7	5.62E+02	1.12E+02
Magnesium	7/7	4.55E+03	2.31E+03
Manganese	7/7	1.23E+03	6.44E+02
Mercury	6/7	4.10E-01	2.01E-01
Potassium	7/7	2.27E+03	9.09E+02
Selenium	7/7	2.80E+00	1.45E+00
Sodium	7/7	2.50E+02	1.58E+02
Vanadium	7/7	8.65E+01	4.61E+01
Zinc	7/7	1.41E+02	5.50E+01
PAHs			
Benzo(g,h,i)Perylene	1/7	3.25E-02	5.23E-03
Total HMW PAHs	--	3.25E-02	5.23E-03
Pesticides			
4,4'-DDD	1/7	6.72E-02	9.82E-03
4,4'-DDE	1/7	4.69E-01	6.73E-02
4,4'-DDT	2/7	5.43E-01	7.88E-02
DDTr	--	--	--
Alpha-Chlordane	1/7	1.56E-02	2.64E-03
Dieldrin	1/7	4.10E-03	8.50E-04
Herbicides			
2,4-D	1/7	2.88E-01	4.99E-02
SVOCs			
Pentachlorophenol	6/7	1.10E-01	2.92E-02
VOCs			
1,1-dichloroethene	4/7	2.10E-03	1.24E-03
Acetone	1/7	1.44E-01	2.28E-02

Table 16-4
Frequency of Detection and Exposure Point Concentrations
for the Site 13 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Aluminum	1/1	1.82E+04	1.82E+04
Arsenic	1/1	1.66E+01	1.66E+01
Calcium	1/1	4.64E+04	4.64E+04
Chromium	1/1	2.95E+01	2.95E+01
Copper	1/1	4.19E+01	4.19E+01
Iron	1/1	2.55E+04	2.55E+04
Lead	1/1	1.28E+02	1.28E+02
Magnesium	1/1	2.91E+03	2.91E+03
Manganese	1/1	7.53E+02	7.53E+02
Mercury	1/1	3.25E-01	3.25E-01
Potassium	1/1	7.12E+02	7.12E+02
Selenium	1/1	1.90E+00	1.90E+00
Sodium	1/1	1.26E+02	1.26E+02
Vanadium	1/1	7.17E+01	7.17E+01
Zinc	1/1	1.14E+02	1.14E+02
PAHs			
Acenaphthylene	1/1	1.37E-02	1.37E-02
Benzo(a)Anthracene	1/1	8.03E-02	8.03E-02
Benzo(a)Pyrene	1/1	8.78E-02	8.78E-02
Benzo(b)Fluoranthene	1/1	1.74E-01	1.74E-01
Benzo(g,h,i)Perylene	1/1	2.47E-02	2.47E-02
Benzo(k)Fluoranthene	1/1	1.18E-01	1.18E-01
Chrysene	1/1	1.06E-01	1.06E-01
Dibenzo(a,h)Anthracene	1/1	1.25E-02	1.25E-02
Fluoranthene	1/1	1.12E-01	1.12E-01
Indeno(1,2,3-Cd)Pyrene	1/1	2.91E-02	2.91E-02
Pyrene	1/1	1.09E-01	1.09E-01
Total LMW PAHs	--	1.26E-01	1.26E-01
Total HMW PAHs	--	7.41E-01	7.41E-01
Pesticides			
4,4'-DDD	1/1	2.26E-02	2.26E-02
4,4'-DDE	1/1	3.65E-01	3.65E-01
4,4'-DDT	1/1	1.36E-01	1.36E-01
DDTr	--	--	--
Alpha-Chlordane	1/1	7.10E-03	7.10E-03
SVOCs			
Bis(2-ethylhexyl)phthalate	1/1	6.25E-02	6.25E-02
Pentachlorophenol	1/1	5.70E-03	5.70E-03

Table 16-4
Frequency of Detection and Exposure Point Concentrations
for the Site 13 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
VOCs			
1,1-dichloroethene	1/1	1.20E-03	1.20E-03

Table 16-5
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 13 Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	2.21E+04	4.42E+02	1.65E+04	3.31E+02	3.00E+04
Arsenic	1.80E+01	1.46E+01	8.11E-01	8.17E+00	4.54E-01	4.39E+01
Calcium	NA	1.84E+04	--	1.17E+04	--	1.06E+05
Chromium	1.00E+00	3.31E+01	3.31E+01	1.86E+01	1.86E+01	6.98E+01
Copper	7.00E+01	4.65E+01	6.64E-01	2.35E+01	3.36E-01	8.37E+01
Iron	NA	2.73E+04	--	1.95E+04	--	4.71E+04
Lead	1.20E+02	5.62E+02	4.68E+00	1.12E+02	9.30E-01	2.75E+01
Magnesium	NA	4.55E+03	--	2.31E+03	--	5.13E+03
Manganese	2.20E+02	1.23E+03	5.59E+00	6.44E+02	2.93E+00	1.18E+03
Mercury	3.00E-01	4.10E-01	1.37E+00	2.01E-01	6.69E-01	3.20E-01
Potassium	NA	2.27E+03	--	9.09E+02	--	1.46E+03
Selenium	5.20E-01	2.80E+00	5.38E+00	1.45E+00	2.79E+00	1.00E+00
Sodium	NA	2.50E+02	--	1.58E+02	--	2.38E+02
Vanadium	2.00E+00	8.65E+01	4.33E+01	4.61E+01	2.30E+01	1.45E+02
Zinc	1.60E+02	1.41E+02	8.81E-01	5.50E+01	3.44E-01	8.10E+01
PAHs						
Total HMW PAHs	2.00E+04	3.25E-02	1.63E-06	5.23E-03	2.61E-07	--
Pesticides						
4,4'-DDD	NA	6.72E-02	--	9.82E-03	--	5.10E-04
4,4'-DDE	NA	4.69E-01	--	6.73E-02	--	3.37E-03
4,4'-DDT	NA	5.43E-01	--	7.88E-02	--	2.65E-03
DDTr	NA	--	--	--	--	--
Alpha-Chlordane	NA	1.56E-02	--	2.64E-03	--	6.40E-04
Dieldrin	NA	4.10E-03	--	8.50E-04	--	--
Herbicides						
2,4-D	NA	2.88E-01	--	4.99E-02	--	--
SVOCs						
Pentachlorophenol	3.00E+00	1.10E-01	3.67E-02	2.92E-02	9.72E-03	--
VOCs						
1,1-dichloroethene	NA	2.10E-03	--	1.24E-03	--	--
Acetone	NA	1.44E-01	--	2.28E-02	--	--

Table 16-6
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 13 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	1.82E+04	3.63E+02	1.82E+04	3.63E+02	3.00E+04
Arsenic	1.80E+01	1.66E+01	9.19E-01	1.66E+01	9.19E-01	4.39E+01
Calcium	NA	4.64E+04	--	4.64E+04	--	1.06E+05
Chromium	1.00E+00	2.95E+01	2.95E+01	2.95E+01	2.95E+01	6.98E+01
Copper	7.00E+01	4.19E+01	5.98E-01	4.19E+01	5.98E-01	8.37E+01
Iron	NA	2.55E+04	--	2.55E+04	--	4.71E+04
Lead	1.20E+02	1.28E+02	1.07E+00	1.28E+02	1.07E+00	2.75E+01
Magnesium	NA	2.91E+03	--	2.91E+03	--	5.13E+03
Manganese	2.20E+02	7.53E+02	3.42E+00	7.53E+02	3.42E+00	1.18E+03
Mercury	3.00E-01	3.25E-01	1.08E+00	3.25E-01	1.08E+00	3.20E-01
Potassium	NA	7.12E+02	--	7.12E+02	--	1.46E+03
Selenium	5.20E-01	1.90E+00	3.65E+00	1.90E+00	3.65E+00	1.00E+00
Sodium	NA	1.26E+02	--	1.26E+02	--	2.38E+02
Vanadium	2.00E+00	7.17E+01	3.58E+01	7.17E+01	3.58E+01	1.45E+02
Zinc	1.60E+02	1.14E+02	7.11E-01	1.14E+02	7.11E-01	8.10E+01
PAHs						
Total LMW PAHs	2.00E+04	1.26E-01	6.29E-06	1.26E-01	6.29E-06	--
Total HMW PAHs	2.00E+04	7.41E-01	3.71E-05	7.41E-01	3.71E-05	--
Pesticides						
4,4'-DDD	NA	2.26E-02	--	2.26E-02	--	5.10E-04
4,4'-DDE	NA	3.65E-01	--	3.65E-01	--	3.37E-03
4,4'-DDT	NA	1.36E-01	--	1.36E-01	--	2.65E-03
DDTr	NA	--	--	--	--	--
Alpha-Chlordane	NA	7.10E-03	--	7.10E-03	--	6.40E-04
SVOCs						
Bis(2-ethylhexyl)phthalate	1.00E+05	6.25E-02	6.25E-07	6.25E-02	6.25E-07	--
Pentachlorophenol	3.00E+00	5.70E-03	1.90E-03	5.70E-03	1.90E-03	--
VOCs						
1,1-dichloroethene	NA	1.20E-03	--	1.20E-03	--	--

2.26E+01	#VALUE!	2.26E+01
3.65E+02	#VALUE!	3.65E+02
1.36E+02	#VALUE!	1.36E+02
#VALUE!	#VALUE!	#VALUE!
7.10E+00	#VALUE!	7.10E+00
#VALUE!	#VALUE!	#VALUE!

Table 16-7
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 13 Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	2.21E+04	--	1.65E+04	--	3.00E+04
Arsenic	6.00E+01	1.46E+01	2.43E-01	8.17E+00	1.36E-01	4.39E+01
Calcium	NA	1.84E+04	--	1.17E+04	--	1.06E+05
Chromium	4.00E-01	3.31E+01	8.28E+01	1.86E+01	4.65E+01	6.98E+01
Copper	8.00E+01	4.65E+01	5.81E-01	2.35E+01	2.94E-01	8.37E+01
Iron	NA	2.73E+04	--	1.95E+04	--	4.71E+04
Lead	1.70E+03	5.62E+02	3.31E-01	1.12E+02	6.57E-02	2.75E+01
Magnesium	NA	4.55E+03	--	2.31E+03	--	5.13E+03
Manganese	4.50E+02	1.23E+03	2.73E+00	6.44E+02	1.43E+00	1.18E+03
Mercury	1.00E-01	4.10E-01	4.10E+00	2.01E-01	2.01E+00	3.20E-01
Potassium	NA	2.27E+03	--	9.09E+02	--	1.46E+03
Selenium	4.10E+00	2.80E+00	6.83E-01	1.45E+00	3.53E-01	1.00E+00
Sodium	NA	2.50E+02	--	1.58E+02	--	2.38E+02
Vanadium	NA	8.65E+01	--	4.61E+01	--	1.45E+02
Zinc	1.20E+02	1.41E+02	1.18E+00	5.50E+01	4.59E-01	8.10E+01
PAHs						
Total HMW PAHs	1.80E+04	3.25E-02	1.81E-06	5.23E-03	2.90E-07	--
Pesticides						
4,4'-DDD	1.50E+03	6.72E-02	4.48E-05	9.82E-03	6.55E-06	5.10E-04
4,4'-DDE	1.50E+03	4.69E-01	3.13E-04	6.73E-02	4.49E-05	3.37E-03
4,4'-DDT	1.50E+03	5.43E-01	3.62E-04	7.88E-02	5.26E-05	2.65E-03
DDTr	1.50E+03	--	--	--	--	--
Alpha-Chlordane	NA	1.56E-02	--	2.64E-03	--	6.40E-04
Dieldrin	NA	4.10E-03	--	8.50E-04	--	--
Herbicides						
2,4-D	NA	2.88E-01	--	4.99E-02	--	--
SVOCs						
Pentachlorophenol	6.00E+00	1.10E-01	1.83E-02	2.92E-02	4.86E-03	--
VOCs						
1,1-dichloroethene	NA	2.10E-03	--	1.24E-03	--	--
Acetone	NA	1.44E-01	--	2.28E-02	--	--

Table 16-8
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 13 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	1.82E+04	--	1.82E+04	--	3.00E+04
Arsenic	6.00E+01	1.66E+01	2.76E-01	1.66E+01	2.76E-01	4.39E+01
Calcium	NA	4.64E+04	--	4.64E+04	--	1.06E+05
Chromium	4.00E-01	2.95E+01	7.36E+01	2.95E+01	7.36E+01	6.98E+01
Copper	8.00E+01	4.19E+01	5.23E-01	4.19E+01	5.23E-01	8.37E+01
Iron	NA	2.55E+04	--	2.55E+04	--	4.71E+04
Lead	1.70E+03	1.28E+02	7.53E-02	1.28E+02	7.53E-02	2.75E+01
Magnesium	NA	2.91E+03	--	2.91E+03	--	5.13E+03
Manganese	4.50E+02	7.53E+02	1.67E+00	7.53E+02	1.67E+00	1.18E+03
Mercury	1.00E-01	3.25E-01	3.25E+00	3.25E-01	3.25E+00	3.20E-01
Potassium	NA	7.12E+02	--	7.12E+02	--	1.46E+03
Selenium	4.10E+00	1.90E+00	4.63E-01	1.90E+00	4.63E-01	1.00E+00
Sodium	NA	1.26E+02	--	1.26E+02	--	2.38E+02
Vanadium	NA	7.17E+01	--	7.17E+01	--	1.45E+02
Zinc	1.20E+02	1.14E+02	9.48E-01	1.14E+02	9.48E-01	8.10E+01
PAHs						
Total LMW PAHs	2.90E+01	1.26E-01	4.33E-03	1.26E-01	4.33E-03	--
Total HMW PAHs	1.80E+04	7.41E-01	4.12E-05	7.41E-01	4.12E-05	--
Pesticides						
4,4'-DDD	1.50E+03	2.26E-02	1.51E-05	2.26E-02	1.51E-05	5.10E-04
4,4'-DDE	1.50E+03	3.65E-01	2.43E-04	3.65E-01	2.43E-04	3.37E-03
4,4'-DDT	1.50E+03	1.36E-01	9.07E-05	1.36E-01	9.07E-05	2.65E-03
DDTr	1.50E+03	--	#VALUE!	--	#VALUE!	--
Alpha-Chlordane	NA	7.10E-03	--	7.10E-03	--	6.40E-04
SVOCs						
Bis(2-ethylhexyl)phthalate	2.00E+05	6.25E-02	3.13E-07	6.25E-02	3.13E-07	--
Pentachlorophenol	6.00E+00	5.70E-03	9.50E-04	5.70E-03	9.50E-04	--
VOCs						
1,1-dichloroethene	NA	1.20E-03	--	1.20E-03	--	--

Table 16-9
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 13 Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Metals								
Aluminum	1.93E+00	1.93E+01	6.41E+01	2.17E+02	4.80E+01	1.63E+02	6.70E+01	2.27E+02
Arsenic	1.04E+00	1.26E+00	1.10E-01	1.34E-01	7.36E-02	8.87E-02	1.19E-01	1.44E-01
Calcium	NA	NA	7.82E+03	1.53E+03	4.99E+03	9.78E+02	1.19E+04	2.32E+03
Chromium	2.40E+00	1.31E+01	1.10E-01	7.88E-01	6.17E-02	8.19E-01	1.46E-01	7.73E-01
Copper	5.60E+00	1.54E+01	1.18E+00	1.23E+00	8.75E-01	1.02E+00	1.14E+00	1.20E+00
Iron	NA	NA	7.91E+01	1.77E+02	5.64E+01	1.26E+02	8.76E+01	1.96E+02
Lead	4.70E+00	8.00E+01	2.47E+00	1.11E+01	7.21E-01	3.01E+00	2.72E-01	9.72E-01
Magnesium	NA	NA	5.61E+02	2.01E+02	2.85E+02	1.02E+02	3.70E+02	1.32E+02
Manganese	5.15E+01	2.84E+02	4.01E+01	4.75E+00	2.10E+01	3.06E+00	2.31E+01	3.26E+00
Mercury	1.32E+01	NA	2.85E-02	3.78E-02	1.91E-02	3.48E-02	1.82E-02	3.44E-02
Potassium	NA	NA	2.80E+02	1.89E+02	1.12E+02	7.58E+01	1.04E+02	7.07E+01
Selenium	1.43E-01	3.30E-01	1.98E-01	1.64E-01	9.58E-02	1.01E-01	5.91E-02	7.35E-02
Sodium	NA	NA	2.87E+00	2.08E+01	1.82E+00	1.32E+01	1.89E+00	1.37E+01
Vanadium	4.16E+00	8.31E+00	2.66E-01	6.34E+00	1.42E-01	3.38E+00	2.96E-01	7.05E+00
Zinc	7.54E+01	3.20E+02	9.44E+00	3.61E+01	5.53E+00	2.65E+01	7.04E+00	3.05E+01
PAHs								
Benzo(g,h,i)Perylene	NA	NA	1.02E-04	4.06E-04	1.64E-05	6.53E-05	0.00E+00	0.00E+00
Total HMW PAHs	6.15E-01	1.08E+01	1.02E-04	4.06E-04	1.64E-05	6.53E-05	0.00E+00	0.00E+00
Pesticides								
4,4'-DDD	1.47E-01	4.00E+00	2.90E-04	5.04E-02	4.23E-05	7.36E-03	1.82E-04	3.16E-02
4,4'-DDE	1.47E-01	4.00E+00	1.88E-03	3.52E-01	2.70E-04	5.05E-02	2.23E-04	4.17E-02
4,4'-DDT	1.47E-01	4.00E+00	1.61E-03	4.07E-01	2.34E-04	5.91E-02	5.26E-05	1.33E-02
DDTr	1.47E-01	4.00E+00	3.78E-03	8.09E-01	5.47E-04	1.17E-01	4.57E-04	8.66E-02
Alpha-Chlordane	4.60E+00	9.20E+00	5.53E-05	1.30E-03	9.36E-06	2.20E-04	4.36E-06	1.02E-04
Dieldrin	1.50E-02	2.00E-01	2.35E-05	6.12E-04	4.87E-06	1.27E-04	0.00E+00	0.00E+00
Herbicides								
2,4-D	NA	NA	3.27E-02	2.40E-02	5.67E-03	4.16E-03	0.00E+00	0.00E+00
SVOCs								
Pentachlorophenol	2.40E-01	2.40E+00	8.31E-04	9.17E-03	2.20E-04	2.43E-03	0.00E+00	0.00E+00
VOCs								
1,1-dichloroethene	2.50E+00	NA	5.82E-04	1.75E-04	3.43E-04	1.03E-04	0.00E+00	0.00E+00
Acetone	1.00E+01	5.00E+01	9.27E-01	1.20E-02	1.47E-01	1.90E-03	0.00E+00	0.00E+00

Table 16-10
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 13 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Metals								
Aluminum	1.93E+00	1.93E+01	5.26E+01	1.78E+02	5.26E+01	1.78E+02	6.70E+01	2.27E+02
Arsenic	1.04E+00	1.26E+00	1.20E-01	1.46E-01	1.20E-01	1.46E-01	1.19E-01	1.44E-01
Calcium	NA	NA	1.97E+04	3.87E+03	1.97E+04	3.87E+03	1.19E+04	2.32E+03
Chromium	2.40E+00	1.31E+01	9.78E-02	7.94E-01	9.78E-02	7.94E-01	1.46E-01	7.73E-01
Copper	5.60E+00	1.54E+01	1.13E+00	1.19E+00	1.13E+00	1.19E+00	1.14E+00	1.20E+00
Iron	NA	NA	7.39E+01	1.66E+02	7.39E+01	1.66E+02	8.76E+01	1.96E+02
Lead	4.70E+00	8.00E+01	7.96E-01	3.36E+00	7.96E-01	3.36E+00	2.72E-01	9.72E-01
Magnesium	NA	NA	3.58E+02	1.28E+02	3.58E+02	1.28E+02	3.70E+02	1.32E+02
Manganese	5.15E+01	2.84E+02	2.45E+01	3.40E+00	2.45E+01	3.40E+00	2.31E+01	3.26E+00
Mercury	1.32E+01	NA	2.50E-02	3.68E-02	2.50E-02	3.68E-02	1.82E-02	3.44E-02
Potassium	NA	NA	8.77E+01	5.93E+01	8.77E+01	5.93E+01	1.04E+02	7.07E+01
Selenium	1.43E-01	3.30E-01	1.29E-01	1.24E-01	1.29E-01	1.24E-01	5.91E-02	7.35E-02
Sodium	NA	NA	1.45E+00	1.05E+01	1.45E+00	1.05E+01	1.89E+00	1.37E+01
Vanadium	4.16E+00	8.31E+00	2.21E-01	5.25E+00	2.21E-01	5.25E+00	2.96E-01	7.05E+00
Zinc	7.54E+01	3.20E+02	8.35E+00	3.37E+01	8.35E+00	3.37E+01	7.04E+00	3.05E+01
PAHs								
Acenaphthylene	NA	NA	3.81E-04	2.51E-04	3.81E-04	2.51E-04	0.00E+00	0.00E+00
Benzo(a)Anthracene	NA	NA	3.94E-04	1.81E-03	3.94E-04	1.81E-03	0.00E+00	0.00E+00
Benzo(a)Pyrene	1.00E+00	1.00E+01	3.57E-04	2.49E-03	3.57E-04	2.49E-03	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NA	NA	6.56E-04	3.04E-03	6.56E-04	3.04E-03	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NA	NA	7.76E-05	3.09E-04	7.76E-05	3.09E-04	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NA	NA	4.45E-04	2.06E-03	4.45E-04	2.06E-03	0.00E+00	0.00E+00
Chrysene	NA	NA	5.20E-04	3.89E-03	5.20E-04	3.89E-03	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NA	NA	4.04E-05	5.10E-04	4.04E-05	5.10E-04	0.00E+00	0.00E+00
Fluoranthene	NA	NA	9.92E-04	3.45E-03	9.92E-04	3.45E-03	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NA	NA	9.16E-05	9.94E-04	9.16E-05	9.94E-04	0.00E+00	0.00E+00
Pyrene	NA	NA	1.03E-03	3.54E-03	1.03E-03	3.54E-03	0.00E+00	0.00E+00
Total LMW PAHs	6.56E+01	4.34E+02	1.37E-03	3.70E-03	1.37E-03	3.70E-03	0.00E+00	0.00E+00
Total HMW PAHs	6.15E-01	1.08E+01	3.61E-03	1.86E-02	3.61E-03	1.86E-02	0.00E+00	0.00E+00
Pesticides								
4,4'-DDD	1.47E-01	4.00E+00	9.74E-05	1.69E-02	9.74E-05	1.69E-02	1.82E-04	3.16E-02
4,4'-DDE	1.47E-01	4.00E+00	1.46E-03	2.74E-01	1.46E-03	2.74E-01	2.23E-04	4.17E-02
4,4'-DDT	1.47E-01	4.00E+00	4.04E-04	1.02E-01	4.04E-04	1.02E-01	5.26E-05	1.33E-02
DDTr	1.47E-01	4.00E+00	1.96E-03	3.93E-01	1.96E-03	3.93E-01	4.57E-04	8.66E-02
Alpha-Chlordane	4.60E+00	9.20E+00	2.52E-05	5.92E-04	2.52E-05	5.92E-04	4.36E-06	1.02E-04
SVOCs								
Bis(2-ethylhexyl)phthalate	1.83E+01	1.83E+02	4.76E-04	5.21E-03	4.76E-04	5.21E-03	0.00E+00	0.00E+00
Pentachlorophenol	2.40E-01	2.40E+00	4.31E-05	4.75E-04	4.31E-05	4.75E-04	0.00E+00	0.00E+00
VOCs								
1,1-dichloroethene	2.50E+00	NA	3.33E-04	1.00E-04	3.33E-04	1.00E-04	0.00E+00	0.00E+00

Table 16-11
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 13 Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Aluminum	1.10E+02	NA	8.88E+00	4.79E+02	4.45E+01	6.65E+00	3.59E+02	3.33E+01	9.29E+00	5.01E+02	4.65E+01
Arsenic	2.24E+00	7.40E+00	1.53E-02	3.01E-01	1.94E-03	1.02E-02	1.90E-01	1.21E-03	1.65E-02	3.28E-01	2.12E-03
Calcium	NA	NA	1.08E+03	2.55E+03	7.49E-02	6.92E+02	1.62E+03	4.78E-02	1.64E+03	3.86E+03	1.14E-01
Chromium	2.66E+00	5.00E+00	1.52E-02	1.45E+00	8.33E-02	8.56E-03	1.41E+00	5.45E-02	2.02E-02	1.49E+00	1.02E-01
Copper	4.05E+00	6.17E+01	1.64E-01	2.23E+00	3.69E-01	1.21E-01	1.77E+00	3.34E-01	1.58E-01	2.17E+00	3.65E-01
Iron	NA	NA	1.10E+01	4.48E+02	3.18E+00	7.82E+00	3.19E+02	2.27E+00	1.21E+01	4.95E+02	3.52E+00
Lead	1.63E+00	1.13E+01	3.43E-01	2.10E+01	4.88E-01	9.99E-02	5.46E+00	2.39E-01	3.77E-02	1.71E+00	1.28E-01
Magnesium	NA	NA	7.77E+01	3.47E+02	1.33E-01	3.95E+01	1.76E+02	6.74E-02	5.13E+01	2.29E+02	8.75E-02
Manganese	9.97E+02	NA	5.56E+00	1.50E+01	1.99E+00	2.91E+00	8.77E+00	1.04E+00	3.20E+00	9.47E+00	1.14E+00
Mercury	4.50E-01	9.00E-01	3.95E-03	6.26E-02	2.16E-03	2.65E-03	5.65E-02	1.06E-03	2.52E-03	5.58E-02	9.72E-04
Potassium	NA	NA	3.88E+01	3.14E+02	2.65E-01	1.55E+01	1.26E+02	1.06E-01	1.45E+01	1.17E+02	9.89E-02
Selenium	5.00E-01	1.00E+00	2.74E-02	2.78E-01	2.67E-02	1.33E-02	1.70E-01	2.09E-02	8.19E-03	1.22E-01	1.77E-02
Sodium	NA	NA	3.98E-01	3.46E+01	8.04E-02	2.52E-01	2.19E+01	5.09E-02	2.63E-01	2.28E+01	5.31E-02
Vanadium	3.44E-01	6.88E-01	3.69E-02	1.06E+01	4.26E-01	1.97E-02	5.64E+00	2.27E-01	4.10E-02	1.18E+01	4.73E-01
Zinc	6.61E+01	1.31E+02	1.31E+00	5.82E+01	3.47E+00	7.67E-01	4.25E+01	3.23E+00	9.76E-01	4.90E+01	3.34E+00
PAHs											
Benzo(g,h,i)Perylene	NA	NA	1.42E-05	8.43E-04	2.19E-05	2.28E-06	1.35E-04	3.52E-06	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	3.37E+00	3.37E+01	1.42E-05	8.43E-04	2.19E-05	2.28E-06	1.35E-04	3.52E-06	0.00E+00	0.00E+00	0.00E+00
Pesticides											
4,4'-DDD	2.27E-01	2.27E+00	4.02E-05	8.04E-02	1.19E-05	5.87E-06	1.17E-02	1.74E-06	2.52E-05	5.05E-02	7.50E-06
4,4'-DDE	2.27E-01	2.27E+00	2.61E-04	5.61E-01	3.80E-05	3.74E-05	8.06E-02	5.46E-06	3.09E-05	6.65E-02	4.51E-06
4,4'-DDT	2.27E-01	2.27E+00	2.24E-04	6.50E-01	2.17E-04	3.25E-05	9.43E-02	3.14E-05	7.30E-06	2.12E-02	7.06E-06
DDTr	2.27E-01	2.27E+00	5.25E-04	1.29E+00	2.67E-04	7.58E-05	1.87E-01	3.86E-05	6.34E-05	1.38E-01	1.91E-05
Alpha-Chlordane	2.10E+00	1.07E+01	7.66E-06	2.16E-03	8.84E-07	1.30E-06	3.66E-04	1.50E-07	6.04E-07	1.70E-04	6.97E-08
Dieldrin	7.09E-02	1.00E+01	3.26E-06	9.96E-04	2.21E-08	6.75E-07	2.06E-04	4.58E-09	0.00E+00	0.00E+00	0.00E+00
Herbicides											
2,4-D	NA	NA	4.53E-03	3.99E-02	1.28E-07	7.86E-04	6.91E-03	2.23E-08	0.00E+00	0.00E+00	0.00E+00
SVOCs											
Pentachlorophenol	6.73E+00	NA	1.15E-04	1.52E-02	1.00E-05	3.05E-05	4.03E-03	2.65E-06	0.00E+00	0.00E+00	0.00E+00
VOCs											
1,1-dichloroethene	NA	NA	8.07E-05	2.91E-04	1.96E-10	4.75E-05	1.71E-04	1.15E-10	0.00E+00	0.00E+00	0.00E+00
Acetone	NA	NA	1.29E-01	1.99E-02	8.75E-12	2.04E-02	3.16E-03	1.39E-12	0.00E+00	0.00E+00	0.00E+00

Table 16-12
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 13 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Aluminum	1.10E+02	NA	7.30E+00	3.94E+02	3.65E+01	7.30E+00	3.94E+02	3.65E+01	9.29E+00	5.01E+02	4.65E+01
Arsenic	2.24E+00	7.40E+00	1.67E-02	3.32E-01	2.15E-03	1.67E-02	3.32E-01	2.15E-03	1.65E-02	3.28E-01	2.12E-03
Calcium	NA	NA	2.74E+03	6.42E+03	1.89E-01	2.74E+03	6.42E+03	1.89E-01	1.64E+03	3.86E+03	1.14E-01
Chromium	2.66E+00	5.00E+00	1.36E-02	1.44E+00	7.64E-02	1.36E-02	1.44E+00	7.64E-02	2.02E-02	1.49E+00	1.02E-01
Copper	4.05E+00	6.17E+01	1.56E-01	2.15E+00	3.63E-01	1.56E-01	2.15E+00	3.63E-01	1.58E-01	2.17E+00	3.65E-01
Iron	NA	NA	1.03E+01	4.18E+02	2.97E+00	1.03E+01	4.18E+02	2.97E+00	1.21E+01	4.95E+02	3.52E+00
Lead	1.63E+00	1.13E+01	1.10E-01	6.12E+00	2.54E-01	1.10E-01	6.12E+00	2.54E-01	3.77E-02	1.71E+00	1.28E-01
Magnesium	NA	NA	4.96E+01	2.21E+02	8.47E-02	4.96E+01	2.21E+02	8.47E-02	5.13E+01	2.29E+02	8.75E-02
Manganese	9.97E+02	NA	3.40E+00	9.97E+00	1.21E+00	3.40E+00	9.97E+00	1.21E+00	3.20E+00	9.47E+00	1.14E+00
Mercury	4.50E-01	9.00E-01	3.47E-03	6.04E-02	1.72E-03	3.47E-03	6.04E-02	1.72E-03	2.52E-03	5.58E-02	9.72E-04
Potassium	NA	NA	1.22E+01	9.85E+01	8.30E-02	1.22E+01	9.85E+01	8.30E-02	1.45E+01	1.17E+02	9.89E-02
Selenium	5.00E-01	1.00E+00	1.79E-02	2.08E-01	2.31E-02	1.79E-02	2.08E-01	2.31E-02	8.19E-03	1.22E-01	1.77E-02
Sodium	NA	NA	2.00E-01	1.74E+01	4.05E-02	2.00E-01	1.74E+01	4.05E-02	2.63E-01	2.28E+01	5.31E-02
Vanadium	3.44E-01	6.88E-01	3.06E-02	8.78E+00	3.53E-01	3.06E-02	8.78E+00	3.53E-01	4.10E-02	1.18E+01	4.73E-01
Zinc	6.61E+01	1.31E+02	1.16E+00	5.42E+01	3.41E+00	1.16E+00	5.42E+01	3.41E+00	9.76E-01	4.90E+01	3.34E+00
PAHs											
Acenaphthylene	NA	NA	5.28E-05	4.82E-04	1.65E-08	5.28E-05	4.82E-04	1.65E-08	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Anthracene	NA	NA	5.46E-05	3.36E-03	6.12E-06	5.46E-05	3.36E-03	6.12E-06	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Pyrene	NA	NA	4.96E-05	4.48E-03	1.38E-05	4.96E-05	4.48E-03	1.38E-05	0.00E+00	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NA	NA	9.09E-05	5.89E-03	3.96E-05	9.09E-05	5.89E-03	3.96E-05	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NA	NA	1.08E-05	6.40E-04	1.66E-05	1.08E-05	6.40E-04	1.66E-05	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NA	NA	6.17E-05	4.00E-03	2.68E-05	6.17E-05	4.00E-03	2.68E-05	0.00E+00	0.00E+00	0.00E+00
Chrysene	NA	NA	7.21E-05	6.82E-03	8.07E-06	7.21E-05	6.82E-03	8.07E-06	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NA	NA	5.61E-06	8.86E-04	6.94E-06	5.61E-06	8.86E-04	6.94E-06	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	NA	NA	1.38E-04	6.16E-03	1.56E-06	1.38E-04	6.16E-03	1.56E-06	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NA	NA	1.27E-05	1.76E-03	1.98E-05	1.27E-05	1.76E-03	1.98E-05	0.00E+00	0.00E+00	0.00E+00
Pyrene	NA	NA	1.43E-04	6.29E-03	1.29E-06	1.43E-04	6.29E-03	1.29E-06	0.00E+00	0.00E+00	0.00E+00
Total LMW PAHs	3.37E+00	3.37E+01	1.90E-04	6.65E-03	1.58E-06	1.90E-04	6.65E-03	1.58E-06	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	3.37E+00	3.37E+01	5.01E-04	3.41E-02	1.39E-04	5.01E-04	3.41E-02	1.39E-04	0.00E+00	0.00E+00	0.00E+00
Pesticides											
4,4'-DDD	2.27E-01	2.27E+00	1.35E-05	2.70E-02	4.01E-06	1.35E-05	2.70E-02	4.01E-06	2.52E-05	5.05E-02	7.50E-06
4,4'-DDE	2.27E-01	2.27E+00	2.03E-04	4.37E-01	2.96E-05	2.03E-04	4.37E-01	2.96E-05	3.09E-05	6.65E-02	4.51E-06
4,4'-DDT	2.27E-01	2.27E+00	5.61E-05	1.63E-01	5.42E-05	5.61E-05	1.63E-01	5.42E-05	7.30E-06	2.12E-02	7.06E-06
DDTr	2.27E-01	2.27E+00	2.72E-04	6.27E-01	8.79E-05	2.72E-04	6.27E-01	8.79E-05	6.34E-05	1.38E-01	1.91E-05
Alpha-Chlordane	2.10E+00	1.07E+01	3.49E-06	9.82E-04	4.02E-07	3.49E-06	9.82E-04	4.02E-07	6.04E-07	1.70E-04	6.97E-08
SVOCs											
Bis(2-ethylhexyl)phthalate	1.10E+00	7.63E+02	6.60E-05	8.65E-03	1.27E-06	6.60E-05	8.65E-03	1.27E-06	0.00E+00	0.00E+00	0.00E+00
Pentachlorophenol	6.73E+00	NA	5.97E-06	7.89E-04	5.19E-07	5.97E-06	7.89E-04	5.19E-07	0.00E+00	0.00E+00	0.00E+00
VOCs											
1,1-dichloroethene	NA	NA	4.61E-05	1.66E-04	1.12E-10	4.61E-05	1.66E-04	1.12E-10	0.00E+00	0.00E+00	0.00E+00

Table 17-1
Detection Comparison to Region 4 Screening Levels
for the Site 15 Exposure Grouping

Analyte	Surface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Metals					
Aluminum	2/2	2.57E+04	2.52E+04	5.00E+01	YES
Antimony	2/2	2.70E+00	2.15E+00	3.50E+00	NO
Arsenic	2/2	2.05E+01	1.33E+01	1.00E+01	YES
Barium	2/2	5.26E+01	4.12E+01	1.65E+02	NO
Beryllium	2/2	1.40E+00	8.40E-01	1.10E+00	YES
Cadmium	2/2	1.40E+00	9.40E-01	1.60E+00	NO
Calcium	2/2	4.29E+04	4.17E+04	NA	YES
Chromium	2/2	4.83E+01	4.62E+01	4.00E-01	YES
Cobalt	2/2	1.74E+01	1.19E+01	2.00E+01	NO
Copper	2/2	1.11E+02	7.10E+01	4.00E+01	YES
Iron	2/2	4.13E+04	3.62E+04	2.00E+02	YES
Lead	2/2	3.21E+01	2.31E+01	5.00E+01	NO
Magnesium	2/2	1.32E+04	7.98E+03	NA	YES
Manganese	2/2	9.17E+02	6.99E+02	1.00E+02	YES
Mercury	2/2	1.00E-01	6.60E-02	1.00E-01	YES
Nickel	2/2	3.52E+01	2.26E+01	3.00E+01	YES
Potassium	2/2	6.09E+02	5.69E+02	NA	YES
Selenium	2/2	9.30E-01	7.85E-01	8.10E-01	YES
Silver	1/2	1.40E-01	1.35E-01	2.00E+00	NO
Sodium	2/2	4.05E+02	2.74E+02	NA	YES
Thallium	2/2	1.10E+00	7.25E-01	1.00E+00	YES
Tin	2/2	1.36E+01	8.65E+00	5.30E+01	NO
Vanadium	2/2	1.62E+02	1.26E+02	2.00E+00	YES
Zinc	2/2	2.60E+02	1.61E+02	5.00E+01	YES

Table 17-2
Detection Comparison to Region 4 Screening Levels
for the Site 15 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Mean (mg/kg)	Region 4 Screening Criteria (mg/kg)	Terrestrial Habitats
Metals					
Aluminum	2/2	2.75E+04	2.33E+04	5.00E+01	YES
Antimony	2/2	2.70E+00	2.00E+00	3.50E+00	NO
Arsenic	2/2	4.52E+01	3.16E+01	1.00E+01	YES
Barium	2/2	3.82E+01	3.35E+01	1.65E+02	NO
Beryllium	2/2	4.40E-01	2.85E-01	1.10E+00	NO
Cadmium	2/2	5.50E-01	4.10E-01	1.60E+00	NO
Calcium	2/2	2.89E+04	1.57E+04	NA	YES
Chromium	2/2	8.93E+01	6.31E+01	4.00E-01	YES
Cobalt	2/2	9.30E+00	6.55E+00	2.00E+01	NO
Copper	2/2	6.22E+01	3.89E+01	4.00E+01	YES
Iron	2/2	4.58E+04	3.94E+04	2.00E+02	YES
Lead	2/2	2.14E+01	1.35E+01	5.00E+01	NO
Magnesium	2/2	1.79E+03	1.34E+03	NA	YES
Manganese	2/2	9.17E+02	5.11E+02	1.00E+02	YES
Mercury	2/2	1.00E-01	7.40E-02	1.00E-01	YES
Nickel	2/2	1.40E+01	8.65E+00	3.00E+01	NO
Potassium	2/2	6.18E+02	5.32E+02	NA	YES
Selenium	2/2	2.00E+00	1.80E+00	8.10E-01	YES
Sodium	2/2	1.25E+02	8.43E+01	NA	YES
Thallium	2/2	8.00E-01	5.25E-01	1.00E+00	NO
Tin	2/2	4.40E+00	3.75E+00	5.30E+01	NO
Vanadium	2/2	1.39E+02	1.10E+02	2.00E+00	YES
Zinc	2/2	6.03E+01	3.78E+01	5.00E+01	YES

Table 17-3
Frequency of Detection and Exposure Point Concentrations
for the Site 15 Exposure Grouping

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Aluminum	2/2	2.57E+04	2.52E+04
Arsenic	2/2	2.05E+01	1.33E+01
Beryllium	2/2	1.40E+00	8.40E-01
Calcium	2/2	4.29E+04	4.17E+04
Chromium	2/2	4.83E+01	4.62E+01
Copper	2/2	1.11E+02	7.10E+01
Iron	2/2	4.13E+04	3.62E+04
Magnesium	2/2	1.32E+04	7.98E+03
Manganese	2/2	9.17E+02	6.99E+02
Mercury	2/2	1.00E-01	6.60E-02
Nickel	2/2	3.52E+01	2.26E+01
Potassium	2/2	6.09E+02	5.69E+02
Selenium	2/2	9.30E-01	7.85E-01
Sodium	2/2	4.05E+02	2.74E+02
Thallium	2/2	1.10E+00	7.25E-01
Vanadium	2/2	1.62E+02	1.26E+02
Zinc	2/2	2.60E+02	1.61E+02

Table 17-4
Frequency of Detection and Exposure Point Concentrations
for the Site 15 (Subsurface Soil) Exposure Grouping

Analyte	Subsurface Soil		
	Frequency	Maximum (mg/kg)	Mean (mg/kg)
Metals			
Aluminum	2/2	2.75E+04	2.33E+04
Arsenic	2/2	4.52E+01	3.16E+01
Calcium	2/2	2.89E+04	1.57E+04
Chromium	2/2	8.93E+01	6.31E+01
Copper	2/2	6.22E+01	3.89E+01
Iron	2/2	4.58E+04	3.94E+04
Magnesium	2/2	1.79E+03	1.34E+03
Manganese	2/2	9.17E+02	5.11E+02
Mercury	2/2	1.00E-01	7.40E-02
Potassium	2/2	6.18E+02	5.32E+02
Selenium	2/2	2.00E+00	1.80E+00
Sodium	2/2	1.25E+02	8.43E+01
Vanadium	2/2	1.39E+02	1.10E+02
Zinc	2/2	6.03E+01	3.78E+01

Table 17-5
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 15 Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	2.57E+04	5.14E+02	2.52E+04	5.03E+02	3.00E+04
Arsenic	1.80E+01	2.05E+01	1.14E+00	1.33E+01	7.36E-01	4.39E+01
Beryllium	1.00E+01	1.40E+00	1.40E-01	8.40E-01	8.40E-02	6.47E-01
Calcium	NA	4.29E+04	--	4.17E+04	--	1.06E+05
Chromium	1.00E+00	4.83E+01	4.83E+01	4.62E+01	4.62E+01	6.98E+01
Copper	7.00E+01	1.11E+02	1.59E+00	7.10E+01	1.01E+00	8.37E+01
Iron	NA	4.13E+04	--	3.62E+04	--	4.71E+04
Magnesium	NA	1.32E+04	--	7.98E+03	--	5.13E+03
Manganese	2.20E+02	9.17E+02	4.17E+00	6.99E+02	3.18E+00	1.18E+03
Mercury	3.00E-01	1.00E-01	3.33E-01	6.60E-02	2.20E-01	3.20E-01
Nickel	3.80E+01	3.52E+01	9.26E-01	2.26E+01	5.95E-01	2.30E+01
Potassium	NA	6.09E+02	--	5.69E+02	--	1.46E+03
Selenium	5.20E-01	9.30E-01	1.79E+00	7.85E-01	1.51E+00	1.00E+00
Sodium	NA	4.05E+02	--	2.74E+02	--	2.38E+02
Thallium	1.00E+00	1.10E+00	1.10E+00	7.25E-01	7.25E-01	1.10E+00
Vanadium	2.00E+00	1.62E+02	8.10E+01	1.26E+02	6.29E+01	1.45E+02
Zinc	1.60E+02	2.60E+02	1.63E+00	1.61E+02	1.01E+00	8.10E+01

Table 17-6
Comparison of Exposure Point Concentrations (EPCs) in Soil to Plant Toxicity Reference Values for the Site 15 (Subsurface Soil) Exposure Grouping

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean EPC (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	5.00E+01	2.75E+04	5.50E+02	2.33E+04	4.65E+02	3.00E+04
Arsenic	1.80E+01	4.52E+01	2.51E+00	3.16E+01	1.76E+00	4.39E+01
Calcium	NA	2.89E+04	--	1.57E+04	--	1.06E+05
Chromium	1.00E+00	8.93E+01	8.93E+01	6.31E+01	6.31E+01	6.98E+01
Copper	7.00E+01	6.22E+01	8.89E-01	3.89E+01	5.56E-01	8.37E+01
Iron	NA	4.58E+04	--	3.94E+04	--	4.71E+04
Magnesium	NA	1.79E+03	--	1.34E+03	--	5.13E+03
Manganese	2.20E+02	9.17E+02	4.17E+00	5.11E+02	2.32E+00	1.18E+03
Mercury	3.00E-01	1.00E-01	3.33E-01	7.40E-02	2.47E-01	3.20E-01
Potassium	NA	6.18E+02	--	5.32E+02	--	1.46E+03
Selenium	5.20E-01	2.00E+00	3.85E+00	1.80E+00	3.46E+00	1.00E+00
Sodium	NA	1.25E+02	--	8.43E+01	--	2.38E+02
Vanadium	2.00E+00	1.39E+02	6.95E+01	1.10E+02	5.48E+01	1.45E+02
Zinc	1.60E+02	6.03E+01	3.77E-01	3.78E+01	2.36E-01	8.10E+01

Table 17-7
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 15 Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	2.57E+04	--	2.52E+04	--	3.00E+04
Arsenic	6.00E+01	2.05E+01	3.42E-01	1.33E+01	2.21E-01	4.39E+01
Beryllium	4.00E+01	1.40E+00	3.50E-02	8.40E-01	2.10E-02	6.47E-01
Calcium	NA	4.29E+04	--	4.17E+04	--	1.06E+05
Chromium	4.00E-01	4.83E+01	1.21E+02	4.62E+01	1.16E+02	6.98E+01
Copper	8.00E+01	1.11E+02	1.39E+00	7.10E+01	8.87E-01	8.37E+01
Iron	NA	4.13E+04	--	3.62E+04	--	4.71E+04
Magnesium	NA	1.32E+04	--	7.98E+03	--	5.13E+03
Manganese	4.50E+02	9.17E+02	2.04E+00	6.99E+02	1.55E+00	1.18E+03
Mercury	1.00E-01	1.00E-01	1.00E+00	6.60E-02	6.60E-01	3.20E-01
Nickel	2.80E+02	3.52E+01	1.26E-01	2.26E+01	8.07E-02	2.30E+01
Potassium	NA	6.09E+02	--	5.69E+02	--	1.46E+03
Selenium	4.10E+00	9.30E-01	2.27E-01	7.85E-01	1.91E-01	1.00E+00
Sodium	NA	4.05E+02	--	2.74E+02	--	2.38E+02
Thallium	NA	1.10E+00	--	7.25E-01	--	1.10E+00
Vanadium	NA	1.62E+02	--	1.26E+02	--	1.45E+02
Zinc	1.20E+02	2.60E+02	2.17E+00	1.61E+02	1.35E+00	8.10E+01

Table 17-8
Comparison of Exposure Point Concentrations (EPCs) in Soil to Soil Invertebrate Toxicity Reference Values for the Site 15 (Subsurface Soil) Exposure Grouping

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Maximum EPC	Mean Exposure Point Concentration (mg/kg dry wt)	Hazard Quotient for Mean EPC	Background 95% UCL Mean
Metals						
Aluminum	NA	2.75E+04	--	2.33E+04	--	3.00E+04
Arsenic	6.00E+01	4.52E+01	7.53E-01	3.16E+01	5.27E-01	4.39E+01
Calcium	NA	2.89E+04	--	1.57E+04	--	1.06E+05
Chromium	4.00E-01	8.93E+01	2.23E+02	6.31E+01	1.58E+02	6.98E+01
Copper	8.00E+01	6.22E+01	7.78E-01	3.89E+01	4.86E-01	8.37E+01
Iron	NA	4.58E+04	--	3.94E+04	--	4.71E+04
Magnesium	NA	1.79E+03	--	1.34E+03	--	5.13E+03
Manganese	4.50E+02	9.17E+02	2.04E+00	5.11E+02	1.14E+00	1.18E+03
Mercury	1.00E-01	1.00E-01	1.00E+00	7.40E-02	7.40E-01	3.20E-01
Potassium	NA	6.18E+02	--	5.32E+02	--	1.46E+03
Selenium	4.10E+00	2.00E+00	4.88E-01	1.80E+00	4.39E-01	1.00E+00
Sodium	NA	1.25E+02	--	8.43E+01	--	2.38E+02
Vanadium	NA	1.39E+02	--	1.10E+02	--	1.45E+02
Zinc	1.20E+02	6.03E+01	5.03E-01	3.78E+01	3.15E-01	8.10E+01

Table 17-9
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 15 Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Metals								
Aluminum	1.93E+00	1.93E+01	7.45E+01	2.53E+02	7.29E+01	2.47E+02	6.70E+01	2.27E+02
Arsenic	1.04E+00	1.26E+00	1.40E-01	1.70E-01	1.03E-01	1.25E-01	1.19E-01	1.44E-01
Beryllium	5.32E-01	NA	5.07E-03	1.38E-01	3.04E-03	8.26E-02	1.33E-03	3.62E-02
Calcium	NA	NA	1.82E+04	3.57E+03	1.77E+04	3.47E+03	1.19E+04	2.32E+03
Chromium	2.40E+00	1.31E+01	1.60E-01	7.68E-01	1.53E-01	7.70E-01	1.46E-01	7.73E-01
Copper	5.60E+00	1.54E+01	1.78E+00	1.54E+00	1.44E+00	1.37E+00	1.14E+00	1.20E+00
Iron	NA	NA	1.20E+02	2.68E+02	1.05E+02	2.35E+02	8.76E+01	1.96E+02
Magnesium	NA	NA	1.63E+03	5.83E+02	9.83E+02	3.52E+02	3.70E+02	1.32E+02
Manganese	5.15E+01	2.84E+02	2.99E+01	3.89E+00	2.28E+01	3.23E+00	2.31E+01	3.26E+00
Mercury	1.32E+01	NA	1.30E-02	3.20E-02	1.03E-02	3.05E-02	1.82E-02	3.44E-02
Nickel	1.70E+00	8.00E+01	2.73E-01	1.30E+00	1.89E-01	1.46E+00	1.30E-01	1.65E+00
Potassium	NA	NA	7.50E+01	5.07E+01	7.01E+01	4.74E+01	1.04E+02	7.07E+01
Selenium	1.43E-01	3.30E-01	5.88E-02	7.33E-02	4.88E-02	6.47E-02	5.91E-02	7.35E-02
Sodium	NA	NA	4.65E+00	3.37E+01	3.14E+00	2.28E+01	1.89E+00	1.37E+01
Thallium	7.40E-03	7.40E-02	3.19E-03	9.17E-02	2.10E-03	6.04E-02	2.93E-03	8.42E-02
Vanadium	4.16E+00	8.31E+00	4.99E-01	1.19E+01	3.88E-01	9.22E+00	2.96E-01	7.05E+00
Zinc	7.54E+01	3.20E+02	1.34E+01	4.42E+01	1.02E+01	3.78E+01	7.04E+00	3.05E+01

Table 17-10
Comparison of Modeled Wildlife Doses to Mammals to Mammalian TRVs
for the Site 15 (Subsurface Soil) Exposure Grouping

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario		Mean Case Scenario		Background Mean Case Scenario	
	NOAEL	LOAEL	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)	Dose to Herbivorous Mammals (mg/kg-bw day)	Dose to Insectivorous Mammals (mg/kg-bw day)
Metals								
Aluminum	1.93E+00	1.93E+01	7.97E+01	2.70E+02	6.74E+01	2.29E+02	6.70E+01	2.27E+02
Arsenic	1.04E+00	1.26E+00	2.51E-01	2.97E-01	1.92E-01	2.30E-01	1.19E-01	1.44E-01
Calcium	NA	NA	1.23E+04	2.41E+03	6.68E+03	1.31E+03	1.19E+04	2.32E+03
Chromium	2.40E+00	1.31E+01	2.97E-01	7.37E-01	2.09E-01	7.55E-01	1.46E-01	7.73E-01
Copper	5.60E+00	1.54E+01	1.35E+00	1.32E+00	1.09E+00	1.17E+00	1.14E+00	1.20E+00
Iron	NA	NA	1.33E+02	2.98E+02	1.14E+02	2.56E+02	8.76E+01	1.96E+02
Magnesium	NA	NA	2.21E+02	7.91E+01	1.64E+02	5.90E+01	3.70E+02	1.32E+02
Manganese	5.15E+01	2.84E+02	2.99E+01	3.89E+00	1.67E+01	2.61E+00	2.31E+01	3.26E+00
Mercury	1.32E+01	NA	1.30E-02	3.20E-02	1.10E-02	3.09E-02	1.82E-02	3.44E-02
Potassium	NA	NA	7.61E+01	5.15E+01	6.56E+01	4.43E+01	1.04E+02	7.07E+01
Selenium	1.43E-01	3.30E-01	1.37E-01	1.28E-01	1.22E-01	1.19E-01	5.91E-02	7.35E-02
Sodium	NA	NA	1.43E+00	1.04E+01	9.67E-01	7.02E+00	1.89E+00	1.37E+01
Vanadium	4.16E+00	8.31E+00	4.28E-01	1.02E+01	3.38E-01	8.04E+00	2.96E-01	7.05E+00
Zinc	7.54E+01	3.20E+02	5.82E+00	2.73E+01	4.47E+00	2.35E+01	7.04E+00	3.05E+01

Table 17-11
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 15 Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Aluminum	1.10E+02	NA	1.03E+01	5.58E+02	5.17E+01	1.01E+01	5.46E+02	5.06E+01	9.29E+00	5.01E+02	4.65E+01
Arsenic	2.24E+00	7.40E+00	1.94E-02	3.94E-01	2.56E-03	1.43E-02	2.79E-01	1.79E-03	1.65E-02	3.28E-01	2.12E-03
Beryllium	NA	NA	7.04E-04	2.27E-01	8.16E-06	4.22E-04	1.36E-01	4.90E-06	1.85E-04	5.97E-02	2.15E-06
Calcium	NA	NA	2.53E+03	5.94E+03	1.75E-01	2.46E+03	5.76E+03	1.70E-01	1.64E+03	3.86E+03	1.14E-01
Chromium	2.66E+00	5.00E+00	2.22E-02	1.51E+00	1.10E-01	2.13E-02	1.50E+00	1.06E-01	2.02E-02	1.49E+00	1.02E-01
Copper	4.05E+00	6.17E+01	2.46E-01	3.12E+00	4.18E-01	1.99E-01	2.61E+00	3.92E-01	1.58E-01	2.17E+00	3.65E-01
Iron	NA	NA	1.66E+01	6.77E+02	4.82E+00	1.46E+01	5.94E+02	4.22E+00	1.21E+01	4.95E+02	3.52E+00
Magnesium	NA	NA	2.26E+02	1.01E+03	3.85E-01	1.36E+02	6.08E+02	2.32E-01	5.13E+01	2.29E+02	8.75E-02
Manganese	9.97E+02	NA	4.15E+00	1.18E+01	1.48E+00	3.16E+00	9.38E+00	1.13E+00	3.20E+00	9.47E+00	1.14E+00
Mercury	4.50E-01	9.00E-01	1.80E-03	5.15E-02	5.28E-04	1.43E-03	4.88E-02	3.48E-04	2.52E-03	5.58E-02	9.72E-04
Nickel	7.74E+01	1.07E+02	3.78E-02	2.29E+00	1.13E-01	2.62E-02	2.46E+00	9.19E-02	1.80E-02	2.71E+00	7.42E-02
Potassium	NA	NA	1.04E+01	8.43E+01	7.10E-02	9.72E+00	7.87E+01	6.63E-02	1.45E+01	1.17E+02	9.89E-02
Selenium	5.00E-01	1.00E+00	8.16E-03	1.22E-01	1.77E-02	6.77E-03	1.08E-01	1.66E-02	8.19E-03	1.22E-01	1.77E-02
Sodium	NA	NA	6.44E-01	5.60E+01	1.30E-01	4.36E-01	3.79E+01	8.82E-02	2.63E-01	2.28E+01	5.31E-02
Thallium	3.50E-01	NA	4.42E-04	1.52E-01	3.72E-03	2.91E-04	1.00E-01	2.45E-03	4.06E-04	1.40E-01	3.42E-03
Vanadium	3.44E-01	6.88E-01	6.92E-02	1.98E+01	7.97E-01	5.37E-02	1.54E+01	6.19E-01	4.10E-02	1.18E+01	4.73E-01
Zinc	6.61E+01	1.31E+02	1.86E+00	7.17E+01	3.63E+00	1.41E+00	6.09E+01	3.50E+00	9.76E-01	4.90E+01	3.34E+00

Table 17-12
Comparison of Modeled Wildlife Doses to Birds to Avian TRVs
for the Site 15 (Subsurface Soil) Exposure Grouping

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario			Mean Case Scenario			Background Mean Case Scenario		
	NOAEL	LOAEL	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)	Dose to Herbivorous Birds (mg/kg-bw day)	Dose to Insectivorous Birds (mg/kg-bw day)	Dose to Predatory Birds (mg/kg-bw day)
Metals											
Aluminum	1.10E+02	NA	1.11E+01	5.97E+02	5.54E+01	9.35E+00	5.04E+02	4.68E+01	9.29E+00	5.01E+02	4.65E+01
Arsenic	2.24E+00	7.40E+00	3.47E-02	7.46E-01	4.89E-03	2.66E-02	5.58E-01	3.65E-03	1.65E-02	3.28E-01	2.12E-03
Calcium	NA	NA	1.70E+03	4.00E+03	1.18E-01	9.27E+02	2.18E+03	6.40E-02	1.64E+03	3.86E+03	1.14E-01
Chromium	2.66E+00	5.00E+00	4.11E-02	1.71E+00	1.73E-01	2.90E-02	1.58E+00	1.34E-01	2.02E-02	1.49E+00	1.02E-01
Copper	4.05E+00	6.17E+01	1.87E-01	2.48E+00	3.85E-01	1.51E-01	2.09E+00	3.60E-01	1.58E-01	2.17E+00	3.65E-01
Iron	NA	NA	1.84E+01	7.51E+02	5.34E+00	1.58E+01	6.46E+02	4.59E+00	1.21E+01	4.95E+02	3.52E+00
Magnesium	NA	NA	3.06E+01	1.36E+02	5.22E-02	2.28E+01	1.02E+02	3.89E-02	5.13E+01	2.29E+02	8.75E-02
Manganese	9.97E+02	NA	4.15E+00	1.18E+01	1.48E+00	2.31E+00	7.25E+00	8.25E-01	3.20E+00	9.47E+00	1.14E+00
Mercury	4.50E-01	9.00E-01	1.80E-03	5.15E-02	5.28E-04	1.53E-03	4.95E-02	3.91E-04	2.52E-03	5.58E-02	9.72E-04
Potassium	NA	NA	1.06E+01	8.55E+01	7.21E-02	9.09E+00	7.36E+01	6.20E-02	1.45E+01	1.17E+02	9.89E-02
Selenium	5.00E-01	1.00E+00	1.89E-02	2.16E-01	2.36E-02	1.69E-02	2.00E-01	2.26E-02	8.19E-03	1.22E-01	1.77E-02
Sodium	NA	NA	1.99E-01	1.73E+01	4.02E-02	1.34E-01	1.17E+01	2.71E-02	2.63E-01	2.28E+01	5.31E-02
Vanadium	3.44E-01	6.88E-01	5.94E-02	1.70E+01	6.84E-01	4.68E-02	1.34E+01	5.40E-01	4.10E-02	1.18E+01	4.73E-01
Zinc	6.61E+01	1.31E+02	8.07E-01	4.38E+01	3.26E+00	6.20E-01	3.75E+01	3.14E+00	9.76E-01	4.90E+01	3.34E+00

Attachment A. Wildlife Exposure Modeling Used in the Ecological Risk Assessment

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Table A-1
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 1 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PAHs															
Acenaphthylene	8.41E-03	2.40E-03	NO COPC	NO COPC	2.10E-01	1.77E-03	5.05E-04	2.03E-05	2.13E-04	0.00E+00	2.34E-04	5.80E-06	6.09E-05	0.00E+00	6.68E-05
Anthracene	2.50E-02	1.93E-02	NO COPC	NO COPC	1.04E-01	2.60E-03	2.00E-03	6.04E-05	3.14E-04	0.00E+00	3.74E-04	4.65E-05	2.42E-04	0.00E+00	2.88E-04
Benzo(a)Anthracene	2.77E-01	1.22E-01	0.00E+00	0.00E+00	2.06E-02	5.71E-03	2.51E-03	6.69E-04	6.89E-04	0.00E+00	1.36E-03	2.95E-04	3.03E-04	0.00E+00	5.98E-04
Benzo(a)Pyrene	4.21E-01	1.68E-01	0.00E+00	0.00E+00	1.37E-02	5.77E-03	2.30E-03	1.02E-03	6.97E-04	0.00E+00	1.71E-03	4.05E-04	2.78E-04	0.00E+00	6.83E-04
Benzo(b)Fluoranthene	4.30E-01	1.80E-01	0.00E+00	0.00E+00	1.12E-02	4.82E-03	2.01E-03	1.04E-03	5.82E-04	0.00E+00	1.62E-03	4.34E-04	2.43E-04	0.00E+00	6.78E-04
Benzo(g,h,i)Perylene	2.85E-01	1.13E-01	0.00E+00	0.00E+00	6.02E-03	1.72E-03	6.79E-04	6.89E-04	2.07E-04	0.00E+00	8.96E-04	2.72E-04	8.20E-05	0.00E+00	3.54E-04
Benzo(k)Fluoranthene	3.81E-01	1.47E-01	0.00E+00	0.00E+00	1.12E-02	4.27E-03	1.65E-03	9.20E-04	5.15E-04	0.00E+00	1.44E-03	3.56E-04	2.00E-04	0.00E+00	5.56E-04
Chrysene	3.66E-01	1.42E-01	0.00E+00	0.00E+00	2.06E-02	7.54E-03	2.92E-03	8.84E-04	9.11E-04	0.00E+00	1.80E-03	3.42E-04	3.52E-04	0.00E+00	6.94E-04
Dibenzo(a,h)Anthracene	9.30E-02	2.76E-02	0.00E+00	0.00E+00	6.78E-03	6.31E-04	1.87E-04	2.25E-04	7.62E-05	0.00E+00	3.01E-04	6.68E-05	2.26E-05	0.00E+00	8.94E-05
Fluoranthene	2.69E-01	1.26E-01	0.00E+00	0.00E+00	5.33E-02	1.43E-02	6.72E-03	6.50E-04	1.73E-03	0.00E+00	2.38E-03	3.05E-04	8.12E-04	0.00E+00	1.12E-03
Indeno(1,2,3-Cd)Pyrene	2.58E-01	1.01E-01	0.00E+00	0.00E+00	6.06E-03	1.56E-03	6.13E-04	6.23E-04	1.89E-04	0.00E+00	8.12E-04	2.44E-04	7.40E-05	0.00E+00	3.18E-04
Phenanthrene	5.49E-02	2.96E-02	NO COPC	NO COPC	1.02E-01	5.60E-03	3.02E-03	1.33E-04	6.76E-04	0.00E+00	8.09E-04	7.16E-05	3.65E-04	0.00E+00	4.37E-04
Pyrene	3.04E-01	1.38E-01	0.00E+00	0.00E+00	5.85E-02	1.78E-02	8.08E-03	7.34E-04	2.15E-03	0.00E+00	2.88E-03	3.34E-04	9.76E-04	0.00E+00	1.31E-03
Total LMW PAHs	3.57E-01	1.77E-01	0.00E+00	0.00E+00	--	--	--	8.63E-04	2.94E-03	0.00E+00	3.80E-03	4.28E-04	1.48E-03	0.00E+00	1.91E-03
Total HMW PAHs	2.82E+00	1.14E+00	0.00E+00	0.00E+00	--	--	--	6.01E-03	0.00E+00	1.28E-02	1.88E-02	2.53E-03	0.00E+00	5.28E-03	7.81E-03
PCBs															
Aroclor-1260	9.11E-02	4.32E-02	0.00E+00	0.00E+00	6.43E-04	5.85E-05	2.78E-05	2.20E-04	7.07E-06	0.00E+00	2.27E-04	1.04E-04	3.36E-06	0.00E+00	1.08E-04
Pesticides															
4,4'-DDD	5.26E-02	2.94E-02	0.00E+00	0.00E+00	1.57E-02	8.24E-04	4.61E-04	1.27E-04	9.96E-05	0.00E+00	2.27E-04	7.11E-05	5.57E-05	0.00E+00	1.27E-04
4,4'-DDE	9.70E-01	2.77E-01	0.00E+00	0.00E+00	1.32E-02	1.28E-02	3.65E-03	2.34E-03	1.54E-03	0.00E+00	3.89E-03	6.70E-04	4.41E-04	0.00E+00	1.11E-03
4,4'-DDT	5.17E-01	2.20E-01	0.00E+00	0.00E+00	4.61E-03	2.38E-03	1.01E-03	1.25E-03	2.88E-04	0.00E+00	1.54E-03	5.32E-04	1.22E-04	0.00E+00	6.54E-04
DDTr	--	--	--	--	--	--	--	3.72E-03	1.93E-03	0.00E+00	5.65E-03	1.27E-03	6.20E-04	0.00E+00	1.89E-03
Alpha-Chlordane	1.21E-02	5.82E-03	0.00E+00	0.00E+00	9.33E-03	1.13E-04	5.43E-05	2.92E-05	1.36E-05	0.00E+00	4.29E-05	1.41E-05	6.56E-06	0.00E+00	2.06E-05
Dieldrin	3.30E-03	1.36E-03	0.00E+00	0.00E+00	2.74E-02	9.05E-05	3.72E-05	7.97E-06	1.09E-05	0.00E+00	1.89E-05	3.28E-06	4.49E-06	0.00E+00	7.77E-06
VOCs															
Acetone	1.43E-02	6.70E-03	0.00E+00	0.00E+00	5.33E+01	7.62E-01	3.57E-01	3.45E-05	9.21E-02	0.00E+00	9.21E-02	1.62E-05	4.31E-02	0.00E+00	4.32E-02

Table A-2
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 1 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PAHs															
Benzo(a)Anthracene	6.82E-02	1.72E-02	0.00E+00	0.00E+00	2.06E-02	1.40E-03	3.55E-04	1.65E-04	1.70E-04	0.00E+00	3.34E-04	4.17E-05	4.29E-05	0.00E+00	8.46E-05
Benzo(a)Pyrene	7.34E-02	1.88E-02	0.00E+00	0.00E+00	1.37E-02	1.01E-03	2.58E-04	1.77E-04	1.21E-04	0.00E+00	2.99E-04	4.55E-05	3.11E-05	0.00E+00	7.66E-05
Benzo(b)Fluoranthene	9.65E-02	2.53E-02	0.00E+00	0.00E+00	1.12E-02	1.08E-03	2.83E-04	2.33E-04	1.31E-04	0.00E+00	3.64E-04	6.11E-05	3.42E-05	0.00E+00	9.54E-05
Benzo(g,h,i)Perylene	5.32E-02	1.38E-02	0.00E+00	0.00E+00	6.02E-03	3.20E-04	8.33E-05	1.29E-04	3.87E-05	0.00E+00	1.67E-04	3.34E-05	1.01E-05	0.00E+00	4.35E-05
Benzo(k)Fluoranthene	8.83E-02	2.26E-02	0.00E+00	0.00E+00	1.12E-02	9.89E-04	2.53E-04	2.13E-04	1.19E-04	0.00E+00	3.33E-04	5.46E-05	3.06E-05	0.00E+00	8.52E-05
Chrysene	6.41E-02	1.64E-02	0.00E+00	0.00E+00	2.06E-02	1.32E-03	3.37E-04	1.55E-04	1.60E-04	0.00E+00	3.14E-04	3.96E-05	4.08E-05	0.00E+00	8.03E-05
Dibenzo(a,h)Anthracene	1.83E-02	4.99E-03	0.00E+00	0.00E+00	6.78E-03	1.24E-04	3.38E-05	4.42E-05	1.50E-05	0.00E+00	5.92E-05	1.20E-05	4.08E-06	0.00E+00	1.61E-05
Indeno(1,2,3-Cd)Pyrene	4.84E-02	1.26E-02	0.00E+00	0.00E+00	6.06E-03	2.93E-04	7.63E-05	1.17E-04	3.54E-05	0.00E+00	1.52E-04	3.04E-05	9.22E-06	0.00E+00	3.96E-05
Pyrene	8.95E-02	3.64E-02	0.00E+00	0.00E+00	5.85E-02	5.24E-03	2.13E-03	2.16E-04	6.32E-04	0.00E+00	8.49E-04	8.79E-05	2.57E-04	0.00E+00	3.45E-04
Total HMW PAHs	6.00E-01	1.68E-01	0.00E+00	0.00E+00	--	--	--	1.42E-03	0.00E+00	0.00E+00	1.42E-03	4.60E-04	0.00E+00	0.00E+00	4.60E-04
Pesticides															
4,4'-DDD	4.30E-03	1.66E-03	0.00E+00	0.00E+00	1.57E-02	6.74E-05	2.60E-05	1.04E-05	8.14E-06	0.00E+00	1.85E-05	4.01E-06	3.14E-06	0.00E+00	7.15E-06
4,4'-DDE	2.73E-02	7.98E-03	0.00E+00	0.00E+00	1.32E-02	3.60E-04	1.05E-04	6.60E-05	4.35E-05	0.00E+00	1.09E-04	1.93E-05	1.27E-05	0.00E+00	3.20E-05
4,4'-DDT	9.10E-03	4.64E-03	0.00E+00	0.00E+00	4.61E-03	4.19E-05	2.14E-05	2.20E-05	5.06E-06	0.00E+00	2.70E-05	1.12E-05	2.58E-06	0.00E+00	1.38E-05
DDTr	--	--	--	--	--	--	--	9.83E-05	5.67E-05	0.00E+00	1.55E-04	3.45E-05	1.84E-05	0.00E+00	5.30E-05
Alpha-Chlordane	2.50E-03	1.00E-03	0.00E+00	0.00E+00	9.33E-03	2.33E-05	9.35E-06	6.04E-06	2.82E-06	0.00E+00	8.86E-06	2.42E-06	1.13E-06	0.00E+00	3.55E-06
SVOCs															
Pentachlorophenol	3.70E-03	1.75E-03	0.00E+00	0.00E+00	4.25E-02	1.57E-04	7.44E-05	8.94E-06	1.90E-05	0.00E+00	2.79E-05	4.23E-06	8.99E-06	0.00E+00	1.32E-05
VOCs															
1,1-dichloroethene	6.10E-04	5.20E-04	0.00E+00	0.00E+00	2.27E+00	1.39E-03	1.18E-03	1.47E-06	1.68E-04	0.00E+00	1.69E-04	1.26E-06	1.43E-04	0.00E+00	1.44E-04
Acetone	1.34E-01	4.17E-02	0.00E+00	0.00E+00	5.33E+01	7.14E+00	2.22E+00	3.24E-04	8.63E-01	0.00E+00	8.63E-01	1.01E-04	2.68E-01	0.00E+00	2.68E-01
Carbon disulfide	1.10E-03	6.28E-04	0.00E+00	0.00E+00	2.93E+00	3.22E-03	1.84E-03	2.66E-06	3.89E-04	0.00E+00	3.92E-04	1.52E-06	2.22E-04	0.00E+00	2.24E-04

Table A-3
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 1 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PAHs															
Acenaphthylene	8.41E-03	2.40E-03	NO COPC	NO COPC	2.10E-01	1.77E-03	5.05E-04	2.82E-06	2.96E-05	0.00E+00	3.24E-05	8.05E-07	8.45E-06	0.00E+00	9.26E-06
Anthracene	2.50E-02	1.93E-02	NO COPC	NO COPC	1.04E-01	2.60E-03	2.00E-03	8.38E-06	4.36E-05	0.00E+00	5.19E-05	6.45E-06	3.35E-05	0.00E+00	4.00E-05
Benzo(a)Anthracene	2.77E-01	1.22E-01	0.00E+00	0.00E+00	2.06E-02	5.71E-03	2.51E-03	9.28E-05	9.56E-05	0.00E+00	1.88E-04	4.08E-05	4.21E-05	0.00E+00	8.29E-05
Benzo(a)Pyrene	4.21E-01	1.68E-01	0.00E+00	0.00E+00	1.37E-02	5.77E-03	2.30E-03	1.41E-04	9.66E-05	0.00E+00	2.38E-04	5.62E-05	3.85E-05	0.00E+00	9.47E-05
Benzo(b)Fluoranthene	4.30E-01	1.80E-01	0.00E+00	0.00E+00	1.12E-02	4.82E-03	2.01E-03	1.44E-04	8.07E-05	0.00E+00	2.25E-04	6.02E-05	3.37E-05	0.00E+00	9.40E-05
Benzo(g,h,i)Perylene	2.85E-01	1.13E-01	0.00E+00	0.00E+00	6.02E-03	1.72E-03	6.79E-04	9.55E-05	2.87E-05	0.00E+00	1.24E-04	3.78E-05	1.14E-05	0.00E+00	4.91E-05
Benzo(k)Fluoranthene	3.81E-01	1.47E-01	0.00E+00	0.00E+00	1.12E-02	4.27E-03	1.65E-03	1.28E-04	7.15E-05	0.00E+00	1.99E-04	4.94E-05	2.77E-05	0.00E+00	7.71E-05
Chrysene	3.66E-01	1.42E-01	0.00E+00	0.00E+00	2.06E-02	7.54E-03	2.92E-03	1.23E-04	1.26E-04	0.00E+00	2.49E-04	4.74E-05	4.88E-05	0.00E+00	9.63E-05
Dibenzo(a,h)Anthracene	9.30E-02	2.76E-02	0.00E+00	0.00E+00	6.78E-03	6.31E-04	1.87E-04	3.12E-05	1.06E-05	0.00E+00	4.17E-05	9.26E-06	3.14E-06	0.00E+00	1.24E-05
Fluoranthene	2.69E-01	1.26E-01	0.00E+00	0.00E+00	5.33E-02	1.43E-02	6.72E-03	9.01E-05	2.40E-04	0.00E+00	3.30E-04	4.22E-05	1.13E-04	0.00E+00	1.55E-04
Indeno(1,2,3-Cd)Pyrene	2.58E-01	1.01E-01	0.00E+00	0.00E+00	6.06E-03	1.56E-03	6.13E-04	8.64E-05	2.62E-05	0.00E+00	1.13E-04	3.39E-05	1.03E-05	0.00E+00	4.41E-05
Phenanthrene	5.49E-02	2.96E-02	NO COPC	NO COPC	1.02E-01	5.60E-03	3.02E-03	1.84E-05	9.38E-05	0.00E+00	1.12E-04	9.93E-06	5.06E-05	0.00E+00	6.06E-05
Pyrene	3.04E-01	1.38E-01	0.00E+00	0.00E+00	5.85E-02	1.78E-02	8.08E-03	1.02E-04	2.98E-04	0.00E+00	4.00E-04	4.63E-05	1.35E-04	0.00E+00	1.82E-04
Total LMW PAHs	3.57E-01	1.77E-01	0.00E+00	0.00E+00	--	--	--	1.20E-04	4.07E-04	0.00E+00	5.27E-04	5.94E-05	2.05E-04	0.00E+00	2.65E-04
Total HMW PAHs	2.82E+00	1.14E+00	0.00E+00	0.00E+00	--	--	--	8.34E-04	0.00E+00	1.78E-03	2.61E-03	3.51E-04	0.00E+00	7.32E-04	1.08E-03
PCBs															
Aroclor-1260	9.11E-02	4.32E-02	0.00E+00	0.00E+00	6.43E-04	5.85E-05	2.78E-05	3.05E-05	9.81E-07	0.00E+00	3.15E-05	1.45E-05	4.65E-07	0.00E+00	1.49E-05
Pesticides															
4,4'-DDD	5.26E-02	2.94E-02	0.00E+00	0.00E+00	1.57E-02	8.24E-04	4.61E-04	1.76E-05	1.38E-05	0.00E+00	3.14E-05	9.86E-06	7.73E-06	0.00E+00	1.76E-05
4,4'-DDE	9.70E-01	2.77E-01	0.00E+00	0.00E+00	1.32E-02	1.28E-02	3.65E-03	3.25E-04	2.14E-04	0.00E+00	5.39E-04	9.29E-05	6.12E-05	0.00E+00	1.54E-04
4,4'-DDT	5.17E-01	2.20E-01	0.00E+00	0.00E+00	4.61E-03	2.38E-03	1.01E-03	1.73E-04	3.99E-05	0.00E+00	2.13E-04	7.37E-05	1.70E-05	0.00E+00	9.07E-05
DDTr	--	--	--	--	--	--	--	5.16E-04	2.68E-04	0.00E+00	7.84E-04	1.76E-04	8.59E-05	0.00E+00	2.62E-04
Alpha-Chlordane	1.21E-02	5.82E-03	0.00E+00	0.00E+00	9.33E-03	1.13E-04	5.43E-05	4.05E-06	1.89E-06	0.00E+00	5.94E-06	1.95E-06	9.09E-07	0.00E+00	2.86E-06
Dieldrin	3.30E-03	1.36E-03	0.00E+00	0.00E+00	2.74E-02	9.05E-05	3.72E-05	1.11E-06	1.52E-06	0.00E+00	2.62E-06	4.55E-07	6.23E-07	0.00E+00	1.08E-06
VOCs															
Acetone	1.43E-02	6.70E-03	0.00E+00	0.00E+00	5.33E+01	7.62E-01	3.57E-01	4.79E-06	1.28E-02	0.00E+00	1.28E-02	2.24E-06	5.98E-03	0.00E+00	5.98E-03

Table A-4
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 1 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PAHs															
Benzo(a)Anthracene	6.82E-02	1.72E-02	0.00E+00	0.00E+00	2.06E-02	1.40E-03	3.55E-04	2.28E-05	2.35E-05	0.00E+00	4.64E-05	5.78E-06	5.95E-06	0.00E+00	1.17E-05
Benzo(a)Pyrene	7.34E-02	1.88E-02	0.00E+00	0.00E+00	1.37E-02	1.01E-03	2.58E-04	2.46E-05	1.68E-05	0.00E+00	4.14E-05	6.30E-06	4.32E-06	0.00E+00	1.06E-05
Benzo(b)Fluoranthene	9.65E-02	2.53E-02	0.00E+00	0.00E+00	1.12E-02	1.08E-03	2.83E-04	3.23E-05	1.81E-05	0.00E+00	5.04E-05	8.48E-06	4.75E-06	0.00E+00	1.32E-05
Benzo(g,h,i)Perylene	5.32E-02	1.38E-02	0.00E+00	0.00E+00	6.02E-03	3.20E-04	8.33E-05	1.78E-05	5.36E-06	0.00E+00	2.32E-05	4.63E-06	1.40E-06	0.00E+00	6.03E-06
Benzo(k)Fluoranthene	8.83E-02	2.26E-02	0.00E+00	0.00E+00	1.12E-02	9.89E-04	2.53E-04	2.96E-05	1.66E-05	0.00E+00	4.61E-05	7.57E-06	4.24E-06	0.00E+00	1.18E-05
Chrysene	6.41E-02	1.64E-02	0.00E+00	0.00E+00	2.06E-02	1.32E-03	3.37E-04	2.15E-05	2.21E-05	0.00E+00	4.36E-05	5.49E-06	5.65E-06	0.00E+00	1.11E-05
Dibenzo(a,h)Anthracene	1.83E-02	4.99E-03	0.00E+00	0.00E+00	6.78E-03	1.24E-04	3.38E-05	6.13E-06	2.08E-06	0.00E+00	8.21E-06	1.67E-06	5.66E-07	0.00E+00	2.24E-06
Indeno(1,2,3-Cd)Pyrene	4.84E-02	1.26E-02	0.00E+00	0.00E+00	6.06E-03	2.93E-04	7.63E-05	1.62E-05	4.91E-06	0.00E+00	2.11E-05	4.22E-06	1.28E-06	0.00E+00	5.50E-06
Pyrene	8.95E-02	3.64E-02	0.00E+00	0.00E+00	5.85E-02	5.24E-03	2.13E-03	3.00E-05	8.77E-05	0.00E+00	1.18E-04	1.22E-05	3.56E-05	0.00E+00	4.78E-05
Total HMW PAHs	6.00E-01	1.68E-01	0.00E+00	0.00E+00	--	--	--	1.97E-04	0.00E+00	0.00E+00	1.97E-04	6.38E-05	0.00E+00	0.00E+00	6.38E-05
Pesticides															
4,4'-DDD	4.30E-03	1.66E-03	0.00E+00	0.00E+00	1.57E-02	6.74E-05	2.60E-05	1.44E-06	1.13E-06	0.00E+00	2.57E-06	5.56E-07	4.36E-07	0.00E+00	9.92E-07
4,4'-DDE	2.73E-02	7.98E-03	0.00E+00	0.00E+00	1.32E-02	3.60E-04	1.05E-04	9.15E-06	6.03E-06	0.00E+00	1.52E-05	2.67E-06	1.76E-06	0.00E+00	4.44E-06
4,4'-DDT	9.10E-03	4.64E-03	0.00E+00	0.00E+00	4.61E-03	4.19E-05	2.14E-05	3.05E-06	7.02E-07	0.00E+00	3.75E-06	1.56E-06	3.58E-07	0.00E+00	1.91E-06
DDTr	--	--	--	--	--	--	--	1.36E-05	7.86E-06	0.00E+00	2.15E-05	4.79E-06	2.56E-06	0.00E+00	7.34E-06
Alpha-Chlordane	2.50E-03	1.00E-03	0.00E+00	0.00E+00	9.33E-03	2.33E-05	9.35E-06	8.38E-07	3.91E-07	0.00E+00	1.23E-06	3.36E-07	1.57E-07	0.00E+00	4.92E-07
SVOCs															
Pentachlorophenol	3.70E-03	1.75E-03	0.00E+00	0.00E+00	4.25E-02	1.57E-04	7.44E-05	1.24E-06	2.64E-06	0.00E+00	3.87E-06	5.86E-07	1.25E-06	0.00E+00	1.83E-06
VOCs															
1,1-dichloroethene	6.10E-04	5.20E-04	0.00E+00	0.00E+00	2.27E+00	1.39E-03	1.18E-03	2.04E-07	2.32E-05	0.00E+00	2.34E-05	1.74E-07	1.98E-05	0.00E+00	2.00E-05
Acetone	1.34E-01	4.17E-02	0.00E+00	0.00E+00	5.33E+01	7.14E+00	2.22E+00	4.49E-05	1.20E-01	0.00E+00	1.20E-01	1.40E-05	3.72E-02	0.00E+00	3.72E-02
Carbon disulfide	1.10E-03	6.28E-04	0.00E+00	0.00E+00	2.93E+00	3.22E-03	1.84E-03	3.69E-07	5.40E-05	0.00E+00	5.43E-05	2.10E-07	3.08E-05	0.00E+00	3.10E-05

Table A-5
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media for the Site 1 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PAHs															
Acenaphthylene	8.41E-03	2.40E-03	NO COPC	NO COPC	2.20E-01	1.85E-03	5.29E-04	0.00E+00	1.54E-04	0.00E+00	1.54E-04	0.00E+00	4.40E-05	0.00E+00	4.40E-05
Anthracene	2.50E-02	1.93E-02	NO COPC	NO COPC	3.20E-01	8.00E-03	6.16E-03	0.00E+00	6.67E-04	0.00E+00	6.67E-04	0.00E+00	5.13E-04	0.00E+00	5.13E-04
Benzo(a)Anthracene	2.77E-01	1.22E-01	0.00E+00	0.00E+00	2.70E-01	7.48E-02	3.29E-02	0.00E+00	6.23E-03	0.00E+00	6.23E-03	0.00E+00	2.74E-03	0.00E+00	2.74E-03
Benzo(a)Pyrene	4.21E-01	1.68E-01	0.00E+00	0.00E+00	3.40E-01	1.43E-01	5.71E-02	0.00E+00	1.19E-02	0.00E+00	1.19E-02	0.00E+00	4.75E-03	0.00E+00	4.75E-03
Benzo(b)Fluoranthene	4.30E-01	1.80E-01	0.00E+00	0.00E+00	2.10E-01	9.03E-02	3.78E-02	0.00E+00	7.52E-03	0.00E+00	7.52E-03	0.00E+00	3.15E-03	0.00E+00	3.15E-03
Benzo(g,h,i)Perylene	2.85E-01	1.13E-01	0.00E+00	0.00E+00	1.50E-01	4.28E-02	1.69E-02	0.00E+00	3.56E-03	0.00E+00	3.56E-03	0.00E+00	1.41E-03	0.00E+00	1.41E-03
Benzo(k)Fluoranthene	3.81E-01	1.47E-01	0.00E+00	0.00E+00	2.10E-01	8.00E-02	3.10E-02	0.00E+00	6.67E-03	0.00E+00	6.67E-03	0.00E+00	2.58E-03	0.00E+00	2.58E-03
Chrysene	3.66E-01	1.42E-01	0.00E+00	0.00E+00	4.40E-01	1.61E-01	6.23E-02	0.00E+00	1.34E-02	0.00E+00	1.34E-02	0.00E+00	5.19E-03	0.00E+00	5.19E-03
Dibenzo(a,h)Anthracene	9.30E-02	2.76E-02	0.00E+00	0.00E+00	4.90E-01	4.56E-02	1.35E-02	0.00E+00	3.80E-03	0.00E+00	3.80E-03	0.00E+00	1.13E-03	0.00E+00	1.13E-03
Fluoranthene	2.69E-01	1.26E-01	0.00E+00	0.00E+00	3.70E-01	9.95E-02	4.66E-02	0.00E+00	8.29E-03	0.00E+00	8.29E-03	0.00E+00	3.89E-03	0.00E+00	3.89E-03
Indeno(1,2,3-Cd)Pyrene	2.58E-01	1.01E-01	0.00E+00	0.00E+00	4.10E-01	1.06E-01	4.15E-02	0.00E+00	8.81E-03	0.00E+00	8.81E-03	0.00E+00	3.45E-03	0.00E+00	3.45E-03
Phenanthrene	5.49E-02	2.96E-02	NO COPC	NO COPC	2.80E-01	1.54E-02	8.30E-03	0.00E+00	1.28E-03	0.00E+00	1.28E-03	0.00E+00	6.91E-04	0.00E+00	6.91E-04
Pyrene	3.04E-01	1.38E-01	0.00E+00	0.00E+00	3.90E-01	1.19E-01	5.39E-02	0.00E+00	9.88E-03	0.00E+00	9.88E-03	0.00E+00	4.49E-03	0.00E+00	4.49E-03
Total LMW PAHs	3.57E-01	1.77E-01	0.00E+00	0.00E+00	--	--	--	0.00E+00	1.04E-02	0.00E+00	1.04E-02	0.00E+00	5.13E-03	0.00E+00	5.13E-03
Total HMW PAHs	2.82E+00	1.14E+00	0.00E+00	0.00E+00	--	--	--	7.18E-02	0.00E+00	7.18E-02	1.44E-01	2.89E-02	0.00E+00	2.89E-02	5.78E-02
PCBs															
Aroclor-1260	9.11E-02	4.32E-02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	1.57E-01	5.70E-02	0.00E+00	1.31E-02	0.00E+00	1.31E-02	0.00E+00	4.75E-03	0.00E+00	4.75E-03
Pesticides															
4,4'-DDD	5.26E-02	2.94E-02	0.00E+00	0.00E+00	9.00E+00	4.73E-01	2.65E-01	0.00E+00	3.94E-02	0.00E+00	3.94E-02	0.00E+00	2.21E-02	0.00E+00	2.21E-02
4,4'-DDE	9.70E-01	2.77E-01	0.00E+00	0.00E+00	9.00E+00	8.73E+00	2.49E+00	0.00E+00	7.27E-01	0.00E+00	7.27E-01	0.00E+00	2.08E-01	0.00E+00	2.08E-01
4,4'-DDT	5.17E-01	2.20E-01	0.00E+00	0.00E+00	9.00E+00	4.65E+00	1.98E+00	0.00E+00	3.88E-01	0.00E+00	3.88E-01	0.00E+00	1.65E-01	0.00E+00	1.65E-01
DDTr	--	--	--	--	--	--	--	0.00E+00	1.15E+00	0.00E+00	1.15E+00	0.00E+00	3.95E-01	0.00E+00	3.95E-01
Alpha-Chlordane	1.21E-02	5.82E-03	0.00E+00	0.00E+00	1.00E+00	1.21E-02	5.82E-03	0.00E+00	1.01E-03	0.00E+00	1.01E-03	0.00E+00	4.85E-04	0.00E+00	4.85E-04
Dieldrin	3.30E-03	1.36E-03	0.00E+00	0.00E+00	1.79E+00	5.91E-03	2.43E-03	0.00E+00	4.92E-04	0.00E+00	4.92E-04	0.00E+00	2.02E-04	0.00E+00	2.02E-04
VOCs															
Acetone	1.43E-02	6.70E-03	0.00E+00	0.00E+00	1.00E+00	1.43E-02	6.70E-03	0.00E+00	1.19E-03	0.00E+00	1.19E-03	0.00E+00	5.58E-04	0.00E+00	5.58E-04

Table A-6
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media for the Site 1 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PAHs															
Benzo(a)Anthracene	6.82E-02	1.72E-02	0.00E+00	0.00E+00	2.70E-01	1.84E-02	4.66E-03	0.00E+00	1.53E-03	0.00E+00	1.53E-03	0.00E+00	3.88E-04	0.00E+00	3.88E-04
Benzo(a)Pyrene	7.34E-02	1.88E-02	0.00E+00	0.00E+00	3.40E-01	2.50E-02	6.40E-03	0.00E+00	2.08E-03	0.00E+00	2.08E-03	0.00E+00	5.33E-04	0.00E+00	5.33E-04
Benzo(b)Fluoranthene	9.65E-02	2.53E-02	0.00E+00	0.00E+00	2.10E-01	2.03E-02	5.31E-03	0.00E+00	1.69E-03	0.00E+00	1.69E-03	0.00E+00	4.43E-04	0.00E+00	4.43E-04
Benzo(g,h,i)Perylene	5.32E-02	1.38E-02	0.00E+00	0.00E+00	1.50E-01	7.98E-03	2.08E-03	0.00E+00	6.65E-04	0.00E+00	6.65E-04	0.00E+00	1.73E-04	0.00E+00	1.73E-04
Benzo(k)Fluoranthene	8.83E-02	2.26E-02	0.00E+00	0.00E+00	2.10E-01	1.85E-02	4.75E-03	0.00E+00	1.55E-03	0.00E+00	1.55E-03	0.00E+00	3.96E-04	0.00E+00	3.96E-04
Chrysene	6.41E-02	1.64E-02	0.00E+00	0.00E+00	4.40E-01	2.82E-02	7.21E-03	0.00E+00	2.35E-03	0.00E+00	2.35E-03	0.00E+00	6.00E-04	0.00E+00	6.00E-04
Dibenzo(a,h)Anthracene	1.83E-02	4.99E-03	0.00E+00	0.00E+00	4.90E-01	8.97E-03	2.44E-03	0.00E+00	7.47E-04	0.00E+00	7.47E-04	0.00E+00	2.04E-04	0.00E+00	2.04E-04
Indeno(1,2,3-Cd)Pyrene	4.84E-02	1.26E-02	0.00E+00	0.00E+00	4.10E-01	1.98E-02	5.16E-03	0.00E+00	1.65E-03	0.00E+00	1.65E-03	0.00E+00	4.30E-04	0.00E+00	4.30E-04
Pyrene	8.95E-02	3.64E-02	0.00E+00	0.00E+00	3.90E-01	3.49E-02	1.42E-02	0.00E+00	2.91E-03	0.00E+00	2.91E-03	0.00E+00	1.18E-03	0.00E+00	1.18E-03
Total HMW PAHs	6.00E-01	1.68E-01	0.00E+00	0.00E+00	--	--	--	1.52E-02	0.00E+00	0.00E+00	1.52E-02	4.35E-03	0.00E+00	0.00E+00	4.35E-03
Pesticides															
4,4'-DDD	4.30E-03	1.66E-03	0.00E+00	0.00E+00	9.00E+00	3.87E-02	1.49E-02	0.00E+00	3.22E-03	0.00E+00	3.22E-03	0.00E+00	1.24E-03	0.00E+00	1.24E-03
4,4'-DDE	2.73E-02	7.98E-03	0.00E+00	0.00E+00	9.00E+00	2.46E-01	7.18E-02	0.00E+00	2.05E-02	0.00E+00	2.05E-02	0.00E+00	5.99E-03	0.00E+00	5.99E-03
4,4'-DDT	9.10E-03	4.64E-03	0.00E+00	0.00E+00	9.00E+00	8.19E-02	4.18E-02	0.00E+00	6.82E-03	0.00E+00	6.82E-03	0.00E+00	3.48E-03	0.00E+00	3.48E-03
DDTr	--	--	--	--	--	--	--	0.00E+00	3.05E-02	0.00E+00	3.05E-02	0.00E+00	1.07E-02	0.00E+00	1.07E-02
Alpha-Chlordane	2.50E-03	1.00E-03	0.00E+00	0.00E+00	1.00E+00	2.50E-03	1.00E-03	0.00E+00	2.08E-04	0.00E+00	2.08E-04	0.00E+00	8.35E-05	0.00E+00	8.35E-05
SVOCs															
Pentachlorophenol	3.70E-03	1.75E-03	0.00E+00	0.00E+00	1.00E+00	3.70E-03	1.75E-03	0.00E+00	3.08E-04	0.00E+00	3.08E-04	0.00E+00	1.46E-04	0.00E+00	1.46E-04
VOCs															
1,1-dichloroethene	6.10E-04	5.20E-04	0.00E+00	0.00E+00	1.00E+00	6.10E-04	5.20E-04	0.00E+00	5.08E-05	0.00E+00	5.08E-05	0.00E+00	4.33E-05	0.00E+00	4.33E-05
Acetone	1.34E-01	4.17E-02	0.00E+00	0.00E+00	1.00E+00	1.34E-01	4.17E-02	0.00E+00	1.12E-02	0.00E+00	1.12E-02	0.00E+00	3.47E-03	0.00E+00	3.47E-03
Carbon disulfide	1.10E-03	6.28E-04	0.00E+00	0.00E+00	1.00E+00	1.10E-03	6.28E-04	0.00E+00	9.17E-05	0.00E+00	9.17E-05	0.00E+00	5.23E-05	0.00E+00	5.23E-05

Table A-7
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 1 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PAHs															
Acenaphthylene	8.41E-03	2.40E-03	NO COPC	NO COPC	2.20E-01	1.85E-03	5.29E-04	5.12E-05	2.45E-04	0.00E+00	2.96E-04	1.46E-05	6.99E-05	0.00E+00	8.45E-05
Anthracene	2.50E-02	1.93E-02	NO COPC	NO COPC	3.20E-01	8.00E-03	6.16E-03	1.52E-04	1.06E-03	0.00E+00	1.21E-03	1.17E-04	8.15E-04	0.00E+00	9.32E-04
Benzo(a)Anthracene	2.77E-01	1.22E-01	0.00E+00	0.00E+00	2.70E-01	7.48E-02	3.29E-02	1.69E-03	9.89E-03	0.00E+00	1.16E-02	7.42E-04	4.35E-03	0.00E+00	5.10E-03
Benzo(a)Pyrene	4.21E-01	1.68E-01	0.00E+00	0.00E+00	3.40E-01	1.43E-01	5.71E-02	2.56E-03	1.89E-02	0.00E+00	2.15E-02	1.02E-03	7.55E-03	0.00E+00	8.57E-03
Benzo(b)Fluoranthene	4.30E-01	1.80E-01	0.00E+00	0.00E+00	2.10E-01	9.03E-02	3.78E-02	2.62E-03	1.19E-02	0.00E+00	1.46E-02	1.09E-03	5.00E-03	0.00E+00	6.09E-03
Benzo(g,h,i)Perylene	2.85E-01	1.13E-01	0.00E+00	0.00E+00	1.50E-01	4.28E-02	1.69E-02	1.73E-03	5.66E-03	0.00E+00	7.39E-03	6.86E-04	2.24E-03	0.00E+00	2.92E-03
Benzo(k)Fluoranthene	3.81E-01	1.47E-01	0.00E+00	0.00E+00	2.10E-01	8.00E-02	3.10E-02	2.32E-03	1.06E-02	0.00E+00	1.29E-02	8.97E-04	4.10E-03	0.00E+00	4.99E-03
Chrysene	3.66E-01	1.42E-01	0.00E+00	0.00E+00	4.40E-01	1.61E-01	6.23E-02	2.23E-03	2.13E-02	0.00E+00	2.35E-02	8.61E-04	8.24E-03	0.00E+00	9.10E-03
Dibenzo(a,h)Anthracene	9.30E-02	2.76E-02	0.00E+00	0.00E+00	4.90E-01	4.56E-02	1.35E-02	5.66E-04	6.03E-03	0.00E+00	6.59E-03	1.68E-04	1.79E-03	0.00E+00	1.96E-03
Fluoranthene	2.69E-01	1.26E-01	0.00E+00	0.00E+00	3.70E-01	9.95E-02	4.66E-02	1.64E-03	1.32E-02	0.00E+00	1.48E-02	7.67E-04	6.17E-03	0.00E+00	6.94E-03
Indeno(1,2,3-Cd)Pyrene	2.58E-01	1.01E-01	0.00E+00	0.00E+00	4.10E-01	1.06E-01	4.15E-02	1.57E-03	1.40E-02	0.00E+00	1.56E-02	6.15E-04	5.48E-03	0.00E+00	6.10E-03
Phenanthrene	5.49E-02	2.96E-02	NO COPC	NO COPC	2.80E-01	1.54E-02	8.30E-03	3.34E-04	2.03E-03	0.00E+00	2.37E-03	1.80E-04	1.10E-03	0.00E+00	1.28E-03
Pyrene	3.04E-01	1.38E-01	0.00E+00	0.00E+00	3.90E-01	1.19E-01	5.39E-02	1.85E-03	1.57E-02	0.00E+00	1.75E-02	8.41E-04	7.13E-03	0.00E+00	7.97E-03
Total LMW PAHs	3.57E-01	1.77E-01	0.00E+00	0.00E+00	--	--	--	2.17E-03	1.65E-02	0.00E+00	1.87E-02	1.08E-03	8.15E-03	0.00E+00	9.23E-03
Total HMW PAHs	2.82E+00	1.14E+00	0.00E+00	0.00E+00	--	--	--	1.14E-01	0.00E+00	1.31E-01	2.45E-01	4.59E-02	0.00E+00	5.28E-02	9.87E-02
PCBs															
Aroclor-1260	9.11E-02	4.32E-02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	1.57E-01	5.70E-02	5.54E-04	2.08E-02	0.00E+00	2.13E-02	2.63E-04	7.54E-03	0.00E+00	7.80E-03
Pesticides															
4,4'-DDD	5.26E-02	2.94E-02	0.00E+00	0.00E+00	9.00E+00	4.73E-01	2.65E-01	3.20E-04	6.26E-02	0.00E+00	6.29E-02	1.79E-04	3.51E-02	0.00E+00	3.52E-02
4,4'-DDE	9.70E-01	2.77E-01	0.00E+00	0.00E+00	9.00E+00	8.73E+00	2.49E+00	5.90E-03	1.15E+00	0.00E+00	1.16E+00	1.69E-03	3.30E-01	0.00E+00	3.32E-01
4,4'-DDT	5.17E-01	2.20E-01	0.00E+00	0.00E+00	9.00E+00	4.65E+00	1.98E+00	3.15E-03	6.16E-01	0.00E+00	6.19E-01	1.34E-03	2.62E-01	0.00E+00	2.63E-01
DDTr	--	--	--	--	--	--	--	9.37E-03	1.83E+00	0.00E+00	1.84E+00	3.20E-03	6.27E-01	0.00E+00	6.30E-01
Alpha-Chlordane	1.21E-02	5.82E-03	0.00E+00	0.00E+00	1.00E+00	1.21E-02	5.82E-03	7.36E-05	1.60E-03	0.00E+00	1.67E-03	3.54E-05	7.70E-04	0.00E+00	8.05E-04
Dieldrin	3.30E-03	1.36E-03	0.00E+00	0.00E+00	1.79E+00	5.91E-03	2.43E-03	2.01E-05	7.81E-04	0.00E+00	8.02E-04	8.26E-06	3.21E-04	0.00E+00	3.30E-04
VOCs															
Acetone	1.43E-02	6.70E-03	0.00E+00	0.00E+00	1.00E+00	1.43E-02	6.70E-03	8.70E-05	1.89E-03	0.00E+00	1.98E-03	4.08E-05	8.86E-04	0.00E+00	9.27E-04

Table A-8
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media for the Site 1 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PAHs															
Benzo(a)Anthracene	6.82E-02	1.72E-02	0.00E+00	0.00E+00	2.70E-01	1.84E-02	4.66E-03	4.15E-04	2.44E-03	0.00E+00	2.85E-03	1.05E-04	6.16E-04	0.00E+00	7.21E-04
Benzo(a)Pyrene	7.34E-02	1.88E-02	0.00E+00	0.00E+00	3.40E-01	2.50E-02	6.40E-03	4.47E-04	3.30E-03	0.00E+00	3.75E-03	1.15E-04	8.47E-04	0.00E+00	9.61E-04
Benzo(b)Fluoranthene	9.65E-02	2.53E-02	0.00E+00	0.00E+00	2.10E-01	2.03E-02	5.31E-03	5.87E-04	2.68E-03	0.00E+00	3.27E-03	1.54E-04	7.03E-04	0.00E+00	8.57E-04
Benzo(g,h,i)Perylene	5.32E-02	1.38E-02	0.00E+00	0.00E+00	1.50E-01	7.98E-03	2.08E-03	3.24E-04	1.06E-03	0.00E+00	1.38E-03	8.42E-05	2.75E-04	0.00E+00	3.59E-04
Benzo(k)Fluoranthene	8.83E-02	2.26E-02	0.00E+00	0.00E+00	2.10E-01	1.85E-02	4.75E-03	5.37E-04	2.45E-03	0.00E+00	2.99E-03	1.38E-04	6.28E-04	0.00E+00	7.66E-04
Chrysene	6.41E-02	1.64E-02	0.00E+00	0.00E+00	4.40E-01	2.82E-02	7.21E-03	3.90E-04	3.73E-03	0.00E+00	4.12E-03	9.97E-05	9.53E-04	0.00E+00	1.05E-03
Dibenzo(a,h)Anthracene	1.83E-02	4.99E-03	0.00E+00	0.00E+00	4.90E-01	8.97E-03	2.44E-03	1.11E-04	1.19E-03	0.00E+00	1.30E-03	3.03E-05	3.23E-04	0.00E+00	3.53E-04
Indeno(1,2,3-Cd)Pyrene	4.84E-02	1.26E-02	0.00E+00	0.00E+00	4.10E-01	1.98E-02	5.16E-03	2.95E-04	2.63E-03	0.00E+00	2.92E-03	7.66E-05	6.83E-04	0.00E+00	7.60E-04
Pyrene	8.95E-02	3.64E-02	0.00E+00	0.00E+00	3.90E-01	3.49E-02	1.42E-02	5.45E-04	4.62E-03	0.00E+00	5.16E-03	2.21E-04	1.88E-03	0.00E+00	2.10E-03
Total HMW PAHs	6.00E-01	1.68E-01	0.00E+00	0.00E+00	--	--	--	2.41E-02	0.00E+00	0.00E+00	2.41E-02	6.90E-03	0.00E+00	0.00E+00	6.90E-03
Pesticides															
4,4'-DDD	4.30E-03	1.66E-03	0.00E+00	0.00E+00	9.00E+00	3.87E-02	1.49E-02	2.62E-05	5.12E-03	0.00E+00	5.15E-03	1.01E-05	1.98E-03	0.00E+00	1.99E-03
4,4'-DDE	2.73E-02	7.98E-03	0.00E+00	0.00E+00	9.00E+00	2.46E-01	7.18E-02	1.66E-04	3.25E-02	0.00E+00	3.27E-02	4.86E-05	9.50E-03	0.00E+00	9.55E-03
4,4'-DDT	9.10E-03	4.64E-03	0.00E+00	0.00E+00	9.00E+00	8.19E-02	4.18E-02	5.54E-05	1.08E-02	0.00E+00	1.09E-02	2.83E-05	5.53E-03	0.00E+00	5.56E-03
DDTr	--	--	--	--	--	--	--	2.48E-04	4.85E-02	0.00E+00	4.87E-02	8.69E-05	1.70E-02	0.00E+00	1.71E-02
Alpha-Chlordane	2.50E-03	1.00E-03	0.00E+00	0.00E+00	1.00E+00	2.50E-03	1.00E-03	1.52E-05	3.31E-04	0.00E+00	3.46E-04	6.10E-06	1.33E-04	0.00E+00	1.39E-04
SVOCs															
Pentachlorophenol	3.70E-03	1.75E-03	0.00E+00	0.00E+00	1.00E+00	3.70E-03	1.75E-03	2.25E-05	4.89E-04	0.00E+00	5.12E-04	1.06E-05	2.32E-04	0.00E+00	2.42E-04
VOCs															
1,1-dichloroethene	6.10E-04	5.20E-04	0.00E+00	0.00E+00	1.00E+00	6.10E-04	5.20E-04	3.71E-06	8.07E-05	0.00E+00	8.44E-05	3.16E-06	6.88E-05	0.00E+00	7.20E-05
Acetone	1.34E-01	4.17E-02	0.00E+00	0.00E+00	1.00E+00	1.34E-01	4.17E-02	8.15E-04	1.77E-02	0.00E+00	1.85E-02	2.53E-04	5.51E-03	0.00E+00	5.76E-03
Carbon disulfide	1.10E-03	6.28E-04	0.00E+00	0.00E+00	1.00E+00	1.10E-03	6.28E-04	6.69E-06	1.46E-04	0.00E+00	1.52E-04	3.82E-06	8.30E-05	0.00E+00	8.68E-05

Table A-9
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 1 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PAHs																	
Acenaphthylene	8.41E-03	2.40E-03	NO COPC	NO COPC	2.34E-04	6.68E-05	4.37E-05	3.68E-07	1.05E-07	0.00E+00	1.01E-08	0.00E+00	1.01E-08	0.00E+00	2.89E-09	0.00E+00	2.89E-09
Anthracene	2.50E-02	1.93E-02	NO COPC	NO COPC	3.74E-04	2.88E-04	1.54E-04	3.85E-06	2.96E-06	0.00E+00	1.06E-07	0.00E+00	1.06E-07	0.00E+00	8.15E-08	0.00E+00	8.15E-08
Benzo(a)Anthracene	2.77E-01	1.22E-01	0.00E+00	0.00E+00	1.36E-03	5.98E-04	2.77E-03	7.67E-04	3.38E-04	0.00E+00	2.11E-05	0.00E+00	2.11E-05	0.00E+00	9.29E-06	0.00E+00	9.29E-06
Benzo(a)Pyrene	4.21E-01	1.68E-01	0.00E+00	0.00E+00	1.71E-03	6.83E-04	5.73E-03	2.41E-03	9.61E-04	0.00E+00	6.63E-05	0.00E+00	6.63E-05	0.00E+00	2.64E-05	0.00E+00	2.64E-05
Benzo(b)Fluoranthene	4.30E-01	1.80E-01	0.00E+00	0.00E+00	1.62E-03	6.78E-04	8.27E-03	3.56E-03	1.49E-03	0.00E+00	9.78E-05	0.00E+00	9.78E-05	0.00E+00	4.09E-05	0.00E+00	4.09E-05
Benzo(g,h,i)Perylene	2.85E-01	1.13E-01	0.00E+00	0.00E+00	8.96E-04	3.54E-04	2.45E-02	6.98E-03	2.76E-03	0.00E+00	1.92E-04	0.00E+00	1.92E-04	0.00E+00	7.60E-05	0.00E+00	7.60E-05
Benzo(k)Fluoranthene	3.81E-01	1.47E-01	0.00E+00	0.00E+00	1.44E-03	5.56E-04	8.27E-03	3.15E-03	1.22E-03	0.00E+00	8.66E-05	0.00E+00	8.66E-05	0.00E+00	3.35E-05	0.00E+00	3.35E-05
Chrysene	3.66E-01	1.42E-01	0.00E+00	0.00E+00	1.80E-03	6.94E-04	2.77E-03	1.01E-03	3.92E-04	0.00E+00	2.79E-05	0.00E+00	2.79E-05	0.00E+00	1.08E-05	0.00E+00	1.08E-05
Dibenzo(a,h)Anthracene	9.30E-02	2.76E-02	0.00E+00	0.00E+00	3.01E-04	8.94E-05	2.02E-02	1.88E-03	5.58E-04	0.00E+00	5.17E-05	0.00E+00	5.17E-05	0.00E+00	1.54E-05	0.00E+00	1.54E-05
Fluoranthene	2.69E-01	1.26E-01	0.00E+00	0.00E+00	2.38E-03	1.12E-03	5.07E-04	1.36E-04	6.39E-05	0.00E+00	3.75E-06	0.00E+00	3.75E-06	0.00E+00	1.76E-06	0.00E+00	1.76E-06
Indeno(1,2,3-Cd)Pyrene	2.58E-01	1.01E-01	0.00E+00	0.00E+00	8.12E-04	3.18E-04	2.47E-02	6.37E-03	2.50E-03	0.00E+00	1.75E-04	0.00E+00	1.75E-04	0.00E+00	6.87E-05	0.00E+00	6.87E-05
Phenanthrene	5.49E-02	2.96E-02	NO COPC	NO COPC	8.09E-04	4.37E-04	1.58E-04	8.67E-06	4.68E-06	0.00E+00	2.39E-07	0.00E+00	2.39E-07	0.00E+00	1.29E-07	0.00E+00	1.29E-07
Pyrene	3.04E-01	1.38E-01	0.00E+00	0.00E+00	2.88E-03	1.31E-03	4.29E-04	1.30E-04	5.93E-05	0.00E+00	3.59E-06	0.00E+00	3.59E-06	0.00E+00	1.63E-06	0.00E+00	1.63E-06
Total LMW PAHs	3.57E-01	1.77E-01	0.00E+00	0.00E+00	3.80E-03	--	--	1.49E-04	7.17E-05	0.00E+00	4.11E-06	0.00E+00	4.11E-06	0.00E+00	1.97E-06	0.00E+00	1.97E-06
Total HMW PAHs	2.82E+00	1.14E+00	0.00E+00	0.00E+00	1.88E-02	--	--	1.03E-02	0.00E+00	7.22E-04	2.83E-04	7.22E-04	1.73E-03	2.83E-04	0.00E+00	0.00E+00	2.83E-04
PCBs																	
Aroclor-1260	9.11E-02	4.32E-02	0.00E+00	0.00E+00	2.27E-04	1.08E-04	1.36E+00	1.24E-01	5.88E-02	0.00E+00	3.41E-03	0.00E+00	3.41E-03	0.00E+00	1.62E-03	0.00E+00	1.62E-03
Pesticides																	
4,4'-DDD	5.26E-02	2.94E-02	0.00E+00	0.00E+00	2.27E-04	1.27E-04	6.46E-03	3.40E-04	1.90E-04	0.00E+00	9.34E-06	0.00E+00	9.34E-06	0.00E+00	5.23E-06	0.00E+00	5.23E-06
4,4'-DDE	9.70E-01	2.77E-01	0.00E+00	0.00E+00	3.89E-03	1.11E-03	2.95E-03	2.86E-03	8.18E-04	0.00E+00	7.87E-05	0.00E+00	7.87E-05	0.00E+00	2.25E-05	0.00E+00	2.25E-05
4,4'-DDT	5.17E-01	2.20E-01	0.00E+00	0.00E+00	1.54E-03	6.54E-04	1.45E-02	7.50E-03	3.19E-03	0.00E+00	2.06E-04	0.00E+00	2.06E-04	0.00E+00	8.77E-05	0.00E+00	8.77E-05
DDTr	--	--	--	--	--	--	--	--	--	0.00E+00	2.94E-04	0.00E+00	2.94E-04	0.00E+00	1.15E-04	0.00E+00	1.15E-04
Alpha-Chlordane	1.21E-02	5.82E-03	0.00E+00	0.00E+00	4.29E-05	2.06E-05	2.06E-03	2.49E-05	1.20E-05	0.00E+00	6.85E-07	0.00E+00	6.85E-07	0.00E+00	3.30E-07	0.00E+00	3.30E-07
Dieldrin	3.30E-03	1.36E-03	0.00E+00	0.00E+00	1.89E-05	7.77E-06	1.96E-04	6.47E-07	2.66E-07	0.00E+00	1.78E-08	0.00E+00	1.78E-08	0.00E+00	7.32E-09	0.00E+00	7.32E-09
VOCs																	
Acetone	1.43E-02	6.70E-03	0.00E+00	0.00E+00	9.21E-02	4.32E-02	2.21E-09	3.16E-11	1.48E-11	0.00E+00	8.69E-13	0.00E+00	8.69E-13	0.00E+00	4.07E-13	0.00E+00	4.07E-13

Table A-10
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 1 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PAHs																	
Benzo(a)Anthracene	6.82E-02	1.72E-02	0.00E+00	0.00E+00	3.34E-04	8.46E-05	2.77E-03	1.89E-04	4.78E-05	0.00E+00	5.20E-06	0.00E+00	5.20E-06	0.00E+00	1.31E-06	0.00E+00	1.31E-06
Benzo(a)Pyrene	7.34E-02	1.88E-02	0.00E+00	0.00E+00	2.99E-04	7.66E-05	5.73E-03	4.21E-04	1.08E-04	0.00E+00	1.16E-05	0.00E+00	1.16E-05	0.00E+00	2.97E-06	0.00E+00	2.97E-06
Benzo(b)Fluoranthene	9.65E-02	2.53E-02	0.00E+00	0.00E+00	3.64E-04	9.54E-05	8.27E-03	7.98E-04	2.09E-04	0.00E+00	2.19E-05	0.00E+00	2.19E-05	0.00E+00	5.75E-06	0.00E+00	5.75E-06
Benzo(g,h,i)Perylene	5.32E-02	1.38E-02	0.00E+00	0.00E+00	1.67E-04	4.35E-05	2.45E-02	1.30E-03	3.39E-04	0.00E+00	3.58E-05	0.00E+00	3.58E-05	0.00E+00	9.32E-06	0.00E+00	9.32E-06
Benzo(k)Fluoranthene	8.83E-02	2.26E-02	0.00E+00	0.00E+00	3.33E-04	8.52E-05	8.27E-03	7.30E-04	1.87E-04	0.00E+00	2.01E-05	0.00E+00	2.01E-05	0.00E+00	5.14E-06	0.00E+00	5.14E-06
Chrysene	6.41E-02	1.64E-02	0.00E+00	0.00E+00	3.14E-04	8.03E-05	2.77E-03	1.78E-04	4.54E-05	0.00E+00	4.88E-06	0.00E+00	4.88E-06	0.00E+00	1.25E-06	0.00E+00	1.25E-06
Dibenzo(a,h)Anthracene	1.83E-02	4.99E-03	0.00E+00	0.00E+00	5.92E-05	1.61E-05	2.02E-02	3.70E-04	1.01E-04	0.00E+00	1.02E-05	0.00E+00	1.02E-05	0.00E+00	2.77E-06	0.00E+00	2.77E-06
Indeno(1,2,3-Cd)Pyrene	4.84E-02	1.26E-02	0.00E+00	0.00E+00	1.52E-04	3.96E-05	2.47E-02	1.20E-03	3.11E-04	0.00E+00	3.29E-05	0.00E+00	3.29E-05	0.00E+00	8.55E-06	0.00E+00	8.55E-06
Pyrene	8.95E-02	3.64E-02	0.00E+00	0.00E+00	8.49E-04	3.45E-04	4.29E-04	3.84E-05	1.56E-05	0.00E+00	1.06E-06	0.00E+00	1.06E-06	0.00E+00	4.29E-07	0.00E+00	4.29E-07
Total HMW PAHs	6.00E-01	1.68E-01	0.00E+00	0.00E+00	--	--	--	5.22E-03	1.36E-03	0.00E+00	1.44E-04	0.00E+00	1.44E-04	0.00E+00	3.75E-05	0.00E+00	3.75E-05
Pesticides																	
4,4'-DDD	4.30E-03	1.66E-03	0.00E+00	0.00E+00	1.85E-05	7.15E-06	6.46E-03	2.78E-05	1.07E-05	0.00E+00	7.64E-07	0.00E+00	7.64E-07	0.00E+00	2.95E-07	0.00E+00	2.95E-07
4,4'-DDE	2.73E-02	7.98E-03	0.00E+00	0.00E+00	1.09E-04	3.20E-05	2.95E-03	8.05E-05	2.35E-05	0.00E+00	2.21E-06	0.00E+00	2.21E-06	0.00E+00	6.48E-07	0.00E+00	6.48E-07
4,4'-DDT	9.10E-03	4.64E-03	0.00E+00	0.00E+00	2.70E-05	1.38E-05	1.45E-02	1.32E-04	6.73E-05	0.00E+00	3.63E-06	0.00E+00	3.63E-06	0.00E+00	1.85E-06	0.00E+00	1.85E-06
DDTr	--	--	--	--	1.55E-04	5.30E-05	--	2.40E-04	1.02E-04	0.00E+00	6.61E-06	0.00E+00	6.61E-06	0.00E+00	2.79E-06	0.00E+00	2.79E-06
Alpha-Chlordane	2.50E-03	1.00E-03	0.00E+00	0.00E+00	8.86E-06	3.55E-06	2.06E-03	5.15E-06	2.07E-06	0.00E+00	1.42E-07	0.00E+00	1.42E-07	0.00E+00	5.68E-08	0.00E+00	5.68E-08
SVOCs																	
Pentachlorophenol	3.70E-03	1.75E-03	0.00E+00	0.00E+00	2.79E-05	1.32E-05	3.31E-03	1.23E-05	5.79E-06	0.00E+00	3.37E-07	0.00E+00	3.37E-07	0.00E+00	1.59E-07	0.00E+00	1.59E-07
VOCs																	
1,1-dichloroethene	6.10E-04	5.20E-04	0.00E+00	0.00E+00	1.69E-04	1.44E-04	3.39E-06	2.07E-09	1.76E-09	0.00E+00	5.68E-11	0.00E+00	5.68E-11	0.00E+00	4.85E-11	0.00E+00	4.85E-11
Acetone	1.34E-01	4.17E-02	0.00E+00	0.00E+00	8.63E-01	2.68E-01	2.21E-09	2.96E-10	9.20E-11	0.00E+00	8.14E-12	0.00E+00	8.14E-12	0.00E+00	2.53E-12	0.00E+00	2.53E-12
Carbon disulfide	1.10E-03	6.28E-04	0.00E+00	0.00E+00	3.92E-04	2.24E-04	8.04E-07	8.84E-10	5.05E-10	0.00E+00	2.43E-11	0.00E+00	2.43E-11	0.00E+00	1.39E-11	0.00E+00	1.39E-11

Table A-11
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 2 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Arsenic	6.18E+01	2.55E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.40E+00	8.48E-01	1.49E-01	1.69E-01	0.00E+00	3.18E-01	6.16E-02	1.02E-01	0.00E+00	1.64E-01
Cadmium	1.80E+00	1.02E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	8.56E-01	6.29E-01	4.35E-03	1.03E-01	0.00E+00	1.08E-01	2.47E-03	7.60E-02	0.00E+00	7.85E-02
Chromium	1.09E+02	4.82E+01	0.00E+00	0.00E+00	7.50E-03	8.18E-01	3.61E-01	2.63E-01	9.88E-02	0.00E+00	3.62E-01	1.16E-01	4.37E-02	0.00E+00	1.60E-01
Cobalt	3.77E+01	1.08E+01	0.00E+00	0.00E+00	2.00E-02	7.54E-01	2.17E-01	9.11E-02	9.11E-02	0.00E+00	1.82E-01	2.62E-02	2.62E-02	0.00E+00	5.24E-02
Copper	5.44E+01	3.45E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	9.43E+00	7.88E+00	1.31E-01	1.14E+00	0.00E+00	1.27E+00	8.33E-02	9.51E-01	0.00E+00	1.03E+00
Mercury	3.80E-01	1.26E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	2.18E-01	1.19E-01	9.18E-04	2.64E-02	0.00E+00	2.73E-02	3.03E-04	1.44E-02	0.00E+00	1.47E-02
Nickel	3.98E+01	1.46E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	1.70E+00	8.03E-01	9.62E-02	2.06E-01	0.00E+00	3.02E-01	3.52E-02	9.70E-02	0.00E+00	1.32E-01
Selenium	4.40E+00	4.04E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	2.61E+00	2.37E+00	1.06E-02	3.15E-01	0.00E+00	3.25E-01	9.77E-03	2.87E-01	0.00E+00	2.97E-01
Vanadium	2.02E+02	9.73E+01	0.00E+00	0.00E+00	5.50E-03	1.11E+00	5.35E-01	4.88E-01	1.34E-01	0.00E+00	6.22E-01	2.35E-01	6.46E-02	0.00E+00	3.00E-01
Zinc	8.87E+01	4.37E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.82E+01	3.93E+01	2.14E-01	7.03E+00	0.00E+00	7.25E+00	1.06E-01	4.75E+00	0.00E+00	4.85E+00
PAHs															
2-Methylnaphthalene	1.63E+00	2.05E-01	0.00E+00	0.00E+00	2.27E-01	3.71E-01	4.66E-02	3.94E-03	4.48E-02	0.00E+00	4.87E-02	4.95E-04	5.63E-03	0.00E+00	6.12E-03
Acenaphthylene	5.34E-02	2.52E-02	0.00E+00	0.00E+00	2.10E-01	1.12E-02	5.29E-03	1.29E-04	1.35E-03	0.00E+00	1.48E-03	6.08E-05	6.39E-04	0.00E+00	6.99E-04
Anthracene	3.92E-02	1.89E-02	0.00E+00	0.00E+00	1.04E-01	4.08E-03	1.97E-03	9.47E-05	4.92E-04	0.00E+00	5.87E-04	4.57E-05	2.37E-04	0.00E+00	2.83E-04
Benzo(a)Anthracene	2.91E-02	3.86E-03	0.00E+00	0.00E+00	2.06E-02	5.99E-04	7.95E-05	7.03E-05	7.24E-05	0.00E+00	1.43E-04	9.32E-06	9.60E-06	0.00E+00	1.89E-05
Chrysene	1.91E-02	2.79E-03	0.00E+00	0.00E+00	2.06E-02	3.93E-04	5.74E-05	4.61E-05	4.75E-05	0.00E+00	9.37E-05	6.74E-06	6.94E-06	0.00E+00	1.37E-05
Fluoranthene	9.09E-02	2.40E-02	0.00E+00	0.00E+00	5.33E-02	4.84E-03	1.28E-03	2.20E-04	5.85E-04	0.00E+00	8.05E-04	5.80E-05	1.54E-04	0.00E+00	2.12E-04
Fluorene	1.45E-01	3.25E-02	0.00E+00	0.00E+00	1.49E-01	2.15E-02	4.83E-03	3.50E-04	2.60E-03	0.00E+00	2.95E-03	7.85E-05	5.83E-04	0.00E+00	6.62E-04
Naphthalene	1.51E+00	1.89E-01	0.00E+00	0.00E+00	4.79E-01	7.24E-01	9.07E-02	3.65E-03	8.74E-02	0.00E+00	9.11E-02	4.57E-04	1.10E-02	0.00E+00	1.14E-02
Phenanthrene	8.33E-02	1.08E-02	0.00E+00	0.00E+00	1.02E-01	8.50E-03	1.10E-03	2.01E-04	1.03E-03	0.00E+00	1.23E-03	2.61E-05	1.33E-04	0.00E+00	1.59E-04
Pyrene	7.36E-02	2.16E-02	0.00E+00	0.00E+00	5.85E-02	4.31E-03	1.26E-03	1.78E-04	5.20E-04	0.00E+00	6.98E-04	5.21E-05	1.52E-04	0.00E+00	2.05E-04
Total LMW PAHs	3.55E+00	5.05E-01	0.00E+00	0.00E+00	--	--	--	8.58E-03	1.38E-01	0.00E+00	1.47E-01	1.22E-03	1.83E-02	0.00E+00	1.95E-02
Total HMW PAHs	1.22E-01	2.82E-02	0.00E+00	0.00E+00	--	--	--	2.94E-04	6.40E-04	0.00E+00	9.34E-04	6.82E-05	1.69E-04	0.00E+00	2.37E-04
Pesticides															
4,4'-DDE	2.80E-03	7.06E-04	0.00E+00	0.00E+00	1.32E-02	3.69E-05	9.31E-06	6.76E-06	4.46E-06	0.00E+00	1.12E-05	1.71E-06	1.12E-06	0.00E+00	2.83E-06
DDTr	--	--	--	--	--	--	--	6.76E-06	4.46E-06	0.00E+00	1.12E-05	1.71E-06	1.12E-06	0.00E+00	2.83E-06
Furans															
Dibenzofuran	3.04E-02	2.06E-02	0.00E+00	0.00E+00	1.61E-01	4.89E-03	3.31E-03	7.34E-05	5.91E-04	0.00E+00	6.64E-04	4.96E-05	4.00E-04	0.00E+00	4.49E-04
SVOCs															
Bis(2-ethylhexyl)phthalate	7.23E-02	5.99E-02	0.00E+00	0.00E+00	4.30E-02	3.11E-03	2.58E-03	1.75E-04	3.76E-04	0.00E+00	5.50E-04	1.45E-04	3.11E-04	0.00E+00	4.56E-04
VOCs															
Acetone	1.25E-02	4.58E-03	0.00E+00	0.00E+00	5.33E+01	6.66E-01	2.44E-01	3.02E-05	8.05E-02	0.00E+00	8.05E-02	1.11E-05	2.95E-02	0.00E+00	2.95E-02
Benzene	1.04E+00	1.30E-01	0.00E+00	0.00E+00	2.27E+00	2.37E+00	2.96E-01	2.51E-03	2.86E-01	0.00E+00	2.88E-01	3.15E-04	3.58E-02	0.00E+00	3.61E-02
Ethylbenzene	1.86E+01	2.33E+00	0.00E+00	0.00E+00	5.85E-01	1.09E+01	1.36E+00	4.49E-02	1.31E+00	0.00E+00	1.36E+00	5.62E-03	1.64E-01	0.00E+00	1.70E-01
Isobutyl alcohol	6.51E+01	6.51E+01	0.00E+00	0.00E+00	1.41E+01	9.17E+02	9.17E+02	1.57E-01	1.11E+02	0.00E+00	1.11E+02	1.57E-01	1.11E+02	0.00E+00	1.11E+02

Table A-12
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 2 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Arsenic	6.18E+01	2.55E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.40E+00	8.48E-01	2.07E-02	2.34E-02	0.00E+00	4.41E-02	8.54E-03	1.42E-02	0.00E+00	2.27E-02
Cadmium	1.80E+00	1.02E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	8.56E-01	6.29E-01	6.03E-04	1.43E-02	0.00E+00	1.49E-02	3.43E-04	1.05E-02	0.00E+00	1.09E-02
Chromium	1.09E+02	4.82E+01	0.00E+00	0.00E+00	7.50E-03	8.18E-01	3.61E-01	3.65E-02	1.37E-02	0.00E+00	5.02E-02	1.61E-02	6.05E-03	0.00E+00	2.22E-02
Cobalt	3.77E+01	1.08E+01	0.00E+00	0.00E+00	2.00E-02	7.54E-01	2.17E-01	1.26E-02	1.26E-02	0.00E+00	2.53E-02	3.63E-03	3.63E-03	0.00E+00	7.26E-03
Copper	5.44E+01	3.45E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	9.43E+00	7.88E+00	1.82E-02	1.58E-01	0.00E+00	1.76E-01	1.15E-02	1.32E-01	0.00E+00	1.43E-01
Mercury	3.80E-01	1.26E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	2.18E-01	1.19E-01	1.27E-04	3.65E-03	0.00E+00	3.78E-03	4.20E-05	2.00E-03	0.00E+00	2.04E-03
Nickel	3.98E+01	1.46E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	1.70E+00	8.03E-01	1.33E-02	2.85E-02	0.00E+00	4.18E-02	4.88E-03	1.34E-02	0.00E+00	1.83E-02
Selenium	4.40E+00	4.04E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	2.61E+00	2.37E+00	1.47E-03	4.36E-02	0.00E+00	4.51E-02	1.35E-03	3.98E-02	0.00E+00	4.11E-02
Vanadium	2.02E+02	9.73E+01	0.00E+00	0.00E+00	5.50E-03	1.11E+00	5.35E-01	6.77E-02	1.86E-02	0.00E+00	8.63E-02	3.26E-02	8.96E-03	0.00E+00	4.15E-02
Zinc	8.87E+01	4.37E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.82E+01	3.93E+01	2.97E-02	9.75E-01	0.00E+00	1.00E+00	1.46E-02	6.58E-01	0.00E+00	6.73E-01
PAHs															
2-Methylnaphthalene	1.63E+00	2.05E-01	0.00E+00	0.00E+00	2.27E-01	3.71E-01	4.66E-02	5.46E-04	6.21E-03	0.00E+00	6.76E-03	6.86E-05	7.80E-04	0.00E+00	8.49E-04
Acenaphthylene	5.34E-02	2.52E-02	0.00E+00	0.00E+00	2.10E-01	1.12E-02	5.29E-03	1.79E-05	1.88E-04	0.00E+00	2.06E-04	8.43E-06	8.86E-05	0.00E+00	9.70E-05
Anthracene	3.92E-02	1.89E-02	0.00E+00	0.00E+00	1.04E-01	4.08E-03	1.97E-03	1.31E-05	6.83E-05	0.00E+00	8.14E-05	6.33E-06	3.29E-05	0.00E+00	3.93E-05
Benzo(a)Anthracene	2.91E-02	3.86E-03	0.00E+00	0.00E+00	2.06E-02	5.99E-04	7.95E-05	9.75E-06	1.00E-05	0.00E+00	1.98E-05	1.29E-06	1.33E-06	0.00E+00	2.62E-06
Chrysene	1.91E-02	2.79E-03	0.00E+00	0.00E+00	2.06E-02	3.93E-04	5.74E-05	6.40E-06	6.59E-06	0.00E+00	1.30E-05	9.34E-07	9.62E-07	0.00E+00	1.90E-06
Fluoranthene	9.09E-02	2.40E-02	0.00E+00	0.00E+00	5.33E-02	4.84E-03	1.28E-03	3.05E-05	8.12E-05	0.00E+00	1.12E-04	8.04E-06	2.14E-05	0.00E+00	2.95E-05
Fluorene	1.45E-01	3.25E-02	0.00E+00	0.00E+00	1.49E-01	2.15E-02	4.83E-03	4.86E-05	3.61E-04	0.00E+00	4.09E-04	1.09E-05	8.09E-05	0.00E+00	9.18E-05
Naphthalene	1.51E+00	1.89E-01	0.00E+00	0.00E+00	4.79E-01	7.24E-01	9.07E-02	5.06E-04	1.21E-02	0.00E+00	1.26E-02	6.34E-05	1.52E-03	0.00E+00	1.58E-03
Phenanthrene	8.33E-02	1.08E-02	0.00E+00	0.00E+00	1.02E-01	8.50E-03	1.10E-03	2.79E-05	1.42E-04	0.00E+00	1.70E-04	3.62E-06	1.84E-05	0.00E+00	2.21E-05
Pyrene	7.36E-02	2.16E-02	0.00E+00	0.00E+00	5.85E-02	4.31E-03	1.26E-03	2.47E-05	7.21E-05	0.00E+00	9.68E-05	7.23E-06	2.11E-05	0.00E+00	2.84E-05
Total LMW PAHs	3.55E+00	5.05E-01	0.00E+00	0.00E+00	--	--	--	1.19E-03	1.92E-02	0.00E+00	2.04E-02	1.69E-04	2.54E-03	0.00E+00	2.71E-03
Total HMW PAHs	1.22E-01	2.82E-02	0.00E+00	0.00E+00	--	--	--	4.08E-05	8.88E-05	0.00E+00	1.30E-04	9.45E-06	2.34E-05	0.00E+00	3.29E-05
Pesticides															
4,4'-DDE	2.80E-03	7.06E-04	0.00E+00	0.00E+00	1.32E-02	3.69E-05	9.31E-06	9.38E-07	6.18E-07	0.00E+00	1.56E-06	2.37E-07	1.56E-07	0.00E+00	3.93E-07
DDTr	--	--	--	--	--	--	--	9.38E-07	6.18E-07	0.00E+00	1.56E-06	2.37E-07	1.56E-07	0.00E+00	3.93E-07
Furans															
Dibenzofuran	3.04E-02	2.06E-02	0.00E+00	0.00E+00	1.61E-01	4.89E-03	3.31E-03	1.02E-05	8.19E-05	0.00E+00	9.21E-05	6.88E-06	5.54E-05	0.00E+00	6.23E-05
SVOCs															
Bis(2-ethylhexyl)phthalate	7.23E-02	5.99E-02	0.00E+00	0.00E+00	4.30E-02	3.11E-03	2.58E-03	2.42E-05	5.21E-05	0.00E+00	7.63E-05	2.01E-05	4.31E-05	0.00E+00	6.32E-05
VOCs															
Acetone	1.25E-02	4.58E-03	0.00E+00	0.00E+00	5.33E+01	6.66E-01	2.44E-01	4.19E-06	1.12E-02	0.00E+00	1.12E-02	1.53E-06	4.09E-03	0.00E+00	4.09E-03
Benzene	1.04E+00	1.30E-01	0.00E+00	0.00E+00	2.27E+00	2.37E+00	2.96E-01	3.48E-04	3.96E-02	0.00E+00	4.00E-02	4.37E-05	4.97E-03	0.00E+00	5.01E-03
Ethylbenzene	1.86E+01	2.33E+00	0.00E+00	0.00E+00	5.85E-01	1.09E+01	1.36E+00	6.23E-03	1.82E-01	0.00E+00	1.89E-01	7.79E-04	2.28E-02	0.00E+00	2.36E-02
Isobutyl alcohol	6.51E+01	6.51E+01	0.00E+00	0.00E+00	1.41E+01	9.17E+02	9.17E+02	2.18E-02	1.54E+01	0.00E+00	1.54E+01	2.18E-02	1.54E+01	0.00E+00	1.54E+01

Table A-13
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 2 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Arsenic	6.18E+01	2.55E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	4.44E+00	2.38E+00	0.00E+00	3.70E-01	0.00E+00	3.70E-01	0.00E+00	1.98E-01	0.00E+00	1.98E-01
Cadmium	1.80E+00	1.02E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	1.32E+01	8.44E+00	0.00E+00	1.10E+00	0.00E+00	1.10E+00	0.00E+00	7.03E-01	0.00E+00	7.03E-01
Chromium	1.09E+02	4.82E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.73E+00	9.22E+00	0.00E+00	7.27E-01	0.00E+00	7.27E-01	0.00E+00	7.68E-01	0.00E+00	7.68E-01
Cobalt	3.77E+01	1.08E+01	0.00E+00	0.00E+00	2.91E-01	1.10E+01	3.15E+00	0.00E+00	9.14E-01	0.00E+00	9.14E-01	0.00E+00	2.63E-01	0.00E+00	2.63E-01
Copper	5.44E+01	3.45E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.53E+01	1.36E+01	0.00E+00	1.28E+00	0.00E+00	1.28E+00	0.00E+00	1.13E+00	0.00E+00	1.13E+00
Mercury	3.80E-01	1.26E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.50E-01	3.95E-01	0.00E+00	3.75E-02	0.00E+00	3.75E-02	0.00E+00	3.29E-02	0.00E+00	3.29E-02
Nickel	3.98E+01	1.46E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.52E+01	1.97E+01	0.00E+00	1.26E+00	0.00E+00	1.26E+00	0.00E+00	1.64E+00	0.00E+00	1.64E+00
Selenium	4.40E+00	4.04E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	2.75E+00	2.58E+00	0.00E+00	2.29E-01	0.00E+00	2.29E-01	0.00E+00	2.15E-01	0.00E+00	2.15E-01
Vanadium	2.02E+02	9.73E+01	0.00E+00	0.00E+00	8.80E-01	1.78E+02	8.56E+01	0.00E+00	1.48E+01	0.00E+00	1.48E+01	0.00E+00	7.13E+00	0.00E+00	7.13E+00
Zinc	8.87E+01	4.37E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.72E+02	2.95E+02	0.00E+00	3.10E+01	0.00E+00	3.10E+01	0.00E+00	2.46E+01	0.00E+00	2.46E+01
PAHs															
2-Methylnaphthalene	1.63E+00	2.05E-01	0.00E+00	0.00E+00	2.00E-01	3.26E-01	4.10E-02	0.00E+00	2.72E-02	0.00E+00	2.72E-02	0.00E+00	3.41E-03	0.00E+00	3.41E-03
Acenaphthylene	5.34E-02	2.52E-02	0.00E+00	0.00E+00	2.20E-01	1.17E-02	5.54E-03	0.00E+00	9.79E-04	0.00E+00	9.79E-04	0.00E+00	4.61E-04	0.00E+00	4.61E-04
Anthracene	3.92E-02	1.89E-02	0.00E+00	0.00E+00	3.20E-01	1.25E-02	6.05E-03	0.00E+00	1.05E-03	0.00E+00	1.05E-03	0.00E+00	5.04E-04	0.00E+00	5.04E-04
Benzo(a)Anthracene	2.91E-02	3.86E-03	0.00E+00	0.00E+00	2.70E-01	7.86E-03	1.04E-03	0.00E+00	6.55E-04	0.00E+00	6.55E-04	0.00E+00	8.68E-05	0.00E+00	8.68E-05
Chrysene	1.91E-02	2.79E-03	0.00E+00	0.00E+00	4.40E-01	8.40E-03	1.23E-03	0.00E+00	7.00E-04	0.00E+00	7.00E-04	0.00E+00	1.02E-04	0.00E+00	1.02E-04
Fluoranthene	9.09E-02	2.40E-02	0.00E+00	0.00E+00	3.70E-01	3.36E-02	8.88E-03	0.00E+00	2.80E-03	0.00E+00	2.80E-03	0.00E+00	7.40E-04	0.00E+00	7.40E-04
Fluorene	1.45E-01	3.25E-02	0.00E+00	0.00E+00	2.00E-01	2.90E-02	6.50E-03	0.00E+00	2.42E-03	0.00E+00	2.42E-03	0.00E+00	5.42E-04	0.00E+00	5.42E-04
Naphthalene	1.51E+00	1.89E-01	0.00E+00	0.00E+00	2.10E-01	3.17E-01	3.97E-02	0.00E+00	2.64E-02	0.00E+00	2.64E-02	0.00E+00	3.31E-03	0.00E+00	3.31E-03
Phenanthrene	8.33E-02	1.08E-02	0.00E+00	0.00E+00	2.80E-01	2.33E-02	3.02E-03	0.00E+00	1.94E-03	0.00E+00	1.94E-03	0.00E+00	2.52E-04	0.00E+00	2.52E-04
Pyrene	7.36E-02	2.16E-02	0.00E+00	0.00E+00	3.90E-01	2.87E-02	8.41E-03	0.00E+00	2.39E-03	0.00E+00	2.39E-03	0.00E+00	7.01E-04	0.00E+00	7.01E-04
Total LMW PAHs	3.55E+00	5.05E-01	0.00E+00	0.00E+00	--	--	--	0.00E+00	6.28E-02	0.00E+00	6.28E-02	0.00E+00	9.22E-03	0.00E+00	9.22E-03
Total HMW PAHs	1.22E-01	2.82E-02	0.00E+00	0.00E+00	--	--	--	0.00E+00	3.75E-03	0.00E+00	3.75E-03	0.00E+00	8.90E-04	0.00E+00	8.90E-04
Pesticides															
4,4'-DDE	2.80E-03	7.06E-04	0.00E+00	0.00E+00	9.00E+00	2.52E-02	6.36E-03	0.00E+00	2.10E-03	0.00E+00	2.10E-03	0.00E+00	5.30E-04	0.00E+00	5.30E-04
DDTr	--	--	--	--	--	--	--	0.00E+00	2.10E-03	0.00E+00	2.10E-03	0.00E+00	5.30E-04	0.00E+00	5.30E-04
Furans															
Dibenzofuran	3.04E-02	2.06E-02	0.00E+00	0.00E+00	1.00E+00	3.04E-02	2.06E-02	0.00E+00	2.53E-03	0.00E+00	2.53E-03	0.00E+00	1.71E-03	0.00E+00	1.71E-03
SVOCs															
Bis(2-ethylhexyl)phthalate	7.23E-02	5.99E-02	0.00E+00	0.00E+00	1.00E+00	7.23E-02	5.99E-02	0.00E+00	6.02E-03	0.00E+00	6.02E-03	0.00E+00	4.99E-03	0.00E+00	4.99E-03
VOCs															
Acetone	1.25E-02	4.58E-03	0.00E+00	0.00E+00	1.00E+00	1.25E-02	4.58E-03	0.00E+00	1.04E-03	0.00E+00	1.04E-03	0.00E+00	3.82E-04	0.00E+00	3.82E-04
Benzene	1.04E+00	1.30E-01	0.00E+00	0.00E+00	1.00E+00	1.04E+00	1.30E-01	0.00E+00	8.67E-02	0.00E+00	8.67E-02	0.00E+00	1.09E-02	0.00E+00	1.09E-02
Ethylbenzene	1.86E+01	2.33E+00	0.00E+00	0.00E+00	1.00E+00	1.86E+01	2.33E+00	0.00E+00	1.55E+00	0.00E+00	1.55E+00	0.00E+00	1.94E-01	0.00E+00	1.94E-01
Isobutyl alcohol	6.51E+01	6.51E+01	0.00E+00	0.00E+00	1.00E+00	6.51E+01	6.51E+01	0.00E+00	5.42E+00	0.00E+00	5.42E+00	0.00E+00	5.42E+00	0.00E+00	5.42E+00

Table A-14
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 2 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Arsenic	6.18E+01	2.55E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	4.44E+00	2.38E+00	3.76E-01	5.87E-01	0.00E+00	9.63E-01	1.55E-01	3.14E-01	0.00E+00	4.70E-01
Cadmium	1.80E+00	1.02E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	1.32E+01	8.44E+00	1.10E-02	1.75E+00	0.00E+00	1.76E+00	6.23E-03	1.12E+00	0.00E+00	1.12E+00
Chromium	1.09E+02	4.82E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.73E+00	9.22E+00	6.63E-01	1.15E+00	0.00E+00	1.82E+00	2.93E-01	1.22E+00	0.00E+00	1.51E+00
Cobalt	3.77E+01	1.08E+01	0.00E+00	0.00E+00	2.91E-01	1.10E+01	3.15E+00	2.29E-01	1.45E+00	0.00E+00	1.68E+00	6.60E-02	4.17E-01	0.00E+00	4.83E-01
Copper	5.44E+01	3.45E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.53E+01	1.36E+01	3.31E-01	2.03E+00	0.00E+00	2.36E+00	2.10E-01	1.80E+00	0.00E+00	2.01E+00
Mercury	3.80E-01	1.26E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.50E-01	3.95E-01	2.31E-03	5.96E-02	0.00E+00	6.19E-02	7.64E-04	5.23E-02	0.00E+00	5.30E-02
Nickel	3.98E+01	1.46E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.52E+01	1.97E+01	2.42E-01	2.01E+00	0.00E+00	2.25E+00	8.87E-02	2.61E+00	0.00E+00	2.69E+00
Selenium	4.40E+00	4.04E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	2.75E+00	2.58E+00	2.68E-02	3.64E-01	0.00E+00	3.90E-01	2.46E-02	3.42E-01	0.00E+00	3.66E-01
Vanadium	2.02E+02	9.73E+01	0.00E+00	0.00E+00	8.80E-01	1.78E+02	8.56E+01	1.23E+00	2.35E+01	0.00E+00	2.47E+01	5.92E-01	1.13E+01	0.00E+00	1.19E+01
Zinc	8.87E+01	4.37E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.72E+02	2.95E+02	5.40E-01	4.93E+01	0.00E+00	4.98E+01	2.66E-01	3.91E+01	0.00E+00	3.93E+01
PAHs															
2-Methylnaphthalene	1.63E+00	2.05E-01	0.00E+00	0.00E+00	2.00E-01	3.26E-01	4.10E-02	9.92E-03	4.31E-02	0.00E+00	5.30E-02	1.25E-03	5.42E-03	0.00E+00	6.66E-03
Acenaphthylene	5.34E-02	2.52E-02	0.00E+00	0.00E+00	2.20E-01	1.17E-02	5.54E-03	3.25E-04	1.55E-03	0.00E+00	1.88E-03	1.53E-04	7.33E-04	0.00E+00	8.86E-04
Anthracene	3.92E-02	1.89E-02	0.00E+00	0.00E+00	3.20E-01	1.25E-02	6.05E-03	2.39E-04	1.66E-03	0.00E+00	1.90E-03	1.15E-04	8.00E-04	0.00E+00	9.15E-04
Benzo(a)Anthracene	2.91E-02	3.86E-03	0.00E+00	0.00E+00	2.70E-01	7.86E-03	1.04E-03	1.77E-04	1.04E-03	0.00E+00	1.22E-03	2.35E-05	1.38E-04	0.00E+00	1.61E-04
Chrysene	1.91E-02	2.79E-03	0.00E+00	0.00E+00	4.40E-01	8.40E-03	1.23E-03	1.16E-04	1.11E-03	0.00E+00	1.23E-03	1.70E-05	1.62E-04	0.00E+00	1.79E-04
Fluoranthene	9.09E-02	2.40E-02	0.00E+00	0.00E+00	3.70E-01	3.36E-02	8.88E-03	5.53E-04	4.45E-03	0.00E+00	5.00E-03	1.46E-04	1.17E-03	0.00E+00	1.32E-03
Fluorene	1.45E-01	3.25E-02	0.00E+00	0.00E+00	2.00E-01	2.90E-02	6.50E-03	8.82E-04	3.84E-03	0.00E+00	4.72E-03	1.98E-04	8.60E-04	0.00E+00	1.06E-03
Naphthalene	1.51E+00	1.89E-01	0.00E+00	0.00E+00	2.10E-01	3.17E-01	3.97E-02	9.19E-03	4.19E-02	0.00E+00	5.11E-02	1.15E-03	5.26E-03	0.00E+00	6.41E-03
Phenanthrene	8.33E-02	1.08E-02	0.00E+00	0.00E+00	2.80E-01	2.33E-02	3.02E-03	5.07E-04	3.09E-03	0.00E+00	3.59E-03	6.57E-05	4.00E-04	0.00E+00	4.66E-04
Pyrene	7.36E-02	2.16E-02	0.00E+00	0.00E+00	3.90E-01	2.87E-02	8.41E-03	4.48E-04	3.80E-03	0.00E+00	4.25E-03	1.31E-04	1.11E-03	0.00E+00	1.24E-03
Total LMW PAHs	3.55E+00	5.05E-01	0.00E+00	0.00E+00	--	--	--	2.16E-02	9.97E-02	0.00E+00	1.21E-01	3.08E-03	1.46E-02	0.00E+00	1.77E-02
Total HMW PAHs	1.22E-01	2.82E-02	0.00E+00	0.00E+00	--	--	--	7.41E-04	5.95E-03	0.00E+00	6.69E-03	1.72E-04	1.41E-03	0.00E+00	1.59E-03
Pesticides															
4,4'-DDE	2.80E-03	7.06E-04	0.00E+00	0.00E+00	9.00E+00	2.52E-02	6.36E-03	1.70E-05	3.33E-03	0.00E+00	3.35E-03	4.30E-06	8.41E-04	0.00E+00	8.45E-04
DDTr	--	--	--	--	--	--	--	1.70E-05	3.33E-03	0.00E+00	3.35E-03	4.30E-06	8.41E-04	0.00E+00	8.45E-04
Furans															
Dibenzofuran	3.04E-02	2.06E-02	0.00E+00	0.00E+00	1.00E+00	3.04E-02	2.06E-02	1.85E-04	4.02E-03	0.00E+00	4.21E-03	1.25E-04	2.72E-03	0.00E+00	2.84E-03
SVOCs															
Bis(2-ethylhexyl)phthalate	7.23E-02	5.99E-02	0.00E+00	0.00E+00	1.00E+00	7.23E-02	5.99E-02	4.40E-04	9.56E-03	0.00E+00	1.00E-02	3.64E-04	7.92E-03	0.00E+00	8.29E-03
VOCs															
Acetone	1.25E-02	4.58E-03	0.00E+00	0.00E+00	1.00E+00	1.25E-02	4.58E-03	7.61E-05	1.65E-03	0.00E+00	1.73E-03	2.79E-05	6.06E-04	0.00E+00	6.34E-04
Benzene	1.04E+00	1.30E-01	0.00E+00	0.00E+00	1.00E+00	1.04E+00	1.30E-01	6.33E-03	1.38E-01	0.00E+00	1.44E-01	7.93E-04	1.72E-02	0.00E+00	1.80E-02
Ethylbenzene	1.86E+01	2.33E+00	0.00E+00	0.00E+00	1.00E+00	1.86E+01	2.33E+00	1.13E-01	2.46E+00	0.00E+00	2.57E+00	1.42E-02	3.08E-01	0.00E+00	3.22E-01
Isobutyl alcohol	6.51E+01	6.51E+01	0.00E+00	0.00E+00	1.00E+00	6.51E+01	6.51E+01	3.96E-01	8.61E+00	0.00E+00	9.01E+00	3.96E-01	8.61E+00	0.00E+00	9.01E+00

Table A-15
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 2 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Arsenic	6.18E+01	2.55E+01	0.00E+00	0.00E+00	3.18E-01	1.64E-01	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	2.30E-01	1.11E-01	0.00E+00	6.32E-03	0.00E+00	6.32E-03	0.00E+00	3.06E-03	0.00E+00	3.06E-03
Cadmium	1.80E+00	1.02E+00	0.00E+00	0.00E+00	1.08E-01	7.85E-02	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	8.65E-01	6.58E-01	0.00E+00	2.38E-02	0.00E+00	2.38E-02	0.00E+00	1.81E-02	0.00E+00	1.81E-02
Chromium	1.09E+02	4.82E+01	0.00E+00	0.00E+00	3.62E-01	1.60E-01	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	7.26E+00	3.99E+00	0.00E+00	2.00E-01	0.00E+00	2.00E-01	0.00E+00	1.10E-01	0.00E+00	1.10E-01
Cobalt	3.77E+01	1.08E+01	0.00E+00	0.00E+00	1.82E-01	5.24E-02	1.00E-01	3.77E+00	1.08E+00	0.00E+00	1.04E-01	0.00E+00	1.04E-01	0.00E+00	2.98E-02	0.00E+00	2.98E-02
Copper	5.44E+01	3.45E+01	0.00E+00	0.00E+00	1.27E+00	1.03E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.37E+01	1.28E+01	0.00E+00	3.77E-01	0.00E+00	3.77E-01	0.00E+00	3.53E-01	0.00E+00	3.53E-01
Mercury	3.80E-01	1.26E-01	0.00E+00	0.00E+00	2.73E-02	1.47E-02	1.92E-01	7.30E-02	2.41E-02	0.00E+00	2.01E-03	0.00E+00	2.01E-03	0.00E+00	6.63E-04	0.00E+00	6.63E-04
Nickel	3.98E+01	1.46E+01	0.00E+00	0.00E+00	3.02E-01	1.32E-01	ln(dry mammal conc, mg/kg) = (-0.2462+0.4658*ln(soil conc))	4.35E+00	2.72E+00	0.00E+00	1.20E-01	0.00E+00	1.20E-01	0.00E+00	7.49E-02	0.00E+00	7.49E-02
Selenium	4.40E+00	4.04E+00	0.00E+00	0.00E+00	3.25E-01	2.97E-01	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	1.15E+00	1.12E+00	0.00E+00	3.17E-02	0.00E+00	3.17E-02	0.00E+00	3.07E-02	0.00E+00	3.07E-02
Vanadium	2.02E+02	9.73E+01	0.00E+00	0.00E+00	6.22E-01	3.00E-01	1.79E-01	3.62E+01	1.74E+01	0.00E+00	9.94E-01	0.00E+00	9.94E-01	0.00E+00	4.79E-01	0.00E+00	4.79E-01
Zinc	8.87E+01	4.37E+01	0.00E+00	0.00E+00	7.25E+00	4.85E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.22E+02	1.16E+02	0.00E+00	3.35E+00	0.00E+00	3.35E+00	0.00E+00	3.18E+00	0.00E+00	3.18E+00
PAHs																	
2-Methylnaphthalene	1.63E+00	2.05E-01	0.00E+00	0.00E+00	4.87E-02	6.12E-03	3.79E-05	6.18E-05	7.76E-06	0.00E+00	1.70E-06	0.00E+00	1.70E-06	0.00E+00	2.13E-07	0.00E+00	2.13E-07
Acenaphthylene	5.34E-02	2.52E-02	0.00E+00	0.00E+00	1.48E-03	6.99E-04	4.37E-05	2.33E-06	1.10E-06	0.00E+00	6.42E-08	0.00E+00	6.42E-08	0.00E+00	3.03E-08	0.00E+00	3.03E-08
Anthracene	3.92E-02	1.89E-02	0.00E+00	0.00E+00	5.87E-04	2.83E-04	1.54E-04	6.04E-06	2.91E-06	0.00E+00	1.66E-07	0.00E+00	1.66E-07	0.00E+00	8.00E-08	0.00E+00	8.00E-08
Benzo(a)Anthracene	2.91E-02	3.86E-03	0.00E+00	0.00E+00	1.43E-04	1.89E-05	2.77E-03	8.06E-05	1.07E-05	0.00E+00	2.22E-06	0.00E+00	2.22E-06	0.00E+00	2.94E-07	0.00E+00	2.94E-07
Chrysene	1.91E-02	2.79E-03	0.00E+00	0.00E+00	9.37E-05	1.37E-05	2.77E-03	5.29E-05	7.72E-06	0.00E+00	1.45E-06	0.00E+00	1.45E-06	0.00E+00	2.12E-07	0.00E+00	2.12E-07
Fluoranthene	9.09E-02	2.40E-02	0.00E+00	0.00E+00	8.05E-04	2.12E-04	5.07E-04	4.61E-05	1.22E-05	0.00E+00	1.27E-06	0.00E+00	1.27E-06	0.00E+00	3.34E-07	0.00E+00	3.34E-07
Fluorene	1.45E-01	3.25E-02	0.00E+00	0.00E+00	2.95E-03	6.62E-04	8.11E-05	1.18E-05	2.64E-06	0.00E+00	3.24E-07	0.00E+00	3.24E-07	0.00E+00	7.25E-08	0.00E+00	7.25E-08
Naphthalene	1.51E+00	1.89E-01	0.00E+00	0.00E+00	9.11E-02	1.14E-02	1.00E-05	1.51E-05	1.89E-06	0.00E+00	4.15E-07	0.00E+00	4.15E-07	0.00E+00	5.21E-08	0.00E+00	5.21E-08
Phenanthrene	8.33E-02	1.08E-02	0.00E+00	0.00E+00	1.23E-03	1.59E-04	1.58E-04	1.32E-05	1.71E-06	0.00E+00	3.62E-07	0.00E+00	3.62E-07	0.00E+00	4.69E-08	0.00E+00	4.69E-08
Pyrene	7.36E-02	2.16E-02	0.00E+00	0.00E+00	6.98E-04	2.05E-04	4.29E-04	3.16E-05	9.26E-06	0.00E+00	8.68E-07	0.00E+00	8.68E-07	0.00E+00	2.55E-07	0.00E+00	2.55E-07
Total LMW PAHs	3.55E+00	5.05E-01	0.00E+00	0.00E+00	1.47E-01	1.95E-02	--	--	--	0.00E+00	4.30E-06	0.00E+00	4.30E-06	0.00E+00	8.30E-07	0.00E+00	8.30E-07
Total HMW PAHs	1.22E-01	2.82E-02	0.00E+00	0.00E+00	9.34E-04	2.37E-04	--	--	--	0.00E+00	4.54E-06	0.00E+00	4.54E-06	0.00E+00	7.61E-07	0.00E+00	7.61E-07
Pesticides																	
4,4'-DDE	2.80E-03	7.06E-04	0.00E+00	0.00E+00	1.12E-05	2.83E-06	2.95E-03	8.26E-06	2.08E-06	0.00E+00	2.27E-07	0.00E+00	2.27E-07	0.00E+00	5.73E-08	0.00E+00	5.73E-08
DDTr	--	--	--	--	--	--	--	--	--	0.00E+00	2.27E-07	0.00E+00	2.27E-07	0.00E+00	5.73E-08	0.00E+00	5.73E-08
Furans																	
Dibenzofuran	3.04E-02	2.06E-02	0.00E+00	0.00E+00	6.64E-04	4.49E-04	7.04E-05	2.14E-06	1.45E-06	0.00E+00	5.88E-08	0.00E+00	5.88E-08	0.00E+00	3.98E-08	0.00E+00	3.98E-08
SVOCs																	
Bis(2-ethylhexyl)phthalate	7.23E-02	5.99E-02	0.00E+00	0.00E+00	5.50E-04	4.56E-04	7.41E-04	5.36E-05	4.44E-05	0.00E+00	1.47E-06	0.00E+00	1.47E-06	0.00E+00	1.22E-06	0.00E+00	1.22E-06
VOCs																	
Acetone	1.25E-02	4.58E-03	0.00E+00	0.00E+00	8.05E-02	2.95E-02	2.21E-09	2.76E-11	1.01E-11	0.00E+00	7.60E-13	0.00E+00	7.60E-13	0.00E+00	2.78E-13	0.00E+00	2.78E-13
Benzene	1.04E+00	1.30E-01	0.00E+00	0.00E+00	2.88E-01	3.61E-02	6.19E-07	6.44E-07	8.07E-08	0.00E+00	1.77E-08	0.00E+00	1.77E-08	0.00E+00	2.22E-09	0.00E+00	2.22E-09
Ethylbenzene	1.86E+01	2.33E+00	0.00E+00	0.00E+00	1.36E+00	1.70E-01	7.00E-06	1.30E-04	1.63E-05	0.00E+00	3.58E-06	0.00E+00	3.58E-06	0.00E+00	4.48E-07	0.00E+00	4.48E-07
Isobutyl alcohol	6.51E+01	6.51E+01	0.00E+00	0.00E+00	1.11E+02	1.11E+02	1.45E-07	9.41E-06	9.41E-06	0.00E+00	2.59E-07	0.00E+00	2.59E-07	0.00E+00	2.59E-07	0.00E+00	2.59E-07

Table A-16
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 3 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	3.22E+04	2.68E+04	0.00E+00	0.00E+00	4.00E-03	1.29E+02	1.07E+02	7.78E+01	1.56E+01	0.00E+00	9.34E+01	6.48E+01	1.30E+01	0.00E+00	7.77E+01
Arsenic	1.22E+02	6.34E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	2.05E+00	1.42E+00	2.95E-01	2.48E-01	0.00E+00	5.42E-01	1.53E-01	1.71E-01	0.00E+00	3.24E-01
Calcium	1.34E+04	4.49E+03	0.00E+00	0.00E+00	3.50E+00	4.69E+04	1.57E+04	3.24E+01	5.67E+03	0.00E+00	5.70E+03	1.09E+01	1.90E+03	0.00E+00	1.91E+03
Chromium	1.67E+02	1.03E+02	0.00E+00	0.00E+00	7.50E-03	1.25E+00	7.70E-01	4.03E-01	1.51E-01	0.00E+00	5.55E-01	2.48E-01	9.30E-02	0.00E+00	3.41E-01
Cobalt	4.53E+01	1.63E+01	0.00E+00	0.00E+00	2.00E-02	9.06E-01	3.26E-01	1.09E-01	1.09E-01	0.00E+00	2.19E-01	3.93E-02	3.93E-02	0.00E+00	7.87E-02
Copper	7.33E+01	5.58E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.06E+01	9.52E+00	1.77E-01	1.28E+00	0.00E+00	1.46E+00	1.35E-01	1.15E+00	0.00E+00	1.28E+00
Iron	9.53E+04	6.34E+04	0.00E+00	0.00E+00	4.00E-03	3.81E+02	2.54E+02	2.30E+02	4.60E+01	0.00E+00	2.76E+02	1.53E+02	3.06E+01	0.00E+00	1.84E+02
Magnesium	1.01E+04	2.68E+03	0.00E+00	0.00E+00	1.00E+00	1.01E+04	2.68E+03	2.44E+01	1.22E+03	0.00E+00	1.24E+03	6.48E+00	3.24E+02	0.00E+00	3.31E+02
Manganese	1.28E+04	2.66E+03	0.00E+00	0.00E+00	2.50E-01	3.20E+03	6.66E+02	3.09E+01	3.87E+02	0.00E+00	4.17E+02	6.44E+00	8.05E+01	0.00E+00	8.69E+01
Mercury	2.00E-01	6.20E-02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.54E-01	8.14E-02	4.83E-04	1.86E-02	0.00E+00	1.91E-02	1.50E-04	9.83E-03	0.00E+00	9.98E-03
Nickel	3.62E+01	2.07E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	1.59E+00	1.04E+00	8.75E-02	1.91E-01	0.00E+00	2.79E-01	5.00E-02	1.26E-01	0.00E+00	1.76E-01
Potassium	7.75E+02	3.39E+02	0.00E+00	0.00E+00	1.00E+00	7.75E+02	3.39E+02	1.87E+00	9.36E+01	0.00E+00	9.55E+01	8.18E-01	4.09E+01	0.00E+00	4.17E+01
Selenium	3.70E+00	1.91E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	2.15E+00	1.04E+00	8.94E-03	2.60E-01	0.00E+00	2.69E-01	4.61E-03	1.25E-01	0.00E+00	1.30E-01
Silver	3.00E+00	1.72E+00	0.00E+00	0.00E+00	4.00E-01	1.20E+00	6.89E-01	7.25E-03	1.45E-01	0.00E+00	1.52E-01	4.16E-03	8.32E-02	0.00E+00	8.74E-02
Sodium	6.15E+02	1.82E+02	0.00E+00	0.00E+00	7.50E-02	4.61E+01	1.36E+01	1.49E+00	5.57E+00	0.00E+00	7.06E+00	4.39E-01	1.65E+00	0.00E+00	2.09E+00
Thallium	4.00E+00	1.32E+00	0.00E+00	0.00E+00	4.00E-03	1.60E-02	5.29E-03	9.66E-03	1.93E-03	0.00E+00	1.16E-02	3.19E-03	6.39E-04	0.00E+00	3.83E-03
Vanadium	2.91E+02	1.76E+02	0.00E+00	0.00E+00	5.50E-03	1.60E+00	9.71E-01	7.03E-01	1.93E-01	0.00E+00	8.96E-01	4.26E-01	1.17E-01	0.00E+00	5.44E-01
Zinc	7.22E+01	4.93E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.19E+01	4.20E+01	1.74E-01	6.27E+00	0.00E+00	6.45E+00	1.19E-01	5.08E+00	0.00E+00	5.20E+00
Pesticides															
4,4'-DDD	9.27E-02	1.19E-02	0.00E+00	0.00E+00	1.57E-02	1.45E-03	1.86E-04	2.24E-04	1.76E-04	0.00E+00	3.99E-04	2.87E-05	2.25E-05	0.00E+00	5.12E-05
4,4'-DDE	1.61E-02	2.48E-03	0.00E+00	0.00E+00	1.32E-02	2.12E-04	3.26E-05	3.89E-05	2.56E-05	0.00E+00	6.45E-05	5.98E-06	3.94E-06	0.00E+00	9.93E-06
4,4'-DDT	2.41E-02	4.48E-03	0.00E+00	0.00E+00	4.61E-03	1.11E-04	2.06E-05	5.82E-05	1.34E-05	0.00E+00	7.16E-05	1.08E-05	2.49E-06	0.00E+00	1.33E-05
DDTr	--	--	--	--	--	--	--	3.21E-04	2.15E-04	0.00E+00	5.36E-04	4.55E-05	2.89E-05	0.00E+00	7.45E-05
Alpha-Chlordane	2.21E-01	3.48E-02	0.00E+00	0.00E+00	9.33E-03	2.06E-03	3.25E-04	5.34E-04	2.49E-04	0.00E+00	7.83E-04	8.41E-05	3.92E-05	0.00E+00	1.23E-04
Dieldrin	9.00E-03	1.49E-03	0.00E+00	0.00E+00	2.74E-02	2.47E-04	4.07E-05	2.17E-05	2.98E-05	0.00E+00	5.15E-05	3.59E-06	4.92E-06	0.00E+00	8.50E-06
Endosulfan I	2.60E-03	7.10E-04	0.00E+00	0.00E+00	3.67E-01	9.55E-04	2.61E-04	6.28E-06	1.15E-04	0.00E+00	1.22E-04	1.72E-06	3.15E-05	0.00E+00	3.32E-05
Heptachlor	6.29E-02	8.36E-03	0.00E+00	0.00E+00	1.59E-02	9.99E-04	1.33E-04	1.52E-04	1.21E-04	0.00E+00	2.73E-04	2.02E-05	1.60E-05	0.00E+00	3.62E-05
Herbicides															
Dichlorprop	1.17E-01	2.63E-02	0.00E+00	0.00E+00	4.03E-01	4.72E-02	1.06E-02	2.83E-04	5.70E-03	0.00E+00	5.98E-03	6.34E-05	1.28E-03	0.00E+00	1.34E-03
SVOCs															
Pentachlorophenol	5.78E-02	1.11E-02	0.00E+00	0.00E+00	4.25E-02	2.46E-03	4.71E-04	1.40E-04	2.97E-04	0.00E+00	4.37E-04	2.68E-05	5.69E-05	0.00E+00	8.37E-05
VOCs															
Acetone	2.39E-02	5.33E-03	0.00E+00	0.00E+00	5.33E+01	1.27E+00	2.84E-01	5.77E-05	1.54E-01	0.00E+00	1.54E-01	1.29E-05	3.43E-02	0.00E+00	3.43E-02
Carbon disulfide	4.30E-04	5.08E-04	0.00E+00	0.00E+00	2.93E+00	1.26E-03	1.49E-03	1.04E-06	1.52E-04	0.00E+00	1.53E-04	1.23E-06	1.80E-04	0.00E+00	1.81E-04

Table A-17
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 3 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	3.22E+04	2.68E+04	0.00E+00	0.00E+00	4.00E-03	1.29E+02	1.07E+02	1.08E+01	2.16E+00	0.00E+00	1.29E+01	8.98E+00	1.80E+00	0.00E+00	1.08E+01
Arsenic	1.22E+02	6.34E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	2.05E+00	1.42E+00	4.09E-02	3.43E-02	0.00E+00	7.52E-02	2.12E-02	2.37E-02	0.00E+00	4.50E-02
Calcium	1.34E+04	4.49E+03	0.00E+00	0.00E+00	3.50E+00	4.69E+04	1.57E+04	4.49E+00	7.86E+02	0.00E+00	7.90E+02	1.51E+00	2.63E+02	0.00E+00	2.65E+02
Chromium	1.67E+02	1.03E+02	0.00E+00	0.00E+00	7.50E-03	1.25E+00	7.70E-01	5.59E-02	2.10E-02	0.00E+00	7.69E-02	3.44E-02	1.29E-02	0.00E+00	4.73E-02
Cobalt	4.53E+01	1.63E+01	0.00E+00	0.00E+00	2.00E-02	9.06E-01	3.26E-01	1.52E-02	1.52E-02	0.00E+00	3.04E-02	5.45E-03	5.45E-03	0.00E+00	1.09E-02
Copper	7.33E+01	5.58E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.06E+01	9.52E+00	2.46E-02	1.78E-01	0.00E+00	2.02E-01	1.87E-02	1.59E-01	0.00E+00	1.78E-01
Iron	9.53E+04	6.34E+04	0.00E+00	0.00E+00	4.00E-03	3.81E+02	2.54E+02	3.19E+01	6.39E+00	0.00E+00	3.83E+01	2.12E+01	4.25E+00	0.00E+00	2.55E+01
Magnesium	1.01E+04	2.68E+03	0.00E+00	0.00E+00	1.00E+00	1.01E+04	2.68E+03	3.38E+00	1.69E+02	0.00E+00	1.73E+02	8.99E-01	4.49E+01	0.00E+00	4.58E+01
Manganese	1.28E+04	2.66E+03	0.00E+00	0.00E+00	2.50E-01	3.20E+03	6.66E+02	4.29E+00	5.36E+01	0.00E+00	5.79E+01	8.93E-01	1.12E+01	0.00E+00	1.20E+01
Mercury	2.00E-01	6.20E-02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.54E-01	8.14E-02	6.70E-05	2.58E-03	0.00E+00	2.64E-03	2.08E-05	1.36E-03	0.00E+00	1.38E-03
Nickel	3.62E+01	2.07E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	1.59E+00	1.04E+00	1.21E-02	2.65E-02	0.00E+00	3.87E-02	6.93E-03	1.75E-02	0.00E+00	2.44E-02
Potassium	7.75E+02	3.39E+02	0.00E+00	0.00E+00	1.00E+00	7.75E+02	3.39E+02	2.60E-01	1.30E+01	0.00E+00	1.32E+01	1.13E-01	5.67E+00	0.00E+00	5.79E+00
Selenium	3.70E+00	1.91E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	2.15E+00	1.04E+00	1.24E-03	3.60E-02	0.00E+00	3.73E-02	6.39E-04	1.74E-02	0.00E+00	1.80E-02
Silver	3.00E+00	1.72E+00	0.00E+00	0.00E+00	4.00E-01	1.20E+00	6.89E-01	1.01E-03	2.01E-02	0.00E+00	2.11E-02	5.77E-04	1.15E-02	0.00E+00	1.21E-02
Sodium	6.15E+02	1.82E+02	0.00E+00	0.00E+00	7.50E-02	4.61E+01	1.36E+01	2.06E-01	7.73E-01	0.00E+00	9.79E-01	6.09E-02	2.28E-01	0.00E+00	2.89E-01
Thallium	4.00E+00	1.32E+00	0.00E+00	0.00E+00	4.00E-03	1.60E-02	5.29E-03	1.34E-03	2.68E-04	0.00E+00	1.61E-03	4.43E-04	8.86E-05	0.00E+00	5.31E-04
Vanadium	2.91E+02	1.76E+02	0.00E+00	0.00E+00	5.50E-03	1.60E+00	9.71E-01	9.75E-02	2.68E-02	0.00E+00	1.24E-01	5.91E-02	1.63E-02	0.00E+00	7.54E-02
Zinc	7.22E+01	4.93E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.19E+01	4.20E+01	2.42E-02	8.70E-01	0.00E+00	8.94E-01	1.65E-02	7.04E-01	0.00E+00	7.21E-01
Pesticides															
4,4'-DDD	9.27E-02	1.19E-02	0.00E+00	0.00E+00	1.57E-02	1.45E-03	1.86E-04	3.11E-05	2.43E-05	0.00E+00	5.54E-05	3.98E-06	3.12E-06	0.00E+00	7.10E-06
4,4'-DDE	1.61E-02	2.48E-03	0.00E+00	0.00E+00	1.32E-02	2.12E-04	3.26E-05	5.39E-06	3.56E-06	0.00E+00	8.95E-06	8.30E-07	5.47E-07	0.00E+00	1.38E-06
4,4'-DDT	2.41E-02	4.48E-03	0.00E+00	0.00E+00	4.61E-03	1.11E-04	2.06E-05	8.07E-06	1.86E-06	0.00E+00	9.93E-06	1.50E-06	3.45E-07	0.00E+00	1.85E-06
DDTr	--	--	--	--	--	--	--	4.45E-05	2.97E-05	0.00E+00	7.43E-05	6.31E-06	4.01E-06	0.00E+00	1.03E-05
Alpha-Chlordane	2.21E-01	3.48E-02	0.00E+00	0.00E+00	9.33E-03	2.06E-03	3.25E-04	7.40E-05	3.45E-05	0.00E+00	1.09E-04	1.17E-05	5.44E-06	0.00E+00	1.71E-05
Dieldrin	9.00E-03	1.49E-03	0.00E+00	0.00E+00	2.74E-02	2.47E-04	4.07E-05	3.02E-06	4.13E-06	0.00E+00	7.15E-06	4.97E-07	6.82E-07	0.00E+00	1.18E-06
Endosulfan I	2.60E-03	7.10E-04	0.00E+00	0.00E+00	3.67E-01	9.55E-04	2.61E-04	8.71E-07	1.60E-05	0.00E+00	1.69E-05	2.38E-07	4.37E-06	0.00E+00	4.61E-06
Heptachlor	6.29E-02	8.36E-03	0.00E+00	0.00E+00	1.59E-02	9.99E-04	1.33E-04	2.11E-05	1.67E-05	0.00E+00	3.78E-05	2.80E-06	2.22E-06	0.00E+00	5.02E-06
Herbicides															
Dichlorprop	1.17E-01	2.63E-02	0.00E+00	0.00E+00	4.03E-01	4.72E-02	1.06E-02	3.92E-05	7.90E-04	0.00E+00	8.29E-04	8.79E-06	1.77E-04	0.00E+00	1.86E-04
SVOCs															
Pentachlorophenol	5.78E-02	1.11E-02	0.00E+00	0.00E+00	4.25E-02	2.46E-03	4.71E-04	1.94E-05	4.12E-05	0.00E+00	6.05E-05	3.71E-06	7.89E-06	0.00E+00	1.16E-05
VOCs															
Acetone	2.39E-02	5.33E-03	0.00E+00	0.00E+00	5.33E+01	1.27E+00	2.84E-01	8.01E-06	2.13E-02	0.00E+00	2.13E-02	1.79E-06	4.76E-03	0.00E+00	4.76E-03
Carbon disulfide	4.30E-04	5.08E-04	0.00E+00	0.00E+00	2.93E+00	1.26E-03	1.49E-03	1.44E-07	2.11E-05	0.00E+00	2.12E-05	1.70E-07	2.49E-05	0.00E+00	2.51E-05

Table A-18
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 3 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	3.22E+04	2.68E+04	0.00E+00	0.00E+00	1.18E-01	3.80E+03	3.16E+03	0.00E+00	3.17E+02	0.00E+00	3.17E+02	0.00E+00	2.64E+02	0.00E+00	2.64E+02
Arsenic	1.22E+02	6.34E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	7.18E+00	4.52E+00	0.00E+00	5.98E-01	0.00E+00	5.98E-01	0.00E+00	3.77E-01	0.00E+00	3.77E-01
Calcium	1.34E+04	4.49E+03	0.00E+00	0.00E+00	1.00E+00	1.34E+04	4.49E+03	0.00E+00	1.12E+03	0.00E+00	1.12E+03	0.00E+00	3.74E+02	0.00E+00	3.74E+02
Chromium	1.67E+02	1.03E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.48E+00	8.76E+00	0.00E+00	7.07E-01	0.00E+00	7.07E-01	0.00E+00	7.30E-01	0.00E+00	7.30E-01
Cobalt	4.53E+01	1.63E+01	0.00E+00	0.00E+00	2.91E-01	1.32E+01	4.74E+00	0.00E+00	1.10E+00	0.00E+00	1.10E+00	0.00E+00	3.95E-01	0.00E+00	3.95E-01
Copper	7.33E+01	5.58E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.66E+01	1.54E+01	0.00E+00	1.38E+00	0.00E+00	1.38E+00	0.00E+00	1.29E+00	0.00E+00	1.29E+00
Iron	9.53E+04	6.34E+04	0.00E+00	0.00E+00	7.80E-02	7.43E+03	4.94E+03	0.00E+00	6.19E+02	0.00E+00	6.19E+02	0.00E+00	4.12E+02	0.00E+00	4.12E+02
Magnesium	1.01E+04	2.68E+03	0.00E+00	0.00E+00	5.30E-01	5.35E+03	1.42E+03	0.00E+00	4.46E+02	0.00E+00	4.46E+02	0.00E+00	1.18E+02	0.00E+00	1.18E+02
Manganese	1.28E+04	2.66E+03	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	2.82E+02	9.66E+01	0.00E+00	2.35E+01	0.00E+00	2.35E+01	0.00E+00	8.05E+00	0.00E+00	8.05E+00
Mercury	2.00E-01	6.20E-02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.17E-01	3.63E-01	0.00E+00	3.48E-02	0.00E+00	3.48E-02	0.00E+00	3.03E-02	0.00E+00	3.03E-02
Nickel	3.62E+01	2.07E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.55E+01	1.80E+01	0.00E+00	1.30E+00	0.00E+00	1.30E+00	0.00E+00	1.50E+00	0.00E+00	1.50E+00
Potassium	7.75E+02	3.39E+02	0.00E+00	0.00E+00	1.00E+00	7.75E+02	3.39E+02	0.00E+00	6.46E+01	0.00E+00	6.46E+01	0.00E+00	2.82E+01	0.00E+00	2.82E+01
Selenium	3.70E+00	1.91E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	2.42E+00	1.49E+00	0.00E+00	2.02E-01	0.00E+00	2.02E-01	0.00E+00	1.24E-01	0.00E+00	1.24E-01
Silver	3.00E+00	1.72E+00	0.00E+00	0.00E+00	1.53E+01	4.59E+01	2.64E+01	0.00E+00	3.82E+00	0.00E+00	3.82E+00	0.00E+00	2.20E+00	0.00E+00	2.20E+00
Sodium	6.15E+02	1.82E+02	0.00E+00	0.00E+00	1.00E+00	6.15E+02	1.82E+02	0.00E+00	5.12E+01	0.00E+00	5.12E+01	0.00E+00	1.52E+01	0.00E+00	1.52E+01
Thallium	4.00E+00	1.32E+00	0.00E+00	0.00E+00	1.00E+00	4.00E+00	1.32E+00	0.00E+00	3.33E-01	0.00E+00	3.33E-01	0.00E+00	1.10E-01	0.00E+00	1.10E-01
Vanadium	2.91E+02	1.76E+02	0.00E+00	0.00E+00	8.80E-01	2.56E+02	1.55E+02	0.00E+00	2.13E+01	0.00E+00	2.13E+01	0.00E+00	1.29E+01	0.00E+00	1.29E+01
Zinc	7.22E+01	4.93E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.48E+02	3.07E+02	0.00E+00	2.90E+01	0.00E+00	2.90E+01	0.00E+00	2.56E+01	0.00E+00	2.56E+01
Pesticides															
4,4'-DDD	9.27E-02	1.19E-02	0.00E+00	0.00E+00	9.00E+00	8.34E-01	1.07E-01	0.00E+00	6.95E-02	0.00E+00	6.95E-02	0.00E+00	8.92E-03	0.00E+00	8.92E-03
4,4'-DDE	1.61E-02	2.48E-03	0.00E+00	0.00E+00	9.00E+00	1.45E-01	2.23E-02	0.00E+00	1.21E-02	0.00E+00	1.21E-02	0.00E+00	1.86E-03	0.00E+00	1.86E-03
4,4'-DDT	2.41E-02	4.48E-03	0.00E+00	0.00E+00	9.00E+00	2.17E-01	4.03E-02	0.00E+00	1.81E-02	0.00E+00	1.81E-02	0.00E+00	3.36E-03	0.00E+00	3.36E-03
DDTr	--	--	--	--	--	--	--	0.00E+00	9.97E-02	0.00E+00	9.97E-02	0.00E+00	1.41E-02	0.00E+00	1.41E-02
Alpha-Chlordane	2.21E-01	3.48E-02	0.00E+00	0.00E+00	1.00E+00	2.21E-01	3.48E-02	0.00E+00	1.84E-02	0.00E+00	1.84E-02	0.00E+00	2.90E-03	0.00E+00	2.90E-03
Dieldrin	9.00E-03	1.49E-03	0.00E+00	0.00E+00	1.79E+00	1.61E-02	2.66E-03	0.00E+00	1.34E-03	0.00E+00	1.34E-03	0.00E+00	2.21E-04	0.00E+00	2.21E-04
Endosulfan I	2.60E-03	7.10E-04	0.00E+00	0.00E+00	1.00E+00	2.60E-03	7.10E-04	0.00E+00	2.17E-04	0.00E+00	2.17E-04	0.00E+00	5.92E-05	0.00E+00	5.92E-05
Heptachlor	6.29E-02	8.36E-03	0.00E+00	0.00E+00	4.00E-02	2.52E-03	3.34E-04	0.00E+00	2.10E-04	0.00E+00	2.10E-04	0.00E+00	2.79E-05	0.00E+00	2.79E-05
Herbicides															
Dichlorprop	1.17E-01	2.63E-02	0.00E+00	0.00E+00	1.00E+00	1.17E-01	2.63E-02	0.00E+00	9.75E-03	0.00E+00	9.75E-03	0.00E+00	2.19E-03	0.00E+00	2.19E-03
SVOCs															
Pentachlorophenol	5.78E-02	1.11E-02	0.00E+00	0.00E+00	1.00E+00	5.78E-02	1.11E-02	0.00E+00	4.82E-03	0.00E+00	4.82E-03	0.00E+00	9.23E-04	0.00E+00	9.23E-04
VOCs															
Acetone	2.39E-02	5.33E-03	0.00E+00	0.00E+00	1.00E+00	2.39E-02	5.33E-03	0.00E+00	1.99E-03	0.00E+00	1.99E-03	0.00E+00	4.44E-04	0.00E+00	4.44E-04
Carbon disulfide	4.30E-04	5.08E-04	0.00E+00	0.00E+00	1.00E+00	4.30E-04	5.08E-04	0.00E+00	3.58E-05	0.00E+00	3.58E-05	0.00E+00	4.23E-05	0.00E+00	4.23E-05

Table A-19
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 3 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	3.22E+04	2.68E+04	0.00E+00	0.00E+00	1.18E-01	3.80E+03	3.16E+03	1.96E+02	5.03E+02	0.00E+00	6.99E+02	1.63E+02	4.19E+02	0.00E+00	5.82E+02
Arsenic	1.22E+02	6.34E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	7.18E+00	4.52E+00	7.42E-01	9.49E-01	0.00E+00	1.69E+00	3.86E-01	5.98E-01	0.00E+00	9.84E-01
Calcium	1.34E+04	4.49E+03	0.00E+00	0.00E+00	1.00E+00	1.34E+04	4.49E+03	8.15E+01	1.77E+03	0.00E+00	1.85E+03	2.73E+01	5.95E+02	0.00E+00	6.22E+02
Chromium	1.67E+02	1.03E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.48E+00	8.76E+00	1.02E+00	1.12E+00	0.00E+00	2.14E+00	6.24E-01	1.16E+00	0.00E+00	1.78E+00
Cobalt	4.53E+01	1.63E+01	0.00E+00	0.00E+00	2.91E-01	1.32E+01	4.74E+00	2.76E-01	1.74E+00	0.00E+00	2.02E+00	9.91E-02	6.27E-01	0.00E+00	7.26E-01
Copper	7.33E+01	5.58E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.66E+01	1.54E+01	4.46E-01	2.19E+00	0.00E+00	2.64E+00	3.39E-01	2.04E+00	0.00E+00	2.38E+00
Iron	9.53E+04	6.34E+04	0.00E+00	0.00E+00	7.80E-02	7.43E+03	4.94E+03	5.80E+02	9.83E+02	0.00E+00	1.56E+03	3.86E+02	6.54E+02	0.00E+00	1.04E+03
Magnesium	1.01E+04	2.68E+03	0.00E+00	0.00E+00	5.30E-01	5.35E+03	1.42E+03	6.15E+01	7.08E+02	0.00E+00	7.70E+02	1.63E+01	1.88E+02	0.00E+00	2.04E+02
Manganese	1.28E+04	2.66E+03	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	2.82E+02	9.66E+01	7.79E+01	3.73E+01	0.00E+00	1.15E+02	1.62E+01	1.28E+01	0.00E+00	2.90E+01
Mercury	2.00E-01	6.20E-02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.17E-01	3.63E-01	1.22E-03	5.52E-02	0.00E+00	5.64E-02	3.77E-04	4.81E-02	0.00E+00	4.85E-02
Nickel	3.62E+01	2.07E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.55E+01	1.80E+01	2.20E-01	2.06E+00	0.00E+00	2.28E+00	1.26E-01	2.38E+00	0.00E+00	2.50E+00
Potassium	7.75E+02	3.39E+02	0.00E+00	0.00E+00	1.00E+00	7.75E+02	3.39E+02	4.72E+00	1.03E+02	0.00E+00	1.07E+02	2.06E+00	4.48E+01	0.00E+00	4.69E+01
Selenium	3.70E+00	1.91E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	2.42E+00	1.49E+00	2.25E-02	3.20E-01	0.00E+00	3.43E-01	1.16E-02	1.97E-01	0.00E+00	2.09E-01
Silver	3.00E+00	1.72E+00	0.00E+00	0.00E+00	1.53E+01	4.59E+01	2.64E+01	1.83E-02	6.07E+00	0.00E+00	6.09E+00	1.05E-02	3.49E+00	0.00E+00	3.50E+00
Sodium	6.15E+02	1.82E+02	0.00E+00	0.00E+00	1.00E+00	6.15E+02	1.82E+02	3.74E+00	8.14E+01	0.00E+00	8.51E+01	1.11E+00	2.41E+01	0.00E+00	2.52E+01
Thallium	4.00E+00	1.32E+00	0.00E+00	0.00E+00	1.00E+00	4.00E+00	1.32E+00	2.43E-02	5.29E-01	0.00E+00	5.54E-01	8.04E-03	1.75E-01	0.00E+00	1.83E-01
Vanadium	2.91E+02	1.76E+02	0.00E+00	0.00E+00	8.80E-01	2.56E+02	1.55E+02	1.77E+00	3.39E+01	0.00E+00	3.56E+01	1.07E+00	2.05E+01	0.00E+00	2.16E+01
Zinc	7.22E+01	4.93E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.48E+02	3.07E+02	4.39E-01	4.61E+01	0.00E+00	4.65E+01	3.00E-01	4.06E+01	0.00E+00	4.09E+01
Pesticides															
4,4'-DDD	9.27E-02	1.19E-02	0.00E+00	0.00E+00	9.00E+00	8.34E-01	1.07E-01	5.64E-04	1.10E-01	0.00E+00	1.11E-01	7.24E-05	1.42E-02	0.00E+00	1.42E-02
4,4'-DDE	1.61E-02	2.48E-03	0.00E+00	0.00E+00	9.00E+00	1.45E-01	2.23E-02	9.80E-05	1.92E-02	0.00E+00	1.93E-02	1.51E-05	2.95E-03	0.00E+00	2.96E-03
4,4'-DDT	2.41E-02	4.48E-03	0.00E+00	0.00E+00	9.00E+00	2.17E-01	4.03E-02	1.47E-04	2.87E-02	0.00E+00	2.88E-02	2.72E-05	5.33E-03	0.00E+00	5.36E-03
DDTr	--	--	--	--	--	--	--	8.09E-04	1.58E-01	0.00E+00	1.59E-01	1.15E-04	2.24E-02	0.00E+00	2.26E-02
Alpha-Chlordane	2.21E-01	3.48E-02	0.00E+00	0.00E+00	1.00E+00	2.21E-01	3.48E-02	1.34E-03	2.92E-02	0.00E+00	3.06E-02	2.12E-04	4.61E-03	0.00E+00	4.82E-03
Dieldrin	9.00E-03	1.49E-03	0.00E+00	0.00E+00	1.79E+00	1.61E-02	2.66E-03	5.48E-05	2.13E-03	0.00E+00	2.19E-03	9.04E-06	3.52E-04	0.00E+00	3.61E-04
Endosulfan I	2.60E-03	7.10E-04	0.00E+00	0.00E+00	1.00E+00	2.60E-03	7.10E-04	1.58E-05	3.44E-04	0.00E+00	3.60E-04	4.32E-06	9.39E-05	0.00E+00	9.82E-05
Heptachlor	6.29E-02	8.36E-03	0.00E+00	0.00E+00	4.00E-02	2.52E-03	3.34E-04	3.83E-04	3.33E-04	0.00E+00	7.16E-04	5.09E-05	4.42E-05	0.00E+00	9.51E-05
Herbicides															
Dichlorprop	1.17E-01	2.63E-02	0.00E+00	0.00E+00	1.00E+00	1.17E-01	2.63E-02	7.12E-04	1.55E-02	0.00E+00	1.62E-02	1.60E-04	3.47E-03	0.00E+00	3.63E-03
SVOCs															
Pentachlorophenol	5.78E-02	1.11E-02	0.00E+00	0.00E+00	1.00E+00	5.78E-02	1.11E-02	3.52E-04	7.65E-03	0.00E+00	8.00E-03	6.74E-05	1.47E-03	0.00E+00	1.53E-03
VOCs															
Acetone	2.39E-02	5.33E-03	0.00E+00	0.00E+00	1.00E+00	2.39E-02	5.33E-03	1.45E-04	3.16E-03	0.00E+00	3.31E-03	3.24E-05	7.05E-04	0.00E+00	7.38E-04
Carbon disulfide	4.30E-04	5.08E-04	0.00E+00	0.00E+00	1.00E+00	4.30E-04	5.08E-04	2.62E-06	5.69E-05	0.00E+00	5.95E-05	3.09E-06	6.71E-05	0.00E+00	7.02E-05

Table A-20
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 3 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	3.22E+04	2.68E+04	0.00E+00	0.00E+00	9.34E+01	7.77E+01	7.32E-02	2.36E+03	1.96E+03	0.00E+00	6.48E+01	0.00E+00	6.48E+01	0.00E+00	5.40E+01	0.00E+00	5.40E+01
Arsenic	1.22E+02	6.34E+01	0.00E+00	0.00E+00	5.42E-01	3.24E-01	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	4.01E-01	2.35E-01	0.00E+00	1.10E-02	0.00E+00	1.10E-02	0.00E+00	6.45E-03	0.00E+00	6.45E-03
Calcium	1.34E+04	4.49E+03	0.00E+00	0.00E+00	5.70E+03	1.91E+03	1.48E-04	1.98E+00	6.65E-01	0.00E+00	5.45E-02	0.00E+00	5.45E-02	0.00E+00	1.83E-02	0.00E+00	1.83E-02
Chromium	1.67E+02	1.03E+02	0.00E+00	0.00E+00	5.55E-01	3.41E-01	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	9.93E+00	6.95E+00	0.00E+00	2.73E-01	0.00E+00	2.73E-01	0.00E+00	1.91E-01	0.00E+00	1.91E-01
Cobalt	4.53E+01	1.63E+01	0.00E+00	0.00E+00	2.19E-01	7.87E-02	1.00E-01	4.53E+00	1.63E+00	0.00E+00	1.25E-01	0.00E+00	1.25E-01	0.00E+00	4.48E-02	0.00E+00	4.48E-02
Copper	7.33E+01	5.58E+01	0.00E+00	0.00E+00	1.46E+00	1.28E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.43E+01	1.38E+01	0.00E+00	3.94E-01	0.00E+00	3.94E-01	0.00E+00	3.79E-01	0.00E+00	3.79E-01
Iron	9.53E+04	6.34E+04	0.00E+00	0.00E+00	2.76E+02	1.84E+02	4.24E-03	4.04E+02	2.69E+02	0.00E+00	1.11E+01	0.00E+00	1.11E+01	0.00E+00	7.39E+00	0.00E+00	7.39E+00
Magnesium	1.01E+04	2.68E+03	0.00E+00	0.00E+00	1.24E+03	3.31E+02	1.06E-03	1.07E+01	2.84E+00	0.00E+00	2.94E-01	0.00E+00	2.94E-01	0.00E+00	7.82E-02	0.00E+00	7.82E-02
Manganese	1.28E+04	2.66E+03	0.00E+00	0.00E+00	4.17E+02	8.69E+01	5.87E-02	7.51E+02	1.56E+02	0.00E+00	2.07E+01	0.00E+00	2.07E+01	0.00E+00	4.30E+00	0.00E+00	4.30E+00
Mercury	2.00E-01	6.20E-02	0.00E+00	0.00E+00	1.91E-02	9.98E-03	1.92E-01	3.84E-02	1.19E-02	0.00E+00	1.06E-03	0.00E+00	1.06E-03	0.00E+00	3.27E-04	0.00E+00	3.27E-04
Nickel	3.62E+01	2.07E+01	0.00E+00	0.00E+00	2.79E-01	1.76E-01	ln(dry mammal conc, mg/kg) = (-0.2462+0.4658*ln(soil conc))	4.16E+00	3.21E+00	0.00E+00	1.14E-01	0.00E+00	1.14E-01	0.00E+00	8.81E-02	0.00E+00	8.81E-02
Potassium	7.75E+02	3.39E+02	0.00E+00	0.00E+00	9.55E+01	4.17E+01	4.24E-03	3.29E+00	1.44E+00	0.00E+00	9.04E-02	0.00E+00	9.04E-02	0.00E+00	3.95E-02	0.00E+00	3.95E-02
Selenium	3.70E+00	1.91E+00	0.00E+00	0.00E+00	2.69E-01	1.30E-01	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	1.08E+00	8.42E-01	0.00E+00	2.97E-02	0.00E+00	2.97E-02	0.00E+00	2.31E-02	0.00E+00	2.31E-02
Silver	3.00E+00	1.72E+00	0.00E+00	0.00E+00	1.52E-01	8.74E-02	5.01E-01	1.50E+00	8.63E-01	0.00E+00	4.13E-02	0.00E+00	4.13E-02	0.00E+00	2.37E-02	0.00E+00	2.37E-02
Sodium	6.15E+02	1.82E+02	0.00E+00	0.00E+00	7.06E+00	2.09E+00	1.17E-02	7.20E+00	2.13E+00	0.00E+00	1.98E-01	0.00E+00	1.98E-01	0.00E+00	5.85E-02	0.00E+00	5.85E-02
Thallium	4.00E+00	1.32E+00	0.00E+00	0.00E+00	1.16E-02	3.83E-03	1.23E-01	4.92E-01	1.63E-01	0.00E+00	1.35E-02	0.00E+00	1.35E-02	0.00E+00	4.47E-03	0.00E+00	4.47E-03
Vanadium	2.91E+02	1.76E+02	0.00E+00	0.00E+00	8.96E-01	5.44E-01	1.79E-01	5.21E+01	3.16E+01	0.00E+00	1.43E+00	0.00E+00	1.43E+00	0.00E+00	8.69E-01	0.00E+00	8.69E-01
Zinc	7.22E+01	4.93E+01	0.00E+00	0.00E+00	6.45E+00	5.20E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.20E+02	1.17E+02	0.00E+00	3.30E+00	0.00E+00	3.30E+00	0.00E+00	3.21E+00	0.00E+00	3.21E+00
Pesticides																	
4,4'-DDD	9.27E-02	1.19E-02	0.00E+00	0.00E+00	3.99E-04	5.12E-05	6.46E-03	5.99E-04	7.68E-05	0.00E+00	1.65E-05	0.00E+00	1.65E-05	0.00E+00	2.11E-06	0.00E+00	2.11E-06
4,4'-DDE	1.61E-02	2.48E-03	0.00E+00	0.00E+00	6.45E-05	9.93E-06	2.95E-03	4.75E-05	7.30E-06	0.00E+00	1.31E-06	0.00E+00	1.31E-06	0.00E+00	2.01E-07	0.00E+00	2.01E-07
4,4'-DDT	2.41E-02	4.48E-03	0.00E+00	0.00E+00	7.16E-05	1.33E-05	1.45E-02	3.49E-04	6.49E-05	0.00E+00	9.61E-06	0.00E+00	9.61E-06	0.00E+00	1.79E-06	0.00E+00	1.79E-06
DDTr	--	--	--	--	--	--	--	--	--	0.00E+00	2.74E-05	0.00E+00	2.74E-05	0.00E+00	4.10E-06	0.00E+00	4.10E-06
Alpha-Chlordane	2.21E-01	3.48E-02	0.00E+00	0.00E+00	7.83E-04	1.23E-04	2.06E-03	4.55E-04	7.17E-05	0.00E+00	1.25E-05	0.00E+00	1.25E-05	0.00E+00	1.97E-06	0.00E+00	1.97E-06
Dieldrin	9.00E-03	1.49E-03	0.00E+00	0.00E+00	5.15E-05	8.50E-06	1.96E-04	1.76E-06	2.91E-07	0.00E+00	4.85E-08	0.00E+00	4.85E-08	0.00E+00	8.00E-09	0.00E+00	8.00E-09
Endosulfan I	2.60E-03	7.10E-04	0.00E+00	0.00E+00	1.22E-04	3.32E-05	3.53E-05	9.18E-08	2.51E-08	0.00E+00	2.52E-09	0.00E+00	2.52E-09	0.00E+00	6.89E-10	0.00E+00	6.89E-10
Heptachlor	6.29E-02	8.36E-03	0.00E+00	0.00E+00	2.73E-04	3.62E-05	1.01E-04	6.35E-06	8.44E-07	0.00E+00	1.75E-07	0.00E+00	1.75E-07	0.00E+00	2.32E-08	0.00E+00	2.32E-08
Herbicides																	
Dichlorprop	1.17E-01	2.63E-02	0.00E+00	0.00E+00	5.98E-03	1.34E-03	6.76E-05	7.91E-06	1.77E-06	0.00E+00	2.18E-07	0.00E+00	2.18E-07	0.00E+00	4.88E-08	0.00E+00	4.88E-08
SVOCs																	
Pentachlorophenol	5.78E-02	1.11E-02	0.00E+00	0.00E+00	4.37E-04	8.37E-05	3.31E-03	1.91E-04	3.67E-05	0.00E+00	5.26E-06	0.00E+00	5.26E-06	0.00E+00	1.01E-06	0.00E+00	1.01E-06
VOCs																	
Acetone	2.39E-02	5.33E-03	0.00E+00	0.00E+00	1.54E-01	3.43E-02	2.21E-09	5.28E-11	1.18E-11	0.00E+00	1.45E-12	0.00E+00	1.45E-12	0.00E+00	3.24E-13	0.00E+00	3.24E-13
Carbon disulfide	4.30E-04	5.08E-04	0.00E+00	0.00E+00	1.53E-04	1.81E-04	8.04E-07	3.46E-10	4.08E-10	0.00E+00	9.51E-12	0.00E+00	9.51E-12	0.00E+00	1.12E-11	0.00E+00	1.12E-11

Table A-21
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 6 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides															
4,4'-DDD	1.70E-03	7.35E-04	0.00E+00	0.00E+00	1.57E-02	2.66E-05	1.15E-05	4.11E-06	3.22E-06	0.00E+00	7.33E-06	1.78E-06	1.39E-06	0.00E+00	3.17E-06
4,4'-DDE	9.80E-03	3.53E-03	0.00E+00	0.00E+00	1.32E-02	1.29E-04	4.65E-05	2.37E-05	1.56E-05	0.00E+00	3.93E-05	8.52E-06	5.62E-06	0.00E+00	1.41E-05
DDTr	--	--	--	--	--	--	--	2.78E-05	1.88E-05	0.00E+00	4.66E-05	1.03E-05	7.01E-06	0.00E+00	1.73E-05
Alpha-Chlordane	6.70E-03	2.54E-03	0.00E+00	0.00E+00	9.33E-03	6.25E-05	2.37E-05	1.62E-05	7.55E-06	0.00E+00	2.37E-05	6.14E-06	2.86E-06	0.00E+00	9.00E-06
SVOCs															
Pentachlorophenol	5.15E-03	3.72E-03	0.00E+00	0.00E+00	4.25E-02	2.19E-04	1.58E-04	1.24E-05	2.65E-05	0.00E+00	3.89E-05	8.98E-06	1.91E-05	0.00E+00	2.81E-05

Table A-22
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 6 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides															
Alpha-Chlordane	1.68E-02	5.95E-03	0.00E+00	0.00E+00	9.33E-03	1.57E-04	5.55E-05	4.06E-05	1.89E-05	0.00E+00	5.95E-05	1.44E-05	6.70E-06	0.00E+00	2.11E-05
SVOCs															
Pentachlorophenol	1.40E-02	7.87E-03	0.00E+00	0.00E+00	4.25E-02	5.95E-04	3.35E-04	3.38E-05	7.19E-05	0.00E+00	1.06E-04	1.90E-05	4.04E-05	0.00E+00	5.94E-05

Table A-23
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 6 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides															
4,4'-DDD	1.70E-03	7.35E-04	0.00E+00	0.00E+00	1.57E-02	2.66E-05	1.15E-05	5.70E-07	4.46E-07	0.00E+00	1.02E-06	2.46E-07	1.93E-07	0.00E+00	4.39E-07
4,4'-DDE	9.80E-03	3.53E-03	0.00E+00	0.00E+00	1.32E-02	1.29E-04	4.65E-05	3.28E-06	2.16E-06	0.00E+00	5.45E-06	1.18E-06	7.79E-07	0.00E+00	1.96E-06
DDTr	--	--	--	--	--	--	--	3.85E-06	2.61E-06	0.00E+00	6.46E-06	1.43E-06	9.72E-07	0.00E+00	2.40E-06
Alpha-Chlordane	6.70E-03	2.54E-03	0.00E+00	0.00E+00	9.33E-03	6.25E-05	2.37E-05	2.24E-06	1.05E-06	0.00E+00	3.29E-06	8.51E-07	3.97E-07	0.00E+00	1.25E-06
SVOCs															
Pentachlorophenol	5.15E-03	3.72E-03	0.00E+00	0.00E+00	4.25E-02	2.19E-04	1.58E-04	1.73E-06	3.67E-06	0.00E+00	5.39E-06	1.25E-06	2.65E-06	0.00E+00	3.89E-06

Table A-24
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 6 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides															
Alpha-Chlordane	1.68E-02	5.95E-03	0.00E+00	0.00E+00	9.33E-03	1.57E-04	5.55E-05	5.63E-06	2.62E-06	0.00E+00	8.25E-06	1.99E-06	9.30E-07	0.00E+00	2.92E-06
SVOCs															
Pentachlorophenol	1.40E-02	7.87E-03	0.00E+00	0.00E+00	4.25E-02	5.95E-04	3.35E-04	4.69E-06	9.97E-06	0.00E+00	1.47E-05	2.64E-06	5.60E-06	0.00E+00	8.24E-06

Table A-25
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media for the Site 6 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides															
4,4'-DDD	1.70E-03	7.35E-04	0.00E+00	0.00E+00	9.00E+00	1.53E-02	6.62E-03	0.00E+00	1.27E-03	0.00E+00	1.27E-03	0.00E+00	5.51E-04	0.00E+00	5.51E-04
4,4'-DDE	9.80E-03	3.53E-03	0.00E+00	0.00E+00	9.00E+00	8.82E-02	3.17E-02	0.00E+00	7.35E-03	0.00E+00	7.35E-03	0.00E+00	2.64E-03	0.00E+00	2.64E-03
DDTr	--	--	--	--	--	--	--	0.00E+00	8.62E-03	0.00E+00	8.62E-03	0.00E+00	3.20E-03	0.00E+00	3.20E-03
Alpha-Chlordane	6.70E-03	2.54E-03	0.00E+00	0.00E+00	1.00E+00	6.70E-03	2.54E-03	0.00E+00	5.58E-04	0.00E+00	5.58E-04	0.00E+00	2.12E-04	0.00E+00	2.12E-04
SVOCs															
Pentachlorophenol	5.15E-03	3.72E-03	0.00E+00	0.00E+00	1.00E+00	5.15E-03	3.72E-03	0.00E+00	4.29E-04	0.00E+00	4.29E-04	0.00E+00	3.10E-04	0.00E+00	3.10E-04

Table A-26
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media for the Site 6 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides															
Alpha-Chlordane	1.68E-02	5.95E-03	0.00E+00	0.00E+00	1.00E+00	1.68E-02	5.95E-03	0.00E+00	1.40E-03	0.00E+00	1.40E-03	0.00E+00	4.96E-04	0.00E+00	4.96E-04
SVOCs															
Pentachlorophenol	1.40E-02	7.87E-03	0.00E+00	0.00E+00	1.00E+00	1.40E-02	7.87E-03	0.00E+00	1.17E-03	0.00E+00	1.17E-03	0.00E+00	6.55E-04	0.00E+00	6.55E-04

Table A-27
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 6 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides															
4,4'-DDD	1.70E-03	7.35E-04	0.00E+00	0.00E+00	9.00E+00	1.53E-02	6.62E-03	1.03E-05	2.02E-03	0.00E+00	2.03E-03	4.47E-06	8.75E-04	0.00E+00	8.80E-04
4,4'-DDE	9.80E-03	3.53E-03	0.00E+00	0.00E+00	9.00E+00	8.82E-02	3.17E-02	5.96E-05	1.17E-02	0.00E+00	1.17E-02	2.15E-05	4.20E-03	0.00E+00	4.22E-03
DDTr	--	--	--	--	--	--	--	7.00E-05	1.37E-02	0.00E+00	1.38E-02	2.59E-05	5.07E-03	0.00E+00	5.10E-03
Alpha-Chlordane	6.70E-03	2.54E-03	0.00E+00	0.00E+00	1.00E+00	6.70E-03	2.54E-03	4.08E-05	8.86E-04	0.00E+00	9.27E-04	1.55E-05	3.36E-04	0.00E+00	3.51E-04
SVOCs															
Pentachlorophenol	5.15E-03	3.72E-03	0.00E+00	0.00E+00	1.00E+00	5.15E-03	3.72E-03	3.13E-05	6.81E-04	0.00E+00	7.13E-04	2.26E-05	4.92E-04	0.00E+00	5.14E-04

Table A-28
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 6 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides															
Alpha-Chlordane	1.68E-02	5.95E-03	0.00E+00	0.00E+00	1.00E+00	1.68E-02	5.95E-03	1.02E-04	2.22E-03	0.00E+00	2.32E-03	3.62E-05	7.87E-04	0.00E+00	8.23E-04
SVOCs															
Pentachlorophenol	1.40E-02	7.87E-03	0.00E+00	0.00E+00	1.00E+00	1.40E-02	7.87E-03	8.52E-05	1.85E-03	0.00E+00	1.94E-03	4.79E-05	1.04E-03	0.00E+00	1.09E-03

Table A-29
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 6 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides																	
4,4'-DDD	1.70E-03	7.35E-04	0.00E+00	0.00E+00	7.33E-06	3.17E-06	6.46E-03	1.10E-05	4.75E-06	0.00E+00	3.02E-07	0.00E+00	3.02E-07	0.00E+00	1.31E-07	0	1.31E-07
4,4'-DDE	9.80E-03	3.53E-03	0.00E+00	0.00E+00	3.93E-05	1.41E-05	2.95E-03	2.89E-05	1.04E-05	0.00E+00	7.95E-07	0.00E+00	7.95E-07	0.00E+00	2.86E-07	0	2.86E-07
DDTr	--	--	--	--	--	--	--	--	--	0.00E+00	1.10E-06	0.00E+00	1.10E-06	0.00E+00	4.17E-07	0.00E+00	4.17E-07
Alpha-Chlordane	6.70E-03	2.54E-03	0.00E+00	0.00E+00	2.37E-05	9.00E-06	2.06E-03	1.38E-05	5.23E-06	0.00E+00	3.80E-07	0.00E+00	3.80E-07	0.00E+00	1.44E-07	0	1.44E-07
SVOCs																	
Pentachlorophenol	5.15E-03	3.72E-03	0.00E+00	0.00E+00	3.89E-05	2.81E-05	3.31E-03	1.71E-05	1.23E-05	0.00E+00	4.69E-07	0.00E+00	4.69E-07	0.00E+00	3.38E-07	0.00E+00	3.38E-07

Table A-30
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 6 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides																	
Alpha-Chlordane	1.68E-02	5.95E-03	0.00E+00	0.00E+00	5.95E-05	2.11E-05	2.06E-03	3.46E-05	1.23E-05	0.00E+00	9.52E-07	0.00E+00	9.52E-07	0.00E+00	3.37E-07	0.00E+00	3.37E-07
SVOCs																	
Pentachlorophenol	1.40E-02	7.87E-03	0.00E+00	0.00E+00	1.06E-04	5.94E-05	3.31E-03	4.64E-05	2.60E-05	0.00E+00	1.27E-06	0.00E+00	1.27E-06	0.00E+00	7.16E-07	0.00E+00	7.16E-07

Table A-31
Wildlife Exposure Modeling of Doses to Piscivorous Birds (Great Blue Heron) from Media
for the Site 6 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	9.00E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	4.50E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	4.50E-02	L/kg-day
Sulfide		

Chemical	Sediment Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Fish) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/L dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/L dry wt.)	Mean Food Item Tissue Concentration (mg/L dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Pesticides															
4,4'-DDE	6.90E-03	2.75E-03	0.00E+00	0.00E+00	2.95E-03	0.00E+00	0.00E+00	6.21E-06	0.00E+00	0.00E+00	6.21E-06	2.47E-06	0.00E+00	0.00E+00	2.47E-06
DDTr	--	--	--	--	0.00E+00	--	--	6.21E-06	0.00E+00	0.00E+00	6.21E-06	2.47E-06	0.00E+00	0.00E+00	2.47E-06
Alpha-Chlordane	6.90E-02	2.87E-02	0.00E+00	0.00E+00	2.06E-03	0.00E+00	0.00E+00	6.21E-05	0.00E+00	0.00E+00	6.21E-05	2.58E-05	0.00E+00	0.00E+00	2.58E-05
Heptachlor Epoxide	4.10E-03	1.72E-03	NO COPC	NO COPC	1.48E-03	0.00E+00	0.00E+00	3.69E-06	0.00E+00	0.00E+00	3.69E-06	1.55E-06	0.00E+00	0.00E+00	1.55E-06

Table A-32
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 7 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.52E+04	2.52E+04	0.00E+00	0.00E+00	4.00E-03	1.01E+02	1.01E+02	6.09E+01	1.22E+01	0.00E+00	7.31E+01	6.09E+01	1.22E+01	0.00E+00	7.31E+01
Arsenic	4.38E+01	4.38E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.15E+00	1.15E+00	1.06E-01	1.39E-01	0.00E+00	2.45E-01	1.06E-01	1.39E-01	0.00E+00	2.45E-01
Calcium	3.79E+04	3.79E+04	0.00E+00	0.00E+00	3.50E+00	1.33E+05	1.33E+05	9.16E+01	1.60E+04	0.00E+00	1.61E+04	9.16E+01	1.60E+04	0.00E+00	1.61E+04
Chromium	1.02E+02	1.02E+02	0.00E+00	0.00E+00	7.50E-03	7.65E-01	7.65E-01	2.46E-01	9.24E-02	0.00E+00	3.39E-01	2.46E-01	9.24E-02	0.00E+00	3.39E-01
Copper	4.59E+01	4.59E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	8.82E+00	8.82E+00	1.11E-01	1.07E+00	0.00E+00	1.18E+00	1.11E-01	1.07E+00	0.00E+00	1.18E+00
Iron	4.26E+04	4.26E+04	0.00E+00	0.00E+00	4.00E-03	1.70E+02	1.70E+02	1.03E+02	2.06E+01	0.00E+00	1.24E+02	1.03E+02	2.06E+01	0.00E+00	1.24E+02
Magnesium	1.25E+03	1.25E+03	0.00E+00	0.00E+00	1.00E+00	1.25E+03	1.25E+03	3.02E+00	1.51E+02	0.00E+00	1.54E+02	3.02E+00	1.51E+02	0.00E+00	1.54E+02
Manganese	5.78E+02	5.78E+02	0.00E+00	0.00E+00	2.50E-01	1.45E+02	1.45E+02	1.40E+00	1.75E+01	0.00E+00	1.89E+01	1.40E+00	1.75E+01	0.00E+00	1.89E+01
Mercury	1.20E-01	1.20E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.17E-01	1.17E-01	2.90E-04	1.41E-02	0.00E+00	1.44E-02	2.90E-04	1.41E-02	0.00E+00	1.44E-02
Potassium	5.91E+02	5.91E+02	0.00E+00	0.00E+00	1.00E+00	5.91E+02	5.91E+02	1.43E+00	7.14E+01	0.00E+00	7.28E+01	1.43E+00	7.14E+01	0.00E+00	7.28E+01
Selenium	1.70E+00	1.70E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	9.12E-01	9.12E-01	4.11E-03	1.10E-01	0.00E+00	1.14E-01	4.11E-03	1.10E-01	0.00E+00	1.14E-01
Silver	NO COPC	NO COPC	NO COPC	NO COPC	4.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sodium	8.70E+01	8.70E+01	0.00E+00	0.00E+00	7.50E-02	6.53E+00	6.53E+00	2.10E-01	7.88E-01	0.00E+00	9.98E-01	2.10E-01	7.88E-01	0.00E+00	9.98E-01
Thallium	NO COPC	NO COPC	NO COPC	NO COPC	4.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tin	NO COPC	NO COPC	NO COPC	NO COPC	3.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.63E+02	1.63E+02	0.00E+00	0.00E+00	5.50E-03	8.97E-01	8.97E-01	3.94E-01	1.08E-01	0.00E+00	5.02E-01	3.94E-01	1.08E-01	0.00E+00	5.02E-01
Zinc	7.36E+01	7.36E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.25E+01	5.25E+01	1.78E-01	6.34E+00	0.00E+00	6.52E+00	1.78E-01	6.34E+00	0.00E+00	6.52E+00
PAHs															
Benzo(a)Anthracene	1.32E-02	1.32E-02	0.00E+00	0.00E+00	2.06E-02	2.72E-04	2.72E-04	3.19E-05	3.28E-05	0.00E+00	6.47E-05	3.19E-05	3.28E-05	0.00E+00	6.47E-05
Chrysene	7.61E-03	7.61E-03	0.00E+00	0.00E+00	2.06E-02	1.57E-04	1.57E-04	1.84E-05	1.89E-05	0.00E+00	3.73E-05	1.84E-05	1.89E-05	0.00E+00	3.73E-05
Total HMW PAHs	2.08E-02	2.08E-02	0.00E+00	0.00E+00	--	4.29E-04	4.29E-04	5.03E-05	5.18E-05	0.00E+00	1.02E-04	5.03E-05	5.18E-05	0.00E+00	1.02E-04
Pesticides															
4,4'-DDD	2.42E-02	2.42E-02	0.00E+00	0.00E+00	1.57E-02	3.79E-04	3.79E-04	5.85E-05	4.58E-05	0.00E+00	1.04E-04	5.85E-05	4.58E-05	0.00E+00	1.04E-04
4,4'-DDE	3.41E-02	3.41E-02	0.00E+00	0.00E+00	1.32E-02	4.50E-04	4.50E-04	8.24E-05	5.43E-05	0.00E+00	1.37E-04	8.24E-05	5.43E-05	0.00E+00	1.37E-04
4,4'-DDT	4.08E-02	4.08E-02	0.00E+00	0.00E+00	4.61E-03	1.88E-04	1.88E-04	9.86E-05	2.27E-05	0.00E+00	1.21E-04	9.86E-05	2.27E-05	0.00E+00	1.21E-04
DDTr	--	--	--	--	--	--	--	2.39E-04	1.23E-04	0.00E+00	3.62E-04	2.39E-04	1.23E-04	0.00E+00	3.62E-04
Dieldrin	4.40E-03	4.40E-03	0.00E+00	0.00E+00	2.74E-02	1.21E-04	1.21E-04	1.06E-05	1.46E-05	0.00E+00	2.52E-05	1.06E-05	1.46E-05	0.00E+00	2.52E-05
VOCs															
Acetone	2.03E-02	2.03E-02	0.00E+00	0.00E+00	5.33E+01	1.08E+00	1.08E+00	4.90E-05	1.31E-01	0.00E+00	1.31E-01	4.90E-05	1.31E-01	0.00E+00	1.31E-01

Table A-33
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 7 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.02E+04	1.02E+04	0.00E+00	0.00E+00	4.00E-03	4.07E+01	4.07E+01	2.46E+01	4.92E+00	0.00E+00	2.95E+01	2.46E+01	4.92E+00	0.00E+00	2.95E+01
Calcium	2.19E+05	2.19E+05	0.00E+00	0.00E+00	3.50E+00	7.65E+05	7.65E+05	5.28E+02	9.24E+04	0.00E+00	9.29E+04	5.28E+02	9.24E+04	0.00E+00	9.29E+04
Chromium	1.47E+01	1.47E+01	0.00E+00	0.00E+00	7.50E-03	1.10E-01	1.10E-01	3.55E-02	1.33E-02	0.00E+00	4.88E-02	3.55E-02	1.33E-02	0.00E+00	4.88E-02
Iron	1.44E+04	1.44E+04	0.00E+00	0.00E+00	4.00E-03	5.74E+01	5.74E+01	3.47E+01	6.93E+00	0.00E+00	4.16E+01	3.47E+01	6.93E+00	0.00E+00	4.16E+01
Magnesium	2.70E+03	2.70E+03	0.00E+00	0.00E+00	1.00E+00	2.70E+03	2.70E+03	6.51E+00	3.26E+02	0.00E+00	3.32E+02	6.51E+00	3.26E+02	0.00E+00	3.32E+02
Manganese	3.61E+02	3.61E+02	0.00E+00	0.00E+00	2.50E-01	9.01E+01	9.01E+01	8.71E-01	1.09E+01	0.00E+00	1.18E+01	8.71E-01	1.09E+01	0.00E+00	1.18E+01
Mercury	3.01E+00	3.01E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	6.72E-01	6.72E-01	7.27E-03	8.12E-02	0.00E+00	8.85E-02	7.27E-03	8.12E-02	0.00E+00	8.85E-02
Potassium	1.15E+03	1.15E+03	0.00E+00	0.00E+00	1.00E+00	1.15E+03	1.15E+03	2.78E+00	1.39E+02	0.00E+00	1.42E+02	2.78E+00	1.39E+02	0.00E+00	1.42E+02
Selenium	5.70E+00	5.70E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	3.47E+00	3.47E+00	1.38E-02	4.19E-01	0.00E+00	4.33E-01	1.38E-02	4.19E-01	0.00E+00	4.33E-01
Sodium	6.98E+01	6.98E+01	0.00E+00	0.00E+00	7.50E-02	5.24E+00	5.24E+00	1.69E-01	6.32E-01	0.00E+00	8.01E-01	1.69E-01	6.32E-01	0.00E+00	8.01E-01
Vanadium	3.86E+01	3.86E+01	0.00E+00	0.00E+00	5.50E-03	2.12E-01	2.12E-01	9.31E-02	2.56E-02	0.00E+00	1.19E-01	9.31E-02	2.56E-02	0.00E+00	1.19E-01
VOCs															
1,1-dichloroethene	1.10E-03	1.10E-03	0.00E+00	0.00E+00	2.27E+00	2.50E-03	2.50E-03	2.66E-06	3.02E-04	0.00E+00	3.05E-04	2.66E-06	3.02E-04	0.00E+00	3.05E-04
Acetone	3.70E-03	3.70E-03	0.00E+00	0.00E+00	5.33E+01	1.97E-01	1.97E-01	8.94E-06	2.38E-02	0.00E+00	2.38E-02	8.94E-06	2.38E-02	0.00E+00	2.38E-02

Table A-34
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 7 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.52E+04	2.52E+04	0.00E+00	0.00E+00	4.00E-03	1.01E+02	1.01E+02	8.44E+00	1.69E+00	0.00E+00	1.01E+01	8.44E+00	1.69E+00	0.00E+00	1.01E+01
Arsenic	4.38E+01	4.38E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.15E+00	1.15E+00	1.47E-02	1.93E-02	0.00E+00	3.39E-02	1.47E-02	1.93E-02	0.00E+00	3.39E-02
Calcium	3.79E+04	3.79E+04	0.00E+00	0.00E+00	3.50E+00	1.33E+05	1.33E+05	1.27E+01	2.22E+03	0.00E+00	2.23E+03	1.27E+01	2.22E+03	0.00E+00	2.23E+03
Chromium	1.02E+02	1.02E+02	0.00E+00	0.00E+00	7.50E-03	7.65E-01	7.65E-01	3.42E-02	1.28E-02	0.00E+00	4.70E-02	3.42E-02	1.28E-02	0.00E+00	4.70E-02
Copper	4.59E+01	4.59E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	8.82E+00	8.82E+00	1.54E-02	1.48E-01	0.00E+00	1.63E-01	1.54E-02	1.48E-01	0.00E+00	1.63E-01
Iron	4.26E+04	4.26E+04	0.00E+00	0.00E+00	4.00E-03	1.70E+02	1.70E+02	1.43E+01	2.85E+00	0.00E+00	1.71E+01	1.43E+01	2.85E+00	0.00E+00	1.71E+01
Magnesium	1.25E+03	1.25E+03	0.00E+00	0.00E+00	1.00E+00	1.25E+03	1.25E+03	4.19E-01	2.09E+01	0.00E+00	2.14E+01	4.19E-01	2.09E+01	0.00E+00	2.14E+01
Manganese	5.78E+02	5.78E+02	0.00E+00	0.00E+00	2.50E-01	1.45E+02	1.45E+02	1.94E-01	2.42E+00	0.00E+00	2.61E+00	1.94E-01	2.42E+00	0.00E+00	2.61E+00
Mercury	1.20E-01	1.20E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.17E-01	1.17E-01	4.02E-05	1.95E-03	0.00E+00	1.99E-03	4.02E-05	1.95E-03	0.00E+00	1.99E-03
Potassium	5.91E+02	5.91E+02	0.00E+00	0.00E+00	1.00E+00	5.91E+02	5.91E+02	1.98E-01	9.90E+00	0.00E+00	1.01E+01	1.98E-01	9.90E+00	0.00E+00	1.01E+01
Selenium	1.70E+00	1.70E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	9.12E-01	9.12E-01	5.70E-04	1.53E-02	0.00E+00	1.58E-02	5.70E-04	1.53E-02	0.00E+00	1.58E-02
Silver	NO COPC	NO COPC	NO COPC	NO COPC	4.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sodium	8.70E+01	8.70E+01	0.00E+00	0.00E+00	7.50E-02	6.53E+00	6.53E+00	2.91E-02	1.09E-01	0.00E+00	1.38E-01	2.91E-02	1.09E-01	0.00E+00	1.38E-01
Thallium	NO COPC	NO COPC	NO COPC	NO COPC	4.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tin	NO COPC	NO COPC	NO COPC	NO COPC	3.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.63E+02	1.63E+02	0.00E+00	0.00E+00	5.50E-03	8.97E-01	8.97E-01	5.46E-02	1.50E-02	0.00E+00	6.96E-02	5.46E-02	1.50E-02	0.00E+00	6.96E-02
Zinc	7.36E+01	7.36E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.25E+01	5.25E+01	2.47E-02	8.79E-01	0.00E+00	9.04E-01	2.47E-02	8.79E-01	0.00E+00	9.04E-01
PAHs															
Benzo(a)Anthracene	1.32E-02	1.32E-02	0.00E+00	0.00E+00	2.06E-02	2.72E-04	2.72E-04	4.42E-06	4.55E-06	0.00E+00	8.98E-06	4.42E-06	4.55E-06	0.00E+00	8.98E-06
Chrysene	7.61E-03	7.61E-03	0.00E+00	0.00E+00	2.06E-02	1.57E-04	1.57E-04	2.55E-06	2.63E-06	0.00E+00	5.18E-06	2.55E-06	2.63E-06	0.00E+00	5.18E-06
Total HMW PAHs	2.08E-02	2.08E-02	0.00E+00	0.00E+00	--	4.29E-04	4.29E-04	6.97E-06	7.18E-06	0.00E+00	1.42E-05	6.97E-06	7.18E-06	0.00E+00	1.42E-05
Pesticides															
4,4'-DDD	2.42E-02	2.42E-02	0.00E+00	0.00E+00	1.57E-02	3.79E-04	3.79E-04	8.11E-06	6.35E-06	0.00E+00	1.45E-05	8.11E-06	6.35E-06	0.00E+00	1.45E-05
4,4'-DDE	3.41E-02	3.41E-02	0.00E+00	0.00E+00	1.32E-02	4.50E-04	4.50E-04	1.14E-05	7.53E-06	0.00E+00	1.90E-05	1.14E-05	7.53E-06	0.00E+00	1.90E-05
4,4'-DDT	4.08E-02	4.08E-02	0.00E+00	0.00E+00	4.61E-03	1.88E-04	1.88E-04	1.37E-05	3.15E-06	0.00E+00	1.68E-05	1.37E-05	3.15E-06	0.00E+00	1.68E-05
DDTr	--	--	--	--	--	--	--	3.32E-05	1.70E-05	0.00E+00	5.02E-05	3.32E-05	1.70E-05	0.00E+00	5.02E-05
Dieldrin	4.40E-03	4.40E-03	0.00E+00	0.00E+00	2.74E-02	1.21E-04	1.21E-04	1.47E-06	2.02E-06	0.00E+00	3.49E-06	1.47E-06	2.02E-06	0.00E+00	3.49E-06
VOCs															
Acetone	2.03E-02	2.03E-02	0.00E+00	0.00E+00	5.33E+01	1.08E+00	1.08E+00	6.80E-06	1.81E-02	0.00E+00	1.81E-02	6.80E-06	1.81E-02	0.00E+00	1.81E-02

Table A-35
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 7 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.02E+04	1.02E+04	0.00E+00	0.00E+00	4.00E-03	4.07E+01	4.07E+01	3.41E+00	6.82E-01	0.00E+00	4.09E+00	3.41E+00	6.82E-01	0.00E+00	4.09E+00
Calcium	2.19E+05	2.19E+05	0.00E+00	0.00E+00	3.50E+00	7.65E+05	7.65E+05	7.32E+01	1.28E+04	0.00E+00	1.29E+04	7.32E+01	1.28E+04	0.00E+00	1.29E+04
Chromium	1.47E+01	1.47E+01	0.00E+00	0.00E+00	7.50E-03	1.10E-01	1.10E-01	4.92E-03	1.85E-03	0.00E+00	6.77E-03	4.92E-03	1.85E-03	0.00E+00	6.77E-03
Iron	1.44E+04	1.44E+04	0.00E+00	0.00E+00	4.00E-03	5.74E+01	5.74E+01	4.81E+00	9.61E-01	0.00E+00	5.77E+00	4.81E+00	9.61E-01	0.00E+00	5.77E+00
Magnesium	2.70E+03	2.70E+03	0.00E+00	0.00E+00	1.00E+00	2.70E+03	2.70E+03	9.03E-01	4.51E+01	0.00E+00	4.60E+01	9.03E-01	4.51E+01	0.00E+00	4.60E+01
Manganese	3.61E+02	3.61E+02	0.00E+00	0.00E+00	2.50E-01	9.01E+01	9.01E+01	1.21E-01	1.51E+00	0.00E+00	1.63E+00	1.21E-01	1.51E+00	0.00E+00	1.63E+00
Mercury	3.01E+00	3.01E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	6.72E-01	6.72E-01	1.01E-03	1.13E-02	0.00E+00	1.23E-02	1.01E-03	1.13E-02	0.00E+00	1.23E-02
Potassium	1.15E+03	1.15E+03	0.00E+00	0.00E+00	1.00E+00	1.15E+03	1.15E+03	3.85E-01	1.93E+01	0.00E+00	1.96E+01	3.85E-01	1.93E+01	0.00E+00	1.96E+01
Selenium	5.70E+00	5.70E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	3.47E+00	3.47E+00	1.91E-03	5.81E-02	0.00E+00	6.00E-02	1.91E-03	5.81E-02	0.00E+00	6.00E-02
Sodium	6.98E+01	6.98E+01	0.00E+00	0.00E+00	7.50E-02	5.24E+00	5.24E+00	2.34E-02	8.77E-02	0.00E+00	1.11E-01	2.34E-02	8.77E-02	0.00E+00	1.11E-01
Vanadium	3.86E+01	3.86E+01	0.00E+00	0.00E+00	5.50E-03	2.12E-01	2.12E-01	1.29E-02	3.55E-03	0.00E+00	1.65E-02	1.29E-02	3.55E-03	0.00E+00	1.65E-02
VOCs															
1,1-dichloroethene	1.10E-03	1.10E-03	0.00E+00	0.00E+00	2.27E+00	2.50E-03	2.50E-03	3.69E-07	4.19E-05	0.00E+00	4.23E-05	3.69E-07	4.19E-05	0.00E+00	4.23E-05
Acetone	3.70E-03	3.70E-03	0.00E+00	0.00E+00	5.33E+01	1.97E-01	1.97E-01	1.24E-06	3.30E-03	0.00E+00	3.30E-03	1.24E-06	3.30E-03	0.00E+00	3.30E-03

Table A-36
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 7 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.52E+04	2.52E+04	0.00E+00	0.00E+00	1.18E-01	2.97E+03	2.97E+03	0.00E+00	2.48E+02	0.00E+00	2.48E+02	0.00E+00	2.48E+02	0.00E+00	2.48E+02
Arsenic	4.38E+01	4.38E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	3.48E+00	3.48E+00	0.00E+00	2.90E-01	0.00E+00	2.90E-01	0.00E+00	2.90E-01	0.00E+00	2.90E-01
Calcium	3.79E+04	3.79E+04	0.00E+00	0.00E+00	1.00E+00	3.79E+04	3.79E+04	0.00E+00	3.16E+03	0.00E+00	3.16E+03	0.00E+00	3.16E+03	0.00E+00	3.16E+03
Chromium	1.02E+02	1.02E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.77E+00	8.77E+00	0.00E+00	7.31E-01	0.00E+00	7.31E-01	0.00E+00	7.31E-01	0.00E+00	7.31E-01
Copper	4.59E+01	4.59E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.47E+01	1.47E+01	0.00E+00	1.22E+00	0.00E+00	1.22E+00	0.00E+00	1.22E+00	0.00E+00	1.22E+00
Iron	4.26E+04	4.26E+04	0.00E+00	0.00E+00	7.80E-02	3.32E+03	3.32E+03	0.00E+00	2.77E+02	0.00E+00	2.77E+02	0.00E+00	2.77E+02	0.00E+00	2.77E+02
Magnesium	1.25E+03	1.25E+03	0.00E+00	0.00E+00	5.30E-01	6.63E+02	6.63E+02	0.00E+00	5.52E+01	0.00E+00	5.52E+01	0.00E+00	5.52E+01	0.00E+00	5.52E+01
Manganese	5.78E+02	5.78E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	3.41E+01	3.41E+01	0.00E+00	2.84E+00	0.00E+00	2.84E+00	0.00E+00	2.84E+00	0.00E+00	2.84E+00
Mercury	1.20E-01	1.20E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	3.93E-01	3.93E-01	0.00E+00	3.27E-02	0.00E+00	3.27E-02	0.00E+00	3.27E-02	0.00E+00	3.27E-02
Potassium	5.91E+02	5.91E+02	0.00E+00	0.00E+00	1.00E+00	5.91E+02	5.91E+02	0.00E+00	4.92E+01	0.00E+00	4.92E+01	0.00E+00	4.92E+01	0.00E+00	4.92E+01
Selenium	1.70E+00	1.70E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	1.37E+00	1.37E+00	0.00E+00	1.14E-01	0.00E+00	1.14E-01	0.00E+00	1.14E-01	0.00E+00	1.14E-01
Silver	NO COPC	NO COPC	NO COPC	NO COPC	1.53E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sodium	8.70E+01	8.70E+01	0.00E+00	0.00E+00	1.00E+00	8.70E+01	8.70E+01	0.00E+00	7.25E+00	0.00E+00	7.25E+00	0.00E+00	7.25E+00	0.00E+00	7.25E+00
Thallium	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tin	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.63E+02	1.63E+02	0.00E+00	0.00E+00	8.80E-01	1.43E+02	1.43E+02	0.00E+00	1.20E+01	0.00E+00	1.20E+01	0.00E+00	1.20E+01	0.00E+00	1.20E+01
Zinc	7.36E+01	7.36E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.50E+02	3.50E+02	0.00E+00	2.92E+01	0.00E+00	2.92E+01	0.00E+00	2.92E+01	0.00E+00	2.92E+01
PAHs															
Benzo(a)Anthracene	1.32E-02	1.32E-02	0.00E+00	0.00E+00	2.70E-01	3.56E-03	3.56E-03	0.00E+00	2.97E-04	0.00E+00	2.97E-04	0.00E+00	2.97E-04	0.00E+00	2.97E-04
Chrysene	7.61E-03	7.61E-03	0.00E+00	0.00E+00	4.40E-01	3.35E-03	3.35E-03	0.00E+00	2.79E-04	0.00E+00	2.79E-04	0.00E+00	2.79E-04	0.00E+00	2.79E-04
Total HMW PAHs	2.08E-02	2.08E-02	0.00E+00	0.00E+00	--	6.91E-03	6.91E-03	0.00E+00	5.76E-04	0.00E+00	5.76E-04	0.00E+00	5.76E-04	0.00E+00	5.76E-04
Pesticides															
4,4'-DDD	2.42E-02	2.42E-02	0.00E+00	0.00E+00	9.00E+00	2.18E-01	2.18E-01	0.00E+00	1.81E-02	0.00E+00	1.81E-02	0.00E+00	1.81E-02	0.00E+00	1.81E-02
4,4'-DDE	3.41E-02	3.41E-02	0.00E+00	0.00E+00	9.00E+00	3.07E-01	3.07E-01	0.00E+00	2.56E-02	0.00E+00	2.56E-02	0.00E+00	2.56E-02	0.00E+00	2.56E-02
4,4'-DDT	4.08E-02	4.08E-02	0.00E+00	0.00E+00	9.00E+00	3.67E-01	3.67E-01	0.00E+00	3.06E-02	0.00E+00	3.06E-02	0.00E+00	3.06E-02	0.00E+00	3.06E-02
DDTr	--	--	--	--	--	--	--	0.00E+00	7.43E-02	0.00E+00	7.43E-02	0.00E+00	7.43E-02	0.00E+00	7.43E-02
Dieldrin	4.40E-03	4.40E-03	0.00E+00	0.00E+00	1.79E+00	7.88E-03	7.88E-03	0.00E+00	6.56E-04	0.00E+00	6.56E-04	0.00E+00	6.56E-04	0.00E+00	6.56E-04
VOCs															
Acetone	2.03E-02	2.03E-02	0.00E+00	0.00E+00	1.00E+00	2.03E-02	2.03E-02	0.00E+00	1.69E-03	0.00E+00	1.69E-03	0.00E+00	1.69E-03	0.00E+00	1.69E-03

Table A-37
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 7 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.02E+04	1.02E+04	0.00E+00	0.00E+00	1.18E-01	1.20E+03	1.20E+03	0.00E+00	1.00E+02	0.00E+00	1.00E+02	0.00E+00	1.00E+02	0.00E+00	1.00E+02
Calcium	2.19E+05	2.19E+05	0.00E+00	0.00E+00	1.00E+00	2.19E+05	2.19E+05	0.00E+00	1.82E+04	0.00E+00	1.82E+04	0.00E+00	1.82E+04	0.00E+00	1.82E+04
Chromium	1.47E+01	1.47E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.98E+00	9.98E+00	0.00E+00	8.32E-01	0.00E+00	8.32E-01	0.00E+00	8.32E-01	0.00E+00	8.32E-01
Iron	1.44E+04	1.44E+04	0.00E+00	0.00E+00	7.80E-02	1.12E+03	1.12E+03	0.00E+00	9.33E+01	0.00E+00	9.33E+01	0.00E+00	9.33E+01	0.00E+00	9.33E+01
Magnesium	2.70E+03	2.70E+03	0.00E+00	0.00E+00	5.30E-01	1.43E+03	1.43E+03	0.00E+00	1.19E+02	0.00E+00	1.19E+02	0.00E+00	1.19E+02	0.00E+00	1.19E+02
Manganese	3.61E+02	3.61E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	2.47E+01	2.47E+01	0.00E+00	2.06E+00	0.00E+00	2.06E+00	0.00E+00	2.06E+00	0.00E+00	2.06E+00
Mercury	3.01E+00	3.01E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	5.75E-01	5.75E-01	0.00E+00	4.79E-02	0.00E+00	4.79E-02	0.00E+00	4.79E-02	0.00E+00	4.79E-02
Potassium	1.15E+03	1.15E+03	0.00E+00	0.00E+00	1.00E+00	1.15E+03	1.15E+03	0.00E+00	9.58E+01	0.00E+00	9.58E+01	0.00E+00	9.58E+01	0.00E+00	9.58E+01
Selenium	5.70E+00	5.70E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	3.32E+00	3.32E+00	0.00E+00	2.77E-01	0.00E+00	2.77E-01	0.00E+00	2.77E-01	0.00E+00	2.77E-01
Sodium	6.98E+01	6.98E+01	0.00E+00	0.00E+00	1.00E+00	6.98E+01	6.98E+01	0.00E+00	5.82E+00	0.00E+00	5.82E+00	0.00E+00	5.82E+00	0.00E+00	5.82E+00
Vanadium	3.86E+01	3.86E+01	0.00E+00	0.00E+00	8.80E-01	3.39E+01	3.39E+01	0.00E+00	2.83E+00	0.00E+00	2.83E+00	0.00E+00	2.83E+00	0.00E+00	2.83E+00
VOCs															
1,1-dichloroethene	1.10E-03	1.10E-03	0.00E+00	0.00E+00	1.00E+00	1.10E-03	1.10E-03	0.00E+00	9.17E-05	0.00E+00	9.17E-05	0.00E+00	9.17E-05	0.00E+00	9.17E-05
Acetone	3.70E-03	3.70E-03	0.00E+00	0.00E+00	1.00E+00	3.70E-03	3.70E-03	0.00E+00	3.08E-04	0.00E+00	3.08E-04	0.00E+00	3.08E-04	0.00E+00	3.08E-04

Table A-38
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 7 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.52E+04	2.52E+04	0.00E+00	0.00E+00	1.18E-01	2.97E+03	2.97E+03	1.53E+02	3.93E+02	0.00E+00	5.47E+02	1.53E+02	3.93E+02	0.00E+00	5.47E+02
Arsenic	4.38E+01	4.38E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	3.48E+00	3.48E+00	2.67E-01	4.61E-01	0.00E+00	7.27E-01	2.67E-01	4.61E-01	0.00E+00	7.27E-01
Calcium	3.79E+04	3.79E+04	0.00E+00	0.00E+00	1.00E+00	3.79E+04	3.79E+04	2.31E+02	5.01E+03	0.00E+00	5.24E+03	2.31E+02	5.01E+03	0.00E+00	5.24E+03
Chromium	1.02E+02	1.02E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.77E+00	8.77E+00	6.21E-01	1.16E+00	0.00E+00	1.78E+00	6.21E-01	1.16E+00	0.00E+00	1.78E+00
Copper	4.59E+01	4.59E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.47E+01	1.47E+01	2.79E-01	1.94E+00	0.00E+00	2.22E+00	2.79E-01	1.94E+00	0.00E+00	2.22E+00
Iron	4.26E+04	4.26E+04	0.00E+00	0.00E+00	7.80E-02	3.32E+03	3.32E+03	2.59E+02	4.40E+02	0.00E+00	6.99E+02	2.59E+02	4.40E+02	0.00E+00	6.99E+02
Magnesium	1.25E+03	1.25E+03	0.00E+00	0.00E+00	5.30E-01	6.63E+02	6.63E+02	7.61E+00	8.76E+01	0.00E+00	9.53E+01	7.61E+00	8.76E+01	0.00E+00	9.53E+01
Manganese	5.78E+02	5.78E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	3.41E+01	3.41E+01	3.52E+00	4.51E+00	0.00E+00	8.02E+00	3.52E+00	4.51E+00	0.00E+00	8.02E+00
Mercury	1.20E-01	1.20E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	3.93E-01	3.93E-01	7.30E-04	5.20E-02	0.00E+00	5.27E-02	7.30E-04	5.20E-02	0.00E+00	5.27E-02
Potassium	5.91E+02	5.91E+02	0.00E+00	0.00E+00	1.00E+00	5.91E+02	5.91E+02	3.60E+00	7.82E+01	0.00E+00	8.18E+01	3.60E+00	7.82E+01	0.00E+00	8.18E+01
Selenium	1.70E+00	1.70E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	1.37E+00	1.37E+00	1.03E-02	1.81E-01	0.00E+00	1.91E-01	1.03E-02	1.81E-01	0.00E+00	1.91E-01
Silver	NO COPC	NO COPC	NO COPC	NO COPC	1.53E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sodium	8.70E+01	8.70E+01	0.00E+00	0.00E+00	1.00E+00	8.70E+01	8.70E+01	5.29E-01	1.15E+01	0.00E+00	1.20E+01	5.29E-01	1.15E+01	0.00E+00	1.20E+01
Thallium	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tin	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.63E+02	1.63E+02	0.00E+00	0.00E+00	8.80E-01	1.43E+02	1.43E+02	9.92E-01	1.90E+01	0.00E+00	2.00E+01	9.92E-01	1.90E+01	0.00E+00	2.00E+01
Zinc	7.36E+01	7.36E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.50E+02	3.50E+02	4.48E-01	4.63E+01	0.00E+00	4.68E+01	4.48E-01	4.63E+01	0.00E+00	4.68E+01
PAHs															
Benzo(a)Anthracene	1.32E-02	1.32E-02	0.00E+00	0.00E+00	2.70E-01	3.56E-03	3.56E-03	8.03E-05	4.71E-04	0.00E+00	5.52E-04	8.03E-05	4.71E-04	0.00E+00	5.52E-04
Chrysene	7.61E-03	7.61E-03	0.00E+00	0.00E+00	4.40E-01	3.35E-03	3.35E-03	4.63E-05	4.43E-04	0.00E+00	4.89E-04	4.63E-05	4.43E-04	0.00E+00	4.89E-04
Total HMW PAHs	2.08E-02	2.08E-02	0.00E+00	0.00E+00	--	6.91E-03	6.91E-03	1.27E-04	9.14E-04	0.00E+00	1.04E-03	1.27E-04	9.14E-04	0.00E+00	1.04E-03
Pesticides															
4,4'-DDD	2.42E-02	2.42E-02	0.00E+00	0.00E+00	9.00E+00	2.18E-01	2.18E-01	1.47E-04	2.88E-02	0.00E+00	2.90E-02	1.47E-04	2.88E-02	0.00E+00	2.90E-02
4,4'-DDE	3.41E-02	3.41E-02	0.00E+00	0.00E+00	9.00E+00	3.07E-01	3.07E-01	2.08E-04	4.06E-02	0.00E+00	4.08E-02	2.08E-04	4.06E-02	0.00E+00	4.08E-02
4,4'-DDT	4.08E-02	4.08E-02	0.00E+00	0.00E+00	9.00E+00	3.67E-01	3.67E-01	2.48E-04	4.86E-02	0.00E+00	4.88E-02	2.48E-04	4.86E-02	0.00E+00	4.88E-02
DDTr	--	--	--	--	--	--	--	6.03E-04	1.18E-01	0.00E+00	1.19E-01	6.03E-04	1.18E-01	0.00E+00	1.19E-01
Dieldrin	4.40E-03	4.40E-03	0.00E+00	0.00E+00	1.79E+00	7.88E-03	7.88E-03	2.68E-05	1.04E-03	0.00E+00	1.07E-03	2.68E-05	1.04E-03	0.00E+00	1.07E-03
VOCs															
Acetone	2.03E-02	2.03E-02	0.00E+00	0.00E+00	1.00E+00	2.03E-02	2.03E-02	1.24E-04	2.69E-03	0.00E+00	2.81E-03	1.24E-04	2.69E-03	0.00E+00	2.81E-03

Table A-39
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 7 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.02E+04	1.02E+04	0.00E+00	0.00E+00	1.18E-01	1.20E+03	1.20E+03	6.19E+01	1.59E+02	0.00E+00	2.21E+02	6.19E+01	1.59E+02	0.00E+00	2.21E+02
Calcium	2.19E+05	2.19E+05	0.00E+00	0.00E+00	1.00E+00	2.19E+05	2.19E+05	1.33E+03	2.89E+04	0.00E+00	3.02E+04	1.33E+03	2.89E+04	0.00E+00	3.02E+04
Chromium	1.47E+01	1.47E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.98E+00	9.98E+00	8.95E-02	1.32E+00	0.00E+00	1.41E+00	8.95E-02	1.32E+00	0.00E+00	1.41E+00
Iron	1.44E+04	1.44E+04	0.00E+00	0.00E+00	7.80E-02	1.12E+03	1.12E+03	8.73E+01	1.48E+02	0.00E+00	2.35E+02	8.73E+01	1.48E+02	0.00E+00	2.35E+02
Magnesium	2.70E+03	2.70E+03	0.00E+00	0.00E+00	5.30E-01	1.43E+03	1.43E+03	1.64E+01	1.89E+02	0.00E+00	2.05E+02	1.64E+01	1.89E+02	0.00E+00	2.05E+02
Manganese	3.61E+02	3.61E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	2.47E+01	2.47E+01	2.19E+00	3.27E+00	0.00E+00	5.46E+00	2.19E+00	3.27E+00	0.00E+00	5.46E+00
Mercury	3.01E+00	3.01E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	5.75E-01	5.75E-01	1.83E-02	7.60E-02	0.00E+00	9.43E-02	1.83E-02	7.60E-02	0.00E+00	9.43E-02
Potassium	1.15E+03	1.15E+03	0.00E+00	0.00E+00	1.00E+00	1.15E+03	1.15E+03	7.00E+00	1.52E+02	0.00E+00	1.59E+02	7.00E+00	1.52E+02	0.00E+00	1.59E+02
Selenium	5.70E+00	5.70E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	3.32E+00	3.32E+00	3.47E-02	4.40E-01	0.00E+00	4.74E-01	3.47E-02	4.40E-01	0.00E+00	4.74E-01
Sodium	6.98E+01	6.98E+01	0.00E+00	0.00E+00	1.00E+00	6.98E+01	6.98E+01	4.25E-01	9.23E+00	0.00E+00	9.66E+00	4.25E-01	9.23E+00	0.00E+00	9.66E+00
Vanadium	3.86E+01	3.86E+01	0.00E+00	0.00E+00	8.80E-01	3.39E+01	3.39E+01	2.35E-01	4.49E+00	0.00E+00	4.72E+00	2.35E-01	4.49E+00	0.00E+00	4.72E+00
VOCs															
1,1-dichloroethene	1.10E-03	1.10E-03	0.00E+00	0.00E+00	1.00E+00	1.10E-03	1.10E-03	6.69E-06	1.46E-04	0.00E+00	1.52E-04	6.69E-06	1.46E-04	0.00E+00	1.52E-04
Acetone	3.70E-03	3.70E-03	0.00E+00	0.00E+00	1.00E+00	3.70E-03	3.70E-03	2.25E-05	4.89E-04	0.00E+00	5.12E-04	2.25E-05	4.89E-04	0.00E+00	5.12E-04

Table A-40
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 7 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	2.52E+04	2.52E+04	0.00E+00	0.00E+00	7.31E+01	7.31E+01	7.32E-02	1.84E+03	1.84E+03	0.00E+00	5.07E+01	0.00E+00	5.07E+01	0.00E+00	5.07E+01	0.00E+00	5.07E+01
Arsenic	4.38E+01	4.38E+01	0.00E+00	0.00E+00	2.45E-01	2.45E-01	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	1.73E-01	1.73E-01	0.00E+00	4.77E-03	0.00E+00	4.77E-03	0.00E+00	4.77E-03	0.00E+00	4.77E-03
Calcium	3.79E+04	3.79E+04	0.00E+00	0.00E+00	1.61E+04	1.61E+04	1.48E-04	5.61E+00	5.61E+00	0.00E+00	1.54E-01	0.00E+00	1.54E-01	0.00E+00	1.54E-01	0.00E+00	1.54E-01
Chromium	1.02E+02	1.02E+02	0.00E+00	0.00E+00	3.39E-01	3.39E-01	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	6.92E+00	6.92E+00	0.00E+00	1.90E-01	0.00E+00	1.90E-01	0.00E+00	1.90E-01	0.00E+00	1.90E-01
Copper	4.59E+01	4.59E+01	0.00E+00	0.00E+00	1.18E+00	1.18E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.34E+01	1.34E+01	0.00E+00	3.68E-01	0.00E+00	3.68E-01	0.00E+00	3.68E-01	0.00E+00	3.68E-01
Iron	4.26E+04	4.26E+04	0.00E+00	0.00E+00	1.24E+02	1.24E+02	4.24E-03	1.81E+02	1.81E+02	0.00E+00	4.97E+00	0.00E+00	4.97E+00	0.00E+00	4.97E+00	0.00E+00	4.97E+00
Magnesium	1.25E+03	1.25E+03	0.00E+00	0.00E+00	1.54E+02	1.54E+02	1.06E-03	1.33E+00	1.33E+00	0.00E+00	3.64E-02	0.00E+00	3.64E-02	0.00E+00	3.64E-02	0.00E+00	3.64E-02
Manganese	5.78E+02	5.78E+02	0.00E+00	0.00E+00	1.89E+01	1.89E+01	5.87E-02	3.39E+01	3.39E+01	0.00E+00	9.33E-01	0.00E+00	9.33E-01	0.00E+00	9.33E-01	0.00E+00	9.33E-01
Mercury	1.20E-01	1.20E-01	0.00E+00	0.00E+00	1.44E-02	1.44E-02	1.92E-01	2.30E-02	2.30E-02	0.00E+00	6.34E-04	0.00E+00	6.34E-04	0.00E+00	6.34E-04	0.00E+00	6.34E-04
Potassium	5.91E+02	5.91E+02	0.00E+00	0.00E+00	7.28E+01	7.28E+01	4.24E-03	2.51E+00	2.51E+00	0.00E+00	6.89E-02	0.00E+00	6.89E-02	0.00E+00	6.89E-02	0.00E+00	6.89E-02
Selenium	1.70E+00	1.70E+00	0.00E+00	0.00E+00	1.14E-01	1.14E-01	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	8.06E-01	8.06E-01	0.00E+00	2.22E-02	0.00E+00	2.22E-02	0.00E+00	2.22E-02	0.00E+00	2.22E-02
Silver	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	5.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sodium	8.70E+01	8.70E+01	0.00E+00	0.00E+00	9.98E-01	9.98E-01	1.17E-02	1.02E+00	1.02E+00	0.00E+00	2.80E-02	0.00E+00	2.80E-02	0.00E+00	2.80E-02	0.00E+00	2.80E-02
Thallium	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tin	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.63E+02	1.63E+02	0.00E+00	0.00E+00	5.02E-01	5.02E-01	1.79E-01	2.92E+01	2.92E+01	0.00E+00	8.02E-01	0.00E+00	8.02E-01	0.00E+00	8.02E-01	0.00E+00	8.02E-01
Zinc	7.36E+01	7.36E+01	0.00E+00	0.00E+00	6.52E+00	6.52E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.20E+02	1.20E+02	0.00E+00	3.30E+00	0.00E+00	3.30E+00	0.00E+00	3.30E+00	0.00E+00	3.30E+00
PAHs																	
Benzo(a)Anthracene	1.32E-02	1.32E-02	0.00E+00	0.00E+00	6.47E-05	6.47E-05	2.77E-03	3.66E-05	3.66E-05	0.00E+00	1.01E-06	0.00E+00	1.01E-06	0.00E+00	1.01E-06	0.00E+00	1.01E-06
Chrysene	7.61E-03	7.61E-03	0.00E+00	0.00E+00	3.73E-05	3.73E-05	2.77E-03	2.11E-05	2.11E-05	0.00E+00	5.80E-07	0.00E+00	5.80E-07	0.00E+00	5.80E-07	0.00E+00	5.80E-07
Total HMW PAHs	2.08E-02	2.08E-02	0.00E+00	0.00E+00	1.02E-04	1.02E-04	--	--	--	0.00E+00	1.59E-06	0.00E+00	1.59E-06	0.00E+00	1.59E-06	0.00E+00	1.59E-06
Pesticides																	
4,4'-DDD	2.42E-02	2.42E-02	0.00E+00	0.00E+00	1.04E-04	1.04E-04	6.46E-03	1.56E-04	1.56E-04	0.00E+00	4.30E-06	0.00E+00	4.30E-06	0.00E+00	4.30E-06	0.00E+00	4.30E-06
4,4'-DDE	3.41E-02	3.41E-02	0.00E+00	0.00E+00	1.37E-04	1.37E-04	2.95E-03	1.01E-04	1.01E-04	0.00E+00	2.77E-06	0.00E+00	2.77E-06	0.00E+00	2.77E-06	0.00E+00	2.77E-06
4,4'-DDT	4.08E-02	4.08E-02	0.00E+00	0.00E+00	1.21E-04	1.21E-04	1.45E-02	5.92E-04	5.92E-04	0.00E+00	1.63E-05	0.00E+00	1.63E-05	0.00E+00	1.63E-05	0.00E+00	1.63E-05
DDTr	--	--	--	--	--	--	--	--	--	0.00E+00	2.33E-05	0.00E+00	2.33E-05	0.00E+00	2.33E-05	0.00E+00	2.33E-05
Dieldrin	4.40E-03	4.40E-03	0.00E+00	0.00E+00	2.52E-05	2.52E-05	1.96E-04	8.62E-07	8.62E-07	0.00E+00	2.37E-08	0.00E+00	2.37E-08	0.00E+00	2.37E-08	0.00E+00	2.37E-08
VOCs																	
Acetone	2.03E-02	2.03E-02	0.00E+00	0.00E+00	1.31E-01	1.31E-01	2.21E-09	4.49E-11	4.49E-11	0.00E+00	1.23E-12	0.00E+00	1.23E-12	0.00E+00	1.23E-12	0.00E+00	1.23E-12

Table A-41
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 7 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	1.02E+04	1.02E+04	0.00E+00	0.00E+00	2.95E+01	2.95E+01	7.32E-02	7.45E+02	7.45E+02	0.00E+00	2.05E+01	0.00E+00	2.05E+01	0.00E+00	2.05E+01	0.00E+00	2.05E+01
Calcium	2.19E+05	2.19E+05	0.00E+00	0.00E+00	9.29E+04	9.29E+04	1.48E-04	3.23E+01	3.23E+01	0.00E+00	8.89E-01	0.00E+00	8.89E-01	0.00E+00	8.89E-01	0.00E+00	8.89E-01
Chromium	1.47E+01	1.47E+01	0.00E+00	0.00E+00	4.88E-02	4.88E-02	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	1.67E+00	1.67E+00	0.00E+00	4.59E-02	0.00E+00	4.59E-02	0.00E+00	4.59E-02	0.00E+00	4.59E-02
Iron	1.44E+04	1.44E+04	0.00E+00	0.00E+00	4.16E+01	4.16E+01	4.24E-03	6.08E+01	6.08E+01	0.00E+00	1.67E+00	0.00E+00	1.67E+00	0.00E+00	1.67E+00	0.00E+00	1.67E+00
Magnesium	2.70E+03	2.70E+03	0.00E+00	0.00E+00	3.32E+02	3.32E+02	1.06E-03	2.86E+00	2.86E+00	0.00E+00	7.86E-02	0.00E+00	7.86E-02	0.00E+00	7.86E-02	0.00E+00	7.86E-02
Manganese	3.61E+02	3.61E+02	0.00E+00	0.00E+00	1.18E+01	1.18E+01	5.87E-02	2.12E+01	2.12E+01	0.00E+00	5.82E-01	0.00E+00	5.82E-01	0.00E+00	5.82E-01	0.00E+00	5.82E-01
Mercury	3.01E+00	3.01E+00	0.00E+00	0.00E+00	8.85E-02	8.85E-02	1.92E-01	5.77E-01	5.77E-01	0.00E+00	1.59E-02	0.00E+00	1.59E-02	0.00E+00	1.59E-02	0.00E+00	1.59E-02
Potassium	1.15E+03	1.15E+03	0.00E+00	0.00E+00	1.42E+02	1.42E+02	4.24E-03	4.88E+00	4.88E+00	0.00E+00	1.34E-01	0.00E+00	1.34E-01	0.00E+00	1.34E-01	0.00E+00	1.34E-01
Selenium	5.70E+00	5.70E+00	0.00E+00	0.00E+00	4.33E-01	4.33E-01	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	1.27E+00	1.27E+00	0.00E+00	3.49E-02	0.00E+00	3.49E-02	0.00E+00	3.49E-02	0.00E+00	3.49E-02
Sodium	6.98E+01	6.98E+01	0.00E+00	0.00E+00	8.01E-01	8.01E-01	1.17E-02	8.17E-01	8.17E-01	0.00E+00	2.25E-02	0.00E+00	2.25E-02	0.00E+00	2.25E-02	0.00E+00	2.25E-02
Vanadium	3.86E+01	3.86E+01	0.00E+00	0.00E+00	1.19E-01	1.19E-01	1.79E-01	6.90E+00	6.90E+00	0.00E+00	1.90E-01	0.00E+00	1.90E-01	0.00E+00	1.90E-01	0.00E+00	1.90E-01
VOCs																	
1,1-dichloroethene	1.10E-03	1.10E-03	0.00E+00	0.00E+00	3.05E-04	3.05E-04	3.39E-06	3.73E-09	3.73E-09	0.00E+00	1.03E-10	0.00E+00	1.03E-10	0.00E+00	1.03E-10	0.00E+00	1.03E-10
Acetone	3.70E-03	3.70E-03	0.00E+00	0.00E+00	2.38E-02	2.38E-02	2.21E-09	8.18E-12	8.18E-12	0.00E+00	2.25E-13	0.00E+00	2.25E-13	0.00E+00	2.25E-13	0.00E+00	2.25E-13

Table A-42
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 8 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	3.18E+04	2.59E+04	0.00E+00	0.00E+00	4.00E-03	1.27E+02	1.04E+02	7.68E+01	1.54E+01	0.00E+00	9.22E+01	6.26E+01	1.25E+01	0.00E+00	7.52E+01
Arsenic	3.37E+01	1.96E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	9.92E-01	7.31E-01	8.14E-02	1.20E-01	0.00E+00	2.01E-01	4.74E-02	8.83E-02	0.00E+00	1.36E-01
Calcium	1.38E+05	4.06E+04	0.00E+00	0.00E+00	3.50E+00	4.83E+05	1.42E+05	3.33E+02	5.83E+04	0.00E+00	5.87E+04	9.80E+01	1.71E+04	0.00E+00	1.72E+04
Chromium	6.63E+01	5.84E+01	0.00E+00	0.00E+00	7.50E-03	4.97E-01	4.38E-01	1.60E-01	6.01E-02	0.00E+00	2.20E-01	1.41E-01	5.29E-02	0.00E+00	1.94E-01
Cobalt	5.66E+01	2.40E+01	0.00E+00	0.00E+00	2.00E-02	1.13E+00	4.81E-01	1.37E-01	1.37E-01	0.00E+00	2.73E-01	5.80E-02	5.80E-02	0.00E+00	1.16E-01
Copper	6.11E+01	4.65E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	9.87E+00	8.86E+00	1.48E-01	1.19E+00	0.00E+00	1.34E+00	1.12E-01	1.07E+00	0.00E+00	1.18E+00
Iron	4.94E+04	3.29E+04	0.00E+00	0.00E+00	4.00E-03	1.98E+02	1.32E+02	1.19E+02	2.39E+01	0.00E+00	1.43E+02	7.95E+01	1.59E+01	0.00E+00	9.55E+01
Magnesium	3.85E+03	2.41E+03	0.00E+00	0.00E+00	1.00E+00	3.85E+03	2.41E+03	9.30E+00	4.65E+02	0.00E+00	4.74E+02	5.83E+00	2.91E+02	0.00E+00	2.97E+02
Manganese	2.05E+03	7.41E+02	0.00E+00	0.00E+00	2.50E-01	5.13E+02	1.85E+02	4.95E+00	6.19E+01	0.00E+00	6.69E+01	1.79E+00	2.24E+01	0.00E+00	2.42E+01
Mercury	1.50E-01	8.88E-02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.32E-01	9.89E-02	3.62E-04	1.59E-02	0.00E+00	1.63E-02	2.14E-04	1.19E-02	0.00E+00	1.22E-02
Potassium	9.64E+02	8.13E+02	0.00E+00	0.00E+00	1.00E+00	9.64E+02	8.13E+02	2.33E+00	1.16E+02	0.00E+00	1.19E+02	1.96E+00	9.82E+01	0.00E+00	1.00E+02
Selenium	2.50E+00	1.07E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	1.40E+00	5.48E-01	6.04E-03	1.69E-01	0.00E+00	1.75E-01	2.59E-03	6.62E-02	0.00E+00	6.88E-02
Sodium	2.17E+02	1.64E+02	0.00E+00	0.00E+00	7.50E-02	1.63E+01	1.23E+01	5.24E-01	1.97E+00	0.00E+00	2.49E+00	3.97E-01	1.49E+00	0.00E+00	1.88E+00
Vanadium	1.39E+02	9.60E+01	0.00E+00	0.00E+00	5.50E-03	7.65E-01	5.28E-01	3.36E-01	9.24E-02	0.00E+00	4.28E-01	2.32E-01	6.38E-02	0.00E+00	2.96E-01
Zinc	9.06E+01	6.82E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.89E+01	5.03E+01	2.19E-01	7.12E+00	0.00E+00	7.34E+00	1.65E-01	6.08E+00	0.00E+00	6.24E+00
VOCs															
2-Butanone	1.51E-02	9.58E-02	0.00E+00	0.00E+00	2.74E+01	4.14E-01	2.62E+00	3.65E-05	5.00E-02	0.00E+00	5.00E-02	2.31E-04	3.17E-01	0.00E+00	3.17E-01
Acetone	1.84E-01	1.63E-01	0.00E+00	0.00E+00	5.33E+01	9.81E+00	8.67E+00	4.45E-04	1.18E+00	0.00E+00	1.19E+00	3.93E-04	1.05E+00	0.00E+00	1.05E+00
Carbon disulfide	3.00E-03	2.20E-02	0.00E+00	0.00E+00	2.93E+00	8.79E-03	6.44E-02	7.25E-06	1.06E-03	0.00E+00	1.07E-03	5.31E-05	7.77E-03	0.00E+00	7.83E-03

Table A-43
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 8 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	3.18E+04	2.59E+04	0.00E+00	0.00E+00	4.00E-03	1.27E+02	1.04E+02	1.07E+01	2.13E+00	0.00E+00	1.28E+01	8.68E+00	1.74E+00	0.00E+00	1.04E+01
Arsenic	3.37E+01	1.96E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	9.92E-01	7.31E-01	1.13E-02	1.66E-02	0.00E+00	2.79E-02	6.57E-03	1.22E-02	0.00E+00	1.88E-02
Calcium	1.38E+05	4.06E+04	0.00E+00	0.00E+00	3.50E+00	4.83E+05	1.42E+05	4.62E+01	8.09E+03	0.00E+00	8.14E+03	1.36E+01	2.38E+03	0.00E+00	2.39E+03
Chromium	6.63E+01	5.84E+01	0.00E+00	0.00E+00	7.50E-03	4.97E-01	4.38E-01	2.22E-02	8.33E-03	0.00E+00	3.05E-02	1.96E-02	7.34E-03	0.00E+00	2.69E-02
Cobalt	5.66E+01	2.40E+01	0.00E+00	0.00E+00	2.00E-02	1.13E+00	4.81E-01	1.90E-02	1.90E-02	0.00E+00	3.79E-02	8.05E-03	8.05E-03	0.00E+00	1.61E-02
Copper	6.11E+01	4.65E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	9.87E+00	8.86E+00	2.05E-02	1.65E-01	0.00E+00	1.86E-01	1.56E-02	1.48E-01	0.00E+00	1.64E-01
Iron	4.94E+04	3.29E+04	0.00E+00	0.00E+00	4.00E-03	1.98E+02	1.32E+02	1.65E+01	3.31E+00	0.00E+00	1.99E+01	1.10E+01	2.21E+00	0.00E+00	1.32E+01
Magnesium	3.85E+03	2.41E+03	0.00E+00	0.00E+00	1.00E+00	3.85E+03	2.41E+03	1.29E+00	6.45E+01	0.00E+00	6.58E+01	8.08E-01	4.04E+01	0.00E+00	4.12E+01
Manganese	2.05E+03	7.41E+02	0.00E+00	0.00E+00	2.50E-01	5.13E+02	1.85E+02	6.87E-01	8.58E+00	0.00E+00	9.27E+00	2.48E-01	3.10E+00	0.00E+00	3.35E+00
Mercury	1.50E-01	8.88E-02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.32E-01	9.89E-02	5.03E-05	2.20E-03	0.00E+00	2.25E-03	2.97E-05	1.66E-03	0.00E+00	1.69E-03
Potassium	9.64E+02	8.13E+02	0.00E+00	0.00E+00	1.00E+00	9.64E+02	8.13E+02	3.23E-01	1.61E+01	0.00E+00	1.65E+01	2.72E-01	1.36E+01	0.00E+00	1.39E+01
Selenium	2.50E+00	1.07E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	1.40E+00	5.48E-01	8.38E-04	2.34E-02	0.00E+00	2.42E-02	3.59E-04	9.19E-03	0.00E+00	9.55E-03
Sodium	2.17E+02	1.64E+02	0.00E+00	0.00E+00	7.50E-02	1.63E+01	1.23E+01	7.27E-02	2.73E-01	0.00E+00	3.45E-01	5.50E-02	2.06E-01	0.00E+00	2.61E-01
Vanadium	1.39E+02	9.60E+01	0.00E+00	0.00E+00	5.50E-03	7.65E-01	5.28E-01	4.66E-02	1.28E-02	0.00E+00	5.94E-02	3.22E-02	8.84E-03	0.00E+00	4.10E-02
Zinc	9.06E+01	6.82E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.89E+01	5.03E+01	3.04E-02	9.87E-01	0.00E+00	1.02E+00	2.28E-02	8.43E-01	0.00E+00	8.66E-01
VOCs															
2-Butanone	1.51E-02	9.58E-02	0.00E+00	0.00E+00	2.74E+01	4.14E-01	2.62E+00	5.06E-06	6.93E-03	0.00E+00	6.93E-03	3.21E-05	4.40E-02	0.00E+00	4.40E-02
Acetone	1.84E-01	1.63E-01	0.00E+00	0.00E+00	5.33E+01	9.81E+00	8.67E+00	6.16E-05	1.64E-01	0.00E+00	1.64E-01	5.45E-05	1.45E-01	0.00E+00	1.45E-01
Carbon disulfide	3.00E-03	2.20E-02	0.00E+00	0.00E+00	2.93E+00	8.79E-03	6.44E-02	1.01E-06	1.47E-04	0.00E+00	1.48E-04	7.36E-06	1.08E-03	0.00E+00	1.09E-03

Table A-44
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 8 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	3.18E+04	2.59E+04	0.00E+00	0.00E+00	1.18E-01	3.75E+03	3.06E+03	0.00E+00	3.13E+02	0.00E+00	3.13E+02	0.00E+00	2.55E+02	0.00E+00	2.55E+02
Arsenic	3.37E+01	1.96E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	2.89E+00	1.97E+00	0.00E+00	2.41E-01	0.00E+00	2.41E-01	0.00E+00	1.64E-01	0.00E+00	1.64E-01
Calcium	1.38E+05	4.06E+04	0.00E+00	0.00E+00	1.00E+00	1.38E+05	4.06E+04	0.00E+00	1.15E+04	0.00E+00	1.15E+04	0.00E+00	3.38E+03	0.00E+00	3.38E+03
Chromium	6.63E+01	5.84E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.02E+00	9.10E+00	0.00E+00	7.52E-01	0.00E+00	7.52E-01	0.00E+00	7.58E-01	0.00E+00	7.58E-01
Cobalt	5.66E+01	2.40E+01	0.00E+00	0.00E+00	2.91E-01	1.65E+01	6.99E+00	0.00E+00	1.37E+00	0.00E+00	1.37E+00	0.00E+00	5.83E-01	0.00E+00	5.83E-01
Copper	6.11E+01	4.65E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.58E+01	1.47E+01	0.00E+00	1.32E+00	0.00E+00	1.32E+00	0.00E+00	1.23E+00	0.00E+00	1.23E+00
Iron	4.94E+04	3.29E+04	0.00E+00	0.00E+00	7.80E-02	3.85E+03	2.57E+03	0.00E+00	3.21E+02	0.00E+00	3.21E+02	0.00E+00	2.14E+02	0.00E+00	2.14E+02
Magnesium	3.85E+03	2.41E+03	0.00E+00	0.00E+00	5.30E-01	2.04E+03	1.28E+03	0.00E+00	1.70E+02	0.00E+00	1.70E+02	0.00E+00	1.07E+02	0.00E+00	1.07E+02
Manganese	2.05E+03	7.41E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	8.08E+01	4.04E+01	0.00E+00	6.73E+00	0.00E+00	6.73E+00	0.00E+00	3.36E+00	0.00E+00	3.36E+00
Mercury	1.50E-01	8.88E-02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.03E-01	3.79E-01	0.00E+00	3.36E-02	0.00E+00	3.36E-02	0.00E+00	3.16E-02	0.00E+00	3.16E-02
Potassium	9.64E+02	8.13E+02	0.00E+00	0.00E+00	1.00E+00	9.64E+02	8.13E+02	0.00E+00	8.03E+01	0.00E+00	8.03E+01	0.00E+00	6.78E+01	0.00E+00	6.78E+01
Selenium	2.50E+00	1.07E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	1.82E+00	9.77E-01	0.00E+00	1.51E-01	0.00E+00	1.51E-01	0.00E+00	8.14E-02	0.00E+00	8.14E-02
Sodium	2.17E+02	1.64E+02	0.00E+00	0.00E+00	1.00E+00	2.17E+02	1.64E+02	0.00E+00	1.81E+01	0.00E+00	1.81E+01	0.00E+00	1.37E+01	0.00E+00	1.37E+01
Vanadium	1.39E+02	9.60E+01	0.00E+00	0.00E+00	8.80E-01	1.22E+02	8.45E+01	0.00E+00	1.02E+01	0.00E+00	1.02E+01	0.00E+00	7.04E+00	0.00E+00	7.04E+00
Zinc	9.06E+01	6.82E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.75E+02	3.42E+02	0.00E+00	3.13E+01	0.00E+00	3.13E+01	0.00E+00	2.85E+01	0.00E+00	2.85E+01
VOCs															
2-Butanone	1.51E-02	9.58E-02	0.00E+00	0.00E+00	1.00E+00	1.51E-02	9.58E-02	0.00E+00	1.26E-03	0.00E+00	1.26E-03	0.00E+00	7.98E-03	0.00E+00	7.98E-03
Acetone	1.84E-01	1.63E-01	0.00E+00	0.00E+00	1.00E+00	1.84E-01	1.63E-01	0.00E+00	1.53E-02	0.00E+00	1.53E-02	0.00E+00	1.36E-02	0.00E+00	1.36E-02
Carbon disulfide	3.00E-03	2.20E-02	0.00E+00	0.00E+00	1.00E+00	3.00E-03	2.20E-02	0.00E+00	2.50E-04	0.00E+00	2.50E-04	0.00E+00	1.83E-03	0.00E+00	1.83E-03

Table A-45
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 8 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	3.18E+04	2.59E+04	0.00E+00	0.00E+00	1.18E-01	3.75E+03	3.06E+03	1.94E+02	4.96E+02	0.00E+00	6.90E+02	1.58E+02	4.05E+02	0.00E+00	5.62E+02
Arsenic	3.37E+01	1.96E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	2.89E+00	1.97E+00	2.05E-01	3.83E-01	0.00E+00	5.88E-01	1.19E-01	2.61E-01	0.00E+00	3.80E-01
Calcium	1.38E+05	4.06E+04	0.00E+00	0.00E+00	1.00E+00	1.38E+05	4.06E+04	8.40E+02	1.83E+04	0.00E+00	1.91E+04	2.47E+02	5.37E+03	0.00E+00	5.61E+03
Chromium	6.63E+01	5.84E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.02E+00	9.10E+00	4.03E-01	1.19E+00	0.00E+00	1.60E+00	3.56E-01	1.20E+00	0.00E+00	1.56E+00
Cobalt	5.66E+01	2.40E+01	0.00E+00	0.00E+00	2.91E-01	1.65E+01	6.99E+00	3.44E-01	2.18E+00	0.00E+00	2.52E+00	1.46E-01	9.25E-01	0.00E+00	1.07E+00
Copper	6.11E+01	4.65E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.58E+01	1.47E+01	3.72E-01	2.09E+00	0.00E+00	2.46E+00	2.83E-01	1.95E+00	0.00E+00	2.23E+00
Iron	4.94E+04	3.29E+04	0.00E+00	0.00E+00	7.80E-02	3.85E+03	2.57E+03	3.01E+02	5.10E+02	0.00E+00	8.10E+02	2.00E+02	3.40E+02	0.00E+00	5.40E+02
Magnesium	3.85E+03	2.41E+03	0.00E+00	0.00E+00	5.30E-01	2.04E+03	1.28E+03	2.34E+01	2.70E+02	0.00E+00	2.93E+02	1.47E+01	1.69E+02	0.00E+00	1.84E+02
Manganese	2.05E+03	7.41E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	8.08E+01	4.04E+01	1.25E+01	1.07E+01	0.00E+00	2.32E+01	4.51E+00	5.34E+00	0.00E+00	9.85E+00
Mercury	1.50E-01	8.88E-02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.03E-01	3.79E-01	9.13E-04	5.34E-02	0.00E+00	5.43E-02	5.40E-04	5.02E-02	0.00E+00	5.07E-02
Potassium	9.64E+02	8.13E+02	0.00E+00	0.00E+00	1.00E+00	9.64E+02	8.13E+02	5.87E+00	1.28E+02	0.00E+00	1.33E+02	4.95E+00	1.08E+02	0.00E+00	1.13E+02
Selenium	2.50E+00	1.07E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	1.82E+00	9.77E-01	1.52E-02	2.40E-01	0.00E+00	2.55E-01	6.53E-03	1.29E-01	0.00E+00	1.36E-01
Sodium	2.17E+02	1.64E+02	0.00E+00	0.00E+00	1.00E+00	2.17E+02	1.64E+02	1.32E+00	2.87E+01	0.00E+00	3.00E+01	1.00E+00	2.17E+01	0.00E+00	2.27E+01
Vanadium	1.39E+02	9.60E+01	0.00E+00	0.00E+00	8.80E-01	1.22E+02	8.45E+01	8.46E-01	1.62E+01	0.00E+00	1.70E+01	5.84E-01	1.12E+01	0.00E+00	1.18E+01
Zinc	9.06E+01	6.82E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.75E+02	3.42E+02	5.51E-01	4.96E+01	0.00E+00	5.02E+01	4.15E-01	4.52E+01	0.00E+00	4.56E+01
VOCs															
2-Butanone	1.51E-02	9.58E-02	0.00E+00	0.00E+00	1.00E+00	1.51E-02	9.58E-02	9.19E-05	2.00E-03	0.00E+00	2.09E-03	5.83E-04	1.27E-02	0.00E+00	1.33E-02
Acetone	1.84E-01	1.63E-01	0.00E+00	0.00E+00	1.00E+00	1.84E-01	1.63E-01	1.12E-03	2.43E-02	0.00E+00	2.55E-02	9.90E-04	2.15E-02	0.00E+00	2.25E-02
Carbon disulfide	3.00E-03	2.20E-02	0.00E+00	0.00E+00	1.00E+00	3.00E-03	2.20E-02	1.83E-05	3.97E-04	0.00E+00	4.15E-04	1.34E-04	2.91E-03	0.00E+00	3.04E-03

Table A-46
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 8 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	3.18E+04	2.59E+04	0.00E+00	0.00E+00	9.22E+01	7.52E+01	7.32E-02	2.33E+03	1.90E+03	0.00E+00	6.40E+01	0.00E+00	6.40E+01	0.00E+00	5.22E+01	0.00E+00	5.22E+01
Arsenic	3.37E+01	1.96E+01	0.00E+00	0.00E+00	2.01E-01	1.36E-01	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	1.40E-01	8.97E-02	0.00E+00	3.85E-03	0.00E+00	3.85E-03	0.00E+00	2.47E-03	0.00E+00	2.47E-03
Calcium	1.38E+05	4.06E+04	0.00E+00	0.00E+00	5.87E+04	1.72E+04	1.48E-04	2.04E+01	6.00E+00	0.00E+00	5.62E-01	0.00E+00	5.62E-01	0.00E+00	1.65E-01	0.00E+00	1.65E-01
Chromium	6.63E+01	5.84E+01	0.00E+00	0.00E+00	2.20E-01	1.94E-01	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	5.04E+00	4.60E+00	0.00E+00	1.39E-01	0.00E+00	1.39E-01	0.00E+00	1.26E-01	0.00E+00	1.26E-01
Cobalt	5.66E+01	2.40E+01	0.00E+00	0.00E+00	2.73E-01	1.16E-01	1.00E-01	5.66E+00	2.40E+00	0.00E+00	1.56E-01	0.00E+00	1.56E-01	0.00E+00	6.61E-02	0.00E+00	6.61E-02
Copper	6.11E+01	4.65E+01	0.00E+00	0.00E+00	1.34E+00	1.18E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.40E+01	1.34E+01	0.00E+00	3.84E-01	0.00E+00	3.84E-01	0.00E+00	3.69E-01	0.00E+00	3.69E-01
Iron	4.94E+04	3.29E+04	0.00E+00	0.00E+00	1.43E+02	9.55E+01	4.24E-03	2.09E+02	1.40E+02	0.00E+00	5.76E+00	0.00E+00	5.76E+00	0.00E+00	3.84E+00	0.00E+00	3.84E+00
Magnesium	3.85E+03	2.41E+03	0.00E+00	0.00E+00	4.74E+02	2.97E+02	1.06E-03	4.08E+00	2.56E+00	0.00E+00	1.12E-01	0.00E+00	1.12E-01	0.00E+00	7.03E-02	0.00E+00	7.03E-02
Manganese	2.05E+03	7.41E+02	0.00E+00	0.00E+00	6.69E+01	2.42E+01	5.87E-02	1.20E+02	4.35E+01	0.00E+00	3.31E+00	0.00E+00	3.31E+00	0.00E+00	1.20E+00	0.00E+00	1.20E+00
Mercury	1.50E-01	8.88E-02	0.00E+00	0.00E+00	1.63E-02	1.22E-02	1.92E-01	2.88E-02	1.70E-02	0.00E+00	7.92E-04	0.00E+00	7.92E-04	0.00E+00	4.69E-04	0.00E+00	4.69E-04
Potassium	9.64E+02	8.13E+02	0.00E+00	0.00E+00	1.19E+02	1.00E+02	4.24E-03	4.09E+00	3.45E+00	0.00E+00	1.12E-01	0.00E+00	1.12E-01	0.00E+00	9.48E-02	0.00E+00	9.48E-02
Selenium	2.50E+00	1.07E+00	0.00E+00	0.00E+00	1.75E-01	6.88E-02	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	9.32E-01	6.77E-01	0.00E+00	2.56E-02	0.00E+00	2.56E-02	0.00E+00	1.86E-02	0.00E+00	1.86E-02
Sodium	2.17E+02	1.64E+02	0.00E+00	0.00E+00	2.49E+00	1.88E+00	1.17E-02	2.54E+00	1.92E+00	0.00E+00	6.98E-02	0.00E+00	6.98E-02	0.00E+00	5.28E-02	0.00E+00	5.28E-02
Vanadium	1.39E+02	9.60E+01	0.00E+00	0.00E+00	4.28E-01	2.96E-01	1.79E-01	2.49E+01	1.72E+01	0.00E+00	6.84E-01	0.00E+00	6.84E-01	0.00E+00	4.72E-01	0.00E+00	4.72E-01
Zinc	9.06E+01	6.82E+01	0.00E+00	0.00E+00	7.34E+00	6.24E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.22E+02	1.19E+02	0.00E+00	3.35E+00	0.00E+00	3.35E+00	0.00E+00	3.28E+00	0.00E+00	3.28E+00
VOCs																	
2-Butanone	1.51E-02	9.58E-02	0.00E+00	0.00E+00	5.00E-02	3.17E-01	7.78E-09	1.17E-10	7.45E-10	0.00E+00	3.23E-12	0.00E+00	3.23E-12	0.00E+00	2.05E-11	0.00E+00	2.05E-11
Acetone	1.84E-01	1.63E-01	0.00E+00	0.00E+00	1.19E+00	1.05E+00	2.21E-09	4.07E-10	3.60E-10	0.00E+00	1.12E-11	0.00E+00	1.12E-11	0.00E+00	9.89E-12	0.00E+00	9.89E-12
Carbon disulfide	3.00E-03	2.20E-02	0.00E+00	0.00E+00	1.07E-03	7.83E-03	8.04E-07	2.41E-09	1.77E-08	0.00E+00	6.63E-11	0.00E+00	6.63E-11	0.00E+00	4.86E-10	0.00E+00	4.86E-10

Table A-47
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 9 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.28E+04	2.01E+04	0.00E+00	0.00E+00	4.00E-03	9.10E+01	8.03E+01	5.50E+01	1.10E+01	0.00E+00	6.60E+01	4.85E+01	9.70E+00	0.00E+00	5.82E+01
Arsenic	1.89E+02	1.01E+02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	2.62E+00	1.84E+00	4.55E-01	3.16E-01	0.00E+00	7.72E-01	2.43E-01	2.22E-01	0.00E+00	4.65E-01
Barium	1.84E+02	4.75E+01	0.00E+00	0.00E+00	1.50E-01	2.76E+01	7.12E+00	4.45E-01	3.33E+00	0.00E+00	3.78E+00	1.15E-01	8.61E-01	0.00E+00	9.75E-01
Calcium	1.53E+04	3.71E+03	0.00E+00	0.00E+00	3.50E+00	5.36E+04	1.30E+04	3.70E+01	6.47E+03	0.00E+00	6.51E+03	8.97E+00	1.57E+03	0.00E+00	1.58E+03
Chromium	1.63E+02	9.42E+01	0.00E+00	0.00E+00	7.50E-03	1.22E+00	7.07E-01	3.94E-01	1.48E-01	0.00E+00	5.41E-01	2.28E-01	8.54E-02	0.00E+00	3.13E-01
Cobalt	1.04E+02	2.78E+01	0.00E+00	0.00E+00	2.00E-02	2.08E+00	5.56E-01	2.51E-01	2.51E-01	0.00E+00	5.03E-01	6.72E-02	6.72E-02	0.00E+00	1.34E-01
Copper	8.78E+01	5.39E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.14E+01	9.39E+00	2.12E-01	1.38E+00	0.00E+00	1.59E+00	1.30E-01	1.13E+00	0.00E+00	1.27E+00
Iron	1.23E+05	7.48E+04	0.00E+00	0.00E+00	4.00E-03	4.92E+02	2.99E+02	2.97E+02	5.94E+01	0.00E+00	3.57E+02	1.81E+02	3.62E+01	0.00E+00	2.17E+02
Magnesium	4.23E+02	3.24E+02	0.00E+00	0.00E+00	1.00E+00	4.23E+02	3.24E+02	1.02E+00	5.11E+01	0.00E+00	5.21E+01	7.82E-01	3.91E+01	0.00E+00	3.99E+01
Manganese	7.15E+03	1.73E+03	0.00E+00	0.00E+00	2.50E-01	1.79E+03	4.32E+02	1.73E+01	2.16E+02	0.00E+00	2.33E+02	4.18E+00	5.22E+01	0.00E+00	5.64E+01
Mercury	4.40E-01	1.06E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	2.36E-01	1.09E-01	1.06E-03	2.85E-02	0.00E+00	2.96E-02	2.56E-04	1.32E-02	0.00E+00	1.34E-02
Potassium	6.19E+02	4.62E+02	0.00E+00	0.00E+00	1.00E+00	6.19E+02	4.62E+02	1.50E+00	7.48E+01	0.00E+00	7.63E+01	1.12E+00	5.58E+01	0.00E+00	5.69E+01
Selenium	1.07E+01	4.37E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	6.95E+00	2.58E+00	2.59E-02	8.40E-01	0.00E+00	8.65E-01	1.06E-02	3.12E-01	0.00E+00	3.23E-01
Sodium	4.35E+01	3.61E+01	0.00E+00	0.00E+00	7.50E-02	3.26E+00	2.71E+00	1.05E-01	3.94E-01	0.00E+00	4.99E-01	8.73E-02	3.27E-01	0.00E+00	4.15E-01
Vanadium	2.22E+02	1.81E+02	0.00E+00	0.00E+00	5.50E-03	1.22E+00	9.97E-01	5.36E-01	1.47E-01	0.00E+00	6.84E-01	4.38E-01	1.20E-01	0.00E+00	5.58E-01
Zinc	6.77E+01	3.96E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.01E+01	3.72E+01	1.64E-01	6.05E+00	0.00E+00	6.22E+00	9.56E-02	4.50E+00	0.00E+00	4.59E+00
VOCs															
Acetone	1.06E-02	1.06E-02	0.00E+00	0.00E+00	5.33E+01	5.65E-01	5.65E-01	2.56E-05	6.82E-02	0.00E+00	6.83E-02	2.56E-05	6.82E-02	0.00E+00	6.83E-02

Table A-48
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 9 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.28E+04	2.01E+04	0.00E+00	0.00E+00	4.00E-03	9.10E+01	8.03E+01	7.62E+00	1.52E+00	0.00E+00	9.15E+00	6.73E+00	1.35E+00	0.00E+00	8.07E+00
Arsenic	1.89E+02	1.01E+02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	2.62E+00	1.84E+00	6.31E-02	4.39E-02	0.00E+00	1.07E-01	3.37E-02	3.08E-02	0.00E+00	6.45E-02
Barium	1.84E+02	4.75E+01	0.00E+00	0.00E+00	1.50E-01	2.76E+01	7.12E+00	6.16E-02	4.62E-01	0.00E+00	5.24E-01	1.59E-02	1.19E-01	0.00E+00	1.35E-01
Calcium	1.53E+04	3.71E+03	0.00E+00	0.00E+00	3.50E+00	5.36E+04	1.30E+04	5.13E+00	8.97E+02	0.00E+00	9.02E+02	1.24E+00	2.18E+02	0.00E+00	2.19E+02
Chromium	1.63E+02	9.42E+01	0.00E+00	0.00E+00	7.50E-03	1.22E+00	7.07E-01	5.46E-02	2.05E-02	0.00E+00	7.51E-02	3.16E-02	1.18E-02	0.00E+00	4.34E-02
Cobalt	1.04E+02	2.78E+01	0.00E+00	0.00E+00	2.00E-02	2.08E+00	5.56E-01	3.48E-02	3.48E-02	0.00E+00	6.97E-02	9.31E-03	9.31E-03	0.00E+00	1.86E-02
Copper	8.78E+01	5.39E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.14E+01	9.39E+00	2.94E-02	1.91E-01	0.00E+00	2.20E-01	1.81E-02	1.57E-01	0.00E+00	1.75E-01
Iron	1.23E+05	7.48E+04	0.00E+00	0.00E+00	4.00E-03	4.92E+02	2.99E+02	4.12E+01	8.24E+00	0.00E+00	4.94E+01	2.51E+01	5.01E+00	0.00E+00	3.01E+01
Magnesium	4.23E+02	3.24E+02	0.00E+00	0.00E+00	1.00E+00	4.23E+02	3.24E+02	1.42E-01	7.09E+00	0.00E+00	7.23E+00	1.08E-01	5.42E+00	0.00E+00	5.53E+00
Manganese	7.15E+03	1.73E+03	0.00E+00	0.00E+00	2.50E-01	1.79E+03	4.32E+02	2.40E+00	2.99E+01	0.00E+00	3.23E+01	5.79E-01	7.24E+00	0.00E+00	7.82E+00
Mercury	4.40E-01	1.06E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	2.36E-01	1.09E-01	1.47E-04	3.96E-03	0.00E+00	4.11E-03	3.55E-05	1.82E-03	0.00E+00	1.86E-03
Potassium	6.19E+02	4.62E+02	0.00E+00	0.00E+00	1.00E+00	6.19E+02	4.62E+02	2.07E-01	1.04E+01	0.00E+00	1.06E+01	1.55E-01	7.73E+00	0.00E+00	7.89E+00
Selenium	1.07E+01	4.37E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	6.95E+00	2.58E+00	3.58E-03	1.16E-01	0.00E+00	1.20E-01	1.46E-03	4.33E-02	0.00E+00	4.47E-02
Sodium	4.35E+01	3.61E+01	0.00E+00	0.00E+00	7.50E-02	3.26E+00	2.71E+00	1.46E-02	5.46E-02	0.00E+00	6.92E-02	1.21E-02	4.54E-02	0.00E+00	5.75E-02
Vanadium	2.22E+02	1.81E+02	0.00E+00	0.00E+00	5.50E-03	1.22E+00	9.97E-01	7.44E-02	2.05E-02	0.00E+00	9.48E-02	6.07E-02	1.67E-02	0.00E+00	7.74E-02
Zinc	6.77E+01	3.96E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.01E+01	3.72E+01	2.27E-02	8.39E-01	0.00E+00	8.62E-01	1.33E-02	6.23E-01	0.00E+00	6.37E-01
VOCs															
Acetone	1.06E-02	1.06E-02	0.00E+00	0.00E+00	5.33E+01	5.65E-01	5.65E-01	3.55E-06	9.46E-03	0.00E+00	9.47E-03	3.55E-06	9.46E-03	0.00E+00	9.47E-03

Table A-49
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 9 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.28E+04	2.01E+04	0.00E+00	0.00E+00	1.18E-01	2.68E+03	2.37E+03	0.00E+00	2.24E+02	0.00E+00	2.24E+02	0.00E+00	1.97E+02	0.00E+00	1.97E+02
Arsenic	1.89E+02	1.01E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	9.76E+00	6.26E+00	0.00E+00	8.13E-01	0.00E+00	8.13E-01	0.00E+00	5.22E-01	0.00E+00	5.22E-01
Barium	1.84E+02	4.75E+01	0.00E+00	0.00E+00	1.60E-01	2.94E+01	7.60E+00	0.00E+00	2.45E+00	0.00E+00	2.45E+00	0.00E+00	6.33E-01	0.00E+00	6.33E-01
Calcium	1.53E+04	3.71E+03	0.00E+00	0.00E+00	1.00E+00	1.53E+04	3.71E+03	0.00E+00	1.27E+03	0.00E+00	1.27E+03	0.00E+00	3.09E+02	0.00E+00	3.09E+02
Chromium	1.63E+02	9.42E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.50E+00	8.81E+00	0.00E+00	7.08E-01	0.00E+00	7.08E-01	0.00E+00	7.35E-01	0.00E+00	7.35E-01
Cobalt	1.04E+02	2.78E+01	0.00E+00	0.00E+00	2.91E-01	3.03E+01	8.09E+00	0.00E+00	2.52E+00	0.00E+00	2.52E+00	0.00E+00	6.74E-01	0.00E+00	6.74E-01
Copper	8.78E+01	5.39E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.74E+01	1.53E+01	0.00E+00	1.45E+00	0.00E+00	1.45E+00	0.00E+00	1.27E+00	0.00E+00	1.27E+00
Iron	1.23E+05	7.48E+04	0.00E+00	0.00E+00	7.80E-02	9.59E+03	5.84E+03	0.00E+00	7.99E+02	0.00E+00	7.99E+02	0.00E+00	4.86E+02	0.00E+00	4.86E+02
Magnesium	4.23E+02	3.24E+02	0.00E+00	0.00E+00	5.30E-01	2.24E+02	1.72E+02	0.00E+00	1.87E+01	0.00E+00	1.87E+01	0.00E+00	1.43E+01	0.00E+00	1.43E+01
Manganese	7.15E+03	1.73E+03	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	1.89E+02	7.19E+01	0.00E+00	1.58E+01	0.00E+00	1.58E+01	0.00E+00	5.99E+00	0.00E+00	5.99E+00
Mercury	4.40E-01	1.06E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.58E-01	3.87E-01	0.00E+00	3.82E-02	0.00E+00	3.82E-02	0.00E+00	3.23E-02	0.00E+00	3.23E-02
Potassium	6.19E+02	4.62E+02	0.00E+00	0.00E+00	1.00E+00	6.19E+02	4.62E+02	0.00E+00	5.16E+01	0.00E+00	5.16E+01	0.00E+00	3.85E+01	0.00E+00	3.85E+01
Selenium	1.07E+01	4.37E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	5.27E+00	2.73E+00	0.00E+00	4.39E-01	0.00E+00	4.39E-01	0.00E+00	2.28E-01	0.00E+00	2.28E-01
Sodium	4.35E+01	3.61E+01	0.00E+00	0.00E+00	1.00E+00	4.35E+01	3.61E+01	0.00E+00	3.62E+00	0.00E+00	3.62E+00	0.00E+00	3.01E+00	0.00E+00	3.01E+00
Vanadium	2.22E+02	1.81E+02	0.00E+00	0.00E+00	8.80E-01	1.95E+02	1.60E+02	0.00E+00	1.63E+01	0.00E+00	1.63E+01	0.00E+00	1.33E+01	0.00E+00	1.33E+01
Zinc	6.77E+01	3.96E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.41E+02	2.86E+02	0.00E+00	2.84E+01	0.00E+00	2.84E+01	0.00E+00	2.38E+01	0.00E+00	2.38E+01
VOCs															
Acetone	1.06E-02	1.06E-02	0.00E+00	0.00E+00	1.00E+00	1.06E-02	1.06E-02	0.00E+00	8.83E-04	0.00E+00	8.83E-04	0.00E+00	8.83E-04	0.00E+00	8.83E-04

Table A-50
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 9 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.28E+04	2.01E+04	0.00E+00	0.00E+00	1.18E-01	2.68E+03	2.37E+03	1.38E+02	3.55E+02	0.00E+00	4.94E+02	1.22E+02	3.13E+02	0.00E+00	4.36E+02
Arsenic	1.89E+02	1.01E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	9.76E+00	6.26E+00	1.15E+00	1.29E+00	0.00E+00	2.44E+00	6.12E-01	8.28E-01	0.00E+00	1.44E+00
Barium	1.84E+02	4.75E+01	0.00E+00	0.00E+00	1.60E-01	2.94E+01	7.60E+00	1.12E+00	3.89E+00	0.00E+00	5.01E+00	2.89E-01	1.01E+00	0.00E+00	1.29E+00
Calcium	1.53E+04	3.71E+03	0.00E+00	0.00E+00	1.00E+00	1.53E+04	3.71E+03	9.31E+01	2.02E+03	0.00E+00	2.12E+03	2.26E+01	4.91E+02	0.00E+00	5.14E+02
Chromium	1.63E+02	9.42E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.50E+00	8.81E+00	9.92E-01	1.12E+00	0.00E+00	2.12E+00	5.73E-01	1.17E+00	0.00E+00	1.74E+00
Cobalt	1.04E+02	2.78E+01	0.00E+00	0.00E+00	2.91E-01	3.03E+01	8.09E+00	6.33E-01	4.00E+00	0.00E+00	4.64E+00	1.69E-01	1.07E+00	0.00E+00	1.24E+00
Copper	8.78E+01	5.39E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.74E+01	1.53E+01	5.34E-01	2.30E+00	0.00E+00	2.84E+00	3.28E-01	2.02E+00	0.00E+00	2.35E+00
Iron	1.23E+05	7.48E+04	0.00E+00	0.00E+00	7.80E-02	9.59E+03	5.84E+03	7.49E+02	1.27E+03	0.00E+00	2.02E+03	4.55E+02	7.72E+02	0.00E+00	1.23E+03
Magnesium	4.23E+02	3.24E+02	0.00E+00	0.00E+00	5.30E-01	2.24E+02	1.72E+02	2.57E+00	2.97E+01	0.00E+00	3.22E+01	1.97E+00	2.27E+01	0.00E+00	2.47E+01
Manganese	7.15E+03	1.73E+03	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	1.89E+02	7.19E+01	4.35E+01	2.51E+01	0.00E+00	6.86E+01	1.05E+01	9.51E+00	0.00E+00	2.00E+01
Mercury	4.40E-01	1.06E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.58E-01	3.87E-01	2.68E-03	6.06E-02	0.00E+00	6.33E-02	6.45E-04	5.12E-02	0.00E+00	5.19E-02
Potassium	6.19E+02	4.62E+02	0.00E+00	0.00E+00	1.00E+00	6.19E+02	4.62E+02	3.77E+00	8.19E+01	0.00E+00	8.57E+01	2.81E+00	6.11E+01	0.00E+00	6.39E+01
Selenium	1.07E+01	4.37E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	5.27E+00	2.73E+00	6.51E-02	6.97E-01	0.00E+00	7.63E-01	2.66E-02	3.62E-01	0.00E+00	3.88E-01
Sodium	4.35E+01	3.61E+01	0.00E+00	0.00E+00	1.00E+00	4.35E+01	3.61E+01	2.65E-01	5.75E+00	0.00E+00	6.02E+00	2.20E-01	4.78E+00	0.00E+00	5.00E+00
Vanadium	2.22E+02	1.81E+02	0.00E+00	0.00E+00	8.80E-01	1.95E+02	1.60E+02	1.35E+00	2.58E+01	0.00E+00	2.72E+01	1.10E+00	2.11E+01	0.00E+00	2.22E+01
Zinc	6.77E+01	3.96E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.41E+02	2.86E+02	4.12E-01	4.51E+01	0.00E+00	4.55E+01	2.41E-01	3.78E+01	0.00E+00	3.81E+01
VOCs															
Acetone	1.06E-02	1.06E-02	0.00E+00	0.00E+00	1.00E+00	1.06E-02	1.06E-02	6.45E-05	1.40E-03	0.00E+00	1.47E-03	6.45E-05	1.40E-03	0.00E+00	1.47E-03

Table A-51
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 9 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	2.28E+04	2.01E+04	0.00E+00	0.00E+00	6.60E+01	5.82E+01	7.32E-02	1.67E+03	1.47E+03	0.00E+00	4.58E+01	0.00E+00	4.58E+01	0.00E+00	4.04E+01	0.00E+00	4.04E+01
Arsenic	1.89E+02	1.01E+02	0.00E+00	0.00E+00	7.72E-01	4.65E-01	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	5.73E-01	3.42E-01	0.00E+00	1.58E-02	0.00E+00	1.58E-02	0.00E+00	9.42E-03	0.00E+00	9.42E-03
Barium	1.84E+02	4.75E+01	0.00E+00	0.00E+00	3.78E+00	9.75E-01	ln(dry mammal conc, mg/kg) = (-1.412+0.7*ln(soil conc))	9.38E+00	3.63E+00	0.00E+00	2.58E-01	0.00E+00	2.58E-01	0.00E+00	9.99E-02	0.00E+00	9.99E-02
Calcium	1.53E+04	3.71E+03	0.00E+00	0.00E+00	6.51E+03	1.58E+03	1.48E-04	2.26E+00	5.49E-01	0.00E+00	6.23E-02	0.00E+00	6.23E-02	0.00E+00	1.51E-02	0.00E+00	1.51E-02
Chromium	1.63E+02	9.42E+01	0.00E+00	0.00E+00	5.41E-01	3.13E-01	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	9.76E+00	6.53E+00	0.00E+00	2.68E-01	0.00E+00	2.68E-01	0.00E+00	1.79E-01	0.00E+00	1.79E-01
Cobalt	1.04E+02	2.78E+01	0.00E+00	0.00E+00	5.03E-01	1.34E-01	1.00E-01	1.04E+01	2.78E+00	0.00E+00	2.86E-01	0.00E+00	2.86E-01	0.00E+00	7.65E-02	0.00E+00	7.65E-02
Copper	8.78E+01	5.39E+01	0.00E+00	0.00E+00	1.59E+00	1.27E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.47E+01	1.37E+01	0.00E+00	4.04E-01	0.00E+00	4.04E-01	0.00E+00	3.77E-01	0.00E+00	3.77E-01
Iron	1.23E+05	7.48E+04	0.00E+00	0.00E+00	3.57E+02	2.17E+02	4.24E-03	5.22E+02	3.17E+02	0.00E+00	1.43E+01	0.00E+00	1.43E+01	0.00E+00	8.72E+00	0.00E+00	8.72E+00
Magnesium	4.23E+02	3.24E+02	0.00E+00	0.00E+00	5.21E+01	3.99E+01	1.06E-03	4.48E-01	3.43E-01	0.00E+00	1.23E-02	0.00E+00	1.23E-02	0.00E+00	9.44E-03	0.00E+00	9.44E-03
Manganese	7.15E+03	1.73E+03	0.00E+00	0.00E+00	2.33E+02	5.64E+01	5.87E-02	4.20E+02	1.01E+02	0.00E+00	1.15E+01	0.00E+00	1.15E+01	0.00E+00	2.79E+00	0.00E+00	2.79E+00
Mercury	4.40E-01	1.06E-01	0.00E+00	0.00E+00	2.96E-02	1.34E-02	1.92E-01	8.45E-02	2.04E-02	0.00E+00	2.32E-03	0.00E+00	2.32E-03	0.00E+00	5.60E-04	0.00E+00	5.60E-04
Potassium	6.19E+02	4.62E+02	0.00E+00	0.00E+00	7.63E+01	5.69E+01	4.24E-03	2.62E+00	1.96E+00	0.00E+00	7.22E-02	0.00E+00	7.22E-02	0.00E+00	5.38E-02	0.00E+00	5.38E-02
Selenium	1.07E+01	4.37E+00	0.00E+00	0.00E+00	8.65E-01	3.23E-01	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	1.61E+00	1.15E+00	0.00E+00	4.43E-02	0.00E+00	4.43E-02	0.00E+00	3.16E-02	0.00E+00	3.16E-02
Sodium	4.35E+01	3.61E+01	0.00E+00	0.00E+00	4.99E-01	4.15E-01	1.17E-02	5.09E-01	4.23E-01	0.00E+00	1.40E-02	0.00E+00	1.40E-02	0.00E+00	1.16E-02	0.00E+00	1.16E-02
Vanadium	2.22E+02	1.81E+02	0.00E+00	0.00E+00	6.84E-01	5.58E-01	1.79E-01	3.97E+01	3.25E+01	0.00E+00	1.09E+00	0.00E+00	1.09E+00	0.00E+00	8.92E-01	0.00E+00	8.92E-01
Zinc	6.77E+01	3.96E+01	0.00E+00	0.00E+00	6.22E+00	4.59E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.19E+02	1.15E+02	0.00E+00	3.28E+00	0.00E+00	3.28E+00	0.00E+00	3.16E+00	0.00E+00	3.16E+00
VOCs																	
Acetone	1.06E-02	1.06E-02	0.00E+00	0.00E+00	6.83E-02	6.83E-02	2.21E-09	2.34E-11	2.34E-11	0.00E+00	6.44E-13	0.00E+00	6.44E-13	0.00E+00	6.44E-13	0.00E+00	6.44E-13

Table A-52
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 10 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Acetone	4.11E-02	1.93E-02	0.00E+00	0.00E+00	5.33E+01	2.19E+00	1.03E+00	9.93E-05	2.65E-01	0.00E+00	2.65E-01	4.65E-05	1.24E-01	0.00E+00	1.24E-01

Table A-53
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 10 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
VOCs															
Acetone	6.97E-02	4.36E-02	0.00E+00	0.00E+00	5.33E+01	3.71E+00	2.32E+00	1.68E-04	4.49E-01	0.00E+00	4.49E-01	1.05E-04	2.81E-01	0.00E+00	2.81E-01
Carbon disulfide	1.30E-03	8.93E-04	0.00E+00	0.00E+00	2.93E+00	3.81E-03	2.62E-03	3.14E-06	4.60E-04	0.00E+00	4.63E-04	2.16E-06	3.16E-04	0.00E+00	3.18E-04

Table A-54
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 10 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Acetone	4.11E-02	1.93E-02	0.00E+00	0.00E+00	5.33E+01	2.19E+00	1.03E+00	1.38E-05	3.67E-02	0.00E+00	3.67E-02	6.45E-06	1.72E-02	0.00E+00	1.72E-02

Table A-55
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 10 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
VOCs															
Acetone	6.97E-02	4.36E-02	0.00E+00	0.00E+00	5.33E+01	3.71E+00	2.32E+00	2.33E-05	6.22E-02	0.00E+00	6.22E-02	1.46E-05	3.89E-02	0.00E+00	3.89E-02
Carbon disulfide	1.30E-03	8.93E-04	0.00E+00	0.00E+00	2.93E+00	3.81E-03	2.62E-03	4.36E-07	6.38E-05	0.00E+00	6.42E-05	2.99E-07	4.38E-05	0.00E+00	4.41E-05

Table A-56
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 10 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Acetone	4.11E-02	1.93E-02	0.00E+00	0.00E+00	1.00E+00	4.11E-02	1.93E-02	0.00E+00	3.42E-03	0.00E+00	3.42E-03	0.00E+00	1.61E-03	0.00E+00	1.61E-03

Table A-57
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media for the Site 10 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
VOCs															
Acetone	6.97E-02	4.36E-02	0.00E+00	0.00E+00	1.00E+00	6.97E-02	4.36E-02	0.00E+00	5.81E-03	0.00E+00	5.81E-03	0.00E+00	3.63E-03	0.00E+00	3.63E-03
Carbon disulfide	1.30E-03	8.93E-04	0.00E+00	0.00E+00	1.00E+00	1.30E-03	8.93E-04	0.00E+00	1.08E-04	0.00E+00	1.08E-04	0.00E+00	7.44E-05	0.00E+00	7.44E-05

Table A-58
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 10 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Acetone	4.11E-02	1.93E-02	0.00E+00	0.00E+00	1.00E+00	4.11E-02	1.93E-02	2.50E-04	5.44E-03	0.00E+00	5.69E-03	1.17E-04	2.55E-03	0.00E+00	2.67E-03

Table A-59
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 10 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
VOCs															
Acetone	6.97E-02	4.36E-02	0.00E+00	0.00E+00	1.00E+00	6.97E-02	4.36E-02	4.24E-04	9.22E-03	0.00E+00	9.64E-03	2.65E-04	5.76E-03	0.00E+00	6.03E-03
Carbon disulfide	1.30E-03	8.93E-04	0.00E+00	0.00E+00	1.00E+00	1.30E-03	8.93E-04	7.91E-06	1.72E-04	0.00E+00	1.80E-04	5.44E-06	1.18E-04	0.00E+00	1.24E-04

Table A-60
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 10 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Acetone	4.11E-02	1.93E-02	0.00E+00	0.00E+00	2.65E-01	1.24E-01	2.21E-09	9.08E-11	4.26E-11	0.00E+00	2.50E-12	0.00E+00	2.50E-12	0.00E+00	1.17E-12	0.00E+00	1.17E-12

Table A-61
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 10 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
VOCs																	
Acetone	6.97E-02	4.36E-02	0.00E+00	0.00E+00	4.49E-01	2.81E-01	2.21E-09	1.54E-10	9.63E-11	0.00E+00	4.24E-12	0.00E+00	4.24E-12	0.00E+00	2.65E-12	0.00E+00	2.65E-12
Carbon disulfide	1.30E-03	8.93E-04	0.00E+00	0.00E+00	4.63E-04	3.18E-04	8.04E-07	1.05E-09	7.18E-10	0.00E+00	2.87E-11	0.00E+00	2.87E-11	0.00E+00	1.98E-11	0.00E+00	1.98E-11

Table A-62
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 11 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.39E+04	2.24E+04	0.00E+00	0.00E+00	4.00E-03	9.56E+01	8.97E+01	5.77E+01	1.15E+01	0.00E+00	6.93E+01	5.42E+01	1.08E+01	0.00E+00	6.50E+01
Arsenic	1.19E+02	7.81E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	2.02E+00	1.59E+00	2.88E-01	2.44E-01	0.00E+00	5.32E-01	1.89E-01	1.92E-01	0.00E+00	3.81E-01
Calcium	1.39E+04	6.75E+03	0.00E+00	0.00E+00	3.50E+00	4.87E+04	2.36E+04	3.36E+01	5.88E+03	0.00E+00	5.92E+03	1.63E+01	2.85E+03	0.00E+00	2.87E+03
Chromium	1.40E+02	1.01E+02	0.00E+00	0.00E+00	7.50E-03	1.05E+00	7.54E-01	3.38E-01	1.27E-01	0.00E+00	4.65E-01	2.43E-01	9.11E-02	0.00E+00	3.34E-01
Cobalt	2.37E+01	1.03E+01	0.00E+00	0.00E+00	2.00E-02	4.74E-01	2.06E-01	5.73E-02	5.73E-02	0.00E+00	1.15E-01	2.49E-02	2.49E-02	0.00E+00	4.98E-02
Copper	5.81E+01	5.56E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	9.67E+00	9.51E+00	1.40E-01	1.17E+00	0.00E+00	1.31E+00	1.34E-01	1.15E+00	0.00E+00	1.28E+00
Iron	7.00E+04	5.88E+04	0.00E+00	0.00E+00	4.00E-03	2.80E+02	2.35E+02	1.69E+02	3.38E+01	0.00E+00	2.03E+02	1.42E+02	2.84E+01	0.00E+00	1.70E+02
Magnesium	1.43E+03	6.04E+02	0.00E+00	0.00E+00	1.00E+00	1.43E+03	6.04E+02	3.45E+00	1.73E+02	0.00E+00	1.76E+02	1.46E+00	7.29E+01	0.00E+00	7.44E+01
Manganese	3.04E+03	9.15E+02	0.00E+00	0.00E+00	2.50E-01	7.60E+02	2.29E+02	7.34E+00	9.18E+01	0.00E+00	9.92E+01	2.21E+00	2.76E+01	0.00E+00	2.99E+01
Mercury	2.65E-01	1.34E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.79E-01	1.24E-01	6.40E-04	2.17E-02	0.00E+00	2.23E-02	3.24E-04	1.50E-02	0.00E+00	1.53E-02
Potassium	5.18E+02	4.32E+02	0.00E+00	0.00E+00	1.00E+00	5.18E+02	4.32E+02	1.25E+00	6.25E+01	0.00E+00	6.38E+01	1.04E+00	5.22E+01	0.00E+00	5.32E+01
Selenium	4.30E+00	2.58E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	2.54E+00	1.44E+00	1.04E-02	3.07E-01	0.00E+00	3.17E-01	6.22E-03	1.74E-01	0.00E+00	1.80E-01
Sodium	9.78E+01	6.22E+01	0.00E+00	0.00E+00	7.50E-02	7.33E+00	4.66E+00	2.36E-01	8.86E-01	0.00E+00	1.12E+00	1.50E-01	5.63E-01	0.00E+00	7.14E-01
Vanadium	2.41E+02	1.88E+02	0.00E+00	0.00E+00	5.50E-03	1.33E+00	1.04E+00	5.82E-01	1.60E-01	0.00E+00	7.42E-01	4.55E-01	1.25E-01	0.00E+00	5.80E-01
Zinc	5.78E+01	4.49E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	4.59E+01	3.99E+01	1.40E-01	5.55E+00	0.00E+00	5.69E+00	1.08E-01	4.82E+00	0.00E+00	4.93E+00
VOCs															
Acetone	5.23E-02	3.56E-02	0.00E+00	0.00E+00	5.33E+01	2.79E+00	1.90E+00	1.26E-04	3.37E-01	0.00E+00	3.37E-01	8.59E-05	2.29E-01	0.00E+00	2.29E-01

Table A-63
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 11 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.39E+04	2.24E+04	0.00E+00	0.00E+00	4.00E-03	9.56E+01	8.97E+01	8.01E+00	1.60E+00	0.00E+00	9.61E+00	7.51E+00	1.50E+00	0.00E+00	9.01E+00
Arsenic	1.19E+02	7.81E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	2.02E+00	1.59E+00	3.99E-02	3.38E-02	0.00E+00	7.37E-02	2.62E-02	2.67E-02	0.00E+00	5.28E-02
Calcium	1.39E+04	6.75E+03	0.00E+00	0.00E+00	3.50E+00	4.87E+04	2.36E+04	4.66E+00	8.16E+02	0.00E+00	8.20E+02	2.26E+00	3.96E+02	0.00E+00	3.98E+02
Chromium	1.40E+02	1.01E+02	0.00E+00	0.00E+00	7.50E-03	1.05E+00	7.54E-01	4.69E-02	1.76E-02	0.00E+00	6.45E-02	3.37E-02	1.26E-02	0.00E+00	4.63E-02
Cobalt	2.37E+01	1.03E+01	0.00E+00	0.00E+00	2.00E-02	4.74E-01	2.06E-01	7.94E-03	7.94E-03	0.00E+00	1.59E-02	3.45E-03	3.45E-03	0.00E+00	6.91E-03
Copper	5.81E+01	5.56E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	9.67E+00	9.51E+00	1.95E-02	1.62E-01	0.00E+00	1.82E-01	1.86E-02	1.59E-01	0.00E+00	1.78E-01
Iron	7.00E+04	5.88E+04	0.00E+00	0.00E+00	4.00E-03	2.80E+02	2.35E+02	2.35E+01	4.69E+00	0.00E+00	2.81E+01	1.97E+01	3.94E+00	0.00E+00	2.36E+01
Magnesium	1.43E+03	6.04E+02	0.00E+00	0.00E+00	1.00E+00	1.43E+03	6.04E+02	4.79E-01	2.40E+01	0.00E+00	2.44E+01	2.02E-01	1.01E+01	0.00E+00	1.03E+01
Manganese	3.04E+03	9.15E+02	0.00E+00	0.00E+00	2.50E-01	7.60E+02	2.29E+02	1.02E+00	1.27E+01	0.00E+00	1.37E+01	3.07E-01	3.83E+00	0.00E+00	4.14E+00
Mercury	2.65E-01	1.34E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.79E-01	1.24E-01	8.88E-05	3.00E-03	0.00E+00	3.09E-03	4.50E-05	2.08E-03	0.00E+00	2.12E-03
Potassium	5.18E+02	4.32E+02	0.00E+00	0.00E+00	1.00E+00	5.18E+02	4.32E+02	1.73E-01	8.67E+00	0.00E+00	8.84E+00	1.45E-01	7.24E+00	0.00E+00	7.38E+00
Selenium	4.30E+00	2.58E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	2.54E+00	1.44E+00	1.44E-03	4.26E-02	0.00E+00	4.40E-02	8.63E-04	2.42E-02	0.00E+00	2.50E-02
Sodium	9.78E+01	6.22E+01	0.00E+00	0.00E+00	7.50E-02	7.33E+00	4.66E+00	3.27E-02	1.23E-01	0.00E+00	1.56E-01	2.08E-02	7.81E-02	0.00E+00	9.90E-02
Vanadium	2.41E+02	1.88E+02	0.00E+00	0.00E+00	5.50E-03	1.33E+00	1.04E+00	8.07E-02	2.22E-02	0.00E+00	1.03E-01	6.31E-02	1.73E-02	0.00E+00	8.04E-02
Zinc	5.78E+01	4.49E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	4.59E+01	3.99E+01	1.94E-02	7.69E-01	0.00E+00	7.88E-01	1.50E-02	6.68E-01	0.00E+00	6.83E-01
VOCs															
Acetone	5.23E-02	3.56E-02	0.00E+00	0.00E+00	5.33E+01	2.79E+00	1.90E+00	1.75E-05	4.67E-02	0.00E+00	4.67E-02	1.19E-05	3.17E-02	0.00E+00	3.18E-02

Table A-64
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 11 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.39E+04	2.24E+04	0.00E+00	0.00E+00	1.18E-01	2.82E+03	2.65E+03	0.00E+00	2.35E+02	0.00E+00	2.35E+02	0.00E+00	2.20E+02	0.00E+00	2.20E+02
Arsenic	1.19E+02	7.81E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	7.05E+00	5.24E+00	0.00E+00	5.87E-01	0.00E+00	5.87E-01	0.00E+00	4.36E-01	0.00E+00	4.36E-01
Calcium	1.39E+04	6.75E+03	0.00E+00	0.00E+00	1.00E+00	1.39E+04	6.75E+03	0.00E+00	1.16E+03	0.00E+00	1.16E+03	0.00E+00	5.62E+02	0.00E+00	5.62E+02
Chromium	1.40E+02	1.01E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.58E+00	8.78E+00	0.00E+00	7.15E-01	0.00E+00	7.15E-01	0.00E+00	7.31E-01	0.00E+00	7.31E-01
Cobalt	2.37E+01	1.03E+01	0.00E+00	0.00E+00	2.91E-01	6.90E+00	3.00E+00	0.00E+00	5.75E-01	0.00E+00	5.75E-01	0.00E+00	2.50E-01	0.00E+00	2.50E-01
Copper	5.81E+01	5.56E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.56E+01	1.54E+01	0.00E+00	1.30E+00	0.00E+00	1.30E+00	0.00E+00	1.29E+00	0.00E+00	1.29E+00
Iron	7.00E+04	5.88E+04	0.00E+00	0.00E+00	7.80E-02	5.46E+03	4.59E+03	0.00E+00	4.55E+02	0.00E+00	4.55E+02	0.00E+00	3.82E+02	0.00E+00	3.82E+02
Magnesium	1.43E+03	6.04E+02	0.00E+00	0.00E+00	5.30E-01	7.58E+02	3.20E+02	0.00E+00	6.32E+01	0.00E+00	6.32E+01	0.00E+00	2.67E+01	0.00E+00	2.67E+01
Manganese	3.04E+03	9.15E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	1.06E+02	4.66E+01	0.00E+00	8.81E+00	0.00E+00	8.81E+00	0.00E+00	3.88E+00	0.00E+00	3.88E+00
Mercury	2.65E-01	1.34E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.31E-01	3.98E-01	0.00E+00	3.59E-02	0.00E+00	3.59E-02	0.00E+00	3.32E-02	0.00E+00	3.32E-02
Potassium	5.18E+02	4.32E+02	0.00E+00	0.00E+00	1.00E+00	5.18E+02	4.32E+02	0.00E+00	4.31E+01	0.00E+00	4.31E+01	0.00E+00	3.60E+01	0.00E+00	3.60E+01
Selenium	4.30E+00	2.58E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	2.70E+00	1.86E+00	0.00E+00	2.25E-01	0.00E+00	2.25E-01	0.00E+00	1.55E-01	0.00E+00	1.55E-01
Sodium	9.78E+01	6.22E+01	0.00E+00	0.00E+00	1.00E+00	9.78E+01	6.22E+01	0.00E+00	8.15E+00	0.00E+00	8.15E+00	0.00E+00	5.18E+00	0.00E+00	5.18E+00
Vanadium	2.41E+02	1.88E+02	0.00E+00	0.00E+00	8.80E-01	2.12E+02	1.66E+02	0.00E+00	1.77E+01	0.00E+00	1.77E+01	0.00E+00	1.38E+01	0.00E+00	1.38E+01
Zinc	5.78E+01	4.49E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.24E+02	2.98E+02	0.00E+00	2.70E+01	0.00E+00	2.70E+01	0.00E+00	2.48E+01	0.00E+00	2.48E+01
VOCs															
Acetone	5.23E-02	3.56E-02	0.00E+00	0.00E+00	1.00E+00	5.23E-02	3.56E-02	0.00E+00	4.36E-03	0.00E+00	4.36E-03	0.00E+00	2.96E-03	0.00E+00	2.96E-03

Table A-65
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 11 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.39E+04	2.24E+04	0.00E+00	0.00E+00	1.18E-01	2.82E+03	2.65E+03	1.45E+02	3.73E+02	0.00E+00	5.19E+02	1.36E+02	3.50E+02	0.00E+00	4.87E+02
Arsenic	1.19E+02	7.81E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	7.05E+00	5.24E+00	7.24E-01	9.33E-01	0.00E+00	1.66E+00	4.75E-01	6.93E-01	0.00E+00	1.17E+00
Calcium	1.39E+04	6.75E+03	0.00E+00	0.00E+00	1.00E+00	1.39E+04	6.75E+03	8.47E+01	1.84E+03	0.00E+00	1.93E+03	4.11E+01	8.93E+02	0.00E+00	9.34E+02
Chromium	1.40E+02	1.01E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.58E+00	8.78E+00	8.52E-01	1.14E+00	0.00E+00	1.99E+00	6.12E-01	1.16E+00	0.00E+00	1.77E+00
Cobalt	2.37E+01	1.03E+01	0.00E+00	0.00E+00	2.91E-01	6.90E+00	3.00E+00	1.44E-01	9.12E-01	0.00E+00	1.06E+00	6.28E-02	3.97E-01	0.00E+00	4.60E-01
Copper	5.81E+01	5.56E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.56E+01	1.54E+01	3.54E-01	2.06E+00	0.00E+00	2.42E+00	3.38E-01	2.04E+00	0.00E+00	2.38E+00
Iron	7.00E+04	5.88E+04	0.00E+00	0.00E+00	7.80E-02	5.46E+03	4.59E+03	4.26E+02	7.22E+02	0.00E+00	1.15E+03	3.58E+02	6.07E+02	0.00E+00	9.64E+02
Magnesium	1.43E+03	6.04E+02	0.00E+00	0.00E+00	5.30E-01	7.58E+02	3.20E+02	8.70E+00	1.00E+02	0.00E+00	1.09E+02	3.67E+00	4.23E+01	0.00E+00	4.60E+01
Manganese	3.04E+03	9.15E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	1.06E+02	4.66E+01	1.85E+01	1.40E+01	0.00E+00	3.25E+01	5.57E+00	6.17E+00	0.00E+00	1.17E+01
Mercury	2.65E-01	1.34E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.31E-01	3.98E-01	1.61E-03	5.71E-02	0.00E+00	5.87E-02	8.17E-04	5.27E-02	0.00E+00	5.35E-02
Potassium	5.18E+02	4.32E+02	0.00E+00	0.00E+00	1.00E+00	5.18E+02	4.32E+02	3.15E+00	6.85E+01	0.00E+00	7.16E+01	2.63E+00	5.72E+01	0.00E+00	5.98E+01
Selenium	4.30E+00	2.58E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	2.70E+00	1.86E+00	2.62E-02	3.58E-01	0.00E+00	3.84E-01	1.57E-02	2.46E-01	0.00E+00	2.61E-01
Sodium	9.78E+01	6.22E+01	0.00E+00	0.00E+00	1.00E+00	9.78E+01	6.22E+01	5.95E-01	1.29E+01	0.00E+00	1.35E+01	3.78E-01	8.23E+00	0.00E+00	8.61E+00
Vanadium	2.41E+02	1.88E+02	0.00E+00	0.00E+00	8.80E-01	2.12E+02	1.66E+02	1.47E+00	2.81E+01	0.00E+00	2.95E+01	1.15E+00	2.19E+01	0.00E+00	2.31E+01
Zinc	5.78E+01	4.49E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.24E+02	2.98E+02	3.52E-01	4.28E+01	0.00E+00	4.32E+01	2.73E-01	3.94E+01	0.00E+00	3.97E+01
VOCs															
Acetone	5.23E-02	3.56E-02	0.00E+00	0.00E+00	1.00E+00	5.23E-02	3.56E-02	3.18E-04	6.92E-03	0.00E+00	7.24E-03	2.16E-04	4.70E-03	0.00E+00	4.92E-03

Table A-66
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 11 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	2.39E+04	2.24E+04	0.00E+00	0.00E+00	6.93E+01	6.50E+01	7.32E-02	1.75E+03	1.64E+03	0.00E+00	4.81E+01	0.00E+00	4.81E+01	0.00E+00	4.51E+01	0.00E+00	4.51E+01
Arsenic	1.19E+02	7.81E+01	0.00E+00	0.00E+00	5.32E-01	3.81E-01	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	3.93E-01	2.78E-01	0.00E+00	1.08E-02	0.00E+00	1.08E-02	0.00E+00	7.65E-03	0.00E+00	7.65E-03
Calcium	1.39E+04	6.75E+03	0.00E+00	0.00E+00	5.92E+03	2.87E+03	1.48E-04	2.06E+00	9.99E-01	0.00E+00	5.66E-02	0.00E+00	5.66E-02	0.00E+00	2.75E-02	0.00E+00	2.75E-02
Chromium	1.40E+02	1.01E+02	0.00E+00	0.00E+00	4.65E-01	3.34E-01	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	8.73E+00	6.85E+00	0.00E+00	2.40E-01	0.00E+00	2.40E-01	0.00E+00	1.88E-01	0.00E+00	1.88E-01
Cobalt	2.37E+01	1.03E+01	0.00E+00	0.00E+00	1.15E-01	4.98E-02	1.00E-01	2.37E+00	1.03E+00	0.00E+00	6.52E-02	0.00E+00	6.52E-02	0.00E+00	2.84E-02	0.00E+00	2.84E-02
Copper	5.81E+01	5.56E+01	0.00E+00	0.00E+00	1.31E+00	1.28E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.39E+01	1.38E+01	0.00E+00	3.81E-01	0.00E+00	3.81E-01	0.00E+00	3.79E-01	0.00E+00	3.79E-01
Iron	7.00E+04	5.88E+04	0.00E+00	0.00E+00	2.03E+02	1.70E+02	4.24E-03	2.97E+02	2.49E+02	0.00E+00	8.16E+00	0.00E+00	8.16E+00	0.00E+00	6.85E+00	0.00E+00	6.85E+00
Magnesium	1.43E+03	6.04E+02	0.00E+00	0.00E+00	1.76E+02	7.44E+01	1.06E-03	1.52E+00	6.40E-01	0.00E+00	4.17E-02	0.00E+00	4.17E-02	0.00E+00	1.76E-02	0.00E+00	1.76E-02
Manganese	3.04E+03	9.15E+02	0.00E+00	0.00E+00	9.92E+01	2.99E+01	5.87E-02	1.78E+02	5.37E+01	0.00E+00	4.91E+00	0.00E+00	4.91E+00	0.00E+00	1.48E+00	0.00E+00	1.48E+00
Mercury	2.65E-01	1.34E-01	0.00E+00	0.00E+00	2.23E-02	1.53E-02	1.92E-01	5.09E-02	2.58E-02	0.00E+00	1.40E-03	0.00E+00	1.40E-03	0.00E+00	7.09E-04	0.00E+00	7.09E-04
Potassium	5.18E+02	4.32E+02	0.00E+00	0.00E+00	6.38E+01	5.32E+01	4.24E-03	2.19E+00	1.83E+00	0.00E+00	6.03E-02	0.00E+00	6.03E-02	0.00E+00	5.04E-02	0.00E+00	5.04E-02
Selenium	4.30E+00	2.58E+00	0.00E+00	0.00E+00	3.17E-01	1.80E-01	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	1.14E+00	9.42E-01	0.00E+00	3.14E-02	0.00E+00	3.14E-02	0.00E+00	2.59E-02	0.00E+00	2.59E-02
Sodium	9.78E+01	6.22E+01	0.00E+00	0.00E+00	1.12E+00	7.14E-01	1.17E-02	1.14E+00	7.28E-01	0.00E+00	3.15E-02	0.00E+00	3.15E-02	0.00E+00	2.00E-02	0.00E+00	2.00E-02
Vanadium	2.41E+02	1.88E+02	0.00E+00	0.00E+00	7.42E-01	5.80E-01	1.79E-01	4.31E+01	3.37E+01	0.00E+00	1.19E+00	0.00E+00	1.19E+00	0.00E+00	9.27E-01	0.00E+00	9.27E-01
Zinc	5.78E+01	4.49E+01	0.00E+00	0.00E+00	5.69E+00	4.93E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.18E+02	1.16E+02	0.00E+00	3.25E+00	0.00E+00	3.25E+00	0.00E+00	3.19E+00	0.00E+00	3.19E+00
VOCs																	
Acetone	5.23E-02	3.56E-02	0.00E+00	0.00E+00	3.37E-01	2.29E-01	2.21E-09	1.16E-10	7.86E-11	0.00E+00	3.18E-12	0.00E+00	3.18E-12	0.00E+00	2.16E-12	0.00E+00	2.16E-12

Table A-67
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media for the Site 12 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.91E+04	1.79E+04	0.00E+00	0.00E+00	4.00E-03	7.64E+01	7.15E+01	4.61E+01	9.23E+00	0.00E+00	5.54E+01	4.32E+01	8.63E+00	0.00E+00	5.18E+01
Arsenic	7.90E+00	7.56E+00	8.90E-02	2.15E-02	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	4.38E-01	4.27E-01	1.91E-02	5.29E-02	1.21E-02	8.40E-02	1.83E-02	5.16E-02	2.91E-03	7.28E-02
Barium	5.65E+01	4.79E+01	5.89E-01	2.34E-01	1.50E-01	8.48E+00	7.19E+00	1.37E-01	1.02E+00	7.99E-02	1.24E+00	1.16E-01	8.68E-01	3.18E-02	1.02E+00
Beryllium	3.10E-01	2.38E-01	4.80E-04	4.13E-04	1.00E-02	3.10E-03	2.38E-03	7.49E-04	3.74E-04	6.51E-05	1.19E-03	5.74E-04	2.87E-04	5.61E-05	9.17E-04
Cadmium	1.30E+00	6.35E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	7.17E-01	4.85E-01	3.14E-03	8.66E-02	0.00E+00	8.97E-02	1.53E-03	5.86E-02	0.00E+00	6.01E-02
Calcium	5.48E+04	2.08E+04	0.00E+00	0.00E+00	3.50E+00	1.92E+05	7.29E+04	1.32E+02	2.32E+04	0.00E+00	2.33E+04	5.03E+01	8.81E+03	0.00E+00	8.86E+03
Chromium	2.72E+01	2.35E+01	8.30E-03	2.82E-03	7.50E-03	2.04E-01	1.76E-01	6.57E-02	2.46E-02	1.13E-03	9.15E-02	5.67E-02	2.13E-02	3.83E-04	7.84E-02
Cobalt	9.40E+00	8.28E+00	9.50E-03	4.58E-03	2.00E-02	1.88E-01	1.66E-01	2.27E-02	2.27E-02	1.29E-03	4.67E-02	2.00E-02	2.00E-02	6.22E-04	4.06E-02
Copper	3.47E+01	3.19E+01	4.64E-02	2.00E-02	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	7.90E+00	7.64E+00	8.38E-02	9.54E-01	6.30E-03	1.04E+00	7.71E-02	9.23E-01	2.71E-03	1.00E+00
Iron	2.34E+04	2.16E+04	0.00E+00	0.00E+00	4.00E-03	9.36E+01	8.62E+01	5.65E+01	1.13E+01	0.00E+00	6.78E+01	5.21E+01	1.04E+01	0.00E+00	6.25E+01
Lead	4.27E+01	2.55E+01	6.90E-03	4.12E-03	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	2.18E+00	1.63E+00	1.03E-01	2.63E-01	9.36E-04	3.67E-01	6.16E-02	1.97E-01	5.59E-04	2.59E-01
Magnesium	3.24E+03	2.32E+03	0.00E+00	0.00E+00	1.00E+00	3.24E+03	2.32E+03	7.83E+00	3.91E+02	0.00E+00	3.99E+02	5.61E+00	2.80E+02	0.00E+00	2.86E+02
Manganese	4.06E+02	3.73E+02	0.00E+00	0.00E+00	2.50E-01	1.02E+02	9.32E+01	9.81E-01	1.23E+01	0.00E+00	1.32E+01	9.00E-01	1.13E+01	0.00E+00	1.22E+01
Mercury	1.50E-01	1.03E-01	1.20E-04	6.18E-05	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.32E-01	1.07E-01	3.62E-04	1.59E-02	1.63E-05	1.63E-02	2.49E-04	1.30E-02	8.39E-06	1.32E-02
Potassium	8.55E+02	7.46E+02	0.00E+00	0.00E+00	1.00E+00	8.55E+02	7.46E+02	2.07E+00	1.03E+02	0.00E+00	1.05E+02	1.80E+00	9.01E+01	0.00E+00	9.19E+01
Selenium	0.00E+00	0.00E+00	7.90E-03	6.50E-03	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	#NUM!	#NUM!	0.00E+00	#NUM!	1.07E-03	#NUM!	0.00E+00	#NUM!	8.82E-04	#NUM!
Silver	3.10E-01	2.31E-01	1.40E-03	1.07E-03	4.00E-01	1.24E-01	9.25E-02	7.49E-04	1.50E-02	1.90E-04	1.59E-02	5.59E-04	1.12E-02	1.45E-04	1.19E-02
Vanadium	7.76E+01	6.85E+01	2.32E-02	8.17E-03	5.50E-03	4.27E-01	3.77E-01	1.87E-01	5.16E-02	3.15E-03	2.42E-01	1.65E-01	4.55E-02	1.11E-03	2.12E-01
Zinc	7.80E+01	5.08E+01	4.06E-02	1.83E-02	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.42E+01	4.27E+01	1.88E-01	6.55E+00	5.51E-03	6.74E+00	1.23E-01	5.16E+00	2.49E-03	5.29E+00
PAHs															
Anthracene	1.00E+01	5.00E+00	0.00E+00	0.00E+00	1.04E-01	1.04E+00	5.20E-01	2.42E-02	1.26E-01	0.00E+00	1.50E-01	1.21E-02	6.28E-02	0.00E+00	7.49E-02
Benzo(a)Anthracene	2.18E-02	5.67E-03	0.00E+00	0.00E+00	2.06E-02	4.49E-04	1.17E-04	5.27E-05	5.42E-05	0.00E+00	1.07E-04	1.37E-05	1.41E-05	0.00E+00	2.78E-05
Benzo(a)Pyrene	1.47E-02	4.19E-03	0.00E+00	0.00E+00	1.37E-02	2.01E-04	5.74E-05	3.55E-05	2.43E-05	0.00E+00	5.98E-05	1.01E-05	6.93E-06	0.00E+00	1.71E-05
Benzo(b)Fluoranthene	1.98E-02	6.26E-03	0.00E+00	0.00E+00	1.12E-02	2.22E-04	7.01E-05	4.78E-05	2.68E-05	0.00E+00	7.46E-05	1.51E-05	8.47E-06	0.00E+00	2.36E-05
Benzo(g,h,i)Perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.02E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	1.62E-02	4.63E-03	0.00E+00	0.00E+00	1.12E-02	1.81E-04	5.19E-05	3.91E-05	2.19E-05	0.00E+00	6.11E-05	1.12E-05	6.27E-06	0.00E+00	1.75E-05
Chrysene	1.89E-02	5.11E-03	0.00E+00	0.00E+00	2.06E-02	3.89E-04	1.05E-04	4.57E-05	4.70E-05	0.00E+00	9.27E-05	1.23E-05	1.27E-05	0.00E+00	2.51E-05
Dibenzo(a,h)Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.78E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	3.39E-02	2.06E-02	0.00E+00	0.00E+00	5.33E-02	1.81E-03	1.10E-03	8.19E-05	2.18E-04	0.00E+00	3.00E-04	4.98E-05	1.33E-04	0.00E+00	1.82E-04
Indeno(1,2,3-Cd)Pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.06E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	2.85E-02	7.50E-03	0.00E+00	0.00E+00	1.02E-01	2.91E-03	7.65E-04	6.89E-05	3.51E-04	0.00E+00	4.20E-04	1.81E-05	9.24E-05	0.00E+00	1.10E-04
Pyrene	2.82E-02	1.89E-02	0.00E+00	0.00E+00	5.85E-02	1.65E-03	1.11E-03	6.81E-05	1.99E-04	0.00E+00	2.67E-04	4.57E-05	1.34E-04	0.00E+00	1.79E-04
Total LMW PAHs	2.01E+01	1.00E+01	0.00E+00	0.00E+00	--	--	--	2.43E-02	1.26E-01	0.00E+00	1.51E-01	1.21E-02	6.30E-02	0.00E+00	7.52E-02
Total HMW PAHs	1.20E-01	4.48E-02	0.00E+00	0.00E+00	--	--	--	2.89E-04	3.74E-04	0.00E+00	6.63E-04	1.08E-04	1.82E-04	0.00E+00	2.90E-04
Pesticides															
4,4'-DDE	2.20E-03	8.93E-04	2.70E-05	5.99E-06	1.32E-02	2.90E-05	1.18E-05	5.32E-06	3.50E-06	3.66E-06	1.25E-05	2.16E-06	1.42E-06	8.13E-07	4.39E-06
4,4'-DDT	3.70E-03	1.69E-03	0.00E+00	0.00E+00	4.61E-03	1.70E-05	7.77E-06	8.94E-06	2.06E-06	0.00E+00	1.10E-05	4.08E-06	9.39E-07	0.00E+00	5.02E-06
DDTr	--	--	--	--	--	--	--	1.43E-05	5.56E-06	3.66E-06	2.35E-05	6.23E-06	2.36E-06	8.13E-07	9.41E-06
SVOCs															
Bis(2-ethylhexyl)phthalate	5.63E-02	5.81E-02	1.70E-03	8.51E-04	4.30E-02	2.42E-03	2.50E-03	1.36E-04	2.92E-04	2.31E-04	6.59E-04	1.40E-04	3.02E-04	1.15E-04	5.57E-04

Table A-68
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 12 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.91E+04	1.79E+04	0.00E+00	0.00E+00	4.00E-03	7.64E+01	7.15E+01	6.40E+00	1.28E+00	0.00E+00	7.68E+00	5.98E+00	1.20E+00	0.00E+00	7.18E+00
Arsenic	7.90E+00	7.56E+00	8.90E-02	2.15E-02	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	4.38E-01	4.27E-01	2.65E-03	7.33E-03	1.02E-02	2.02E-02	2.53E-03	7.15E-03	2.47E-03	1.22E-02
Barium	5.65E+01	4.79E+01	5.89E-01	2.34E-01	1.50E-01	8.48E+00	7.19E+00	1.89E-02	1.42E-01	6.77E-02	2.29E-01	1.61E-02	1.20E-01	2.69E-02	1.63E-01
Beryllium	3.10E-01	2.38E-01	4.80E-04	4.13E-04	1.00E-02	3.10E-03	2.38E-03	1.04E-04	5.19E-05	5.52E-05	2.11E-04	7.96E-05	3.98E-05	4.75E-05	1.67E-04
Cadmium	1.30E+00	6.35E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	7.17E-01	4.85E-01	4.36E-04	1.20E-02	0.00E+00	1.24E-02	2.13E-04	8.12E-03	0.00E+00	8.33E-03
Calcium	5.48E+04	2.08E+04	0.00E+00	0.00E+00	3.50E+00	1.92E+05	7.29E+04	1.84E+01	3.21E+03	0.00E+00	3.23E+03	6.98E+00	1.22E+03	0.00E+00	1.23E+03
Chromium	2.72E+01	2.35E+01	8.30E-03	2.82E-03	7.50E-03	2.04E-01	1.76E-01	9.11E-03	3.42E-03	9.55E-04	1.35E-02	7.87E-03	2.95E-03	3.24E-04	1.11E-02
Cobalt	9.40E+00	8.28E+00	9.50E-03	4.58E-03	2.00E-02	1.88E-01	1.66E-01	3.15E-03	3.15E-03	1.09E-03	7.39E-03	2.77E-03	2.77E-03	5.27E-04	6.07E-03
Copper	3.47E+01	3.19E+01	4.64E-02	2.00E-02	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	7.90E+00	7.64E+00	1.16E-02	1.32E-01	5.34E-03	1.49E-01	1.07E-02	1.28E-01	2.29E-03	1.41E-01
Iron	2.34E+04	2.16E+04	0.00E+00	0.00E+00	4.00E-03	9.36E+01	8.62E+01	7.84E+00	1.57E+00	0.00E+00	9.41E+00	7.22E+00	1.44E+00	0.00E+00	8.66E+00
Lead	4.27E+01	2.55E+01	6.90E-03	4.12E-03	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	2.18E+00	1.63E+00	1.43E-02	3.64E-02	7.94E-04	5.15E-02	8.55E-03	2.73E-02	4.73E-04	3.63E-02
Magnesium	3.24E+03	2.32E+03	0.00E+00	0.00E+00	1.00E+00	3.24E+03	2.32E+03	1.09E+00	5.43E+01	0.00E+00	5.54E+01	7.78E-01	3.89E+01	0.00E+00	3.97E+01
Manganese	4.06E+02	3.73E+02	0.00E+00	0.00E+00	2.50E-01	1.02E+02	9.32E+01	1.36E-01	1.70E+00	0.00E+00	1.84E+00	1.25E-01	1.56E+00	0.00E+00	1.69E+00
Mercury	1.50E-01	1.03E-01	1.20E-04	6.18E-05	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.32E-01	1.07E-01	5.03E-05	2.20E-03	1.38E-05	2.27E-03	3.46E-05	1.80E-03	7.11E-06	1.84E-03
Potassium	8.55E+02	7.46E+02	0.00E+00	0.00E+00	1.00E+00	8.55E+02	7.46E+02	2.86E-01	1.43E+01	0.00E+00	1.46E+01	2.50E-01	1.25E+01	0.00E+00	1.27E+01
Selenium	0.00E+00	0.00E+00	7.90E-03	6.50E-03	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.09E-04	9.09E-04	0.00E+00	0.00E+00	7.48E-04	7.48E-04
Silver	3.10E-01	2.31E-01	1.40E-03	1.07E-03	4.00E-01	1.24E-01	9.25E-02	1.04E-04	2.08E-03	1.61E-04	2.34E-03	7.75E-05	1.55E-03	1.23E-04	1.75E-03
Vanadium	7.76E+01	6.85E+01	2.32E-02	8.17E-03	5.50E-03	4.27E-01	3.77E-01	2.60E-02	7.15E-03	2.67E-03	3.58E-02	2.29E-02	6.31E-03	9.39E-04	3.02E-02
Zinc	7.80E+01	5.08E+01	4.06E-02	1.83E-02	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.42E+01	4.27E+01	2.61E-02	9.08E-01	4.67E-03	9.39E-01	1.70E-02	7.16E-01	2.11E-03	7.35E-01
PAHs															
Anthracene	1.00E+01	5.00E+00	0.00E+00	0.00E+00	1.04E-01	1.04E+00	5.20E-01	3.35E-03	1.74E-02	0.00E+00	2.08E-02	1.68E-03	8.71E-03	0.00E+00	1.04E-02
Benzo(a)Anthracene	2.18E-02	5.67E-03	0.00E+00	0.00E+00	2.06E-02	4.49E-04	1.17E-04	7.30E-06	7.52E-06	0.00E+00	1.48E-05	1.90E-06	1.96E-06	0.00E+00	3.85E-06
Benzo(a)Pyrene	1.47E-02	4.19E-03	0.00E+00	0.00E+00	1.37E-02	2.01E-04	5.74E-05	4.92E-06	3.37E-06	0.00E+00	8.30E-06	1.40E-06	9.62E-07	0.00E+00	2.37E-06
Benzo(b)Fluoranthene	1.98E-02	6.26E-03	0.00E+00	0.00E+00	1.12E-02	2.22E-04	7.01E-05	6.63E-06	3.71E-06	0.00E+00	1.03E-05	2.10E-06	1.17E-06	0.00E+00	3.27E-06
Benzo(g,h,i)Perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.02E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	1.62E-02	4.63E-03	0.00E+00	0.00E+00	1.12E-02	1.81E-04	5.19E-05	5.43E-06	3.04E-06	0.00E+00	8.47E-06	1.55E-06	8.69E-07	0.00E+00	2.42E-06
Chrysene	1.89E-02	5.11E-03	0.00E+00	0.00E+00	2.06E-02	3.89E-04	1.05E-04	6.33E-06	6.52E-06	0.00E+00	1.29E-05	1.71E-06	1.76E-06	0.00E+00	3.48E-06
Dibenzo(a,h)Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.78E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	3.39E-02	2.06E-02	0.00E+00	0.00E+00	5.33E-02	1.81E-03	1.10E-03	1.14E-05	3.03E-05	0.00E+00	4.16E-05	6.90E-06	1.84E-05	0.00E+00	2.53E-05
Indeno(1,2,3-Cd)Pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.06E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	2.85E-02	7.50E-03	0.00E+00	0.00E+00	1.02E-01	2.91E-03	7.65E-04	9.55E-06	4.87E-05	0.00E+00	5.82E-05	2.51E-06	1.28E-05	0.00E+00	1.53E-05
Pyrene	2.82E-02	1.89E-02	0.00E+00	0.00E+00	5.85E-02	1.65E-03	1.11E-03	9.45E-06	2.76E-05	0.00E+00	3.71E-05	6.34E-06	1.85E-05	0.00E+00	2.49E-05
Total LMW PAHs	2.01E+01	1.00E+01	0.00E+00	0.00E+00	--	--	--	3.37E-03	1.75E-02	0.00E+00	2.09E-02	1.68E-03	8.74E-03	0.00E+00	1.04E-02
Total HMW PAHs	1.20E-01	4.48E-02	0.00E+00	0.00E+00	--	--	--	4.01E-05	5.18E-05	0.00E+00	9.19E-05	1.50E-05	2.53E-05	0.00E+00	4.03E-05
Pesticides															
4,4'-DDE	2.20E-03	8.93E-04	2.70E-05	5.99E-06	1.32E-02	2.90E-05	1.18E-05	7.37E-07	4.86E-07	3.11E-06	4.33E-06	2.99E-07	1.97E-07	6.89E-07	1.19E-06
4,4'-DDT	3.70E-03	1.69E-03	0.00E+00	0.00E+00	4.61E-03	1.70E-05	7.77E-06	1.24E-06	2.85E-07	0.00E+00	1.52E-06	5.65E-07	1.30E-07	0.00E+00	6.96E-07
DDTr	--	--	--	--	--	--	--	1.98E-06	7.71E-07	3.11E-06	5.85E-06	8.64E-07	3.27E-07	6.89E-07	1.88E-06
SVOCs															
Bis(2-ethylhexyl)phthalate	5.63E-02	5.81E-02	1.70E-03	8.51E-04	4.30E-02	2.42E-03	2.50E-03	1.89E-05	4.06E-05	1.96E-04	2.55E-04	1.95E-05	4.18E-05	9.78E-05	1.59E-04

Table A-69
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media for the Site 12 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.91E+04	1.79E+04	0.00E+00	0.00E+00	1.18E-01	2.25E+03	2.11E+03	0.00E+00	1.88E+02	0.00E+00	1.88E+02	0.00E+00	1.76E+02	0.00E+00	1.76E+02
Arsenic	7.90E+00	7.56E+00	8.90E-02	2.15E-02	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	1.04E+00	1.01E+00	0.00E+00	8.66E-02	1.42E-02	1.01E-01	0.00E+00	8.39E-02	3.43E-03	8.74E-02
Barium	5.65E+01	4.79E+01	5.89E-01	2.34E-01	1.60E-01	9.04E+00	7.67E+00	0.00E+00	7.53E-01	9.42E-02	8.47E-01	0.00E+00	6.39E-01	3.75E-02	6.76E-01
Beryllium	3.10E-01	2.38E-01	4.80E-04	4.13E-04	1.18E+00	3.66E-01	2.80E-01	0.00E+00	3.05E-02	7.68E-05	3.06E-02	0.00E+00	2.34E-02	6.61E-05	2.34E-02
Cadmium	1.30E+00	6.35E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	1.02E+01	5.77E+00	0.00E+00	8.50E-01	0.00E+00	8.50E-01	0.00E+00	4.81E-01	0.00E+00	4.81E-01
Calcium	5.48E+04	2.08E+04	0.00E+00	0.00E+00	1.00E+00	5.48E+04	2.08E+04	0.00E+00	4.57E+03	0.00E+00	4.57E+03	0.00E+00	1.74E+03	0.00E+00	1.74E+03
Chromium	2.72E+01	2.35E+01	8.30E-03	2.82E-03	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.58E+00	9.67E+00	0.00E+00	7.98E-01	1.33E-03	8.00E-01	0.00E+00	8.06E-01	4.51E-04	8.07E-01
Cobalt	9.40E+00	8.28E+00	9.50E-03	4.58E-03	2.91E-01	2.74E+00	2.41E+00	0.00E+00	2.28E-01	1.52E-03	2.29E-01	0.00E+00	2.01E-01	7.33E-04	2.01E-01
Copper	3.47E+01	3.19E+01	4.64E-02	2.00E-02	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.36E+01	1.33E+01	0.00E+00	1.13E+00	7.42E-03	1.14E+00	0.00E+00	1.11E+00	3.19E-03	1.11E+00
Iron	2.34E+04	2.16E+04	0.00E+00	0.00E+00	7.80E-02	1.83E+03	1.68E+03	0.00E+00	1.52E+02	0.00E+00	1.52E+02	0.00E+00	1.40E+02	0.00E+00	1.40E+02
Lead	4.27E+01	2.55E+01	6.90E-03	4.12E-03	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.66E+01	1.10E+01	0.00E+00	1.38E+00	1.10E-03	1.39E+00	0.00E+00	9.15E-01	6.59E-04	9.16E-01
Magnesium	3.24E+03	2.32E+03	0.00E+00	0.00E+00	5.30E-01	1.72E+03	1.23E+03	0.00E+00	1.43E+02	0.00E+00	1.43E+02	0.00E+00	1.03E+02	0.00E+00	1.03E+02
Manganese	4.06E+02	3.73E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	2.68E+01	2.53E+01	0.00E+00	2.23E+00	0.00E+00	2.23E+00	0.00E+00	2.10E+00	0.00E+00	2.10E+00
Mercury	1.50E-01	1.03E-01	1.20E-04	6.18E-05	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.03E-01	3.86E-01	0.00E+00	3.36E-02	1.92E-05	3.36E-02	0.00E+00	3.22E-02	9.89E-06	3.22E-02
Potassium	8.55E+02	7.46E+02	0.00E+00	0.00E+00	1.00E+00	8.55E+02	7.46E+02	0.00E+00	7.12E+01	0.00E+00	7.12E+01	0.00E+00	6.22E+01	0.00E+00	6.22E+01
Selenium	0.00E+00	0.00E+00	7.90E-03	6.50E-03	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-03	1.26E-03	0.00E+00	0.00E+00	1.04E-03	1.04E-03
Silver	3.10E-01	2.31E-01	1.40E-03	1.07E-03	1.53E+01	4.74E+00	3.54E+00	0.00E+00	3.95E-01	2.24E-04	3.95E-01	0.00E+00	2.95E-01	1.71E-04	2.95E-01
Vanadium	7.76E+01	6.85E+01	2.32E-02	8.17E-03	8.80E-01	6.83E+01	6.03E+01	0.00E+00	5.69E+00	3.71E-03	5.69E+00	0.00E+00	5.02E+00	1.31E-03	5.02E+00
Zinc	7.80E+01	5.08E+01	4.06E-02	1.83E-02	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.57E+02	3.10E+02	0.00E+00	2.98E+01	6.50E-03	2.98E+01	0.00E+00	2.59E+01	2.93E-03	2.59E+01
PAHs															
Anthracene	1.00E+01	5.00E+00	0.00E+00	0.00E+00	3.20E-01	3.20E+00	1.60E+00	0.00E+00	2.67E-01	0.00E+00	2.67E-01	0.00E+00	1.33E-01	0.00E+00	1.33E-01
Benzo(a)Anthracene	2.18E-02	5.67E-03	0.00E+00	0.00E+00	2.70E-01	5.89E-03	1.53E-03	0.00E+00	4.90E-04	0.00E+00	4.90E-04	0.00E+00	1.27E-04	0.00E+00	1.27E-04
Benzo(a)Pyrene	1.47E-02	4.19E-03	0.00E+00	0.00E+00	3.40E-01	5.00E-03	1.42E-03	0.00E+00	4.16E-04	0.00E+00	4.16E-04	0.00E+00	1.19E-04	0.00E+00	1.19E-04
Benzo(b)Fluoranthene	1.98E-02	6.26E-03	0.00E+00	0.00E+00	2.10E-01	4.16E-03	1.32E-03	0.00E+00	3.46E-04	0.00E+00	3.46E-04	0.00E+00	1.10E-04	0.00E+00	1.10E-04
Benzo(g,h,i)Perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	1.62E-02	4.63E-03	0.00E+00	0.00E+00	2.10E-01	3.40E-03	9.73E-04	0.00E+00	2.83E-04	0.00E+00	2.83E-04	0.00E+00	8.11E-05	0.00E+00	8.11E-05
Chrysene	1.89E-02	5.11E-03	0.00E+00	0.00E+00	4.40E-01	8.32E-03	2.25E-03	0.00E+00	6.93E-04	0.00E+00	6.93E-04	0.00E+00	1.87E-04	0.00E+00	1.87E-04
Dibenzo(a,h)Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	3.39E-02	2.06E-02	0.00E+00	0.00E+00	3.70E-01	1.25E-02	7.62E-03	0.00E+00	1.05E-03	0.00E+00	1.05E-03	0.00E+00	6.35E-04	0.00E+00	6.35E-04
Indeno(1,2,3-Cd)Pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	2.85E-02	7.50E-03	0.00E+00	0.00E+00	2.80E-01	7.98E-03	2.10E-03	0.00E+00	6.65E-04	0.00E+00	6.65E-04	0.00E+00	1.75E-04	0.00E+00	1.75E-04
Pyrene	2.82E-02	1.89E-02	0.00E+00	0.00E+00	3.90E-01	1.10E-02	7.38E-03	0.00E+00	9.16E-04	0.00E+00	9.16E-04	0.00E+00	6.15E-04	0.00E+00	6.15E-04
Total LMW PAHs	2.01E+01	1.00E+01	0.00E+00	0.00E+00	--	--	--	0.00E+00	2.68E-01	0.00E+00	2.68E-01	0.00E+00	1.34E-01	0.00E+00	1.34E-01
Total HMW PAHs	1.20E-01	4.48E-02	0.00E+00	0.00E+00	--	--	--	0.00E+00	3.15E-03	0.00E+00	3.15E-03	0.00E+00	1.24E-03	0.00E+00	1.24E-03
Pesticides															
4,4'-DDE	2.20E-03	8.93E-04	2.70E-05	5.99E-06	9.00E+00	1.98E-02	8.03E-03	0.00E+00	1.65E-03	4.32E-06	1.65E-03	0.00E+00	6.69E-04	9.59E-07	6.70E-04
4,4'-DDT	3.70E-03	1.69E-03	0.00E+00	0.00E+00	9.00E+00	3.33E-02	1.52E-02	0.00E+00	2.77E-03	0.00E+00	2.77E-03	0.00E+00	1.27E-03	0.00E+00	1.27E-03
DDTr	--	--	--	--	--	--	--	0.00E+00	4.42E-03	4.32E-06	4.43E-03	0.00E+00	1.93E-03	9.59E-07	1.94E-03
SVOCs															
Bis(2-ethylhexyl)phthalate	5.63E-02	5.81E-02	1.70E-03	8.51E-04	1.00E+00	5.63E-02	5.81E-02	0.00E+00	4.69E-03	2.72E-04	4.96E-03	0.00E+00	4.84E-03	1.36E-04	4.98E-03

Table A-70
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 12 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.91E+04	1.79E+04	0.00E+00	0.00E+00	1.18E-01	2.25E+03	2.11E+03	1.16E+02	2.98E+02	0.00E+00	4.14E+02	1.09E+02	2.79E+02	0.00E+00	3.88E+02
Arsenic	7.90E+00	7.56E+00	8.90E-02	2.15E-02	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	1.04E+00	1.01E+00	4.81E-02	1.37E-01	1.14E-02	1.97E-01	4.60E-02	1.33E-01	2.75E-03	1.82E-01
Barium	5.65E+01	4.79E+01	5.89E-01	2.34E-01	1.60E-01	9.04E+00	7.67E+00	3.44E-01	1.20E+00	7.55E-02	1.62E+00	2.92E-01	1.01E+00	3.00E-02	1.34E+00
Beryllium	3.10E-01	2.38E-01	4.80E-04	4.13E-04	1.18E+00	3.66E-01	2.80E-01	1.89E-03	4.84E-02	6.15E-05	5.03E-02	1.45E-03	3.71E-02	5.30E-05	3.86E-02
Cadmium	1.30E+00	6.35E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	1.02E+01	5.77E+00	7.91E-03	1.35E+00	0.00E+00	1.36E+00	3.86E-03	7.64E-01	0.00E+00	7.67E-01
Calcium	5.48E+04	2.08E+04	0.00E+00	0.00E+00	1.00E+00	5.48E+04	2.08E+04	3.33E+02	7.25E+03	0.00E+00	7.58E+03	1.27E+02	2.76E+03	0.00E+00	2.88E+03
Chromium	2.72E+01	2.35E+01	8.30E-03	2.82E-03	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.58E+00	9.67E+00	1.66E-01	1.27E+00	1.06E-03	1.43E+00	1.43E-01	1.28E+00	3.61E-04	1.42E+00
Cobalt	9.40E+00	8.28E+00	9.50E-03	4.58E-03	2.91E-01	2.74E+00	2.41E+00	5.72E-02	3.62E-01	1.22E-03	4.20E-01	5.04E-02	3.19E-01	5.87E-04	3.70E-01
Copper	3.47E+01	3.19E+01	4.64E-02	2.00E-02	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.36E+01	1.33E+01	2.11E-01	1.80E+00	5.95E-03	2.02E+00	1.94E-01	1.76E+00	2.56E-03	1.96E+00
Iron	2.34E+04	2.16E+04	0.00E+00	0.00E+00	7.80E-02	1.83E+03	1.68E+03	1.42E+02	2.41E+02	0.00E+00	3.84E+02	1.31E+02	2.22E+02	0.00E+00	3.54E+02
Lead	4.27E+01	2.55E+01	6.90E-03	4.12E-03	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.66E+01	1.10E+01	2.60E-01	2.20E+00	8.84E-04	2.46E+00	1.55E-01	1.45E+00	5.27E-04	1.61E+00
Magnesium	3.24E+03	2.32E+03	0.00E+00	0.00E+00	5.30E-01	1.72E+03	1.23E+03	1.97E+01	2.27E+02	0.00E+00	2.47E+02	1.41E+01	1.63E+02	0.00E+00	1.77E+02
Manganese	4.06E+02	3.73E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	2.68E+01	2.53E+01	2.47E+00	3.54E+00	0.00E+00	6.01E+00	2.27E+00	3.34E+00	0.00E+00	5.61E+00
Mercury	1.50E-01	1.03E-01	1.20E-04	6.18E-05	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.03E-01	3.86E-01	9.13E-04	5.34E-02	1.54E-05	5.43E-02	6.28E-04	5.11E-02	7.92E-06	5.17E-02
Potassium	8.55E+02	7.46E+02	0.00E+00	0.00E+00	1.00E+00	8.55E+02	7.46E+02	5.20E+00	1.13E+02	0.00E+00	1.18E+02	4.54E+00	9.87E+01	0.00E+00	1.03E+02
Selenium	0.00E+00	0.00E+00	7.90E-03	6.50E-03	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-03	1.01E-03	0.00E+00	0.00E+00	8.33E-04	8.33E-04
Silver	3.10E-01	2.31E-01	1.40E-03	1.07E-03	1.53E+01	4.74E+00	3.54E+00	1.89E-03	6.27E-01	1.79E-04	6.30E-01	1.41E-03	4.68E-01	1.37E-04	4.70E-01
Vanadium	7.76E+01	6.85E+01	2.32E-02	8.17E-03	8.80E-01	6.83E+01	6.03E+01	4.72E-01	9.03E+00	2.97E-03	9.51E+00	4.17E-01	7.97E+00	1.05E-03	8.39E+00
Zinc	7.80E+01	5.08E+01	4.06E-02	1.83E-02	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.57E+02	3.10E+02	4.75E-01	4.72E+01	5.20E-03	4.77E+01	3.09E-01	4.10E+01	2.35E-03	4.14E+01
PAHs															
Anthracene	1.00E+01	5.00E+00	0.00E+00	0.00E+00	3.20E-01	3.20E+00	1.60E+00	6.09E-02	4.23E-01	0.00E+00	4.84E-01	3.04E-02	2.12E-01	0.00E+00	2.42E-01
Benzo(a)Anthracene	2.18E-02	5.67E-03	0.00E+00	0.00E+00	2.70E-01	5.89E-03	1.53E-03	1.33E-04	7.79E-04	0.00E+00	9.11E-04	3.45E-05	2.02E-04	0.00E+00	2.37E-04
Benzo(a)Pyrene	1.47E-02	4.19E-03	0.00E+00	0.00E+00	3.40E-01	5.00E-03	1.42E-03	8.95E-05	6.61E-04	0.00E+00	7.51E-04	2.55E-05	1.88E-04	0.00E+00	2.14E-04
Benzo(b)Fluoranthene	1.98E-02	6.26E-03	0.00E+00	0.00E+00	2.10E-01	4.16E-03	1.32E-03	1.20E-04	5.50E-04	0.00E+00	6.71E-04	3.81E-05	1.74E-04	0.00E+00	2.12E-04
Benzo(g,h,i)Perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	1.62E-02	4.63E-03	0.00E+00	0.00E+00	2.10E-01	3.40E-03	9.73E-04	9.86E-05	4.50E-04	0.00E+00	5.49E-04	2.82E-05	1.29E-04	0.00E+00	1.57E-04
Chrysene	1.89E-02	5.11E-03	0.00E+00	0.00E+00	4.40E-01	8.32E-03	2.25E-03	1.15E-04	1.10E-03	0.00E+00	1.22E-03	3.11E-05	2.98E-04	0.00E+00	3.29E-04
Dibenzo(a,h)Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	3.39E-02	2.06E-02	0.00E+00	0.00E+00	3.70E-01	1.25E-02	7.62E-03	2.06E-04	1.66E-03	0.00E+00	1.87E-03	1.25E-04	1.01E-03	0.00E+00	1.13E-03
Indeno(1,2,3-Cd)Pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	2.85E-02	7.50E-03	0.00E+00	0.00E+00	2.80E-01	7.98E-03	2.10E-03	1.73E-04	1.06E-03	0.00E+00	1.23E-03	4.56E-05	2.78E-04	0.00E+00	3.23E-04
Pyrene	2.82E-02	1.89E-02	0.00E+00	0.00E+00	3.90E-01	1.10E-02	7.38E-03	1.72E-04	1.45E-03	0.00E+00	1.63E-03	1.15E-04	9.76E-04	0.00E+00	1.09E-03
Total LMW PAHs	2.01E+01	1.00E+01	0.00E+00	0.00E+00	--	--	--	6.12E-02	4.26E-01	0.00E+00	4.87E-01	3.06E-02	2.13E-01	0.00E+00	2.44E-01
Total HMW PAHs	1.20E-01	4.48E-02	0.00E+00	0.00E+00	--	--	--	7.28E-04	5.00E-03	0.00E+00	5.72E-03	2.73E-04	1.97E-03	0.00E+00	2.24E-03
Pesticides															
4,4'-DDE	2.20E-03	8.93E-04	2.70E-05	5.99E-06	9.00E+00	1.98E-02	8.03E-03	1.34E-05	2.62E-03	3.46E-06	2.64E-03	5.43E-06	1.06E-03	7.68E-07	1.07E-03
4,4'-DDT	3.70E-03	1.69E-03	0.00E+00	0.00E+00	9.00E+00	3.33E-02	1.52E-02	2.25E-05	4.41E-03	0.00E+00	4.43E-03	1.03E-05	2.01E-03	0.00E+00	2.02E-03
DDTr	--	--	--	--	--	--	--	3.59E-05	7.02E-03	3.46E-06	7.06E-03	1.57E-05	3.07E-03	7.68E-07	3.09E-03
SVOCs															
Bis(2-ethylhexyl)phthalate	5.63E-02	5.81E-02	1.70E-03	8.51E-04	1.00E+00	5.63E-02	5.81E-02	3.43E-04	7.45E-03	2.18E-04	8.01E-03	3.53E-04	7.68E-03	1.09E-04	8.15E-03

Table A-71
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 12 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	1.91E+04	1.79E+04	0.00E+00	0.00E+00	5.54E+01	5.18E+01	7.32E-02	1.40E+03	1.31E+03	0.00E+00	3.84E+01	0.00E+00	3.84E+01	0.00E+00	3.60E+01	0.00E+00	3.60E+01
Arsenic	7.90E+00	7.56E+00	8.90E-02	2.15E-02	8.40E-02	7.28E-02	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	4.26E-02	4.12E-02	0.00E+00	1.17E-03	5.07E-03	6.25E-03	0.00E+00	1.13E-03	1.22E-03	2.35E-03
Barium	5.65E+01	4.79E+01	5.89E-01	2.34E-01	1.24E+00	1.02E+00	ln(dry mammal conc, mg/kg) = (-1.412+0.7*ln(soil conc))	4.10E+00	3.66E+00	0.00E+00	1.13E-01	3.36E-02	1.46E-01	0.00E+00	1.01E-01	1.33E-02	1.14E-01
Beryllium	3.10E-01	2.38E-01	4.80E-04	4.13E-04	1.19E-03	9.17E-04	2.12E-04	6.57E-05	5.04E-05	0.00E+00	1.81E-06	2.74E-05	2.92E-05	0.00E+00	1.38E-06	2.36E-05	2.49E-05
Cadmium	1.30E+00	6.35E-01	0.00E+00	0.00E+00	8.97E-02	6.01E-02	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	7.39E-01	5.21E-01	0.00E+00	2.03E-02	0.00E+00	2.03E-02	0.00E+00	1.43E-02	0.00E+00	1.43E-02
Calcium	5.48E+04	2.08E+04	0.00E+00	0.00E+00	2.33E+04	8.86E+03	1.48E-04	8.11E+00	3.08E+00	0.00E+00	2.23E-01	0.00E+00	2.23E-01	0.00E+00	8.48E-02	0.00E+00	8.48E-02
Chromium	2.72E+01	2.35E+01	8.30E-03	2.82E-03	9.15E-02	7.84E-02	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	2.62E+00	2.35E+00	0.00E+00	7.21E-02	4.73E-04	7.26E-02	0.00E+00	6.47E-02	1.61E-04	6.49E-02
Cobalt	9.40E+00	8.28E+00	9.50E-03	4.58E-03	4.67E-02	4.06E-02	1.00E-01	9.40E-01	8.28E-01	0.00E+00	2.59E-02	5.42E-04	2.64E-02	0.00E+00	2.28E-02	2.61E-04	2.30E-02
Copper	3.47E+01	3.19E+01	4.64E-02	2.00E-02	1.04E+00	1.00E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.29E+01	1.27E+01	0.00E+00	3.54E-01	2.64E-03	3.56E-01	0.00E+00	3.49E-01	1.14E-03	3.51E-01
Iron	2.34E+04	2.16E+04	0.00E+00	0.00E+00	6.78E+01	6.25E+01	4.24E-03	9.92E+01	9.14E+01	0.00E+00	2.73E+00	0.00E+00	2.73E+00	0.00E+00	2.51E+00	0.00E+00	2.51E+00
Lead	4.27E+01	2.55E+01	6.90E-03	4.12E-03	3.67E-01	2.59E-01	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	5.67E+00	4.52E+00	0.00E+00	1.56E-01	3.93E-04	1.56E-01	0.00E+00	1.24E-01	2.35E-04	1.25E-01
Magnesium	3.24E+03	2.32E+03	0.00E+00	0.00E+00	3.99E+02	2.86E+02	1.06E-03	3.43E+00	2.46E+00	0.00E+00	9.44E-02	0.00E+00	9.44E-02	0.00E+00	6.77E-02	0.00E+00	6.77E-02
Manganese	4.06E+02	3.73E+02	0.00E+00	0.00E+00	1.32E+01	1.22E+01	5.87E-02	2.38E+01	2.19E+01	0.00E+00	6.55E-01	0.00E+00	6.55E-01	0.00E+00	6.02E-01	0.00E+00	6.02E-01
Mercury	1.50E-01	1.03E-01	1.20E-04	6.18E-05	1.63E-02	1.32E-02	1.92E-01	2.88E-02	1.98E-02	0.00E+00	7.92E-04	6.84E-06	7.99E-04	0.00E+00	5.45E-04	3.52E-06	5.49E-04
Potassium	8.55E+02	7.46E+02	0.00E+00	0.00E+00	1.05E+02	9.19E+01	4.24E-03	3.63E+00	3.16E+00	0.00E+00	9.97E-02	0.00E+00	9.97E-02	0.00E+00	8.70E-02	0.00E+00	8.70E-02
Selenium	0.00E+00	0.00E+00	7.90E-03	6.50E-03	#NUM!	0.00E+00	0.00E+00	#NUM!	#NUM!	0.00E+00	#NUM!	4.50E-04	#NUM!	0.00E+00	#NUM!	3.71E-04	#NUM!
Silver	3.10E-01	2.31E-01	1.40E-03	1.07E-03	1.59E-02	1.19E-02	5.01E-01	1.55E-01	1.16E-01	0.00E+00	4.27E-03	7.98E-05	4.35E-03	0.00E+00	3.19E-03	6.08E-05	3.25E-03
Vanadium	7.76E+01	6.85E+01	2.32E-02	8.17E-03	2.42E-01	2.12E-01	1.79E-01	1.39E+01	1.23E+01	0.00E+00	3.82E-01	1.32E-03	3.83E-01	0.00E+00	3.37E-01	4.66E-04	3.38E-01
Zinc	7.80E+01	5.08E+01	4.06E-02	1.83E-02	6.74E+00	5.29E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.21E+02	1.17E+02	0.00E+00	3.32E+00	2.31E-03	3.32E+00	0.00E+00	3.21E+00	1.05E-03	3.22E+00
PAHs																	
Anthracene	1.00E+01	5.00E+00	0.00E+00	0.00E+00	1.50E-01	7.49E-02	1.54E-04	1.54E-03	7.70E-04	0.00E+00	4.24E-05	0.00E+00	4.24E-05	0.00E+00	2.12E-05	0.00E+00	2.12E-05
Benzo(a)Anthracene	2.18E-02	5.67E-03	0.00E+00	0.00E+00	1.07E-04	2.78E-05	2.77E-03	6.04E-05	1.57E-05	0.00E+00	1.66E-06	0.00E+00	1.66E-06	0.00E+00	4.32E-07	0.00E+00	4.32E-07
Benzo(a)Pyrene	1.47E-02	4.19E-03	0.00E+00	0.00E+00	5.98E-05	1.71E-05	5.73E-03	8.42E-05	2.40E-05	0.00E+00	2.32E-06	0.00E+00	2.32E-06	0.00E+00	6.60E-07	0.00E+00	6.60E-07
Benzo(b)Fluoranthene	1.98E-02	6.26E-03	0.00E+00	0.00E+00	7.46E-05	2.36E-05	8.27E-03	1.64E-04	5.18E-05	0.00E+00	4.50E-06	0.00E+00	4.50E-06	0.00E+00	1.42E-06	0.00E+00	1.42E-06
Benzo(g,h,i)Perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	1.62E-02	4.63E-03	0.00E+00	0.00E+00	6.11E-05	1.75E-05	8.27E-03	1.34E-04	3.83E-05	0.00E+00	3.68E-06	0.00E+00	3.68E-06	0.00E+00	1.05E-06	0.00E+00	1.05E-06
Chrysene	1.89E-02	5.11E-03	0.00E+00	0.00E+00	9.27E-05	2.51E-05	2.77E-03	5.24E-05	1.42E-05	0.00E+00	1.44E-06	0.00E+00	1.44E-06	0.00E+00	3.89E-07	0.00E+00	3.89E-07
Dibenzo(a,h)Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.02E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	3.39E-02	2.06E-02	0.00E+00	0.00E+00	3.00E-04	1.82E-04	5.07E-04	1.72E-05	1.04E-05	0.00E+00	4.73E-07	0.00E+00	4.73E-07	0.00E+00	2.87E-07	0.00E+00	2.87E-07
Indeno(1,2,3-Cd)Pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.47E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	2.85E-02	7.50E-03	0.00E+00	0.00E+00	4.20E-04	1.10E-04	1.58E-04	4.50E-06	1.18E-06	0.00E+00	1.24E-07	0.00E+00	1.24E-07	0.00E+00	3.26E-08	0.00E+00	3.26E-08
Pyrene	2.82E-02	1.89E-02	0.00E+00	0.00E+00	2.67E-04	1.79E-04	4.29E-04	1.21E-05	8.12E-06	0.00E+00	3.33E-07	0.00E+00	3.33E-07	0.00E+00	2.23E-07	0.00E+00	2.23E-07
Total LMW PAHs	2.01E+01	1.00E+01	0.00E+00	0.00E+00	1.51E-01	--	--	1.56E-03	7.82E-04	0.00E+00	4.29E-05	0.00E+00	4.29E-05	0.00E+00	2.15E-05	0.00E+00	2.15E-05
Total HMW PAHs	1.20E-01	4.48E-02	0.00E+00	0.00E+00	6.63E-04	--	--	5.07E-04	1.52E-04	0.00E+00	1.39E-05	0.00E+00	1.39E-05	0.00E+00	4.18E-06	0.00E+00	4.18E-06
Pesticides																	
4,4'-DDE	2.20E-03	8.93E-04	2.70E-05	5.99E-06	1.25E-05	4.39E-06	2.95E-03	6.49E-06	2.63E-06	0.00E+00	1.78E-07	1.54E-06	1.72E-06	0.00E+00	7.24E-08	3.42E-07	4.14E-07
4,4'-DDT	3.70E-03	1.69E-03	0.00E+00	0.00E+00	1.10E-05	5.02E-06	1.45E-02	5.37E-05	2.45E-05	0.00E+00	1.48E-06	0.00E+00	1.48E-06	0.00E+00	6.73E-07	0.00E+00	6.73E-07
DDTr	--	--	--	--	2.35E-05	--	--	6.01E-05	2.71E-05	0.00E+00	1.65E-06	1.54E-06	3.19E-06	0.00E+00	7.45E-07	#VALUE!	#VALUE!
SVOCs																	
Bis(2-ethylhexyl)phthalate	5.63E-02	5.81E-02	1.70E-03	8.51E-04	6.59E-04	5.57E-04	7.41E-04	4.17E-05	4.30E-05	0.00E+00	1.15E-06	9.69E-05	9.80E-05	0.00E+00	1.18E-06	4.85E-05	4.97E-05

Table A-72
Wildlife Exposure Modeling of Doses to Piscivorous Birds (Great Blue Heron) from Media
for the Site 12 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	9.00E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	4.50E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	4.50E-02	L/kg-day

Sulfide

Chemical	Sediment Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Fish) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/L dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/L dry wt.)	Mean Food Item Tissue Concentration (mg/L dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Arsenic	3.58E+01	2.38E+01	8.90E-02	2.15E-02	4.00E+00	3.56E-01	8.58E-02	3.22E-02	1.60E-02	4.01E-03	5.22E-02	2.14E-02	3.86E-03	9.65E-04	2.62E-02
Barium	2.31E+02	1.28E+02	5.89E-01	2.34E-01	4.00E+00	2.36E+00	9.37E-01	2.08E-01	1.06E-01	2.65E-02	3.40E-01	1.15E-01	4.22E-02	1.05E-02	1.68E-01
Beryllium	4.10E-01	2.50E-01	4.80E-04	4.13E-04	6.20E+01	2.98E-02	2.56E-02	3.69E-04	1.34E-03	2.16E-05	1.73E-03	2.25E-04	1.15E-03	1.86E-05	1.40E-03
Cadmium	7.20E-01	4.28E-01	0.00E+00	0.00E+00	5.90E+01	0.00E+00	0.00E+00	6.48E-04	0.00E+00	0.00E+00	6.48E-04	3.85E-04	0.00E+00	0.00E+00	3.85E-04
Chromium	2.45E+01	1.96E+01	8.30E-03	2.82E-03	2.00E+02	1.66E+00	5.64E-01	2.21E-02	7.47E-02	3.74E-04	9.71E-02	1.76E-02	2.54E-02	1.27E-04	4.31E-02
Cobalt	1.52E+01	8.84E+00	9.50E-03	4.58E-03	1.00E+00	9.50E-03	4.58E-03	1.37E-02	4.28E-04	4.28E-04	1.45E-02	7.96E-03	2.06E-04	2.06E-04	8.37E-03
Copper	2.89E+01	1.86E+01	4.64E-02	2.00E-02	4.64E+02	2.15E+01	9.26E+00	2.60E-02	9.69E-01	2.09E-03	9.97E-01	1.68E-02	4.17E-01	8.98E-04	4.34E-01
Lead	2.21E+01	1.03E+01	6.90E-03	4.12E-03	4.50E+01	3.11E-01	1.85E-01	1.99E-02	1.40E-02	3.11E-04	3.42E-02	9.28E-03	8.34E-03	1.85E-04	1.78E-02
Mercury	1.40E-01	8.23E-02	1.20E-04	6.18E-05	1.80E+03	2.16E-01	1.11E-01	1.26E-04	9.72E-03	5.40E-06	9.85E-03	7.41E-05	5.01E-03	2.78E-06	5.09E-03
Selenium	3.50E+00	2.55E+00	7.90E-03	6.50E-03	2.42E+02	1.91E+00	1.57E+00	3.15E-03	8.60E-02	3.56E-04	8.95E-02	2.30E-03	7.08E-02	2.93E-04	7.34E-02
Silver	6.90E-01	3.17E-01	1.40E-03	1.07E-03	8.77E+01	1.23E-01	9.35E-02	6.21E-04	5.53E-03	6.30E-05	6.21E-03	2.85E-04	4.21E-03	4.80E-05	4.54E-03
Tin	3.50E+00	2.42E+00	0.00E+00	0.00E+00	3.00E+03	0.00E+00	0.00E+00	3.15E-03	0.00E+00	0.00E+00	3.15E-03	2.18E-03	0.00E+00	0.00E+00	2.18E-03
Vanadium	5.62E+01	4.03E+01	2.32E-02	8.17E-03	1.00E+00	2.32E-02	8.17E-03	5.06E-02	1.04E-03	1.04E-03	5.27E-02	3.62E-02	3.68E-04	3.68E-04	3.70E-02
Zinc	8.05E+01	4.83E+01	4.06E-02	1.83E-02	1.30E+01	5.28E-01	2.38E-01	7.25E-02	2.38E-02	1.83E-03	9.80E-02	4.34E-02	1.07E-02	8.25E-04	5.50E-02
PAHs															
Anthracene	8.48E-02	2.97E-02	0.00E+00	0.00E+00	4.01E+02	0.00E+00	0.00E+00	7.63E-05	0.00E+00	0.00E+00	7.63E-05	2.67E-05	0.00E+00	0.00E+00	2.67E-05
Benzo(a)Anthracene	2.25E-01	3.78E-02	0.00E+00	0.00E+00	5.83E+02	0.00E+00	0.00E+00	2.03E-04	0.00E+00	0.00E+00	2.03E-04	3.40E-05	0.00E+00	0.00E+00	3.40E-05
Benzo(a)Pyrene	1.22E-01	2.11E-02	0.00E+00	0.00E+00	5.83E+02	0.00E+00	0.00E+00	1.10E-04	0.00E+00	0.00E+00	1.10E-04	1.90E-05	0.00E+00	0.00E+00	1.90E-05
Benzo(b)Fluoranthene	1.74E-01	3.10E-02	0.00E+00	0.00E+00	5.83E+02	0.00E+00	0.00E+00	1.57E-04	0.00E+00	0.00E+00	1.57E-04	2.79E-05	0.00E+00	0.00E+00	2.79E-05
Benzo(g,h,i)Perylene	6.28E-02	1.14E-02	0.00E+00	0.00E+00	5.83E+02	0.00E+00	0.00E+00	5.65E-05	0.00E+00	0.00E+00	5.65E-05	1.02E-05	0.00E+00	0.00E+00	1.02E-05
Benzo(k)Fluoranthene	5.26E-02	9.67E-03	0.00E+00	0.00E+00	5.83E+02	0.00E+00	0.00E+00	4.73E-05	0.00E+00	0.00E+00	4.73E-05	8.70E-06	0.00E+00	0.00E+00	8.70E-06
Chrysene	1.50E-01	2.56E-02	0.00E+00	0.00E+00	5.83E+02	0.00E+00	0.00E+00	1.35E-04	0.00E+00	0.00E+00	1.35E-04	2.30E-05	0.00E+00	0.00E+00	2.30E-05
Dibenzo(a,h)Anthracene	2.56E-02	4.96E-03	0.00E+00	0.00E+00	5.83E+02	0.00E+00	0.00E+00	2.30E-05	0.00E+00	0.00E+00	2.30E-05	4.47E-06	0.00E+00	0.00E+00	4.47E-06
Fluoranthene	4.14E-01	8.58E-02	0.00E+00	0.00E+00	5.83E+02	0.00E+00	0.00E+00	3.73E-04	0.00E+00	0.00E+00	3.73E-04	7.72E-05	0.00E+00	0.00E+00	7.72E-05
Indeno(1,2,3-Cd)Pyrene	6.38E-02	1.15E-02	0.00E+00	0.00E+00	5.83E+02	0.00E+00	0.00E+00	5.74E-05	0.00E+00	0.00E+00	5.74E-05	1.03E-05	0.00E+00	0.00E+00	1.03E-05
Phenanthrene	2.51E-01	4.67E-02	0.00E+00	0.00E+00	1.87E+03	0.00E+00	0.00E+00	2.26E-04	0.00E+00	0.00E+00	2.26E-04	4.21E-05	0.00E+00	0.00E+00	4.21E-05
Pyrene	3.44E-01	7.37E-02	0.00E+00	0.00E+00	7.71E+02	0.00E+00	0.00E+00	3.10E-04	0.00E+00	0.00E+00	3.10E-04	6.63E-05	0.00E+00	0.00E+00	6.63E-05
Total LMW PAHs	4.99E-01	1.16E-01	0.00E+00	0.00E+00	--	--	--	6.75E-04	0.00E+00	0.00E+00	6.75E-04	1.46E-04	0.00E+00	0.00E+00	1.46E-04
Total HMW PAHs	1.47E+00	2.73E-01	0.00E+00	0.00E+00	--	--	--	1.10E-03	0.00E+00	0.00E+00	1.10E-03	2.04E-04	0.00E+00	0.00E+00	2.04E-04
Pesticides															
4,4'-DDD	2.74E-01	4.72E-02	0.00E+00	0.00E+00	4.36E+03	0.00E+00	0.00E+00	2.47E-04	0.00E+00	0.00E+00	2.47E-04	4.24E-05	0.00E+00	0.00E+00	4.24E-05
4,4'-DDE	3.41E-02	7.20E-03	2.70E-05	5.99E-06	9.17E+03	2.48E-01	5.49E-02	3.07E-05	1.11E-02	1.22E-06	1.12E-02	6.48E-06	2.47E-03	2.70E-07	2.48E-03
4,4'-DDT	1.20E-02	4.70E-03	0.00E+00	0.00E+00	1.68E+04	0.00E+00	0.00E+00	1.08E-05	0.00E+00	0.00E+00	1.08E-05	4.23E-06	0.00E+00	0.00E+00	4.23E-06
DDTr	--	--	--	--	--	--	--	2.88E-04	1.11E-02	1.22E-06	1.14E-02	5.31E-05	2.47E-03	2.70E-07	2.53E-03
Alpha-Chlordane	5.52E-02	1.09E-02	0.00E+00	0.00E+00	5.90E+03	0.00E+00	0.00E+00	4.97E-05	0.00E+00	0.00E+00	4.97E-05	9.84E-06	0.00E+00	0.00E+00	9.84E-06
Dieldrin	1.16E-02	3.47E-03	0.00E+00	0.00E+00	1.25E+03	0.00E+00	0.00E+00	1.04E-05	0.00E+00	0.00E+00	1.04E-05	3.12E-06	0.00E+00	0.00E+00	3.12E-06
SVOCs															
Bis(2-ethylhexyl)phthalate	0.00E+00	0.00E+00	1.70E-03	8.51E-04	1.71E+03	2.91E+00	1.45E+00	0.00E+00	1.31E-01	7.65E-05	1.31E-01	0.00E+00	6.55E-02	3.83E-05	6.55E-02

Table A-73
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 13 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.21E+04	1.65E+04	0.00E+00	0.00E+00	4.00E-03	8.84E+01	6.62E+01	5.34E+01	1.07E+01	0.00E+00	6.41E+01	4.00E+01	7.99E+00	0.00E+00	4.80E+01
Arsenic	1.46E+01	8.17E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	6.19E-01	4.46E-01	3.53E-02	7.48E-02	0.00E+00	1.10E-01	1.97E-02	5.39E-02	0.00E+00	7.36E-02
Calcium	1.84E+04	1.17E+04	0.00E+00	0.00E+00	3.50E+00	6.44E+04	4.11E+04	4.45E+01	7.78E+03	0.00E+00	7.82E+03	2.84E+01	4.96E+03	0.00E+00	4.99E+03
Chromium	3.31E+01	1.86E+01	0.00E+00	0.00E+00	7.50E-03	2.48E-01	1.39E-01	8.00E-02	3.00E-02	0.00E+00	1.10E-01	4.49E-02	1.68E-02	0.00E+00	6.17E-02
Copper	4.65E+01	2.35E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	8.86E+00	6.77E+00	1.12E-01	1.07E+00	0.00E+00	1.18E+00	5.68E-02	8.18E-01	0.00E+00	8.75E-01
Iron	2.73E+04	1.95E+04	0.00E+00	0.00E+00	4.00E-03	1.09E+02	7.78E+01	6.60E+01	1.32E+01	0.00E+00	7.91E+01	4.70E+01	9.40E+00	0.00E+00	5.64E+01
Lead	5.62E+02	1.12E+02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	9.24E+00	3.73E+00	1.36E+00	1.12E+00	0.00E+00	2.47E+00	2.70E-01	4.51E-01	0.00E+00	7.21E-01
Magnesium	4.55E+03	2.31E+03	0.00E+00	0.00E+00	1.00E+00	4.55E+03	2.31E+03	1.10E+01	5.50E+02	0.00E+00	5.61E+02	5.59E+00	2.79E+02	0.00E+00	2.85E+02
Manganese	1.23E+03	6.44E+02	0.00E+00	0.00E+00	2.50E-01	3.08E+02	1.61E+02	2.97E+00	3.71E+01	0.00E+00	4.01E+01	1.56E+00	1.95E+01	0.00E+00	2.10E+01
Mercury	4.10E-01	2.01E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	2.27E-01	1.54E-01	9.91E-04	2.75E-02	0.00E+00	2.85E-02	4.85E-04	1.86E-02	0.00E+00	1.91E-02
Potassium	2.27E+03	9.09E+02	0.00E+00	0.00E+00	1.00E+00	2.27E+03	9.09E+02	5.48E+00	2.74E+02	0.00E+00	2.80E+02	2.20E+00	1.10E+02	0.00E+00	1.12E+02
Selenium	2.80E+00	1.45E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	1.58E+00	7.64E-01	6.76E-03	1.91E-01	0.00E+00	1.98E-01	3.50E-03	9.23E-02	0.00E+00	9.58E-02
Sodium	2.50E+02	1.58E+02	0.00E+00	0.00E+00	7.50E-02	1.88E+01	1.19E+01	6.04E-01	2.27E+00	0.00E+00	2.87E+00	3.82E-01	1.43E+00	0.00E+00	1.82E+00
Vanadium	8.65E+01	4.61E+01	0.00E+00	0.00E+00	5.50E-03	4.76E-01	2.53E-01	2.09E-01	5.75E-02	0.00E+00	2.66E-01	1.11E-01	3.06E-02	0.00E+00	1.42E-01
Zinc	1.41E+02	5.50E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	7.53E+01	4.47E+01	3.41E-01	9.10E+00	0.00E+00	9.44E+00	1.33E-01	5.40E+00	0.00E+00	5.53E+00
PAHs															
Benzo(g,h,i)Perylene	3.25E-02	5.23E-03	0.00E+00	0.00E+00	6.02E-03	1.96E-04	3.15E-05	7.85E-05	2.36E-05	0.00E+00	1.02E-04	1.26E-05	3.80E-06	0.00E+00	1.64E-05
Total HMW PAHs	3.25E-02	5.23E-03	0.00E+00	0.00E+00	--	--	--	7.85E-05	2.36E-05	0.00E+00	1.02E-04	1.26E-05	3.80E-06	0.00E+00	1.64E-05
Pesticides															
4,4'-DDD	6.72E-02	9.82E-03	0.00E+00	0.00E+00	1.57E-02	1.05E-03	1.54E-04	1.62E-04	1.27E-04	0.00E+00	2.90E-04	2.37E-05	1.86E-05	0.00E+00	4.23E-05
4,4'-DDE	4.69E-01	6.73E-02	0.00E+00	0.00E+00	1.32E-02	6.18E-03	8.88E-04	1.13E-03	7.47E-04	0.00E+00	1.88E-03	1.63E-04	1.07E-04	0.00E+00	2.70E-04
4,4'-DDT	5.43E-01	7.88E-02	0.00E+00	0.00E+00	4.61E-03	2.50E-03	3.63E-04	1.31E-03	3.02E-04	0.00E+00	1.61E-03	1.90E-04	4.39E-05	0.00E+00	2.34E-04
DDTr	--	--	--	--	--	--	--	2.61E-03	1.18E-03	0.00E+00	3.78E-03	3.77E-04	1.70E-04	0.00E+00	5.47E-04
Alpha-Chlordane	1.56E-02	2.64E-03	0.00E+00	0.00E+00	9.33E-03	1.45E-04	2.46E-05	3.77E-05	1.76E-05	0.00E+00	5.53E-05	6.39E-06	2.98E-06	0.00E+00	9.36E-06
Dieldrin	4.10E-03	8.50E-04	0.00E+00	0.00E+00	2.74E-02	1.12E-04	2.33E-05	9.91E-06	1.36E-05	0.00E+00	2.35E-05	2.05E-06	2.81E-06	0.00E+00	4.87E-06
Herbicides															
2,4-D	2.88E-01	4.99E-02	0.00E+00	0.00E+00	9.20E-01	2.65E-01	4.60E-02	6.96E-04	3.20E-02	0.00E+00	3.27E-02	1.21E-04	5.55E-03	0.00E+00	5.67E-03
SVOCs															
Pentachlorophenol	1.10E-01	2.92E-02	0.00E+00	0.00E+00	4.25E-02	4.68E-03	1.24E-03	2.66E-04	5.65E-04	0.00E+00	8.31E-04	7.04E-05	1.50E-04	0.00E+00	2.20E-04
VOCs															
1,1-dichloroethene	2.10E-03	1.24E-03	0.00E+00	0.00E+00	2.27E+00	4.78E-03	2.81E-03	5.07E-06	5.77E-04	0.00E+00	5.82E-04	2.99E-06	3.40E-04	0.00E+00	3.43E-04
Acetone	1.44E-01	2.28E-02	0.00E+00	0.00E+00	5.33E+01	7.68E+00	1.22E+00	3.48E-04	9.27E-01	0.00E+00	9.27E-01	5.51E-05	1.47E-01	0.00E+00	1.47E-01

Table A-74
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 13 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.82E+04	1.82E+04	0.00E+00	0.00E+00	4.00E-03	7.26E+01	7.26E+01	4.39E+01	8.77E+00	0.00E+00	5.26E+01	4.39E+01	8.77E+00	0.00E+00	5.26E+01
Arsenic	1.66E+01	1.66E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	6.64E-01	6.64E-01	4.00E-02	8.02E-02	0.00E+00	1.20E-01	4.00E-02	8.02E-02	0.00E+00	1.20E-01
Calcium	4.64E+04	4.64E+04	0.00E+00	0.00E+00	3.50E+00	1.62E+05	1.62E+05	1.12E+02	1.96E+04	0.00E+00	1.97E+04	1.12E+02	1.96E+04	0.00E+00	1.97E+04
Chromium	2.95E+01	2.95E+01	0.00E+00	0.00E+00	7.50E-03	2.21E-01	2.21E-01	7.12E-02	2.67E-02	0.00E+00	9.78E-02	7.12E-02	2.67E-02	0.00E+00	9.78E-02
Copper	4.19E+01	4.19E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	8.50E+00	8.50E+00	1.01E-01	1.03E+00	0.00E+00	1.13E+00	1.01E-01	1.03E+00	0.00E+00	1.13E+00
Iron	2.55E+04	2.55E+04	0.00E+00	0.00E+00	4.00E-03	1.02E+02	1.02E+02	6.16E+01	1.23E+01	0.00E+00	7.39E+01	6.16E+01	1.23E+01	0.00E+00	7.39E+01
Lead	1.28E+02	1.28E+02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	4.03E+00	4.03E+00	3.09E-01	4.87E-01	0.00E+00	7.96E-01	3.09E-01	4.87E-01	0.00E+00	7.96E-01
Magnesium	2.91E+03	2.91E+03	0.00E+00	0.00E+00	1.00E+00	2.91E+03	2.91E+03	7.02E+00	3.51E+02	0.00E+00	3.58E+02	7.02E+00	3.51E+02	0.00E+00	3.58E+02
Manganese	7.53E+02	7.53E+02	0.00E+00	0.00E+00	2.50E-01	1.88E+02	1.88E+02	1.82E+00	2.27E+01	0.00E+00	2.45E+01	1.82E+00	2.27E+01	0.00E+00	2.45E+01
Mercury	3.25E-01	3.25E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	2.00E-01	2.00E-01	7.85E-04	2.42E-02	0.00E+00	2.50E-02	7.85E-04	2.42E-02	0.00E+00	2.50E-02
Potassium	7.12E+02	7.12E+02	0.00E+00	0.00E+00	1.00E+00	7.12E+02	7.12E+02	1.72E+00	8.60E+01	0.00E+00	8.77E+01	1.72E+00	8.60E+01	0.00E+00	8.77E+01
Selenium	1.90E+00	1.90E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	1.03E+00	1.03E+00	4.59E-03	1.25E-01	0.00E+00	1.29E-01	4.59E-03	1.25E-01	0.00E+00	1.29E-01
Sodium	1.26E+02	1.26E+02	0.00E+00	0.00E+00	7.50E-02	9.45E+00	9.45E+00	3.04E-01	1.14E+00	0.00E+00	1.45E+00	3.04E-01	1.14E+00	0.00E+00	1.45E+00
Vanadium	7.17E+01	7.17E+01	0.00E+00	0.00E+00	5.50E-03	3.94E-01	3.94E-01	1.73E-01	4.76E-02	0.00E+00	2.21E-01	1.73E-01	4.76E-02	0.00E+00	2.21E-01
Zinc	1.14E+02	1.14E+02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	6.68E+01	6.68E+01	2.75E-01	8.07E+00	0.00E+00	8.35E+00	2.75E-01	8.07E+00	0.00E+00	8.35E+00
PAHs															
Acenaphthylene	1.37E-02	1.37E-02	0.00E+00	0.00E+00	2.10E-01	2.88E-03	2.88E-03	3.31E-05	3.48E-04	0.00E+00	3.81E-04	3.31E-05	3.48E-04	0.00E+00	3.81E-04
Benzo(a)Anthracene	8.03E-02	8.03E-02	0.00E+00	0.00E+00	2.06E-02	1.65E-03	1.65E-03	1.94E-04	2.00E-04	0.00E+00	3.94E-04	1.94E-04	2.00E-04	0.00E+00	3.94E-04
Benzo(a)Pyrene	8.78E-02	8.78E-02	0.00E+00	0.00E+00	1.37E-02	1.20E-03	1.20E-03	2.12E-04	1.45E-04	0.00E+00	3.57E-04	2.12E-04	1.45E-04	0.00E+00	3.57E-04
Benzo(b)Fluoranthene	1.74E-01	1.74E-01	0.00E+00	0.00E+00	1.12E-02	1.95E-03	1.95E-03	4.20E-04	2.35E-04	0.00E+00	6.56E-04	4.20E-04	2.35E-04	0.00E+00	6.56E-04
Benzo(g,h,i)Perylene	2.47E-02	2.47E-02	0.00E+00	0.00E+00	6.02E-03	1.49E-04	1.49E-04	5.97E-05	1.80E-05	0.00E+00	7.76E-05	5.97E-05	1.80E-05	0.00E+00	7.76E-05
Benzo(k)Fluoranthene	1.18E-01	1.18E-01	0.00E+00	0.00E+00	1.12E-02	1.32E-03	1.32E-03	2.85E-04	1.60E-04	0.00E+00	4.45E-04	2.85E-04	1.60E-04	0.00E+00	4.45E-04
Chrysene	1.06E-01	1.06E-01	0.00E+00	0.00E+00	2.06E-02	2.18E-03	2.18E-03	2.56E-04	2.64E-04	0.00E+00	5.20E-04	2.56E-04	2.64E-04	0.00E+00	5.20E-04
Dibenzo(a,h)Anthracene	1.25E-02	1.25E-02	0.00E+00	0.00E+00	6.78E-03	8.48E-05	8.48E-05	3.02E-05	1.02E-05	0.00E+00	4.04E-05	3.02E-05	1.02E-05	0.00E+00	4.04E-05
Fluoranthene	1.12E-01	1.12E-01	0.00E+00	0.00E+00	5.33E-02	5.97E-03	5.97E-03	2.71E-04	7.21E-04	0.00E+00	9.92E-04	2.71E-04	7.21E-04	0.00E+00	9.92E-04
Indeno(1,2,3-Cd)Pyrene	2.91E-02	2.91E-02	0.00E+00	0.00E+00	6.06E-03	1.76E-04	1.76E-04	7.03E-05	2.13E-05	0.00E+00	9.16E-05	7.03E-05	2.13E-05	0.00E+00	9.16E-05
Pyrene	1.09E-01	1.09E-01	0.00E+00	0.00E+00	5.85E-02	6.38E-03	6.38E-03	2.63E-04	7.70E-04	0.00E+00	1.03E-03	2.63E-04	7.70E-04	0.00E+00	1.03E-03
Total LMW PAHs	1.26E-01	1.26E-01	0.00E+00	0.00E+00	--	--	--	3.04E-04	1.07E-03	0.00E+00	1.37E-03	3.04E-04	1.07E-03	0.00E+00	1.37E-03
Total HMW PAHs	7.41E-01	7.41E-01	0.00E+00	0.00E+00	--	--	--	1.79E-03	1.82E-03	0.00E+00	3.61E-03	1.79E-03	1.82E-03	0.00E+00	3.61E-03
Pesticides															
4,4'-DDD	2.26E-02	2.26E-02	0.00E+00	0.00E+00	1.57E-02	3.54E-04	3.54E-04	5.46E-05	4.28E-05	0.00E+00	9.74E-05	5.46E-05	4.28E-05	0.00E+00	9.74E-05
4,4'-DDE	3.65E-01	3.65E-01	0.00E+00	0.00E+00	1.32E-02	4.81E-03	4.81E-03	8.82E-04	5.81E-04	0.00E+00	1.46E-03	8.82E-04	5.81E-04	0.00E+00	1.46E-03
4,4'-DDT	1.36E-01	1.36E-01	0.00E+00	0.00E+00	4.61E-03	6.26E-04	6.26E-04	3.29E-04	7.57E-05	0.00E+00	4.04E-04	3.29E-04	7.57E-05	0.00E+00	4.04E-04
DDTr	--	--	--	--	--	--	--	1.27E-03	7.00E-04	0.00E+00	1.96E-03	1.27E-03	7.00E-04	0.00E+00	1.96E-03
Alpha-Chlordane	7.10E-03	7.10E-03	0.00E+00	0.00E+00	9.33E-03	6.62E-05	6.62E-05	1.72E-05	8.00E-06	0.00E+00	2.52E-05	1.72E-05	8.00E-06	0.00E+00	2.52E-05
SVOCs															
Bis(2-ethylhexyl)phthalate	6.25E-02	6.25E-02	0.00E+00	0.00E+00	4.30E-02	2.69E-03	2.69E-03	1.51E-04	3.25E-04	0.00E+00	4.76E-04	1.51E-04	3.25E-04	0.00E+00	4.76E-04
Pentachlorophenol	5.70E-03	5.70E-03	0.00E+00	0.00E+00	4.25E-02	2.42E-04	2.42E-04	1.38E-05	2.93E-05	0.00E+00	4.31E-05	1.38E-05	2.93E-05	0.00E+00	4.31E-05
VOCs															
1,1-dichloroethene	1.20E-03	1.20E-03	0.00E+00	0.00E+00	2.27E+00	2.73E-03	2.73E-03	2.90E-06	3.30E-04	0.00E+00	3.33E-04	2.90E-06	3.30E-04	0.00E+00	3.33E-04

Table A-75
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 13 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.21E+04	1.65E+04	0.00E+00	0.00E+00	4.00E-03	8.84E+01	6.62E+01	7.40E+00	1.48E+00	0.00E+00	8.88E+00	5.54E+00	1.11E+00	0.00E+00	6.65E+00
Arsenic	1.46E+01	8.17E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	6.19E-01	4.46E-01	4.89E-03	1.04E-02	0.00E+00	1.53E-02	2.74E-03	7.47E-03	0.00E+00	1.02E-02
Calcium	1.84E+04	1.17E+04	0.00E+00	0.00E+00	3.50E+00	6.44E+04	4.11E+04	6.16E+00	1.08E+03	0.00E+00	1.08E+03	3.93E+00	6.88E+02	0.00E+00	6.92E+02
Chromium	3.31E+01	1.86E+01	0.00E+00	0.00E+00	7.50E-03	2.48E-01	1.39E-01	1.11E-02	4.16E-03	0.00E+00	1.52E-02	6.23E-03	2.33E-03	0.00E+00	8.56E-03
Copper	4.65E+01	2.35E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	8.86E+00	6.77E+00	1.56E-02	1.48E-01	0.00E+00	1.64E-01	7.88E-03	1.13E-01	0.00E+00	1.21E-01
Iron	2.73E+04	1.95E+04	0.00E+00	0.00E+00	4.00E-03	1.09E+02	7.78E+01	9.15E+00	1.83E+00	0.00E+00	1.10E+01	6.52E+00	1.30E+00	0.00E+00	7.82E+00
Lead	5.62E+02	1.12E+02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	9.24E+00	3.73E+00	1.88E-01	1.55E-01	0.00E+00	3.43E-01	3.74E-02	6.25E-02	0.00E+00	9.99E-02
Magnesium	4.55E+03	2.31E+03	0.00E+00	0.00E+00	1.00E+00	4.55E+03	2.31E+03	1.52E+00	7.62E+01	0.00E+00	7.77E+01	7.75E-01	3.87E+01	0.00E+00	3.95E+01
Manganese	1.23E+03	6.44E+02	0.00E+00	0.00E+00	2.50E-01	3.08E+02	1.61E+02	4.12E-01	5.15E+00	0.00E+00	5.56E+00	2.16E-01	2.70E+00	0.00E+00	2.91E+00
Mercury	4.10E-01	2.01E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	2.27E-01	1.54E-01	1.37E-04	3.81E-03	0.00E+00	3.95E-03	6.72E-05	2.58E-03	0.00E+00	2.65E-03
Potassium	2.27E+03	9.09E+02	0.00E+00	0.00E+00	1.00E+00	2.27E+03	9.09E+02	7.60E-01	3.80E+01	0.00E+00	3.88E+01	3.05E-01	1.52E+01	0.00E+00	1.55E+01
Selenium	2.80E+00	1.45E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	1.58E+00	7.64E-01	9.38E-04	2.65E-02	0.00E+00	2.74E-02	4.85E-04	1.28E-02	0.00E+00	1.33E-02
Sodium	2.50E+02	1.58E+02	0.00E+00	0.00E+00	7.50E-02	1.88E+01	1.19E+01	8.38E-02	3.14E-01	0.00E+00	3.98E-01	5.30E-02	1.99E-01	0.00E+00	2.52E-01
Vanadium	8.65E+01	4.61E+01	0.00E+00	0.00E+00	5.50E-03	4.76E-01	2.53E-01	2.90E-02	7.97E-03	0.00E+00	3.69E-02	1.54E-02	4.24E-03	0.00E+00	1.97E-02
Zinc	1.41E+02	5.50E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	7.53E+01	4.47E+01	4.72E-02	1.26E+00	0.00E+00	1.31E+00	1.84E-02	7.48E-01	0.00E+00	7.67E-01
PAHs															
Benzo(g,h,i)Perylene	3.25E-02	5.23E-03	0.00E+00	0.00E+00	6.02E-03	1.96E-04	3.15E-05	1.09E-05	3.28E-06	0.00E+00	1.42E-05	1.75E-06	5.27E-07	0.00E+00	2.28E-06
Total HMW PAHs	3.25E-02	5.23E-03	0.00E+00	0.00E+00	--	--	--	1.09E-05	3.28E-06	0.00E+00	1.42E-05	1.75E-06	5.27E-07	0.00E+00	2.28E-06
Pesticides															
4,4'-DDD	6.72E-02	9.82E-03	0.00E+00	0.00E+00	1.57E-02	1.05E-03	1.54E-04	2.25E-05	1.76E-05	0.00E+00	4.02E-05	3.29E-06	2.58E-06	0.00E+00	5.87E-06
4,4'-DDE	4.69E-01	6.73E-02	0.00E+00	0.00E+00	1.32E-02	6.18E-03	8.88E-04	1.57E-04	1.04E-04	0.00E+00	2.61E-04	2.26E-05	1.49E-05	0.00E+00	3.74E-05
4,4'-DDT	5.43E-01	7.88E-02	0.00E+00	0.00E+00	4.61E-03	2.50E-03	3.63E-04	1.82E-04	4.19E-05	0.00E+00	2.24E-04	2.64E-05	6.08E-06	0.00E+00	3.25E-05
DDTr	--	--	--	--	--	--	--	3.62E-04	1.63E-04	0.00E+00	5.25E-04	5.23E-05	2.35E-05	0.00E+00	7.58E-05
Alpha-Chlordane	1.56E-02	2.64E-03	0.00E+00	0.00E+00	9.33E-03	1.45E-04	2.46E-05	5.23E-06	2.44E-06	0.00E+00	7.66E-06	8.85E-07	4.13E-07	0.00E+00	1.30E-06
Dieldrin	4.10E-03	8.50E-04	0.00E+00	0.00E+00	2.74E-02	1.12E-04	2.33E-05	1.37E-06	1.88E-06	0.00E+00	3.26E-06	2.85E-07	3.90E-07	0.00E+00	6.75E-07
Herbicides															
2,4-D	2.88E-01	4.99E-02	0.00E+00	0.00E+00	9.20E-01	2.65E-01	4.60E-02	9.65E-05	4.44E-03	0.00E+00	4.53E-03	1.67E-05	7.70E-04	0.00E+00	7.86E-04
SVOCs															
Pentachlorophenol	1.10E-01	2.92E-02	0.00E+00	0.00E+00	4.25E-02	4.68E-03	1.24E-03	3.69E-05	7.84E-05	0.00E+00	1.15E-04	9.77E-06	2.08E-05	0.00E+00	3.05E-05
VOCs															
1,1-dichloroethene	2.10E-03	1.24E-03	0.00E+00	0.00E+00	2.27E+00	4.78E-03	2.81E-03	7.04E-07	8.00E-05	0.00E+00	8.07E-05	4.14E-07	4.71E-05	0.00E+00	4.75E-05
Acetone	1.44E-01	2.28E-02	0.00E+00	0.00E+00	5.33E+01	7.68E+00	1.22E+00	4.82E-05	1.29E-01	0.00E+00	1.29E-01	7.64E-06	2.04E-02	0.00E+00	2.04E-02

Table A-76
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 13 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.82E+04	1.82E+04	0.00E+00	0.00E+00	4.00E-03	7.26E+01	7.26E+01	6.08E+00	1.22E+00	0.00E+00	7.30E+00	6.08E+00	1.22E+00	0.00E+00	7.30E+00
Arsenic	1.66E+01	1.66E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	6.64E-01	6.64E-01	5.54E-03	1.11E-02	0.00E+00	1.67E-02	5.54E-03	1.11E-02	0.00E+00	1.67E-02
Calcium	4.64E+04	4.64E+04	0.00E+00	0.00E+00	3.50E+00	1.62E+05	1.62E+05	1.55E+01	2.72E+03	0.00E+00	2.74E+03	1.55E+01	2.72E+03	0.00E+00	2.74E+03
Chromium	2.95E+01	2.95E+01	0.00E+00	0.00E+00	7.50E-03	2.21E-01	2.21E-01	9.87E-03	3.70E-03	0.00E+00	1.36E-02	9.87E-03	3.70E-03	0.00E+00	1.36E-02
Copper	4.19E+01	4.19E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	8.50E+00	8.50E+00	1.40E-02	1.42E-01	0.00E+00	1.56E-01	1.40E-02	1.42E-01	0.00E+00	1.56E-01
Iron	2.55E+04	2.55E+04	0.00E+00	0.00E+00	4.00E-03	1.02E+02	1.02E+02	8.54E+00	1.71E+00	0.00E+00	1.03E+01	8.54E+00	1.71E+00	0.00E+00	1.03E+01
Lead	1.28E+02	1.28E+02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	4.03E+00	4.03E+00	4.29E-02	6.75E-02	0.00E+00	1.10E-01	4.29E-02	6.75E-02	0.00E+00	1.10E-01
Magnesium	2.91E+03	2.91E+03	0.00E+00	0.00E+00	1.00E+00	2.91E+03	2.91E+03	9.73E-01	4.87E+01	0.00E+00	4.96E+01	9.73E-01	4.87E+01	0.00E+00	4.96E+01
Manganese	7.53E+02	7.53E+02	0.00E+00	0.00E+00	2.50E-01	1.88E+02	1.88E+02	2.52E-01	3.15E+00	0.00E+00	3.40E+00	2.52E-01	3.15E+00	0.00E+00	3.40E+00
Mercury	3.25E-01	3.25E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	2.00E-01	2.00E-01	1.09E-04	3.36E-03	0.00E+00	3.47E-03	1.09E-04	3.36E-03	0.00E+00	3.47E-03
Potassium	7.12E+02	7.12E+02	0.00E+00	0.00E+00	1.00E+00	7.12E+02	7.12E+02	2.39E-01	1.19E+01	0.00E+00	1.22E+01	2.39E-01	1.19E+01	0.00E+00	1.22E+01
Selenium	1.90E+00	1.90E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	1.03E+00	1.03E+00	6.37E-04	1.73E-02	0.00E+00	1.79E-02	6.37E-04	1.73E-02	0.00E+00	1.79E-02
Sodium	1.26E+02	1.26E+02	0.00E+00	0.00E+00	7.50E-02	9.45E+00	9.45E+00	4.22E-02	1.58E-01	0.00E+00	2.00E-01	4.22E-02	1.58E-01	0.00E+00	2.00E-01
Vanadium	7.17E+01	7.17E+01	0.00E+00	0.00E+00	5.50E-03	3.94E-01	3.94E-01	2.40E-02	6.60E-03	0.00E+00	3.06E-02	2.40E-02	6.60E-03	0.00E+00	3.06E-02
Zinc	1.14E+02	1.14E+02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	6.68E+01	6.68E+01	3.81E-02	1.12E+00	0.00E+00	1.16E+00	3.81E-02	1.12E+00	0.00E+00	1.16E+00
PAHs															
Acenaphthylene	1.37E-02	1.37E-02	0.00E+00	0.00E+00	2.10E-01	2.88E-03	2.88E-03	4.59E-06	4.82E-05	0.00E+00	5.28E-05	4.59E-06	4.82E-05	0.00E+00	5.28E-05
Benzo(a)Anthracene	8.03E-02	8.03E-02	0.00E+00	0.00E+00	2.06E-02	1.65E-03	1.65E-03	2.69E-05	2.77E-05	0.00E+00	5.46E-05	2.69E-05	2.77E-05	0.00E+00	5.46E-05
Benzo(a)Pyrene	8.78E-02	8.78E-02	0.00E+00	0.00E+00	1.37E-02	1.20E-03	1.20E-03	2.94E-05	2.01E-05	0.00E+00	4.96E-05	2.94E-05	2.01E-05	0.00E+00	4.96E-05
Benzo(b)Fluoranthene	1.74E-01	1.74E-01	0.00E+00	0.00E+00	1.12E-02	1.95E-03	1.95E-03	5.83E-05	3.26E-05	0.00E+00	9.09E-05	5.83E-05	3.26E-05	0.00E+00	9.09E-05
Benzo(g,h,i)Perylene	2.47E-02	2.47E-02	0.00E+00	0.00E+00	6.02E-03	1.49E-04	1.49E-04	8.27E-06	2.49E-06	0.00E+00	1.08E-05	8.27E-06	2.49E-06	0.00E+00	1.08E-05
Benzo(k)Fluoranthene	1.18E-01	1.18E-01	0.00E+00	0.00E+00	1.12E-02	1.32E-03	1.32E-03	3.95E-05	2.21E-05	0.00E+00	6.17E-05	3.95E-05	2.21E-05	0.00E+00	6.17E-05
Chrysene	1.06E-01	1.06E-01	0.00E+00	0.00E+00	2.06E-02	2.18E-03	2.18E-03	3.55E-05	3.66E-05	0.00E+00	7.21E-05	3.55E-05	3.66E-05	0.00E+00	7.21E-05
Dibenzo(a,h)Anthracene	1.25E-02	1.25E-02	0.00E+00	0.00E+00	6.78E-03	8.48E-05	8.48E-05	4.19E-06	1.42E-06	0.00E+00	5.61E-06	4.19E-06	1.42E-06	0.00E+00	5.61E-06
Fluoranthene	1.12E-01	1.12E-01	0.00E+00	0.00E+00	5.33E-02	5.97E-03	5.97E-03	3.75E-05	1.00E-04	0.00E+00	1.38E-04	3.75E-05	1.00E-04	0.00E+00	1.38E-04
Indeno(1,2,3-Cd)Pyrene	2.91E-02	2.91E-02	0.00E+00	0.00E+00	6.06E-03	1.76E-04	1.76E-04	9.75E-06	2.95E-06	0.00E+00	1.27E-05	9.75E-06	2.95E-06	0.00E+00	1.27E-05
Pyrene	1.09E-01	1.09E-01	0.00E+00	0.00E+00	5.85E-02	6.38E-03	6.38E-03	3.65E-05	1.07E-04	0.00E+00	1.43E-04	3.65E-05	1.07E-04	0.00E+00	1.43E-04
Total LMW PAHs	1.26E-01	1.26E-01	0.00E+00	0.00E+00	--	--	--	4.21E-05	1.48E-04	0.00E+00	1.90E-04	4.21E-05	1.48E-04	0.00E+00	1.90E-04
Total HMW PAHs	7.41E-01	7.41E-01	0.00E+00	0.00E+00	--	--	--	2.48E-04	2.53E-04	0.00E+00	5.01E-04	2.48E-04	2.53E-04	0.00E+00	5.01E-04
Pesticides															
4,4'-DDD	2.26E-02	2.26E-02	0.00E+00	0.00E+00	1.57E-02	3.54E-04	3.54E-04	7.57E-06	5.93E-06	0.00E+00	1.35E-05	7.57E-06	5.93E-06	0.00E+00	1.35E-05
4,4'-DDE	3.65E-01	3.65E-01	0.00E+00	0.00E+00	1.32E-02	4.81E-03	4.81E-03	1.22E-04	8.06E-05	0.00E+00	2.03E-04	1.22E-04	8.06E-05	0.00E+00	2.03E-04
4,4'-DDT	1.36E-01	1.36E-01	0.00E+00	0.00E+00	4.61E-03	6.26E-04	6.26E-04	4.56E-05	1.05E-05	0.00E+00	5.61E-05	4.56E-05	1.05E-05	0.00E+00	5.61E-05
DDTr	--	--	0.00E+00	0.00E+00	--	--	--	1.75E-04	9.70E-05	0.00E+00	2.72E-04	1.75E-04	9.70E-05	0.00E+00	2.72E-04
Alpha-Chlordane	7.10E-03	7.10E-03	0.00E+00	0.00E+00	9.33E-03	6.62E-05	6.62E-05	2.38E-06	1.11E-06	0.00E+00	3.49E-06	2.38E-06	1.11E-06	0.00E+00	3.49E-06
SVOCs															
Bis(2-ethylhexyl)phthalate	6.25E-02	6.25E-02	0.00E+00	0.00E+00	4.30E-02	2.69E-03	2.69E-03	2.09E-05	4.50E-05	0.00E+00	6.60E-05	2.09E-05	4.50E-05	0.00E+00	6.60E-05
Pentachlorophenol	5.70E-03	5.70E-03	0.00E+00	0.00E+00	4.25E-02	2.42E-04	2.42E-04	1.91E-06	4.06E-06	0.00E+00	5.97E-06	1.91E-06	4.06E-06	0.00E+00	5.97E-06
VOCs															
1,1-dichloroethene	1.20E-03	1.20E-03	0.00E+00	0.00E+00	2.27E+00	2.73E-03	2.73E-03	4.02E-07	4.57E-05	0.00E+00	4.61E-05	4.02E-07	4.57E-05	0.00E+00	4.61E-05

Table A-77
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 13 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.21E+04	1.65E+04	0.00E+00	0.00E+00	1.18E-01	2.61E+03	1.95E+03	0.00E+00	2.17E+02	0.00E+00	2.17E+02	0.00E+00	1.63E+02	0.00E+00	1.63E+02
Arsenic	1.46E+01	8.17E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	1.60E+00	1.06E+00	0.00E+00	1.34E-01	0.00E+00	1.34E-01	0.00E+00	8.87E-02	0.00E+00	8.87E-02
Calcium	1.84E+04	1.17E+04	0.00E+00	0.00E+00	1.00E+00	1.84E+04	1.17E+04	0.00E+00	1.53E+03	0.00E+00	1.53E+03	0.00E+00	9.78E+02	0.00E+00	9.78E+02
Chromium	3.31E+01	1.86E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.45E+00	9.83E+00	0.00E+00	7.88E-01	0.00E+00	7.88E-01	0.00E+00	8.19E-01	0.00E+00	8.19E-01
Copper	4.65E+01	2.35E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.47E+01	1.23E+01	0.00E+00	1.23E+00	0.00E+00	1.23E+00	0.00E+00	1.02E+00	0.00E+00	1.02E+00
Iron	2.73E+04	1.95E+04	0.00E+00	0.00E+00	7.80E-02	2.13E+03	1.52E+03	0.00E+00	1.77E+02	0.00E+00	1.77E+02	0.00E+00	1.26E+02	0.00E+00	1.26E+02
Lead	5.62E+02	1.12E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.33E+02	3.61E+01	0.00E+00	1.11E+01	0.00E+00	1.11E+01	0.00E+00	3.01E+00	0.00E+00	3.01E+00
Magnesium	4.55E+03	2.31E+03	0.00E+00	0.00E+00	5.30E-01	2.41E+03	1.23E+03	0.00E+00	2.01E+02	0.00E+00	2.01E+02	0.00E+00	1.02E+02	0.00E+00	1.02E+02
Manganese	1.23E+03	6.44E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	5.70E+01	3.67E+01	0.00E+00	4.75E+00	0.00E+00	4.75E+00	0.00E+00	3.06E+00	0.00E+00	3.06E+00
Mercury	4.10E-01	2.01E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.54E-01	4.17E-01	0.00E+00	3.78E-02	0.00E+00	3.78E-02	0.00E+00	3.48E-02	0.00E+00	3.48E-02
Potassium	2.27E+03	9.09E+02	0.00E+00	0.00E+00	1.00E+00	2.27E+03	9.09E+02	0.00E+00	1.89E+02	0.00E+00	1.89E+02	0.00E+00	7.58E+01	0.00E+00	7.58E+01
Selenium	2.80E+00	1.45E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	1.97E+00	1.22E+00	0.00E+00	1.64E-01	0.00E+00	1.64E-01	0.00E+00	1.01E-01	0.00E+00	1.01E-01
Sodium	2.50E+02	1.58E+02	0.00E+00	0.00E+00	1.00E+00	2.50E+02	1.58E+02	0.00E+00	2.08E+01	0.00E+00	2.08E+01	0.00E+00	1.32E+01	0.00E+00	1.32E+01
Vanadium	8.65E+01	4.61E+01	0.00E+00	0.00E+00	8.80E-01	7.61E+01	4.05E+01	0.00E+00	6.34E+00	0.00E+00	6.34E+00	0.00E+00	3.38E+00	0.00E+00	3.38E+00
Zinc	1.41E+02	5.50E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	4.34E+02	3.19E+02	0.00E+00	3.61E+01	0.00E+00	3.61E+01	0.00E+00	2.65E+01	0.00E+00	2.65E+01
PAHs															
Benzo(g,h,i)Perylene	3.25E-02	5.23E-03	0.00E+00	0.00E+00	1.50E-01	4.88E-03	7.84E-04	0.00E+00	4.06E-04	0.00E+00	4.06E-04	0.00E+00	6.53E-05	0.00E+00	6.53E-05
Total HMW PAHs	3.25E-02	5.23E-03	0.00E+00	0.00E+00	--	--	--	0.00E+00	4.06E-04	0.00E+00	4.06E-04	0.00E+00	6.53E-05	0.00E+00	6.53E-05
Pesticides															
4,4'-DDD	6.72E-02	9.82E-03	0.00E+00	0.00E+00	9.00E+00	6.05E-01	8.84E-02	0.00E+00	5.04E-02	0.00E+00	5.04E-02	0.00E+00	7.36E-03	0.00E+00	7.36E-03
4,4'-DDE	4.69E-01	6.73E-02	0.00E+00	0.00E+00	9.00E+00	4.22E+00	6.06E-01	0.00E+00	3.52E-01	0.00E+00	3.52E-01	0.00E+00	5.05E-02	0.00E+00	5.05E-02
4,4'-DDT	5.43E-01	7.88E-02	0.00E+00	0.00E+00	9.00E+00	4.89E+00	7.09E-01	0.00E+00	4.07E-01	0.00E+00	4.07E-01	0.00E+00	5.91E-02	0.00E+00	5.91E-02
DDTr	--	--	--	--	--	--	--	0.00E+00	8.09E-01	0.00E+00	8.09E-01	0.00E+00	1.17E-01	0.00E+00	1.17E-01
Alpha-Chlordane	1.56E-02	2.64E-03	0.00E+00	0.00E+00	1.00E+00	1.56E-02	2.64E-03	0.00E+00	1.30E-03	0.00E+00	1.30E-03	0.00E+00	2.20E-04	0.00E+00	2.20E-04
Dieldrin	4.10E-03	8.50E-04	0.00E+00	0.00E+00	1.79E+00	7.34E-03	1.52E-03	0.00E+00	6.12E-04	0.00E+00	6.12E-04	0.00E+00	1.27E-04	0.00E+00	1.27E-04
Herbicides															
2,4-D	2.88E-01	4.99E-02	0.00E+00	0.00E+00	1.00E+00	2.88E-01	4.99E-02	0.00E+00	2.40E-02	0.00E+00	2.40E-02	0.00E+00	4.16E-03	0.00E+00	4.16E-03
SVOCs															
Pentachlorophenol	1.10E-01	2.92E-02	0.00E+00	0.00E+00	1.00E+00	1.10E-01	2.92E-02	0.00E+00	9.17E-03	0.00E+00	9.17E-03	0.00E+00	2.43E-03	0.00E+00	2.43E-03
VOCs															
1,1-dichloroethene	2.10E-03	1.24E-03	0.00E+00	0.00E+00	1.00E+00	2.10E-03	1.24E-03	0.00E+00	1.75E-04	0.00E+00	1.75E-04	0.00E+00	1.03E-04	0.00E+00	1.03E-04
Acetone	1.44E-01	2.28E-02	0.00E+00	0.00E+00	1.00E+00	1.44E-01	2.28E-02	0.00E+00	1.20E-02	0.00E+00	1.20E-02	0.00E+00	1.90E-03	0.00E+00	1.90E-03

Table A-78
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 13 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.82E+04	1.82E+04	0.00E+00	0.00E+00	1.18E-01	2.14E+03	2.14E+03	0.00E+00	1.78E+02	0.00E+00	1.78E+02	0.00E+00	1.78E+02	0.00E+00	1.78E+02
Arsenic	1.66E+01	1.66E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	1.75E+00	1.75E+00	0.00E+00	1.46E-01	0.00E+00	1.46E-01	0.00E+00	1.46E-01	0.00E+00	1.46E-01
Calcium	4.64E+04	4.64E+04	0.00E+00	0.00E+00	1.00E+00	4.64E+04	4.64E+04	0.00E+00	3.87E+03	0.00E+00	3.87E+03	0.00E+00	3.87E+03	0.00E+00	3.87E+03
Chromium	2.95E+01	2.95E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.53E+00	9.53E+00	0.00E+00	7.94E-01	0.00E+00	7.94E-01	0.00E+00	7.94E-01	0.00E+00	7.94E-01
Copper	4.19E+01	4.19E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.43E+01	1.43E+01	0.00E+00	1.19E+00	0.00E+00	1.19E+00	0.00E+00	1.19E+00	0.00E+00	1.19E+00
Iron	2.55E+04	2.55E+04	0.00E+00	0.00E+00	7.80E-02	1.99E+03	1.99E+03	0.00E+00	1.66E+02	0.00E+00	1.66E+02	0.00E+00	1.66E+02	0.00E+00	1.66E+02
Lead	1.28E+02	1.28E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	4.03E+01	4.03E+01	0.00E+00	3.36E+00	0.00E+00	3.36E+00	0.00E+00	3.36E+00	0.00E+00	3.36E+00
Magnesium	2.91E+03	2.91E+03	0.00E+00	0.00E+00	5.30E-01	1.54E+03	1.54E+03	0.00E+00	1.28E+02	0.00E+00	1.28E+02	0.00E+00	1.28E+02	0.00E+00	1.28E+02
Manganese	7.53E+02	7.53E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	4.08E+01	4.08E+01	0.00E+00	3.40E+00	0.00E+00	3.40E+00	0.00E+00	3.40E+00	0.00E+00	3.40E+00
Mercury	3.25E-01	3.25E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.42E-01	4.42E-01	0.00E+00	3.68E-02	0.00E+00	3.68E-02	0.00E+00	3.68E-02	0.00E+00	3.68E-02
Potassium	7.12E+02	7.12E+02	0.00E+00	0.00E+00	1.00E+00	7.12E+02	7.12E+02	0.00E+00	5.93E+01	0.00E+00	5.93E+01	0.00E+00	5.93E+01	0.00E+00	5.93E+01
Selenium	1.90E+00	1.90E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	1.49E+00	1.49E+00	0.00E+00	1.24E-01	0.00E+00	1.24E-01	0.00E+00	1.24E-01	0.00E+00	1.24E-01
Sodium	1.26E+02	1.26E+02	0.00E+00	0.00E+00	1.00E+00	1.26E+02	1.26E+02	0.00E+00	1.05E+01	0.00E+00	1.05E+01	0.00E+00	1.05E+01	0.00E+00	1.05E+01
Vanadium	7.17E+01	7.17E+01	0.00E+00	0.00E+00	8.80E-01	6.31E+01	6.31E+01	0.00E+00	5.25E+00	0.00E+00	5.25E+00	0.00E+00	5.25E+00	0.00E+00	5.25E+00
Zinc	1.14E+02	1.14E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	4.04E+02	4.04E+02	0.00E+00	3.37E+01	0.00E+00	3.37E+01	0.00E+00	3.37E+01	0.00E+00	3.37E+01
PAHs															
Acenaphthylene	1.37E-02	1.37E-02	0.00E+00	0.00E+00	2.20E-01	3.01E-03	3.01E-03	0.00E+00	2.51E-04	0.00E+00	2.51E-04	0.00E+00	2.51E-04	0.00E+00	2.51E-04
Benzo(a)Anthracene	8.03E-02	8.03E-02	0.00E+00	0.00E+00	2.70E-01	2.17E-02	2.17E-02	0.00E+00	1.81E-03	0.00E+00	1.81E-03	0.00E+00	1.81E-03	0.00E+00	1.81E-03
Benzo(a)Pyrene	8.78E-02	8.78E-02	0.00E+00	0.00E+00	3.40E-01	2.99E-02	2.99E-02	0.00E+00	2.49E-03	0.00E+00	2.49E-03	0.00E+00	2.49E-03	0.00E+00	2.49E-03
Benzo(b)Fluoranthene	1.74E-01	1.74E-01	0.00E+00	0.00E+00	2.10E-01	3.65E-02	3.65E-02	0.00E+00	3.04E-03	0.00E+00	3.04E-03	0.00E+00	3.04E-03	0.00E+00	3.04E-03
Benzo(g,h,i)Perylene	2.47E-02	2.47E-02	0.00E+00	0.00E+00	1.50E-01	3.71E-03	3.71E-03	0.00E+00	3.09E-04	0.00E+00	3.09E-04	0.00E+00	3.09E-04	0.00E+00	3.09E-04
Benzo(k)Fluoranthene	1.18E-01	1.18E-01	0.00E+00	0.00E+00	2.10E-01	2.48E-02	2.48E-02	0.00E+00	2.06E-03	0.00E+00	2.06E-03	0.00E+00	2.06E-03	0.00E+00	2.06E-03
Chrysene	1.06E-01	1.06E-01	0.00E+00	0.00E+00	4.40E-01	4.66E-02	4.66E-02	0.00E+00	3.89E-03	0.00E+00	3.89E-03	0.00E+00	3.89E-03	0.00E+00	3.89E-03
Dibenzo(a,h)Anthracene	1.25E-02	1.25E-02	0.00E+00	0.00E+00	4.90E-01	6.13E-03	6.13E-03	0.00E+00	5.10E-04	0.00E+00	5.10E-04	0.00E+00	5.10E-04	0.00E+00	5.10E-04
Fluoranthene	1.12E-01	1.12E-01	0.00E+00	0.00E+00	3.70E-01	4.14E-02	4.14E-02	0.00E+00	3.45E-03	0.00E+00	3.45E-03	0.00E+00	3.45E-03	0.00E+00	3.45E-03
Indeno(1,2,3-Cd)Pyrene	2.91E-02	2.91E-02	0.00E+00	0.00E+00	4.10E-01	1.19E-02	1.19E-02	0.00E+00	9.94E-04	0.00E+00	9.94E-04	0.00E+00	9.94E-04	0.00E+00	9.94E-04
Pyrene	1.09E-01	1.09E-01	0.00E+00	0.00E+00	3.90E-01	4.25E-02	4.25E-02	0.00E+00	3.54E-03	0.00E+00	3.54E-03	0.00E+00	3.54E-03	0.00E+00	3.54E-03
Total LMW PAHs	1.26E-01	1.26E-01	0.00E+00	0.00E+00	--	--	--	0.00E+00	3.70E-03	0.00E+00	3.70E-03	0.00E+00	3.70E-03	0.00E+00	3.70E-03
Total HMW PAHs	7.41E-01	7.41E-01	0.00E+00	0.00E+00	--	--	--	0.00E+00	1.86E-02	0.00E+00	1.86E-02	0.00E+00	1.86E-02	0.00E+00	1.86E-02
Pesticides															
4,4'-DDD	2.26E-02	2.26E-02	0.00E+00	0.00E+00	9.00E+00	2.03E-01	2.03E-01	0.00E+00	1.69E-02	0.00E+00	1.69E-02	0.00E+00	1.69E-02	0.00E+00	1.69E-02
4,4'-DDE	3.65E-01	3.65E-01	0.00E+00	0.00E+00	9.00E+00	3.29E+00	3.29E+00	0.00E+00	2.74E-01	0.00E+00	2.74E-01	0.00E+00	2.74E-01	0.00E+00	2.74E-01
4,4'-DDT	1.36E-01	1.36E-01	0.00E+00	0.00E+00	9.00E+00	1.22E+00	1.22E+00	0.00E+00	1.02E-01	0.00E+00	1.02E-01	0.00E+00	1.02E-01	0.00E+00	1.02E-01
DDTr	--	--	0.00E+00	0.00E+00	--	--	--	0.00E+00	3.93E-01	0.00E+00	3.93E-01	0.00E+00	3.93E-01	0.00E+00	3.93E-01
Alpha-Chlordane	7.10E-03	7.10E-03	0.00E+00	0.00E+00	1.00E+00	7.10E-03	7.10E-03	0.00E+00	5.92E-04	0.00E+00	5.92E-04	0.00E+00	5.92E-04	0.00E+00	5.92E-04
SVOCs															
Bis(2-ethylhexyl)phthalate	6.25E-02	6.25E-02	0.00E+00	0.00E+00	1.00E+00	6.25E-02	6.25E-02	0.00E+00	5.21E-03	0.00E+00	5.21E-03	0.00E+00	5.21E-03	0.00E+00	5.21E-03
Pentachlorophenol	5.70E-03	5.70E-03	0.00E+00	0.00E+00	1.00E+00	5.70E-03	5.70E-03	0.00E+00	4.75E-04	0.00E+00	4.75E-04	0.00E+00	4.75E-04	0.00E+00	4.75E-04
VOCs															
1,1-dichloroethene	1.20E-03	1.20E-03	0.00E+00	0.00E+00	1.00E+00	1.20E-03	1.20E-03	0.00E+00	1.00E-04	0.00E+00	1.00E-04	0.00E+00	1.00E-04	0.00E+00	1.00E-04

Table A-79
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media for the Site 13 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.21E+04	1.65E+04	0.00E+00	0.00E+00	1.18E-01	2.61E+03	1.95E+03	1.34E+02	3.45E+02	0.00E+00	4.79E+02	1.01E+02	2.58E+02	0.00E+00	3.59E+02
Arsenic	1.46E+01	8.17E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	1.60E+00	1.06E+00	8.88E-02	2.12E-01	0.00E+00	3.01E-01	4.97E-02	1.41E-01	0.00E+00	1.90E-01
Calcium	1.84E+04	1.17E+04	0.00E+00	0.00E+00	1.00E+00	1.84E+04	1.17E+04	1.12E+02	2.43E+03	0.00E+00	2.55E+03	7.14E+01	1.55E+03	0.00E+00	1.62E+03
Chromium	3.31E+01	1.86E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.45E+00	9.83E+00	2.01E-01	1.25E+00	0.00E+00	1.45E+00	1.13E-01	1.30E+00	0.00E+00	1.41E+00
Cobalt	NO COPC	NO COPC	NO COPC	NO COPC	2.91E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	4.65E+01	2.35E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.47E+01	1.23E+01	2.83E-01	1.95E+00	0.00E+00	2.23E+00	1.43E-01	1.63E+00	0.00E+00	1.77E+00
Iron	2.73E+04	1.95E+04	0.00E+00	0.00E+00	7.80E-02	2.13E+03	1.52E+03	1.66E+02	2.82E+02	0.00E+00	4.48E+02	1.18E+02	2.01E+02	0.00E+00	3.19E+02
Lead	5.62E+02	1.12E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.33E+02	3.61E+01	3.42E+00	1.76E+01	0.00E+00	2.10E+01	6.79E-01	4.78E+00	0.00E+00	5.46E+00
Magnesium	4.55E+03	2.31E+03	0.00E+00	0.00E+00	5.30E-01	2.41E+03	1.23E+03	2.77E+01	3.19E+02	0.00E+00	3.47E+02	1.41E+01	1.62E+02	0.00E+00	1.76E+02
Manganese	1.23E+03	6.44E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	5.70E+01	3.67E+01	7.49E+00	7.54E+00	0.00E+00	1.50E+01	3.92E+00	4.85E+00	0.00E+00	8.77E+00
Mercury	4.10E-01	2.01E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.54E-01	4.17E-01	2.50E-03	6.01E-02	0.00E+00	6.26E-02	1.22E-03	5.52E-02	0.00E+00	5.65E-02
Nickel	NO COPC	NO COPC	NO COPC	NO COPC	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	#VALUE!	#VALUE!	0.00E+00	#VALUE!	0.00E+00	#VALUE!	0.00E+00	#VALUE!	0.00E+00	#VALUE!
Potassium	2.27E+03	9.09E+02	0.00E+00	0.00E+00	1.00E+00	2.27E+03	9.09E+02	1.38E+01	3.00E+02	0.00E+00	3.14E+02	5.53E+00	1.20E+02	0.00E+00	1.26E+02
Selenium	2.80E+00	1.45E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	1.97E+00	1.22E+00	1.70E-02	2.61E-01	0.00E+00	2.78E-01	8.82E-03	1.61E-01	0.00E+00	1.70E-01
Sodium	2.50E+02	1.58E+02	0.00E+00	0.00E+00	1.00E+00	2.50E+02	1.58E+02	1.52E+00	3.31E+01	0.00E+00	3.46E+01	9.63E-01	2.09E+01	0.00E+00	2.19E+01
Vanadium	8.65E+01	4.61E+01	0.00E+00	0.00E+00	8.80E-01	7.61E+01	4.05E+01	5.26E-01	1.01E+01	0.00E+00	1.06E+01	2.80E-01	5.36E+00	0.00E+00	5.64E+00
Zinc	1.41E+02	5.50E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	4.34E+02	3.19E+02	8.58E-01	5.74E+01	0.00E+00	5.82E+01	3.35E-01	4.21E+01	0.00E+00	4.25E+01
PAHs															
Benzo(g,h,i)Perylene	3.25E-02	5.23E-03	0.00E+00	0.00E+00	1.50E-01	4.88E-03	7.84E-04	1.98E-04	6.45E-04	0.00E+00	8.43E-04	3.18E-05	1.04E-04	0.00E+00	1.35E-04
Total HMW PAHs	3.25E-02	5.23E-03	0.00E+00	0.00E+00	--	--	--	1.98E-04	6.45E-04	0.00E+00	8.43E-04	3.18E-05	1.04E-04	0.00E+00	1.35E-04
Pesticides															
4,4'-DDD	6.72E-02	9.82E-03	0.00E+00	0.00E+00	9.00E+00	6.05E-01	8.84E-02	4.09E-04	8.00E-02	0.00E+00	8.04E-02	5.98E-05	1.17E-02	0.00E+00	1.17E-02
4,4'-DDE	4.69E-01	6.73E-02	0.00E+00	0.00E+00	9.00E+00	4.22E+00	6.06E-01	2.85E-03	5.58E-01	0.00E+00	5.61E-01	4.10E-04	8.02E-02	0.00E+00	8.06E-02
4,4'-DDT	5.43E-01	7.88E-02	0.00E+00	0.00E+00	9.00E+00	4.89E+00	7.09E-01	3.30E-03	6.47E-01	0.00E+00	6.50E-01	4.80E-04	9.39E-02	0.00E+00	9.43E-02
DDTr	--	--	--	--	--	--	--	6.57E-03	1.28E+00	0.00E+00	1.29E+00	9.49E-04	1.86E-01	0.00E+00	1.87E-01
Alpha-Chlordane	1.56E-02	2.64E-03	0.00E+00	0.00E+00	1.00E+00	1.56E-02	2.64E-03	9.49E-05	2.06E-03	0.00E+00	2.16E-03	1.61E-05	3.50E-04	0.00E+00	3.66E-04
Dieldrin	4.10E-03	8.50E-04	0.00E+00	0.00E+00	1.79E+00	7.34E-03	1.52E-03	2.50E-05	9.71E-04	0.00E+00	9.96E-04	5.17E-06	2.01E-04	0.00E+00	2.06E-04
Herbicides															
2,4-D	2.88E-01	4.99E-02	0.00E+00	0.00E+00	1.00E+00	2.88E-01	4.99E-02	1.75E-03	3.81E-02	0.00E+00	3.99E-02	3.04E-04	6.61E-03	0.00E+00	6.91E-03
SVOCs															
Pentachlorophenol	1.10E-01	2.92E-02	0.00E+00	0.00E+00	1.00E+00	1.10E-01	2.92E-02	6.69E-04	1.46E-02	0.00E+00	1.52E-02	1.77E-04	3.86E-03	0.00E+00	4.03E-03
VOCs															
1,1-dichloroethene	2.10E-03	1.24E-03	0.00E+00	0.00E+00	1.00E+00	2.10E-03	1.24E-03	1.28E-05	2.78E-04	0.00E+00	2.91E-04	7.53E-06	1.64E-04	0.00E+00	1.71E-04
Acetone	1.44E-01	2.28E-02	0.00E+00	0.00E+00	1.00E+00	1.44E-01	2.28E-02	8.76E-04	1.91E-02	0.00E+00	1.99E-02	1.39E-04	3.02E-03	0.00E+00	3.16E-03

Table A-80
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 13 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	1.82E+04	1.82E+04	0.00E+00	0.00E+00	1.18E-01	2.14E+03	2.14E+03	1.10E+02	2.83E+02	0.00E+00	3.94E+02	1.10E+02	2.83E+02	0.00E+00	3.94E+02
Arsenic	1.66E+01	1.66E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	1.75E+00	1.75E+00	1.01E-01	2.32E-01	0.00E+00	3.32E-01	1.01E-01	2.32E-01	0.00E+00	3.32E-01
Calcium	4.64E+04	4.64E+04	0.00E+00	0.00E+00	1.00E+00	4.64E+04	4.64E+04	2.82E+02	6.14E+03	0.00E+00	6.42E+03	2.82E+02	6.14E+03	0.00E+00	6.42E+03
Chromium	2.95E+01	2.95E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.53E+00	9.53E+00	1.79E-01	1.26E+00	0.00E+00	1.44E+00	1.79E-01	1.26E+00	0.00E+00	1.44E+00
Copper	4.19E+01	4.19E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.43E+01	1.43E+01	2.55E-01	1.89E+00	0.00E+00	2.15E+00	2.55E-01	1.89E+00	0.00E+00	2.15E+00
Iron	2.55E+04	2.55E+04	0.00E+00	0.00E+00	7.80E-02	1.99E+03	1.99E+03	1.55E+02	2.63E+02	0.00E+00	4.18E+02	1.55E+02	2.63E+02	0.00E+00	4.18E+02
Lead	1.28E+02	1.28E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	4.03E+01	4.03E+01	7.79E-01	5.34E+00	0.00E+00	6.12E+00	7.79E-01	5.34E+00	0.00E+00	6.12E+00
Magnesium	2.91E+03	2.91E+03	0.00E+00	0.00E+00	5.30E-01	1.54E+03	1.54E+03	1.77E+01	2.04E+02	0.00E+00	2.21E+02	1.77E+01	2.04E+02	0.00E+00	2.21E+02
Manganese	7.53E+02	7.53E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	4.08E+01	4.08E+01	4.58E+00	5.39E+00	0.00E+00	9.97E+00	4.58E+00	5.39E+00	0.00E+00	9.97E+00
Mercury	3.25E-01	3.25E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.42E-01	4.42E-01	1.98E-03	5.85E-02	0.00E+00	6.04E-02	1.98E-03	5.85E-02	0.00E+00	6.04E-02
Potassium	7.12E+02	7.12E+02	0.00E+00	0.00E+00	1.00E+00	7.12E+02	7.12E+02	4.33E+00	9.42E+01	0.00E+00	9.85E+01	4.33E+00	9.42E+01	0.00E+00	9.85E+01
Selenium	1.90E+00	1.90E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	1.49E+00	1.49E+00	1.16E-02	1.96E-01	0.00E+00	2.08E-01	1.16E-02	1.96E-01	0.00E+00	2.08E-01
Sodium	1.26E+02	1.26E+02	0.00E+00	0.00E+00	1.00E+00	1.26E+02	1.26E+02	7.67E-01	1.67E+01	0.00E+00	1.74E+01	7.67E-01	1.67E+01	0.00E+00	1.74E+01
Vanadium	7.17E+01	7.17E+01	0.00E+00	0.00E+00	8.80E-01	6.31E+01	6.31E+01	4.36E-01	8.34E+00	0.00E+00	8.78E+00	4.36E-01	8.34E+00	0.00E+00	8.78E+00
Zinc	1.14E+02	1.14E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	4.04E+02	4.04E+02	6.92E-01	5.35E+01	0.00E+00	5.42E+01	6.92E-01	5.35E+01	0.00E+00	5.42E+01
PAHs															
Acenaphthylene	1.37E-02	1.37E-02	0.00E+00	0.00E+00	2.20E-01	3.01E-03	3.01E-03	8.34E-05	3.99E-04	0.00E+00	4.82E-04	8.34E-05	3.99E-04	0.00E+00	4.82E-04
Benzo(a)Anthracene	8.03E-02	8.03E-02	0.00E+00	0.00E+00	2.70E-01	2.17E-02	2.17E-02	4.89E-04	2.87E-03	0.00E+00	3.36E-03	4.89E-04	2.87E-03	0.00E+00	3.36E-03
Benzo(a)Pyrene	8.78E-02	8.78E-02	0.00E+00	0.00E+00	3.40E-01	2.99E-02	2.99E-02	5.34E-04	3.95E-03	0.00E+00	4.48E-03	5.34E-04	3.95E-03	0.00E+00	4.48E-03
Benzo(b)Fluoranthene	1.74E-01	1.74E-01	0.00E+00	0.00E+00	2.10E-01	3.65E-02	3.65E-02	1.06E-03	4.83E-03	0.00E+00	5.89E-03	1.06E-03	4.83E-03	0.00E+00	5.89E-03
Benzo(g,h,i)Perylene	2.47E-02	2.47E-02	0.00E+00	0.00E+00	1.50E-01	3.71E-03	3.71E-03	1.50E-04	4.90E-04	0.00E+00	6.40E-04	1.50E-04	4.90E-04	0.00E+00	6.40E-04
Benzo(k)Fluoranthene	1.18E-01	1.18E-01	0.00E+00	0.00E+00	2.10E-01	2.48E-02	2.48E-02	7.18E-04	3.28E-03	0.00E+00	4.00E-03	7.18E-04	3.28E-03	0.00E+00	4.00E-03
Chrysene	1.06E-01	1.06E-01	0.00E+00	0.00E+00	4.40E-01	4.66E-02	4.66E-02	6.45E-04	6.17E-03	0.00E+00	6.82E-03	6.45E-04	6.17E-03	0.00E+00	6.82E-03
Dibenzo(a,h)Anthracene	1.25E-02	1.25E-02	0.00E+00	0.00E+00	4.90E-01	6.13E-03	6.13E-03	7.61E-05	8.10E-04	0.00E+00	8.86E-04	7.61E-05	8.10E-04	0.00E+00	8.86E-04
Fluoranthene	1.12E-01	1.12E-01	0.00E+00	0.00E+00	3.70E-01	4.14E-02	4.14E-02	6.82E-04	5.48E-03	0.00E+00	6.16E-03	6.82E-04	5.48E-03	0.00E+00	6.16E-03
Indeno(1,2,3-Cd)Pyrene	2.91E-02	2.91E-02	0.00E+00	0.00E+00	4.10E-01	1.19E-02	1.19E-02	1.77E-04	1.58E-03	0.00E+00	1.76E-03	1.77E-04	1.58E-03	0.00E+00	1.76E-03
Pyrene	1.09E-01	1.09E-01	0.00E+00	0.00E+00	3.90E-01	4.25E-02	4.25E-02	6.63E-04	5.62E-03	0.00E+00	6.29E-03	6.63E-04	5.62E-03	0.00E+00	6.29E-03
Total LMW PAHs	1.26E-01	1.26E-01	0.00E+00	0.00E+00	--	--	--	7.65E-04	5.88E-03	0.00E+00	6.65E-03	7.65E-04	5.88E-03	0.00E+00	6.65E-03
Total HMW PAHs	7.41E-01	7.41E-01	0.00E+00	0.00E+00	--	--	--	4.51E-03	2.96E-02	0.00E+00	3.41E-02	4.51E-03	2.96E-02	0.00E+00	3.41E-02
Pesticides															
4,4'-DDD	2.26E-02	2.26E-02	0.00E+00	0.00E+00	9.00E+00	2.03E-01	2.03E-01	1.38E-04	2.69E-02	0.00E+00	2.70E-02	1.38E-04	2.69E-02	0.00E+00	2.70E-02
4,4'-DDE	3.65E-01	3.65E-01	0.00E+00	0.00E+00	9.00E+00	3.29E+00	3.29E+00	2.22E-03	4.35E-01	0.00E+00	4.37E-01	2.22E-03	4.35E-01	0.00E+00	4.37E-01
4,4'-DDT	1.36E-01	1.36E-01	0.00E+00	0.00E+00	9.00E+00	1.22E+00	1.22E+00	8.28E-04	1.62E-01	0.00E+00	1.63E-01	8.28E-04	1.62E-01	0.00E+00	1.63E-01
DDTr	--	--	0.00E+00	0.00E+00	--	--	--	3.19E-03	6.23E-01	0.00E+00	6.27E-01	3.19E-03	6.23E-01	0.00E+00	6.27E-01
Alpha-Chlordane	7.10E-03	7.10E-03	0.00E+00	0.00E+00	1.00E+00	7.10E-03	7.10E-03	4.32E-05	9.39E-04	0.00E+00	9.82E-04	4.32E-05	9.39E-04	0.00E+00	9.82E-04
SVOCs															
Bis(2-ethylhexyl)phthalate	6.25E-02	6.25E-02	0.00E+00	0.00E+00	1.00E+00	6.25E-02	6.25E-02	3.80E-04	8.27E-03	0.00E+00	8.65E-03	3.80E-04	8.27E-03	0.00E+00	8.65E-03
Pentachlorophenol	5.70E-03	5.70E-03	0.00E+00	0.00E+00	1.00E+00	5.70E-03	5.70E-03	3.47E-05	7.54E-04	0.00E+00	7.89E-04	3.47E-05	7.54E-04	0.00E+00	7.89E-04
VOCs															
1,1-dichloroethene	1.20E-03	1.20E-03	0.00E+00	0.00E+00	1.00E+00	1.20E-03	1.20E-03	7.30E-06	1.59E-04	0.00E+00	1.66E-04	7.30E-06	1.59E-04	0.00E+00	1.66E-04

Table A-81
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 13 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	2.21E+04	1.65E+04	0.00E+00	0.00E+00	6.41E+01	4.80E+01	7.32E-02	1.62E+03	1.21E+03	0.00E+00	4.45E+01	0.00E+00	4.45E+01	0.00E+00	3.33E+01	0.00E+00	3.33E+01
Arsenic	1.46E+01	8.17E+00	0.00E+00	0.00E+00	1.10E-01	7.36E-02	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	7.05E-02	4.38E-02	0.00E+00	1.94E-03	0.00E+00	1.94E-03	0.00E+00	1.21E-03	0.00E+00	1.21E-03
Calcium	1.84E+04	1.17E+04	0.00E+00	0.00E+00	7.82E+03	4.99E+03	1.48E-04	2.72E+00	1.74E+00	0.00E+00	7.49E-02	0.00E+00	7.49E-02	0.00E+00	4.78E-02	0.00E+00	4.78E-02
Chromium	3.31E+01	1.86E+01	0.00E+00	0.00E+00	1.10E-01	6.17E-02	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	3.03E+00	1.98E+00	0.00E+00	8.33E-02	0.00E+00	8.33E-02	0.00E+00	5.45E-02	0.00E+00	5.45E-02
Copper	4.65E+01	2.35E+01	0.00E+00	0.00E+00	1.18E+00	8.75E-01	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.34E+01	1.22E+01	0.00E+00	3.69E-01	0.00E+00	3.69E-01	0.00E+00	3.34E-01	0.00E+00	3.34E-01
Iron	2.73E+04	1.95E+04	0.00E+00	0.00E+00	7.91E+01	5.64E+01	4.24E-03	1.16E+02	8.25E+01	0.00E+00	3.18E+00	0.00E+00	3.18E+00	0.00E+00	2.27E+00	0.00E+00	2.27E+00
Lead	5.62E+02	1.12E+02	0.00E+00	0.00E+00	2.47E+00	7.21E-01	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.77E+01	8.68E+00	0.00E+00	4.88E-01	0.00E+00	4.88E-01	0.00E+00	2.39E-01	0.00E+00	2.39E-01
Magnesium	4.55E+03	2.31E+03	0.00E+00	0.00E+00	5.61E+02	2.85E+02	1.06E-03	4.82E+00	2.45E+00	0.00E+00	1.33E-01	0.00E+00	1.33E-01	0.00E+00	6.74E-02	0.00E+00	6.74E-02
Manganese	1.23E+03	6.44E+02	0.00E+00	0.00E+00	4.01E+01	2.10E+01	5.87E-02	7.22E+01	3.78E+01	0.00E+00	1.99E+00	0.00E+00	1.99E+00	0.00E+00	1.04E+00	0.00E+00	1.04E+00
Mercury	4.10E-01	2.01E-01	0.00E+00	0.00E+00	2.85E-02	1.91E-02	1.92E-01	7.87E-02	3.85E-02	0.00E+00	2.16E-03	0.00E+00	2.16E-03	0.00E+00	1.06E-03	0.00E+00	1.06E-03
Potassium	2.27E+03	9.09E+02	0.00E+00	0.00E+00	2.80E+02	1.12E+02	4.24E-03	9.62E+00	3.86E+00	0.00E+00	2.65E-01	0.00E+00	2.65E-01	0.00E+00	1.06E-01	0.00E+00	1.06E-01
Selenium	2.80E+00	1.45E+00	0.00E+00	0.00E+00	1.98E-01	9.58E-02	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	9.72E-01	7.59E-01	0.00E+00	2.67E-02	0.00E+00	2.67E-02	0.00E+00	2.09E-02	0.00E+00	2.09E-02
Sodium	2.50E+02	1.58E+02	0.00E+00	0.00E+00	2.87E+00	1.82E+00	1.17E-02	2.93E+00	1.85E+00	0.00E+00	8.04E-02	0.00E+00	8.04E-02	0.00E+00	5.09E-02	0.00E+00	5.09E-02
Vanadium	8.65E+01	4.61E+01	0.00E+00	0.00E+00	2.66E-01	1.42E-01	1.79E-01	1.55E+01	8.25E+00	0.00E+00	4.26E-01	0.00E+00	4.26E-01	0.00E+00	2.27E-01	0.00E+00	2.27E-01
Zinc	1.41E+02	5.50E+01	0.00E+00	0.00E+00	9.44E+00	5.53E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.26E+02	1.18E+02	0.00E+00	3.47E+00	0.00E+00	3.47E+00	0.00E+00	3.23E+00	0.00E+00	3.23E+00
PAHs																	
Benzo(g,h,i)Perylene	3.25E-02	5.23E-03	0.00E+00	0.00E+00	1.02E-04	1.64E-05	2.45E-02	7.96E-04	1.28E-04	0.00E+00	2.19E-05	0.00E+00	2.19E-05	0.00E+00	3.52E-06	0.00E+00	3.52E-06
Total HMW PAHs	3.25E-02	5.23E-03	0.00E+00	0.00E+00	1.02E-04	1.64E-05	--	--	--	0.00E+00	2.19E-05	0.00E+00	2.19E-05	0.00E+00	3.52E-06	0.00E+00	3.52E-06
Pesticides																	
4,4'-DDD	6.72E-02	9.82E-03	0.00E+00	0.00E+00	2.90E-04	4.23E-05	6.46E-03	4.34E-04	6.34E-05	0.00E+00	1.19E-05	0.00E+00	1.19E-05	0.00E+00	1.74E-06	0.00E+00	1.74E-06
4,4'-DDE	4.69E-01	6.73E-02	0.00E+00	0.00E+00	1.88E-03	2.70E-04	2.95E-03	1.38E-03	1.99E-04	0.00E+00	3.80E-05	0.00E+00	3.80E-05	0.00E+00	5.46E-06	0.00E+00	5.46E-06
4,4'-DDT	5.43E-01	7.88E-02	0.00E+00	0.00E+00	1.61E-03	2.34E-04	1.45E-02	7.87E-03	1.14E-03	0.00E+00	2.17E-04	0.00E+00	2.17E-04	0.00E+00	3.14E-05	0.00E+00	3.14E-05
DDTr	--	--	--	--	--	--	--	--	--	0.00E+00	2.67E-04	0.00E+00	2.67E-04	0.00E+00	3.86E-05	0.00E+00	3.86E-05
Alpha-Chlordane	1.56E-02	2.64E-03	0.00E+00	0.00E+00	5.53E-05	9.36E-06	2.06E-03	3.21E-05	5.44E-06	0.00E+00	8.84E-07	0.00E+00	8.84E-07	0.00E+00	1.50E-07	0.00E+00	1.50E-07
Dieldrin	4.10E-03	8.50E-04	0.00E+00	0.00E+00	2.35E-05	4.87E-06	1.96E-04	8.04E-07	1.67E-07	0.00E+00	2.21E-08	0.00E+00	2.21E-08	0.00E+00	4.58E-09	0.00E+00	4.58E-09
Herbicides																	
2,4-D	2.88E-01	4.99E-02	0.00E+00	0.00E+00	3.27E-02	5.67E-03	1.62E-05	4.67E-06	8.10E-07	0.00E+00	1.28E-07	0.00E+00	1.28E-07	0.00E+00	2.23E-08	0.00E+00	2.23E-08
SVOCs																	
Pentachlorophenol	1.10E-01	2.92E-02	0.00E+00	0.00E+00	8.31E-04	2.20E-04	3.31E-03	3.64E-04	9.65E-05	0.00E+00	1.00E-05	0.00E+00	1.00E-05	0.00E+00	2.65E-06	0.00E+00	2.65E-06
VOCs																	
1,1-dichloroethene	2.10E-03	1.24E-03	0.00E+00	0.00E+00	5.82E-04	3.43E-04	3.39E-06	7.12E-09	4.19E-09	0.00E+00	1.96E-10	0.00E+00	1.96E-10	0.00E+00	1.15E-10	0.00E+00	1.15E-10
Acetone	1.44E-01	2.28E-02	0.00E+00	0.00E+00	9.27E-01	1.47E-01	2.21E-09	3.18E-10	5.04E-11	0.00E+00	8.75E-12	0.00E+00	8.75E-12	0.00E+00	1.39E-12	0.00E+00	1.39E-12

Table A-82
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 13 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	1.82E+04	1.82E+04	0.00E+00	0.00E+00	5.26E+01	5.26E+01	7.32E-02	1.33E+03	1.33E+03	0.00E+00	3.65E+01	0.00E+00	3.65E+01	0.00E+00	3.65E+01	0.00E+00	3.65E+01
Arsenic	1.66E+01	1.66E+01	0.00E+00	0.00E+00	1.20E-01	1.20E-01	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	7.81E-02	7.81E-02	0.00E+00	2.15E-03	0.00E+00	2.15E-03	0.00E+00	2.15E-03	0.00E+00	2.15E-03
Calcium	4.64E+04	4.64E+04	0.00E+00	0.00E+00	1.97E+04	1.97E+04	1.48E-04	6.87E+00	6.87E+00	0.00E+00	1.89E-01	0.00E+00	1.89E-01	0.00E+00	1.89E-01	0.00E+00	1.89E-01
Chromium	2.95E+01	2.95E+01	0.00E+00	0.00E+00	9.78E-02	9.78E-02	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	2.78E+00	2.78E+00	0.00E+00	7.64E-02	0.00E+00	7.64E-02	0.00E+00	7.64E-02	0.00E+00	7.64E-02
Copper	4.19E+01	4.19E+01	0.00E+00	0.00E+00	1.13E+00	1.13E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.32E+01	1.32E+01	0.00E+00	3.63E-01	0.00E+00	3.63E-01	0.00E+00	3.63E-01	0.00E+00	3.63E-01
Iron	2.55E+04	2.55E+04	0.00E+00	0.00E+00	7.39E+01	7.39E+01	4.24E-03	1.08E+02	1.08E+02	0.00E+00	2.97E+00	0.00E+00	2.97E+00	0.00E+00	2.97E+00	0.00E+00	2.97E+00
Lead	1.28E+02	1.28E+02	0.00E+00	0.00E+00	7.96E-01	7.96E-01	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	9.22E+00	9.22E+00	0.00E+00	2.54E-01	0.00E+00	2.54E-01	0.00E+00	2.54E-01	0.00E+00	2.54E-01
Magnesium	2.91E+03	2.91E+03	0.00E+00	0.00E+00	3.58E+02	3.58E+02	1.06E-03	3.08E+00	3.08E+00	0.00E+00	8.47E-02	0.00E+00	8.47E-02	0.00E+00	8.47E-02	0.00E+00	8.47E-02
Manganese	7.53E+02	7.53E+02	0.00E+00	0.00E+00	2.45E+01	2.45E+01	5.87E-02	4.42E+01	4.42E+01	0.00E+00	1.21E+00	0.00E+00	1.21E+00	0.00E+00	1.21E+00	0.00E+00	1.21E+00
Mercury	3.25E-01	3.25E-01	0.00E+00	0.00E+00	2.50E-02	2.50E-02	1.92E-01	6.24E-02	6.24E-02	0.00E+00	1.72E-03	0.00E+00	1.72E-03	0.00E+00	1.72E-03	0.00E+00	1.72E-03
Potassium	7.12E+02	7.12E+02	0.00E+00	0.00E+00	8.77E+01	8.77E+01	4.24E-03	3.02E+00	3.02E+00	0.00E+00	8.30E-02	0.00E+00	8.30E-02	0.00E+00	8.30E-02	0.00E+00	8.30E-02
Selenium	1.90E+00	1.90E+00	0.00E+00	0.00E+00	1.29E-01	1.29E-01	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	8.40E-01	8.40E-01	0.00E+00	2.31E-02	0.00E+00	2.31E-02	0.00E+00	2.31E-02	0.00E+00	2.31E-02
Sodium	1.26E+02	1.26E+02	0.00E+00	0.00E+00	1.45E+00	1.45E+00	1.17E-02	1.47E+00	1.47E+00	0.00E+00	4.05E-02	0.00E+00	4.05E-02	0.00E+00	4.05E-02	0.00E+00	4.05E-02
Vanadium	7.17E+01	7.17E+01	0.00E+00	0.00E+00	2.21E-01	2.21E-01	1.79E-01	1.28E+01	1.28E+01	0.00E+00	3.53E-01	0.00E+00	3.53E-01	0.00E+00	3.53E-01	0.00E+00	3.53E-01
Zinc	1.14E+02	1.14E+02	0.00E+00	0.00E+00	8.35E+00	8.35E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.24E+02	1.24E+02	0.00E+00	3.41E+00	0.00E+00	3.41E+00	0.00E+00	3.41E+00	0.00E+00	3.41E+00
PAHs																	
Acenaphthylene	1.37E-02	1.37E-02	0.00E+00	0.00E+00	3.81E-04	3.81E-04	4.37E-05	5.99E-07	5.99E-07	0.00E+00	1.65E-08	0.00E+00	1.65E-08	0.00E+00	1.65E-08	0.00E+00	1.65E-08
Benzo(a)Anthracene	8.03E-02	8.03E-02	0.00E+00	0.00E+00	3.94E-04	3.94E-04	2.77E-03	2.22E-04	2.22E-04	0.00E+00	6.12E-06	0.00E+00	6.12E-06	0.00E+00	6.12E-06	0.00E+00	6.12E-06
Benzo(a)Pyrene	8.78E-02	8.78E-02	0.00E+00	0.00E+00	3.57E-04	3.57E-04	5.73E-03	5.03E-04	5.03E-04	0.00E+00	1.38E-05	0.00E+00	1.38E-05	0.00E+00	1.38E-05	0.00E+00	1.38E-05
Benzo(b)Fluoranthene	1.74E-01	1.74E-01	0.00E+00	0.00E+00	6.56E-04	6.56E-04	8.27E-03	1.44E-03	1.44E-03	0.00E+00	3.96E-05	0.00E+00	3.96E-05	0.00E+00	3.96E-05	0.00E+00	3.96E-05
Benzo(g,h,i)Perylene	2.47E-02	2.47E-02	0.00E+00	0.00E+00	7.76E-05	7.76E-05	2.45E-02	6.05E-04	6.05E-04	0.00E+00	1.66E-05	0.00E+00	1.66E-05	0.00E+00	1.66E-05	0.00E+00	1.66E-05
Benzo(k)Fluoranthene	1.18E-01	1.18E-01	0.00E+00	0.00E+00	4.45E-04	4.45E-04	8.27E-03	9.76E-04	9.76E-04	0.00E+00	2.68E-05	0.00E+00	2.68E-05	0.00E+00	2.68E-05	0.00E+00	2.68E-05
Chrysene	1.06E-01	1.06E-01	0.00E+00	0.00E+00	5.20E-04	5.20E-04	2.77E-03	2.94E-04	2.94E-04	0.00E+00	8.07E-06	0.00E+00	8.07E-06	0.00E+00	8.07E-06	0.00E+00	8.07E-06
Dibenzo(a,h)Anthracene	1.25E-02	1.25E-02	0.00E+00	0.00E+00	4.04E-05	4.04E-05	2.02E-02	2.53E-04	2.53E-04	0.00E+00	6.94E-06	0.00E+00	6.94E-06	0.00E+00	6.94E-06	0.00E+00	6.94E-06
Fluoranthene	1.12E-01	1.12E-01	0.00E+00	0.00E+00	9.92E-04	9.92E-04	5.07E-04	5.68E-05	5.68E-05	0.00E+00	1.56E-06	0.00E+00	1.56E-06	0.00E+00	1.56E-06	0.00E+00	1.56E-06
Indeno(1,2,3-Cd)Pyrene	2.91E-02	2.91E-02	0.00E+00	0.00E+00	9.16E-05	9.16E-05	2.47E-02	7.19E-04	7.19E-04	0.00E+00	1.98E-05	0.00E+00	1.98E-05	0.00E+00	1.98E-05	0.00E+00	1.98E-05
Pyrene	1.09E-01	1.09E-01	0.00E+00	0.00E+00	1.03E-03	1.03E-03	4.29E-04	4.68E-05	4.68E-05	0.00E+00	1.29E-06	0.00E+00	1.29E-06	0.00E+00	1.29E-06	0.00E+00	1.29E-06
Total LMW PAHs	1.26E-01	1.26E-01	0.00E+00	0.00E+00	1.37E-03	1.37E-03	--	--	--	0.00E+00	1.58E-06	0.00E+00	1.58E-06	0.00E+00	1.58E-06	0.00E+00	1.58E-06
Total HMW PAHs	7.41E-01	7.41E-01	0.00E+00	0.00E+00	3.61E-03	3.61E-03	--	--	--	0.00E+00	1.39E-04	0.00E+00	1.39E-04	0.00E+00	1.39E-04	0.00E+00	1.39E-04
Pesticides																	
4,4'-DDD	2.26E-02	2.26E-02	0.00E+00	0.00E+00	9.74E-05	9.74E-05	6.46E-03	1.46E-04	1.46E-04	0.00E+00	4.01E-06	0.00E+00	4.01E-06	0.00E+00	4.01E-06	0.00E+00	4.01E-06
4,4'-DDE	3.65E-01	3.65E-01	0.00E+00	0.00E+00	1.46E-03	1.46E-03	2.95E-03	1.08E-03	1.08E-03	0.00E+00	2.96E-05	0.00E+00	2.96E-05	0.00E+00	2.96E-05	0.00E+00	2.96E-05
4,4'-DDT	1.36E-01	1.36E-01	0.00E+00	0.00E+00	4.04E-04	4.04E-04	1.45E-02	1.97E-03	1.97E-03	0.00E+00	5.42E-05	0.00E+00	5.42E-05	0.00E+00	5.42E-05	0.00E+00	5.42E-05
DDTr	--	--	--	--	--	--	--	--	--	0.00E+00	8.79E-05	0.00E+00	8.79E-05	0.00E+00	8.79E-05	0.00E+00	8.79E-05
Alpha-Chlordane	7.10E-03	7.10E-03	0.00E+00	0.00E+00	2.52E-05	2.52E-05	2.06E-03	1.46E-05	1.46E-05	0.00E+00	4.02E-07	0.00E+00	4.02E-07	0.00E+00	4.02E-07	0.00E+00	4.02E-07
SVOCs																	
Bis(2-ethylhexyl)phthalate	6.25E-02	6.25E-02	0.00E+00	0.00E+00	4.76E-04	4.76E-04	7.41E-04	4.63E-05	4.63E-05	0.00E+00	1.27E-06	0.00E+00	1.27E-06	0.00E+00	1.27E-06	0.00E+00	1.27E-06
Pentachlorophenol	5.70E-03	5.70E-03	0.00E+00	0.00E+00	4.31E-05	4.31E-05	3.31E-03	1.89E-05	1.89E-05	0.00E+00	5.19E-07	0.00E+00	5.19E-07	0.00E+00	5.19E-07	0.00E+00	5.19E-07
VOCs																	
1,1-dichloroethene	1.20E-03	1.20E-03	0.00E+00	0.00E+00	3.33E-04	3.33E-04	3.39E-06	4.07E-09	4.07E-09	0.00E+00	1.12E-10	0.00E+00	1.12E-10	0.00E+00	1.12E-10	0.00E+00	1.12E-10

Table A-83
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 15 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.57E+04	2.52E+04	0.00E+00	0.00E+00	4.00E-03	1.03E+02	1.01E+02	6.21E+01	1.24E+01	0.00E+00	7.45E+01	6.08E+01	1.22E+01	0.00E+00	7.29E+01
Arsenic	2.05E+01	1.33E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	7.49E-01	5.86E-01	4.95E-02	9.05E-02	0.00E+00	1.40E-01	3.20E-02	7.08E-02	0.00E+00	1.03E-01
Beryllium	1.40E+00	8.40E-01	0.00E+00	0.00E+00	1.00E-02	1.40E-02	8.40E-03	3.38E-03	1.69E-03	0.00E+00	5.07E-03	2.03E-03	1.01E-03	0.00E+00	3.04E-03
Calcium	4.29E+04	4.17E+04	0.00E+00	0.00E+00	3.50E+00	1.50E+05	1.46E+05	1.04E+02	1.81E+04	0.00E+00	1.82E+04	1.01E+02	1.76E+04	0.00E+00	1.77E+04
Chromium	4.83E+01	4.62E+01	0.00E+00	0.00E+00	7.50E-03	3.62E-01	3.47E-01	1.17E-01	4.38E-02	0.00E+00	1.60E-01	1.12E-01	4.19E-02	0.00E+00	1.53E-01
Copper	1.11E+02	7.10E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.25E+01	1.05E+01	2.68E-01	1.51E+00	0.00E+00	1.78E+00	1.71E-01	1.26E+00	0.00E+00	1.44E+00
Iron	4.13E+04	3.62E+04	0.00E+00	0.00E+00	4.00E-03	1.65E+02	1.45E+02	9.98E+01	2.00E+01	0.00E+00	1.20E+02	8.75E+01	1.75E+01	0.00E+00	1.05E+02
Magnesium	1.32E+04	7.98E+03	0.00E+00	0.00E+00	1.00E+00	1.32E+04	7.98E+03	3.19E+01	1.59E+03	0.00E+00	1.63E+03	1.93E+01	9.63E+02	0.00E+00	9.83E+02
Manganese	9.17E+02	6.99E+02	0.00E+00	0.00E+00	2.50E-01	2.29E+02	1.75E+02	2.22E+00	2.77E+01	0.00E+00	2.99E+01	1.69E+00	2.11E+01	0.00E+00	2.28E+01
Mercury	1.00E-01	6.60E-02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.06E-01	8.42E-02	2.42E-04	1.27E-02	0.00E+00	1.30E-02	1.59E-04	1.02E-02	0.00E+00	1.03E-02
Nickel	3.52E+01	2.26E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	1.55E+00	1.11E+00	8.50E-02	1.88E-01	0.00E+00	2.73E-01	5.46E-02	1.35E-01	0.00E+00	1.89E-01
Potassium	6.09E+02	5.69E+02	0.00E+00	0.00E+00	1.00E+00	6.09E+02	5.69E+02	1.47E+00	7.36E+01	0.00E+00	7.50E+01	1.37E+00	6.87E+01	0.00E+00	7.01E+01
Selenium	9.30E-01	7.85E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	4.69E-01	3.89E-01	2.25E-03	5.66E-02	0.00E+00	5.88E-02	1.90E-03	4.69E-02	0.00E+00	4.88E-02
Sodium	4.05E+02	2.74E+02	0.00E+00	0.00E+00	7.50E-02	3.04E+01	2.06E+01	9.78E-01	3.67E+00	0.00E+00	4.65E+00	6.62E-01	2.48E+00	0.00E+00	3.14E+00
Thallium	1.10E+00	7.25E-01	0.00E+00	0.00E+00	4.00E-03	4.40E-03	2.90E-03	2.66E-03	5.32E-04	0.00E+00	3.19E-03	1.75E-03	3.50E-04	0.00E+00	2.10E-03
Vanadium	1.62E+02	1.26E+02	0.00E+00	0.00E+00	5.50E-03	8.91E-01	6.92E-01	3.91E-01	1.08E-01	0.00E+00	4.99E-01	3.04E-01	8.36E-02	0.00E+00	3.88E-01
Zinc	2.60E+02	1.61E+02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.06E+02	8.12E+01	6.28E-01	1.28E+01	0.00E+00	1.34E+01	3.90E-01	9.81E+00	0.00E+00	1.02E+01

Table A-84
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media
for the Site 15 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.75E+04	2.33E+04	0.00E+00	0.00E+00	4.00E-03	1.10E+02	9.30E+01	6.64E+01	1.33E+01	0.00E+00	7.97E+01	5.62E+01	1.12E+01	0.00E+00	6.74E+01
Arsenic	4.52E+01	3.16E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.17E+00	9.57E-01	1.09E-01	1.41E-01	0.00E+00	2.51E-01	7.63E-02	1.16E-01	0.00E+00	1.92E-01
Calcium	2.89E+04	1.57E+04	0.00E+00	0.00E+00	3.50E+00	1.01E+05	5.50E+04	6.98E+01	1.22E+04	0.00E+00	1.23E+04	3.80E+01	6.65E+03	0.00E+00	6.68E+03
Chromium	8.93E+01	6.31E+01	0.00E+00	0.00E+00	7.50E-03	6.70E-01	4.73E-01	2.16E-01	8.09E-02	0.00E+00	2.97E-01	1.52E-01	5.71E-02	0.00E+00	2.09E-01
Copper	6.22E+01	3.89E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	9.94E+00	8.26E+00	1.50E-01	1.20E+00	0.00E+00	1.35E+00	9.40E-02	9.98E-01	0.00E+00	1.09E+00
Iron	4.58E+04	3.94E+04	0.00E+00	0.00E+00	4.00E-03	1.83E+02	1.57E+02	1.11E+02	2.21E+01	0.00E+00	1.33E+02	9.51E+01	1.90E+01	0.00E+00	1.14E+02
Magnesium	1.79E+03	1.34E+03	0.00E+00	0.00E+00	1.00E+00	1.79E+03	1.34E+03	4.32E+00	2.16E+02	0.00E+00	2.21E+02	3.23E+00	1.61E+02	0.00E+00	1.64E+02
Manganese	9.17E+02	5.11E+02	0.00E+00	0.00E+00	2.50E-01	2.29E+02	1.28E+02	2.22E+00	2.77E+01	0.00E+00	2.99E+01	1.23E+00	1.54E+01	0.00E+00	1.67E+01
Mercury	1.00E-01	7.40E-02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.06E-01	8.96E-02	2.42E-04	1.27E-02	0.00E+00	1.30E-02	1.79E-04	1.08E-02	0.00E+00	1.10E-02
Potassium	6.18E+02	5.32E+02	0.00E+00	0.00E+00	1.00E+00	6.18E+02	5.32E+02	1.49E+00	7.47E+01	0.00E+00	7.61E+01	1.29E+00	6.43E+01	0.00E+00	6.56E+01
Selenium	2.00E+00	1.80E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	1.09E+00	9.71E-01	4.83E-03	1.32E-01	0.00E+00	1.37E-01	4.35E-03	1.17E-01	0.00E+00	1.22E-01
Sodium	1.25E+02	8.43E+01	0.00E+00	0.00E+00	7.50E-02	9.38E+00	6.32E+00	3.02E-01	1.13E+00	0.00E+00	1.43E+00	2.04E-01	7.63E-01	0.00E+00	9.67E-01
Vanadium	1.39E+02	1.10E+02	0.00E+00	0.00E+00	5.50E-03	7.65E-01	6.03E-01	3.36E-01	9.24E-02	0.00E+00	4.28E-01	2.65E-01	7.28E-02	0.00E+00	3.38E-01
Zinc	6.03E+01	3.78E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	4.70E+01	3.63E+01	1.46E-01	5.68E+00	0.00E+00	5.82E+00	9.13E-02	4.38E+00	0.00E+00	4.47E+00

Table A-85
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 15 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.57E+04	2.52E+04	0.00E+00	0.00E+00	4.00E-03	1.03E+02	1.01E+02	8.61E+00	1.72E+00	0.00E+00	1.03E+01	8.43E+00	1.69E+00	0.00E+00	1.01E+01
Arsenic	2.05E+01	1.33E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	7.49E-01	5.86E-01	6.87E-03	1.26E-02	0.00E+00	1.94E-02	4.44E-03	9.81E-03	0.00E+00	1.43E-02
Beryllium	1.40E+00	8.40E-01	0.00E+00	0.00E+00	1.00E-02	1.40E-02	8.40E-03	4.69E-04	2.35E-04	0.00E+00	7.04E-04	2.81E-04	1.41E-04	0.00E+00	4.22E-04
Calcium	4.29E+04	4.17E+04	0.00E+00	0.00E+00	3.50E+00	1.50E+05	1.46E+05	1.44E+01	2.52E+03	0.00E+00	2.53E+03	1.40E+01	2.44E+03	0.00E+00	2.46E+03
Chromium	4.83E+01	4.62E+01	0.00E+00	0.00E+00	7.50E-03	3.62E-01	3.47E-01	1.62E-02	6.07E-03	0.00E+00	2.22E-02	1.55E-02	5.80E-03	0.00E+00	2.13E-02
Copper	1.11E+02	7.10E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.25E+01	1.05E+01	3.72E-02	2.09E-01	0.00E+00	2.46E-01	2.38E-02	1.75E-01	0.00E+00	1.99E-01
Iron	4.13E+04	3.62E+04	0.00E+00	0.00E+00	4.00E-03	1.65E+02	1.45E+02	1.38E+01	2.77E+00	0.00E+00	1.66E+01	1.21E+01	2.43E+00	0.00E+00	1.46E+01
Magnesium	1.32E+04	7.98E+03	0.00E+00	0.00E+00	1.00E+00	1.32E+04	7.98E+03	4.42E+00	2.21E+02	0.00E+00	2.26E+02	2.67E+00	1.34E+02	0.00E+00	1.36E+02
Manganese	9.17E+02	6.99E+02	0.00E+00	0.00E+00	2.50E-01	2.29E+02	1.75E+02	3.07E-01	3.84E+00	0.00E+00	4.15E+00	2.34E-01	2.92E+00	0.00E+00	3.16E+00
Mercury	1.00E-01	6.60E-02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.06E-01	8.42E-02	3.35E-05	1.77E-03	0.00E+00	1.80E-03	2.21E-05	1.41E-03	0.00E+00	1.43E-03
Nickel	3.52E+01	2.26E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	1.55E+00	1.11E+00	1.18E-02	2.60E-02	0.00E+00	3.78E-02	7.57E-03	1.87E-02	0.00E+00	2.62E-02
Potassium	6.09E+02	5.69E+02	0.00E+00	0.00E+00	1.00E+00	6.09E+02	5.69E+02	2.04E-01	1.02E+01	0.00E+00	1.04E+01	1.91E-01	9.53E+00	0.00E+00	9.72E+00
Selenium	9.30E-01	7.85E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	4.69E-01	3.89E-01	3.12E-04	7.85E-03	0.00E+00	8.16E-03	2.63E-04	6.51E-03	0.00E+00	6.77E-03
Sodium	4.05E+02	2.74E+02	0.00E+00	0.00E+00	7.50E-02	3.04E+01	2.06E+01	1.36E-01	5.09E-01	0.00E+00	6.44E-01	9.18E-02	3.44E-01	0.00E+00	4.36E-01
Thallium	1.10E+00	7.25E-01	0.00E+00	0.00E+00	4.00E-03	4.40E-03	2.90E-03	3.69E-04	7.37E-05	0.00E+00	4.42E-04	2.43E-04	4.86E-05	0.00E+00	2.91E-04
Vanadium	1.62E+02	1.26E+02	0.00E+00	0.00E+00	5.50E-03	8.91E-01	6.92E-01	5.43E-02	1.49E-02	0.00E+00	6.92E-02	4.21E-02	1.16E-02	0.00E+00	5.37E-02
Zinc	2.60E+02	1.61E+02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.06E+02	8.12E+01	8.71E-02	1.77E+00	0.00E+00	1.86E+00	5.41E-02	1.36E+00	0.00E+00	1.41E+00

Table A-86
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for the Site 15 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.75E+04	2.33E+04	0.00E+00	0.00E+00	4.00E-03	1.10E+02	9.30E+01	9.21E+00	1.84E+00	0.00E+00	1.11E+01	7.79E+00	1.56E+00	0.00E+00	9.35E+00
Arsenic	4.52E+01	3.16E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.17E+00	9.57E-01	1.51E-02	1.96E-02	0.00E+00	3.47E-02	1.06E-02	1.60E-02	0.00E+00	2.66E-02
Calcium	2.89E+04	1.57E+04	0.00E+00	0.00E+00	3.50E+00	1.01E+05	5.50E+04	9.68E+00	1.69E+03	0.00E+00	1.70E+03	5.27E+00	9.22E+02	0.00E+00	9.27E+02
Chromium	8.93E+01	6.31E+01	0.00E+00	0.00E+00	7.50E-03	6.70E-01	4.73E-01	2.99E-02	1.12E-02	0.00E+00	4.11E-02	2.11E-02	7.92E-03	0.00E+00	2.90E-02
Copper	6.22E+01	3.89E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	9.94E+00	8.26E+00	2.08E-02	1.66E-01	0.00E+00	1.87E-01	1.30E-02	1.38E-01	0.00E+00	1.51E-01
Iron	4.58E+04	3.94E+04	0.00E+00	0.00E+00	4.00E-03	1.83E+02	1.57E+02	1.53E+01	3.07E+00	0.00E+00	1.84E+01	1.32E+01	2.64E+00	0.00E+00	1.58E+01
Magnesium	1.79E+03	1.34E+03	0.00E+00	0.00E+00	1.00E+00	1.79E+03	1.34E+03	6.00E-01	3.00E+01	0.00E+00	3.06E+01	4.47E-01	2.24E+01	0.00E+00	2.28E+01
Manganese	9.17E+02	5.11E+02	0.00E+00	0.00E+00	2.50E-01	2.29E+02	1.28E+02	3.07E-01	3.84E+00	0.00E+00	4.15E+00	1.71E-01	2.14E+00	0.00E+00	2.31E+00
Mercury	1.00E-01	7.40E-02	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.06E-01	8.96E-02	3.35E-05	1.77E-03	0.00E+00	1.80E-03	2.48E-05	1.50E-03	0.00E+00	1.53E-03
Potassium	6.18E+02	5.32E+02	0.00E+00	0.00E+00	1.00E+00	6.18E+02	5.32E+02	2.07E-01	1.04E+01	0.00E+00	1.06E+01	1.78E-01	8.91E+00	0.00E+00	9.09E+00
Selenium	2.00E+00	1.80E+00	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	1.09E+00	9.71E-01	6.70E-04	1.83E-02	0.00E+00	1.89E-02	6.03E-04	1.63E-02	0.00E+00	1.69E-02
Sodium	1.25E+02	8.43E+01	0.00E+00	0.00E+00	7.50E-02	9.38E+00	6.32E+00	4.19E-02	1.57E-01	0.00E+00	1.99E-01	2.82E-02	1.06E-01	0.00E+00	1.34E-01
Vanadium	1.39E+02	1.10E+02	0.00E+00	0.00E+00	5.50E-03	7.65E-01	6.03E-01	4.66E-02	1.28E-02	0.00E+00	5.94E-02	3.67E-02	1.01E-02	0.00E+00	4.68E-02
Zinc	6.03E+01	3.78E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	4.70E+01	3.63E+01	2.02E-02	7.87E-01	0.00E+00	8.07E-01	1.27E-02	6.07E-01	0.00E+00	6.20E-01

Table A-87
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 15 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.57E+04	2.52E+04	0.00E+00	0.00E+00	1.18E-01	3.03E+03	2.97E+03	0.00E+00	2.53E+02	0.00E+00	2.53E+02	0.00E+00	2.47E+02	0.00E+00	2.47E+02
Arsenic	2.05E+01	1.33E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	2.04E+00	1.50E+00	0.00E+00	1.70E-01	0.00E+00	1.70E-01	0.00E+00	1.25E-01	0.00E+00	1.25E-01
Beryllium	1.40E+00	8.40E-01	0.00E+00	0.00E+00	1.18E+00	1.65E+00	9.91E-01	0.00E+00	1.38E-01	0.00E+00	1.38E-01	0.00E+00	8.26E-02	0.00E+00	8.26E-02
Calcium	4.29E+04	4.17E+04	0.00E+00	0.00E+00	1.00E+00	4.29E+04	4.17E+04	0.00E+00	3.57E+03	0.00E+00	3.57E+03	0.00E+00	3.47E+03	0.00E+00	3.47E+03
Chromium	4.83E+01	4.62E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.22E+00	9.25E+00	0.00E+00	7.68E-01	0.00E+00	7.68E-01	0.00E+00	7.70E-01	0.00E+00	7.70E-01
Copper	1.11E+02	7.10E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.85E+01	1.64E+01	0.00E+00	1.54E+00	0.00E+00	1.54E+00	0.00E+00	1.37E+00	0.00E+00	1.37E+00
Iron	4.13E+04	3.62E+04	0.00E+00	0.00E+00	7.80E-02	3.22E+03	2.82E+03	0.00E+00	2.68E+02	0.00E+00	2.68E+02	0.00E+00	2.35E+02	0.00E+00	2.35E+02
Magnesium	1.32E+04	7.98E+03	0.00E+00	0.00E+00	5.30E-01	7.00E+03	4.23E+03	0.00E+00	5.83E+02	0.00E+00	5.83E+02	0.00E+00	3.52E+02	0.00E+00	3.52E+02
Manganese	9.17E+02	6.99E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	4.67E+01	3.88E+01	0.00E+00	3.89E+00	0.00E+00	3.89E+00	0.00E+00	3.23E+00	0.00E+00	3.23E+00
Mercury	1.00E-01	6.60E-02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	3.85E-01	3.66E-01	0.00E+00	3.20E-02	0.00E+00	3.20E-02	0.00E+00	3.05E-02	0.00E+00	3.05E-02
Nickel	3.52E+01	2.26E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.57E+01	1.76E+01	0.00E+00	1.30E+00	0.00E+00	1.30E+00	0.00E+00	1.46E+00	0.00E+00	1.46E+00
Potassium	6.09E+02	5.69E+02	0.00E+00	0.00E+00	1.00E+00	6.09E+02	5.69E+02	0.00E+00	5.07E+01	0.00E+00	5.07E+01	0.00E+00	4.74E+01	0.00E+00	4.74E+01
Selenium	9.30E-01	7.85E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	8.80E-01	7.77E-01	0.00E+00	7.33E-02	0.00E+00	7.33E-02	0.00E+00	6.47E-02	0.00E+00	6.47E-02
Sodium	4.05E+02	2.74E+02	0.00E+00	0.00E+00	1.00E+00	4.05E+02	2.74E+02	0.00E+00	3.37E+01	0.00E+00	3.37E+01	0.00E+00	2.28E+01	0.00E+00	2.28E+01
Thallium	1.10E+00	7.25E-01	0.00E+00	0.00E+00	1.00E+00	1.10E+00	7.25E-01	0.00E+00	9.17E-02	0.00E+00	9.17E-02	0.00E+00	6.04E-02	0.00E+00	6.04E-02
Vanadium	1.62E+02	1.26E+02	0.00E+00	0.00E+00	8.80E-01	1.43E+02	1.11E+02	0.00E+00	1.19E+01	0.00E+00	1.19E+01	0.00E+00	9.22E+00	0.00E+00	9.22E+00
Zinc	2.60E+02	1.61E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	5.30E+02	4.53E+02	0.00E+00	4.42E+01	0.00E+00	4.42E+01	0.00E+00	3.78E+01	0.00E+00	3.78E+01

Table A-88
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media
for the Site 15 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.75E+04	2.33E+04	0.00E+00	0.00E+00	1.18E-01	3.25E+03	2.74E+03	0.00E+00	2.70E+02	0.00E+00	2.70E+02	0.00E+00	2.29E+02	0.00E+00	2.29E+02
Arsenic	4.52E+01	3.16E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	3.56E+00	2.76E+00	0.00E+00	2.97E-01	0.00E+00	2.97E-01	0.00E+00	2.30E-01	0.00E+00	2.30E-01
Calcium	2.89E+04	1.57E+04	0.00E+00	0.00E+00	1.00E+00	2.89E+04	1.57E+04	0.00E+00	2.41E+03	0.00E+00	2.41E+03	0.00E+00	1.31E+03	0.00E+00	1.31E+03
Chromium	8.93E+01	6.31E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.85E+00	9.06E+00	0.00E+00	7.37E-01	0.00E+00	7.37E-01	0.00E+00	7.55E-01	0.00E+00	7.55E-01
Copper	6.22E+01	3.89E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.59E+01	1.40E+01	0.00E+00	1.32E+00	0.00E+00	1.32E+00	0.00E+00	1.17E+00	0.00E+00	1.17E+00
Iron	4.58E+04	3.94E+04	0.00E+00	0.00E+00	7.80E-02	3.57E+03	3.07E+03	0.00E+00	2.98E+02	0.00E+00	2.98E+02	0.00E+00	2.56E+02	0.00E+00	2.56E+02
Magnesium	1.79E+03	1.34E+03	0.00E+00	0.00E+00	5.30E-01	9.49E+02	7.08E+02	0.00E+00	7.91E+01	0.00E+00	7.91E+01	0.00E+00	5.90E+01	0.00E+00	5.90E+01
Manganese	9.17E+02	5.11E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	4.67E+01	3.13E+01	0.00E+00	3.89E+00	0.00E+00	3.89E+00	0.00E+00	2.61E+00	0.00E+00	2.61E+00
Mercury	1.00E-01	7.40E-02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	3.85E-01	3.71E-01	0.00E+00	3.20E-02	0.00E+00	3.20E-02	0.00E+00	3.09E-02	0.00E+00	3.09E-02
Potassium	6.18E+02	5.32E+02	0.00E+00	0.00E+00	1.00E+00	6.18E+02	5.32E+02	0.00E+00	5.15E+01	0.00E+00	5.15E+01	0.00E+00	4.43E+01	0.00E+00	4.43E+01
Selenium	2.00E+00	1.80E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	1.54E+00	1.43E+00	0.00E+00	1.28E-01	0.00E+00	1.28E-01	0.00E+00	1.19E-01	0.00E+00	1.19E-01
Sodium	1.25E+02	8.43E+01	0.00E+00	0.00E+00	1.00E+00	1.25E+02	8.43E+01	0.00E+00	1.04E+01	0.00E+00	1.04E+01	0.00E+00	7.02E+00	0.00E+00	7.02E+00
Vanadium	1.39E+02	1.10E+02	0.00E+00	0.00E+00	8.80E-01	1.22E+02	9.64E+01	0.00E+00	1.02E+01	0.00E+00	1.02E+01	0.00E+00	8.04E+00	0.00E+00	8.04E+00
Zinc	6.03E+01	3.78E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.28E+02	2.82E+02	0.00E+00	2.73E+01	0.00E+00	2.73E+01	0.00E+00	2.35E+01	0.00E+00	2.35E+01

Table A-89
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 15 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.57E+04	2.52E+04	0.00E+00	0.00E+00	1.18E-01	3.03E+03	2.97E+03	1.56E+02	4.01E+02	0.00E+00	5.58E+02	1.53E+02	3.93E+02	0.00E+00	5.46E+02
Arsenic	2.05E+01	1.33E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	2.04E+00	1.50E+00	1.25E-01	2.69E-01	0.00E+00	3.94E-01	8.06E-02	1.98E-01	0.00E+00	2.79E-01
Beryllium	1.40E+00	8.40E-01	0.00E+00	0.00E+00	1.18E+00	1.65E+00	9.91E-01	8.52E-03	2.19E-01	0.00E+00	2.27E-01	5.11E-03	1.31E-01	0.00E+00	1.36E-01
Calcium	4.29E+04	4.17E+04	0.00E+00	0.00E+00	1.00E+00	4.29E+04	4.17E+04	2.61E+02	5.68E+03	0.00E+00	5.94E+03	2.53E+02	5.51E+03	0.00E+00	5.76E+03
Chromium	4.83E+01	4.62E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.22E+00	9.25E+00	2.94E-01	1.22E+00	0.00E+00	1.51E+00	2.81E-01	1.22E+00	0.00E+00	1.50E+00
Copper	1.11E+02	7.10E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.85E+01	1.64E+01	6.75E-01	2.45E+00	0.00E+00	3.12E+00	4.32E-01	2.18E+00	0.00E+00	2.61E+00
Iron	4.13E+04	3.62E+04	0.00E+00	0.00E+00	7.80E-02	3.22E+03	2.82E+03	2.51E+02	4.26E+02	0.00E+00	6.77E+02	2.20E+02	3.74E+02	0.00E+00	5.94E+02
Magnesium	1.32E+04	7.98E+03	0.00E+00	0.00E+00	5.30E-01	7.00E+03	4.23E+03	8.03E+01	9.26E+02	0.00E+00	1.01E+03	4.85E+01	5.59E+02	0.00E+00	6.08E+02
Manganese	9.17E+02	6.99E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	4.67E+01	3.88E+01	5.58E+00	6.17E+00	0.00E+00	1.18E+01	4.25E+00	5.13E+00	0.00E+00	9.38E+00
Mercury	1.00E-01	6.60E-02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	3.85E-01	3.66E-01	6.09E-04	5.09E-02	0.00E+00	5.15E-02	4.02E-04	4.84E-02	0.00E+00	4.88E-02
Nickel	3.52E+01	2.26E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.57E+01	1.76E+01	2.14E-01	2.07E+00	0.00E+00	2.29E+00	1.38E-01	2.32E+00	0.00E+00	2.46E+00
Potassium	6.09E+02	5.69E+02	0.00E+00	0.00E+00	1.00E+00	6.09E+02	5.69E+02	3.71E+00	8.06E+01	0.00E+00	8.43E+01	3.46E+00	7.53E+01	0.00E+00	7.87E+01
Selenium	9.30E-01	7.85E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	8.80E-01	7.77E-01	5.66E-03	1.16E-01	0.00E+00	1.22E-01	4.78E-03	1.03E-01	0.00E+00	1.08E-01
Sodium	4.05E+02	2.74E+02	0.00E+00	0.00E+00	1.00E+00	4.05E+02	2.74E+02	2.46E+00	5.36E+01	0.00E+00	5.60E+01	1.67E+00	3.62E+01	0.00E+00	3.79E+01
Thallium	1.10E+00	7.25E-01	0.00E+00	0.00E+00	1.00E+00	1.10E+00	7.25E-01	6.69E-03	1.46E-01	0.00E+00	1.52E-01	4.41E-03	9.59E-02	0.00E+00	1.00E-01
Vanadium	1.62E+02	1.26E+02	0.00E+00	0.00E+00	8.80E-01	1.43E+02	1.11E+02	9.86E-01	1.89E+01	0.00E+00	1.98E+01	7.66E-01	1.46E+01	0.00E+00	1.54E+01
Zinc	2.60E+02	1.61E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	5.30E+02	4.53E+02	1.58E+00	7.01E+01	0.00E+00	7.17E+01	9.82E-01	6.00E+01	0.00E+00	6.09E+01

Table A-90
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for the Site 15 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals															
Aluminum	2.75E+04	2.33E+04	0.00E+00	0.00E+00	1.18E-01	3.25E+03	2.74E+03	1.67E+02	4.29E+02	0.00E+00	5.97E+02	1.41E+02	3.63E+02	0.00E+00	5.04E+02
Arsenic	4.52E+01	3.16E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	3.56E+00	2.76E+00	2.75E-01	4.71E-01	0.00E+00	7.46E-01	1.92E-01	3.66E-01	0.00E+00	5.58E-01
Calcium	2.89E+04	1.57E+04	0.00E+00	0.00E+00	1.00E+00	2.89E+04	1.57E+04	1.76E+02	3.82E+03	0.00E+00	4.00E+03	9.57E+01	2.08E+03	0.00E+00	2.18E+03
Chromium	8.93E+01	6.31E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.85E+00	9.06E+00	5.43E-01	1.17E+00	0.00E+00	1.71E+00	3.84E-01	1.20E+00	0.00E+00	1.58E+00
Copper	6.22E+01	3.89E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.59E+01	1.40E+01	3.79E-01	2.10E+00	0.00E+00	2.48E+00	2.37E-01	1.86E+00	0.00E+00	2.09E+00
Iron	4.58E+04	3.94E+04	0.00E+00	0.00E+00	7.80E-02	3.57E+03	3.07E+03	2.79E+02	4.73E+02	0.00E+00	7.51E+02	2.39E+02	4.06E+02	0.00E+00	6.46E+02
Magnesium	1.79E+03	1.34E+03	0.00E+00	0.00E+00	5.30E-01	9.49E+02	7.08E+02	1.09E+01	1.26E+02	0.00E+00	1.36E+02	8.12E+00	9.36E+01	0.00E+00	1.02E+02
Manganese	9.17E+02	5.11E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	4.67E+01	3.13E+01	5.58E+00	6.17E+00	0.00E+00	1.18E+01	3.11E+00	4.14E+00	0.00E+00	7.25E+00
Mercury	1.00E-01	7.40E-02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	3.85E-01	3.71E-01	6.09E-04	5.09E-02	0.00E+00	5.15E-02	4.50E-04	4.91E-02	0.00E+00	4.95E-02
Nickel	NO COPC	NO COPC	NO COPC	NO COPC	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	#VALUE!	#VALUE!	0.00E+00	#VALUE!	0.00E+00	#VALUE!	0.00E+00	#VALUE!	0.00E+00	#VALUE!
Potassium	6.18E+02	5.32E+02	0.00E+00	0.00E+00	1.00E+00	6.18E+02	5.32E+02	3.76E+00	8.18E+01	0.00E+00	8.55E+01	3.24E+00	7.04E+01	0.00E+00	7.36E+01
Selenium	2.00E+00	1.80E+00	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	1.54E+00	1.43E+00	1.22E-02	2.04E-01	0.00E+00	2.16E-01	1.10E-02	1.89E-01	0.00E+00	2.00E-01
Sodium	1.25E+02	8.43E+01	0.00E+00	0.00E+00	1.00E+00	1.25E+02	8.43E+01	7.61E-01	1.65E+01	0.00E+00	1.73E+01	5.13E-01	1.11E+01	0.00E+00	1.17E+01
Vanadium	1.39E+02	1.10E+02	0.00E+00	0.00E+00	8.80E-01	1.22E+02	9.64E+01	8.46E-01	1.62E+01	0.00E+00	1.70E+01	6.67E-01	1.28E+01	0.00E+00	1.34E+01
Zinc	6.03E+01	3.78E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.28E+02	2.82E+02	3.67E-01	4.34E+01	0.00E+00	4.38E+01	2.30E-01	3.72E+01	0.00E+00	3.75E+01

Table A-91
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 15 Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day
Sulfide		

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	2.57E+04	2.52E+04	0.00E+00	0.00E+00	7.45E+01	7.29E+01	7.32E-02	1.88E+03	1.84E+03	0.00E+00	5.17E+01	0.00E+00	5.17E+01	0.00E+00	5.06E+01	0.00E+00	5.06E+01
Arsenic	2.05E+01	1.33E+01	0.00E+00	0.00E+00	1.40E-01	1.03E-01	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	9.31E-02	6.51E-02	0.00E+00	2.56E-03	0.00E+00	2.56E-03	0.00E+00	1.79E-03	0.00E+00	1.79E-03
Beryllium	1.40E+00	8.40E-01	0.00E+00	0.00E+00	5.07E-03	3.04E-03	2.12E-04	2.97E-04	1.78E-04	0.00E+00	8.16E-06	0.00E+00	8.16E-06	0.00E+00	4.90E-06	0.00E+00	4.90E-06
Calcium	4.29E+04	4.17E+04	0.00E+00	0.00E+00	1.82E+04	1.77E+04	1.48E-04	6.35E+00	6.16E+00	0.00E+00	1.75E-01	0.00E+00	1.75E-01	0.00E+00	1.70E-01	0.00E+00	1.70E-01
Chromium	4.83E+01	4.62E+01	0.00E+00	0.00E+00	1.60E-01	1.53E-01	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	4.00E+00	3.87E+00	0.00E+00	1.10E-01	0.00E+00	1.10E-01	0.00E+00	1.06E-01	0.00E+00	1.06E-01
Copper	1.11E+02	7.10E+01	0.00E+00	0.00E+00	1.78E+00	1.44E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.52E+01	1.43E+01	0.00E+00	4.18E-01	0.00E+00	4.18E-01	0.00E+00	3.92E-01	0.00E+00	3.92E-01
Iron	4.13E+04	3.62E+04	0.00E+00	0.00E+00	1.20E+02	1.05E+02	4.24E-03	1.75E+02	1.53E+02	0.00E+00	4.82E+00	0.00E+00	4.82E+00	0.00E+00	4.22E+00	0.00E+00	4.22E+00
Magnesium	1.32E+04	7.98E+03	0.00E+00	0.00E+00	1.63E+03	9.83E+02	1.06E-03	1.40E+01	8.45E+00	0.00E+00	3.85E-01	0.00E+00	3.85E-01	0.00E+00	2.32E-01	0.00E+00	2.32E-01
Manganese	9.17E+02	6.99E+02	0.00E+00	0.00E+00	2.99E+01	2.28E+01	5.87E-02	5.38E+01	4.10E+01	0.00E+00	1.48E+00	0.00E+00	1.48E+00	0.00E+00	1.13E+00	0.00E+00	1.13E+00
Mercury	1.00E-01	6.60E-02	0.00E+00	0.00E+00	1.30E-02	1.03E-02	1.92E-01	1.92E-02	1.27E-02	0.00E+00	5.28E-04	0.00E+00	5.28E-04	0.00E+00	3.48E-04	0.00E+00	3.48E-04
Nickel	3.52E+01	2.26E+01	0.00E+00	0.00E+00	2.73E-01	1.89E-01	ln(dry mammal conc, mg/kg) = (-0.2462+0.4658*ln(soil conc))	4.11E+00	3.34E+00	0.00E+00	1.13E-01	0.00E+00	1.13E-01	0.00E+00	9.19E-02	0.00E+00	9.19E-02
Potassium	6.09E+02	5.69E+02	0.00E+00	0.00E+00	7.50E+01	7.01E+01	4.24E-03	2.58E+00	2.41E+00	0.00E+00	7.10E-02	0.00E+00	7.10E-02	0.00E+00	6.63E-02	0.00E+00	6.63E-02
Selenium	9.30E-01	7.85E-01	0.00E+00	0.00E+00	5.88E-02	4.88E-02	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	6.42E-01	6.02E-01	0.00E+00	1.77E-02	0.00E+00	1.77E-02	0.00E+00	1.66E-02	0.00E+00	1.66E-02
Silver	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	5.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sodium	4.05E+02	2.74E+02	0.00E+00	0.00E+00	4.65E+00	3.14E+00	1.17E-02	4.74E+00	3.21E+00	0.00E+00	1.30E-01	0.00E+00	1.30E-01	0.00E+00	8.82E-02	0.00E+00	8.82E-02
Thallium	1.10E+00	7.25E-01	0.00E+00	0.00E+00	3.19E-03	2.10E-03	1.23E-01	1.35E-01	8.92E-02	0.00E+00	3.72E-03	0.00E+00	3.72E-03	0.00E+00	2.45E-03	0.00E+00	2.45E-03
Vanadium	1.62E+02	1.26E+02	0.00E+00	0.00E+00	4.99E-01	3.88E-01	1.79E-01	2.90E+01	2.25E+01	0.00E+00	7.97E-01	0.00E+00	7.97E-01	0.00E+00	6.19E-01	0.00E+00	6.19E-01
Zinc	2.60E+02	1.61E+02	0.00E+00	0.00E+00	1.34E+01	1.02E+01	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.32E+02	1.27E+02	0.00E+00	3.63E+00	0.00E+00	3.63E+00	0.00E+00	3.50E+00	0.00E+00	3.50E+00

Table A-92
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for the Site 15 (Subsurface Soil) Exposure Grouping

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals																	
Aluminum	2.75E+04	2.33E+04	0.00E+00	0.00E+00	7.97E+01	6.74E+01	7.32E-02	2.01E+03	1.70E+03	0.00E+00	5.54E+01	0.00E+00	5.54E+01	0.00E+00	4.68E+01	0.00E+00	4.68E+01
Arsenic	4.52E+01	3.16E+01	0.00E+00	0.00E+00	2.51E-01	1.92E-01	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	1.78E-01	1.33E-01	0.00E+00	4.89E-03	0.00E+00	4.89E-03	0.00E+00	3.65E-03	0.00E+00	3.65E-03
Calcium	2.89E+04	1.57E+04	0.00E+00	0.00E+00	1.23E+04	6.68E+03	1.48E-04	4.28E+00	2.33E+00	0.00E+00	1.18E-01	0.00E+00	1.18E-01	0.00E+00	6.40E-02	0.00E+00	6.40E-02
Chromium	8.93E+01	6.31E+01	0.00E+00	0.00E+00	2.97E-01	2.09E-01	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	6.27E+00	4.86E+00	0.00E+00	1.73E-01	0.00E+00	1.73E-01	0.00E+00	1.34E-01	0.00E+00	1.34E-01
Copper	6.22E+01	3.89E+01	0.00E+00	0.00E+00	1.35E+00	1.09E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.40E+01	1.31E+01	0.00E+00	3.85E-01	0.00E+00	3.85E-01	0.00E+00	3.60E-01	0.00E+00	3.60E-01
Iron	4.58E+04	3.94E+04	0.00E+00	0.00E+00	1.33E+02	1.14E+02	4.24E-03	1.94E+02	1.67E+02	0.00E+00	5.34E+00	0.00E+00	5.34E+00	0.00E+00	4.59E+00	0.00E+00	4.59E+00
Magnesium	1.79E+03	1.34E+03	0.00E+00	0.00E+00	2.21E+02	1.64E+02	1.06E-03	1.90E+00	1.42E+00	0.00E+00	5.22E-02	0.00E+00	5.22E-02	0.00E+00	3.89E-02	0.00E+00	3.89E-02
Manganese	9.17E+02	5.11E+02	0.00E+00	0.00E+00	2.99E+01	1.67E+01	5.87E-02	5.38E+01	3.00E+01	0.00E+00	1.48E+00	0.00E+00	1.48E+00	0.00E+00	8.25E-01	0.00E+00	8.25E-01
Mercury	1.00E-01	7.40E-02	0.00E+00	0.00E+00	1.30E-02	1.10E-02	1.92E-01	1.92E-02	1.42E-02	0.00E+00	5.28E-04	0.00E+00	5.28E-04	0.00E+00	3.91E-04	0.00E+00	3.91E-04
Potassium	6.18E+02	5.32E+02	0.00E+00	0.00E+00	7.61E+01	6.56E+01	4.24E-03	2.62E+00	2.26E+00	0.00E+00	7.21E-02	0.00E+00	7.21E-02	0.00E+00	6.20E-02	0.00E+00	6.20E-02
Selenium	2.00E+00	1.80E+00	0.00E+00	0.00E+00	1.37E-01	1.22E-01	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	8.57E-01	8.23E-01	0.00E+00	2.36E-02	0.00E+00	2.36E-02	0.00E+00	2.26E-02	0.00E+00	2.26E-02
Sodium	1.25E+02	8.43E+01	0.00E+00	0.00E+00	1.43E+00	9.67E-01	1.17E-02	1.46E+00	9.86E-01	0.00E+00	4.02E-02	0.00E+00	4.02E-02	0.00E+00	2.71E-02	0.00E+00	2.71E-02
Vanadium	1.39E+02	1.10E+02	0.00E+00	0.00E+00	4.28E-01	3.38E-01	1.79E-01	2.49E+01	1.96E+01	0.00E+00	6.84E-01	0.00E+00	6.84E-01	0.00E+00	5.40E-01	0.00E+00	5.40E-01
Zinc	6.03E+01	3.78E+01	0.00E+00	0.00E+00	5.82E+00	4.47E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.18E+02	1.14E+02	0.00E+00	3.26E+00	0.00E+00	3.26E+00	0.00E+00	3.14E+00	0.00E+00	3.14E+00

Table A-93
Wildlife Exposure Modeling of Doses to Herbivorous Mammals (Jamaican Fruit Bat) from Media for Background Exposure

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	2.42E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.21E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.36E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Inorganics															
Cyanide (Total)	NO COPC	NO COPC	NO COPC	NO COPC	8.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfide	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Metals															
Aluminum	3.40E+04	2.31E+04	0.00E+00	0.00E+00	4.00E-03	1.36E+02	9.24E+01	8.21E+01	1.64E+01	0.00E+00	9.86E+01	5.58E+01	1.12E+01	0.00E+00	6.70E+01
Antimony	2.20E+00	9.39E-01	NO COPC	NO COPC	2.00E-01	4.40E-01	1.88E-01	5.32E-03	5.32E-02	0.00E+00	5.85E-02	2.27E-03	2.27E-02	0.00E+00	2.50E-02
Arsenic	4.71E+01	1.63E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.20E+00	6.59E-01	1.14E-01	1.45E-01	0.00E+00	2.59E-01	3.94E-02	7.95E-02	0.00E+00	1.19E-01
Barium	1.18E+02	6.18E+01	NO COPC	NO COPC	1.50E-01	1.77E+01	9.27E+00	2.85E-01	2.14E+00	0.00E+00	2.42E+00	1.49E-01	1.12E+00	0.00E+00	1.27E+00
Beryllium	7.70E-01	3.68E-01	NO COPC	NO COPC	1.00E-02	7.70E-03	3.68E-03	1.86E-03	9.30E-04	0.00E+00	2.79E-03	8.89E-04	4.45E-04	0.00E+00	1.33E-03
Cadmium	3.05E+00	6.14E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	1.14E+00	4.76E-01	7.37E-03	1.38E-01	0.00E+00	1.45E-01	1.48E-03	5.75E-02	0.00E+00	5.90E-02
Calcium	1.17E+05	2.79E+04	0.00E+00	0.00E+00	3.50E+00	4.10E+05	9.77E+04	2.83E+02	4.95E+04	0.00E+00	4.98E+04	6.74E+01	1.18E+04	0.00E+00	1.19E+04
Chromium	8.97E+01	4.38E+01	0.00E+00	0.00E+00	7.50E-03	6.73E-01	3.29E-01	2.17E-01	8.13E-02	0.00E+00	2.98E-01	1.06E-01	3.97E-02	0.00E+00	1.46E-01
Cobalt	2.80E+01	1.11E+01	0.00E+00	0.00E+00	2.00E-02	5.60E-01	2.22E-01	6.76E-02	6.76E-02	0.00E+00	1.35E-01	2.68E-02	2.68E-02	0.00E+00	5.36E-02
Copper	1.11E+02	4.30E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.25E+01	8.59E+00	2.68E-01	1.51E+00	0.00E+00	1.78E+00	1.04E-01	1.04E+00	0.00E+00	1.14E+00
Iron	5.43E+04	3.02E+04	0.00E+00	0.00E+00	4.00E-03	2.17E+02	1.21E+02	1.31E+02	2.62E+01	0.00E+00	1.57E+02	7.30E+01	1.46E+01	0.00E+00	8.76E+01
Lead	1.52E+02	2.75E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	4.44E+00	1.70E+00	3.67E-01	5.36E-01	0.00E+00	9.03E-01	6.64E-02	2.05E-01	0.00E+00	2.72E-01
Magnesium	8.92E+03	3.00E+03	0.00E+00	0.00E+00	1.00E+00	8.92E+03	3.00E+03	2.16E+01	1.08E+03	0.00E+00	1.10E+03	7.25E+00	3.62E+02	0.00E+00	3.70E+02
Manganese	1.28E+03	7.07E+02	0.00E+00	0.00E+00	2.50E-01	3.20E+02	1.77E+02	3.09E+00	3.87E+01	0.00E+00	4.17E+01	1.71E+00	2.14E+01	0.00E+00	2.31E+01
Mercury	1.10E+00	1.84E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	3.89E-01	1.47E-01	2.66E-03	4.70E-02	0.00E+00	4.96E-02	4.45E-04	1.78E-02	0.00E+00	1.82E-02
Nickel	4.23E+01	1.43E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	1.78E+00	7.91E-01	1.02E-01	2.15E-01	0.00E+00	3.17E-01	3.45E-02	9.56E-02	0.00E+00	1.30E-01
Potassium	1.71E+03	8.48E+02	0.00E+00	0.00E+00	1.00E+00	1.71E+03	8.48E+02	4.13E+00	2.07E+02	0.00E+00	2.11E+02	2.05E+00	1.02E+02	0.00E+00	1.04E+02
Selenium	1.00E+00	9.33E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	5.08E-01	4.70E-01	2.42E-03	6.13E-02	0.00E+00	6.37E-02	2.25E-03	5.68E-02	0.00E+00	5.91E-02
Silver	2.00E+00	8.10E-01	0.00E+00	0.00E+00	4.00E-01	8.00E-01	3.24E-01	4.83E-03	9.66E-02	0.00E+00	1.01E-01	1.96E-03	3.91E-02	0.00E+00	4.11E-02
Sodium	2.71E+02	1.65E+02	0.00E+00	0.00E+00	7.50E-02	2.03E+01	1.24E+01	6.55E-01	2.46E+00	0.00E+00	3.11E+00	3.99E-01	1.49E+00	0.00E+00	1.89E+00
Thallium	1.10E+00	1.01E+00	0.00E+00	0.00E+00	4.00E-03	4.40E-03	4.04E-03	2.66E-03	5.32E-04	0.00E+00	3.19E-03	2.44E-03	4.88E-04	0.00E+00	2.93E-03
Tin	0.00E+00	0.00E+00	NO COPC	NO COPC	3.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.76E+02	9.61E+01	0.00E+00	0.00E+00	5.50E-03	9.68E-01	5.29E-01	4.25E-01	1.17E-01	0.00E+00	5.42E-01	2.32E-01	6.38E-02	0.00E+00	2.96E-01
Zinc	6.03E+02	8.42E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.69E+02	5.66E+01	1.46E+00	2.04E+01	0.00E+00	2.18E+01	2.03E-01	6.83E+00	0.00E+00	7.04E+00
PAHs															
2-Methylnaphthalene	NO COPC	NO COPC	NO COPC	NO COPC	2.27E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	NO COPC	NO COPC	NO COPC	NO COPC	2.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	1.04E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	2.06E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	1.37E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	1.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NO COPC	NO COPC	NO COPC	NO COPC	6.02E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	1.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	NO COPC	NO COPC	NO COPC	NO COPC	2.06E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	6.78E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	5.33E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluorene	NO COPC	NO COPC	NO COPC	NO COPC	1.49E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	6.06E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	NO COPC	NO COPC	NO COPC	NO COPC	4.79E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	NO COPC	NO COPC	NO COPC	NO COPC	1.02E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	5.85E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total LMW PAHs	NO COPC	NO COPC	NO COPC	NO COPC	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	NO COPC	NO COPC	NO COPC	NO COPC	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PCBs															
Aroclor-1260	NO COPC	NO COPC	NO COPC	NO COPC	6.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pesticides															
4,4'-DDD	5.02E-01	4.22E-02	0.00E+00	0.00E+00	1.57E-02	7.87E-03	6.61E-04	1.21E-03	9.50E-04	0.00E+00	2.16E-03	1.02E-04	7.99E-05	0.00E+00	1.82E-04
4,4'-DDE	6.50E-01	5.56E-02	0.00E+00	0.00E+00	1.32E-02	8.57E-03	7.33E-04	1.57E-03	1.04E-03	0.00E+00	2.61E-03	1.34E-04	8.85E-05	0.00E+00	2.23E-04
4,4'-DDT	1.98E-01	1.77E-02	0.00E+00	0.00E+00	4.61E-03	9.12E-04	8.15E-05	4.78E-04	1.10E-04	0.00E+00	5.89E-04	4.28E-05	9.85E-06	0.00E+00	5.26E-05
DDTr	--	--	--	--	--	--	--	3.26E-03	2.10E-03	0.00E+00	5.36E-03	2.79E-04	1.78E-04	0.00E+00	4.57E-04
Alpha-Chlordane	9.00E-03	1.23E-03	0.00E+00	0.00E+00	9.33E-03	8.39E-05	1.15E-05	2.17E-05	1.01E-05	0.00E+00	3.19E-05	2.97E-06	1.39E-06	0.00E+00	4.36E-06
Dieldrin	NO COPC	NO COPC	NO COPC	NO COPC	2.74E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Endosulfan I	NO COPC	NO COPC	NO COPC	NO COPC	3.67E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor	NO COPC	NO COPC	NO COPC	NO COPC	1.59E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor Epoxide	NO COPC	NO COPC	NO COPC	NO COPC	8.96E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
trans-Chlordane	8.50E-03	1.09E-03	0.00E+00	0.00E+00	9.33E-03	7.93E-05	1.02E-05	2.05E-05	9.58E-06	0.00E+00	3.01E-05	2.63E-06	1.23E-06	0.00E+00	3.86E-06
Furans															
Dibenzofuran	NO COPC	NO COPC	NO COPC	NO COPC	1.61E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Herbicides															
2,4-D	NO COPC	NO COPC	NO COPC	NO COPC	9.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dichlorprop	NO COPC	NO COPC	NO COPC	NO COPC	4.03E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SVOCs															
Bis(2-ethylhexyl)phthalate	NO COPC	NO COPC	NO COPC	NO COPC	4.30E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pentachlorophenol	NO COPC	NO COPC	NO COPC	NO COPC	4.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOCs															
1,1-dichloroethene	NO COPC	NO COPC	NO COPC	NO COPC	2.27E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Butanone	NO COPC	NO COPC	NO COPC	NO COPC	2.74E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetone	NO COPC	NO COPC	NO COPC	NO COPC	5.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	NO COPC	NO COPC	NO COPC	NO COPC	2.27E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	NO COPC	NO COPC	NO COPC	NO COPC	2.93E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	NO COPC	NO COPC	NO COPC	NO COPC	5.85E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Isobutyl alcohol	NO COPC	NO COPC	NO COPC	NO COPC	1.41E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	NO COPC	NO COPC	NO COPC	NO COPC	1.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table A-94
Wildlife Exposure Modeling of Doses to Herbivorous Birds (Ruddy Quail-dove) from Media
for Background Exposure

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	3.35E-04	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.68E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.15E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Plant) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Inorganics															
Cyanide (Total)	NO COPC	NO COPC	NO COPC	NO COPC	8.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfide	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Metals															
Aluminum	3.40E+04	2.31E+04	0.00E+00	0.00E+00	4.00E-03	1.36E+02	9.24E+01	1.14E+01	2.28E+00	0.00E+00	1.37E+01	7.74E+00	1.55E+00	0.00E+00	9.29E+00
Antimony	2.20E+00	9.39E-01	NO COPC	NO COPC	2.00E-01	4.40E-01	1.88E-01	7.37E-04	7.37E-03	0.00E+00	8.11E-03	3.15E-04	3.15E-03	0.00E+00	3.46E-03
Arsenic	4.71E+01	1.63E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.20E+00	6.59E-01	1.58E-02	2.01E-02	0.00E+00	3.58E-02	5.46E-03	1.10E-02	0.00E+00	1.65E-02
Barium	1.18E+02	6.18E+01	NO COPC	NO COPC	1.50E-01	1.77E+01	9.27E+00	3.95E-02	2.96E-01	0.00E+00	3.36E-01	2.07E-02	1.55E-01	0.00E+00	1.76E-01
Beryllium	7.70E-01	3.68E-01	NO COPC	NO COPC	1.00E-02	7.70E-03	3.68E-03	2.58E-04	1.29E-04	0.00E+00	3.87E-04	1.23E-04	6.16E-05	0.00E+00	1.85E-04
Cadmium	3.05E+00	6.14E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	1.14E+00	4.76E-01	1.02E-03	1.91E-02	0.00E+00	2.02E-02	2.06E-04	7.97E-03	0.00E+00	8.18E-03
Calcium	1.17E+05	2.79E+04	0.00E+00	0.00E+00	3.50E+00	4.10E+05	9.77E+04	3.92E+01	6.86E+03	0.00E+00	6.90E+03	9.35E+00	1.64E+03	0.00E+00	1.64E+03
Chromium	8.97E+01	4.38E+01	0.00E+00	0.00E+00	7.50E-03	6.73E-01	3.29E-01	3.00E-02	1.13E-02	0.00E+00	4.13E-02	1.47E-02	5.50E-03	0.00E+00	2.02E-02
Cobalt	2.80E+01	1.11E+01	0.00E+00	0.00E+00	2.00E-02	5.60E-01	2.22E-01	9.38E-03	9.38E-03	0.00E+00	1.88E-02	3.72E-03	3.72E-03	0.00E+00	7.44E-03
Copper	1.11E+02	4.30E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.25E+01	8.59E+00	3.72E-02	2.09E-01	0.00E+00	2.46E-01	1.44E-02	1.44E-01	0.00E+00	1.58E-01
Iron	5.43E+04	3.02E+04	0.00E+00	0.00E+00	4.00E-03	2.17E+02	1.21E+02	1.82E+01	3.64E+00	0.00E+00	2.18E+01	1.01E+01	2.02E+00	0.00E+00	1.21E+01
Lead	1.52E+02	2.75E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	4.44E+00	1.70E+00	5.09E-02	7.44E-02	0.00E+00	1.25E-01	9.21E-03	2.85E-02	0.00E+00	3.77E-02
Magnesium	8.92E+03	3.00E+03	0.00E+00	0.00E+00	1.00E+00	8.92E+03	3.00E+03	2.99E+00	1.49E+02	0.00E+00	1.52E+02	1.01E+00	5.03E+01	0.00E+00	5.13E+01
Manganese	1.28E+03	7.07E+02	0.00E+00	0.00E+00	2.50E-01	3.20E+02	1.77E+02	4.29E-01	5.36E+00	0.00E+00	5.79E+00	2.37E-01	2.96E+00	0.00E+00	3.20E+00
Mercury	1.10E+00	1.84E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	3.89E-01	1.47E-01	3.69E-04	6.52E-03	0.00E+00	6.88E-03	6.16E-05	2.46E-03	0.00E+00	2.52E-03
Nickel	4.23E+01	1.43E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	1.78E+00	7.91E-01	1.42E-02	2.98E-02	0.00E+00	4.40E-02	4.79E-03	1.33E-02	0.00E+00	1.80E-02
Potassium	1.71E+03	8.48E+02	0.00E+00	0.00E+00	1.00E+00	1.71E+03	8.48E+02	5.73E-01	2.86E+01	0.00E+00	2.92E+01	2.84E-01	1.42E+01	0.00E+00	1.45E+01
Selenium	1.00E+00	9.33E-01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	5.08E-01	4.70E-01	3.35E-04	8.50E-03	0.00E+00	8.84E-03	3.13E-04	7.88E-03	0.00E+00	8.19E-03
Silver	2.00E+00	8.10E-01	0.00E+00	0.00E+00	4.00E-01	8.00E-01	3.24E-01	6.70E-04	1.34E-02	0.00E+00	1.41E-02	2.71E-04	5.43E-03	0.00E+00	5.70E-03
Sodium	2.71E+02	1.65E+02	0.00E+00	0.00E+00	7.50E-02	2.03E+01	1.24E+01	9.08E-02	3.40E-01	0.00E+00	4.31E-01	5.53E-02	2.07E-01	0.00E+00	2.63E-01
Thallium	1.10E+00	1.01E+00	0.00E+00	0.00E+00	4.00E-03	4.40E-03	4.04E-03	3.69E-04	7.37E-05	0.00E+00	4.42E-04	3.38E-04	6.77E-05	0.00E+00	4.06E-04
Tin	0.00E+00	0.00E+00	NO COPC	NO COPC	3.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.76E+02	9.61E+01	0.00E+00	0.00E+00	5.50E-03	9.68E-01	5.29E-01	5.90E-02	1.62E-02	0.00E+00	7.52E-02	3.22E-02	8.85E-03	0.00E+00	4.10E-02
Zinc	6.03E+02	8.42E+01	0.00E+00	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.69E+02	5.66E+01	2.02E-01	2.83E+00	0.00E+00	3.03E+00	2.82E-02	9.47E-01	0.00E+00	9.76E-01
PAHs															
2-Methylnaphthalene	NO COPC	NO COPC	NO COPC	NO COPC	2.27E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	NO COPC	NO COPC	NO COPC	NO COPC	2.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	1.04E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	2.06E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	1.37E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	1.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NO COPC	NO COPC	NO COPC	NO COPC	6.02E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	1.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	NO COPC	NO COPC	NO COPC	NO COPC	2.06E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	6.78E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	5.33E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluorene	NO COPC	NO COPC	NO COPC	NO COPC	1.49E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	6.06E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	NO COPC	NO COPC	NO COPC	NO COPC	4.79E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	NO COPC	NO COPC	NO COPC	NO COPC	1.02E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	5.85E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total LMW PAHs	NO COPC	NO COPC	NO COPC	NO COPC	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	NO COPC	NO COPC	NO COPC	NO COPC	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PCBs															
Aroclor-1260	NO COPC	NO COPC	NO COPC	NO COPC	6.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pesticides															
4,4'-DDD	5.02E-01	4.22E-02	0.00E+00	0.00E+00	1.57E-02	7.87E-03	6.61E-04	1.68E-04	1.32E-04	0.00E+00	3.00E-04	1.41E-05	1.11E-05	0.00E+00	2.52E-05
4,4'-DDE	6.50E-01	5.56E-02	0.00E+00	0.00E+00	1.32E-02	8.57E-03	7.33E-04	2.18E-04	1.44E-04	0.00E+00	3.61E-04	1.86E-05	1.23E-05	0.00E+00	3.09E-05
4,4'-DDT	1.98E-01	1.77E-02	0.00E+00	0.00E+00	4.61E-03	9.12E-04	8.15E-05	6.63E-05	1.53E-05	0.00E+00	8.16E-05	5.93E-06	1.37E-06	0.00E+00	7.30E-06
DDTr	--	--	--	--	--	--	--	4.52E-04	2.91E-04	0.00E+00	7.43E-04	3.87E-05	2.47E-05	0.00E+00	6.34E-05
Alpha-Chlordane	9.00E-03	1.23E-03	0.00E+00	0.00E+00	9.33E-03	8.39E-05	1.15E-05	3.02E-06	1.41E-06	0.00E+00	4.42E-06	4.12E-07	1.92E-07	0.00E+00	6.04E-07
Dieldrin	NO COPC	NO COPC	NO COPC	NO COPC	2.74E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Endosulfan I	NO COPC	NO COPC	NO COPC	NO COPC	3.67E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor	NO COPC	NO COPC	NO COPC	NO COPC	1.59E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor Epoxide	NO COPC	NO COPC	NO COPC	NO COPC	8.96E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
trans-Chlordane	8.50E-03	1.09E-03	0.00E+00	0.00E+00	9.33E-03	7.93E-05	1.02E-05	2.85E-06	1.33E-06	0.00E+00	4.18E-06	3.65E-07	1.70E-07	0.00E+00	5.35E-07
Furans															
Dibenzofuran	NO COPC	NO COPC	NO COPC	NO COPC	1.61E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Herbicides															
2,4-D	NO COPC	NO COPC	NO COPC	NO COPC	9.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dichlorprop	NO COPC	NO COPC	NO COPC	NO COPC	4.03E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SVOCs															
Bis(2-ethylhexyl)phthalate	NO COPC	NO COPC	NO COPC	NO COPC	4.30E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pentachlorophenol	NO COPC	NO COPC	NO COPC	NO COPC	4.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOCs															
1,1-dichloroethene	NO COPC	NO COPC	NO COPC	NO COPC	2.27E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Butanone	NO COPC	NO COPC	NO COPC	NO COPC	2.74E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetone	NO COPC	NO COPC	NO COPC	NO COPC	5.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	NO COPC	NO COPC	NO COPC	NO COPC	2.27E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	NO COPC	NO COPC	NO COPC	NO COPC	2.93E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	NO COPC	NO COPC	NO COPC	NO COPC	5.85E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Isobutyl alcohol	NO COPC	NO COPC	NO COPC	NO COPC	1.41E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	NO COPC	NO COPC	NO COPC	NO COPC	1.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table A-95
Wildlife Exposure Modeling of Doses to Insectivorous Mammals (Antillean Ghost-Faced Bat) from Media for Background Exposure

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	8.33E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.60E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Inorganics															
Cyanide (Total)	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfide	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Metals															
Aluminum	3.40E+04	2.31E+04	0.00E+00	0.00E+00	1.18E-01	4.01E+03	2.73E+03	0.00E+00	3.34E+02	0.00E+00	3.34E+02	0.00E+00	2.27E+02	0.00E+00	2.27E+02
Antimony	2.20E+00	9.39E-01	NO COPC	NO COPC	1.00E+00	2.20E+00	9.39E-01	0.00E+00	1.83E-01	0.00E+00	1.83E-01	0.00E+00	7.82E-02	0.00E+00	7.82E-02
Arsenic	4.71E+01	1.63E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	3.66E+00	1.73E+00	0.00E+00	3.05E-01	0.00E+00	3.05E-01	0.00E+00	1.44E-01	0.00E+00	1.44E-01
Barium	1.18E+02	6.18E+01	NO COPC	NO COPC	1.60E-01	1.89E+01	9.89E+00	0.00E+00	1.57E+00	0.00E+00	1.57E+00	0.00E+00	8.24E-01	0.00E+00	8.24E-01
Beryllium	7.70E-01	3.68E-01	NO COPC	NO COPC	1.18E+00	9.09E-01	4.34E-01	0.00E+00	7.57E-02	0.00E+00	7.57E-02	0.00E+00	3.62E-02	0.00E+00	3.62E-02
Cadmium	3.05E+00	6.14E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	2.01E+01	5.62E+00	0.00E+00	1.67E+00	0.00E+00	1.67E+00	0.00E+00	4.68E-01	0.00E+00	4.68E-01
Calcium	1.17E+05	2.79E+04	0.00E+00	0.00E+00	1.00E+00	1.17E+05	2.79E+04	0.00E+00	9.75E+03	0.00E+00	9.75E+03	0.00E+00	2.32E+03	0.00E+00	2.32E+03
Chromium	8.97E+01	4.38E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.84E+00	9.28E+00	0.00E+00	7.37E-01	0.00E+00	7.37E-01	0.00E+00	7.73E-01	0.00E+00	7.73E-01
Cobalt	2.80E+01	1.11E+01	0.00E+00	0.00E+00	2.91E-01	8.15E+00	3.23E+00	0.00E+00	6.79E-01	0.00E+00	6.79E-01	0.00E+00	2.69E-01	0.00E+00	2.69E-01
Copper	1.11E+02	4.30E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.85E+01	1.44E+01	0.00E+00	1.54E+00	0.00E+00	1.54E+00	0.00E+00	1.20E+00	0.00E+00	1.20E+00
Iron	5.43E+04	3.02E+04	0.00E+00	0.00E+00	7.80E-02	4.24E+03	2.36E+03	0.00E+00	3.53E+02	0.00E+00	3.53E+02	0.00E+00	1.96E+02	0.00E+00	1.96E+02
Lead	1.52E+02	2.75E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	4.64E+01	1.17E+01	0.00E+00	3.86E+00	0.00E+00	3.86E+00	0.00E+00	9.72E-01	0.00E+00	9.72E-01
Magnesium	8.92E+03	3.00E+03	0.00E+00	0.00E+00	5.30E-01	4.73E+03	1.59E+03	0.00E+00	3.94E+02	0.00E+00	3.94E+02	0.00E+00	1.32E+02	0.00E+00	1.32E+02
Manganese	1.28E+03	7.07E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	5.86E+01	3.91E+01	0.00E+00	4.88E+00	0.00E+00	4.88E+00	0.00E+00	3.26E+00	0.00E+00	3.26E+00
Mercury	1.10E+00	1.84E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	5.10E-01	4.13E-01	0.00E+00	4.25E-02	0.00E+00	4.25E-02	0.00E+00	3.44E-02	0.00E+00	3.44E-02
Nickel	4.23E+01	1.43E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.49E+01	1.98E+01	0.00E+00	1.24E+00	0.00E+00	1.24E+00	0.00E+00	1.65E+00	0.00E+00	1.65E+00
Potassium	1.71E+03	8.48E+02	0.00E+00	0.00E+00	1.00E+00	1.71E+03	8.48E+02	0.00E+00	1.42E+02	0.00E+00	1.42E+02	0.00E+00	7.07E+01	0.00E+00	7.07E+01
Selenium	1.00E+00	9.33E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	9.28E-01	8.82E-01	0.00E+00	7.73E-02	0.00E+00	7.73E-02	0.00E+00	7.35E-02	0.00E+00	7.35E-02
Silver	2.00E+00	8.10E-01	0.00E+00	0.00E+00	1.53E+01	3.06E+01	1.24E+01	0.00E+00	2.55E+00	0.00E+00	2.55E+00	0.00E+00	1.03E+00	0.00E+00	1.03E+00
Sodium	2.71E+02	1.65E+02	0.00E+00	0.00E+00	1.00E+00	2.71E+02	1.65E+02	0.00E+00	2.26E+01	0.00E+00	2.26E+01	0.00E+00	1.37E+01	0.00E+00	1.37E+01
Thallium	1.10E+00	1.01E+00	0.00E+00	0.00E+00	1.00E+00	1.10E+00	1.01E+00	0.00E+00	9.17E-02	0.00E+00	9.17E-02	0.00E+00	8.42E-02	0.00E+00	8.42E-02
Tin	0.00E+00	0.00E+00	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.76E+02	9.61E+01	0.00E+00	0.00E+00	8.80E-01	1.55E+02	8.46E+01	0.00E+00	1.29E+01	0.00E+00	1.29E+01	0.00E+00	7.05E+00	0.00E+00	7.05E+00
Zinc	6.03E+02	8.42E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	6.98E+02	3.66E+02	0.00E+00	5.82E+01	0.00E+00	5.82E+01	0.00E+00	3.05E+01	0.00E+00	3.05E+01
PAHs															
2-Methylnaphthalene	NO COPC	NO COPC	NO COPC	NO COPC	2.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	NO COPC	NO COPC	NO COPC	NO COPC	2.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	3.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	2.70E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	3.40E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	2.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NO COPC	NO COPC	NO COPC	NO COPC	1.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	2.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	NO COPC	NO COPC	NO COPC	NO COPC	4.40E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	4.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	3.70E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluorene	NO COPC	NO COPC	NO COPC	NO COPC	2.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	4.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	NO COPC	NO COPC	NO COPC	NO COPC	2.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	NO COPC	NO COPC	NO COPC	NO COPC	2.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	3.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total LMW PAHs	NO COPC	NO COPC	NO COPC	NO COPC	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	NO COPC	NO COPC	NO COPC	NO COPC	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PCBs															
Aroclor-1260	NO COPC	NO COPC	NO COPC	NO COPC	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	#VALUE!	#VALUE!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pesticides															
4,4'-DDD	5.02E-01	4.22E-02	0.00E+00	0.00E+00	9.00E+00	4.52E+00	3.80E-01	0.00E+00	3.76E-01	0.00E+00	3.76E-01	0.00E+00	3.16E-02	0.00E+00	3.16E-02
4,4'-DDE	6.50E-01	5.56E-02	0.00E+00	0.00E+00	9.00E+00	5.85E+00	5.00E-01	0.00E+00	4.87E-01	0.00E+00	4.87E-01	0.00E+00	4.17E-02	0.00E+00	4.17E-02
4,4'-DDT	1.98E-01	1.77E-02	0.00E+00	0.00E+00	9.00E+00	1.78E+00	1.59E-01	0.00E+00	1.48E-01	0.00E+00	1.48E-01	0.00E+00	1.33E-02	0.00E+00	1.33E-02
DDTr	--	--	--	--	--	--	--	0.00E+00	1.01E+00	0.00E+00	1.01E+00	0.00E+00	8.66E-02	0.00E+00	8.66E-02
Alpha-Chlordane	9.00E-03	1.23E-03	0.00E+00	0.00E+00	1.00E+00	9.00E-03	1.23E-03	0.00E+00	7.50E-04	0.00E+00	7.50E-04	0.00E+00	1.02E-04	0.00E+00	1.02E-04
Dieldrin	NO COPC	NO COPC	NO COPC	NO COPC	1.79E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Endosulfan I	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor	NO COPC	NO COPC	NO COPC	NO COPC	4.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor Epoxide	NO COPC	NO COPC	NO COPC	NO COPC	4.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
trans-Chlordane	8.50E-03	1.09E-03	0.00E+00	0.00E+00	1.00E+00	8.50E-03	1.09E-03	0.00E+00	7.08E-04	0.00E+00	7.08E-04	0.00E+00	9.08E-05	0.00E+00	9.08E-05
Furans															
Dibenzofuran	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Herbicides															
2,4-D	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dichlorprop	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SVOCs															
Bis(2-ethylhexyl)phthalate	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pentachlorophenol	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOCs															
1,1-dichloroethene	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Butanone	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetone	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Isobutyl alcohol	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table A-96
Wildlife Exposure Modeling of Doses to Insectivorous Birds (Pearly-eyed Thrasher) from Media
for Background Exposure

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	6.09E-03	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	1.32E-01	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	1.28E-01	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Food Item (Insect/Worm) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Inorganics															
Cyanide (Total)	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfide	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Metals															
Aluminum	3.40E+04	2.31E+04	0.00E+00	0.00E+00	1.18E-01	4.01E+03	2.73E+03	2.07E+02	5.31E+02	0.00E+00	7.38E+02	1.41E+02	3.61E+02	0.00E+00	5.01E+02
Antimony	2.20E+00	9.39E-01	0.00E+00	0.00E+00	1.00E+00	2.20E+00	9.39E-01	1.34E-02	2.91E-01	0.00E+00	3.04E-01	5.71E-03	1.24E-01	0.00E+00	1.30E-01
Arsenic	4.71E+01	1.63E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	3.66E+00	1.73E+00	2.87E-01	4.85E-01	0.00E+00	7.71E-01	9.92E-02	2.29E-01	0.00E+00	3.28E-01
Barium	1.18E+02	6.18E+01	0.00E+00	0.00E+00	1.60E-01	1.89E+01	9.89E+00	7.18E-01	2.50E+00	0.00E+00	3.22E+00	3.76E-01	1.31E+00	0.00E+00	1.68E+00
Beryllium	7.70E-01	3.68E-01	0.00E+00	0.00E+00	1.18E+00	9.09E-01	4.34E-01	4.69E-03	1.20E-01	0.00E+00	1.25E-01	2.24E-03	5.74E-02	0.00E+00	5.97E-02
Cadmium	3.05E+00	6.14E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	2.01E+01	5.62E+00	1.86E-02	2.66E+00	0.00E+00	2.68E+00	3.74E-03	7.43E-01	0.00E+00	7.47E-01
Calcium	1.17E+05	2.79E+04	0.00E+00	0.00E+00	1.00E+00	1.17E+05	2.79E+04	7.12E+02	1.55E+04	0.00E+00	1.62E+04	1.70E+02	3.69E+03	0.00E+00	3.86E+03
Chromium	8.97E+01	4.38E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.84E+00	9.28E+00	5.46E-01	1.17E+00	0.00E+00	1.72E+00	2.67E-01	1.23E+00	0.00E+00	1.49E+00
Cobalt	2.80E+01	1.11E+01	0.00E+00	0.00E+00	2.91E-01	8.15E+00	3.23E+00	1.70E-01	1.08E+00	0.00E+00	1.25E+00	6.75E-02	4.27E-01	0.00E+00	4.95E-01
Copper	1.11E+02	4.30E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.85E+01	1.44E+01	6.75E-01	2.45E+00	0.00E+00	3.12E+00	2.62E-01	1.91E+00	0.00E+00	2.17E+00
Iron	5.43E+04	3.02E+04	0.00E+00	0.00E+00	7.80E-02	4.24E+03	2.36E+03	3.30E+02	5.60E+02	0.00E+00	8.91E+02	1.84E+02	3.12E+02	0.00E+00	4.95E+02
Lead	1.52E+02	2.75E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	4.64E+01	1.17E+01	9.25E-01	6.13E+00	0.00E+00	7.06E+00	1.67E-01	1.54E+00	0.00E+00	1.71E+00
Magnesium	8.92E+03	3.00E+03	0.00E+00	0.00E+00	5.30E-01	4.73E+03	1.59E+03	5.43E+01	6.25E+02	0.00E+00	6.80E+02	1.83E+01	2.10E+02	0.00E+00	2.29E+02
Manganese	1.28E+03	7.07E+02	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	5.86E+01	3.91E+01	7.79E+00	7.75E+00	0.00E+00	1.55E+01	4.30E+00	5.17E+00	0.00E+00	9.47E+00
Mercury	1.10E+00	1.84E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	5.10E-01	4.13E-01	6.69E-03	6.75E-02	0.00E+00	7.42E-02	1.12E-03	5.47E-02	0.00E+00	5.58E-02
Nickel	4.23E+01	1.43E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.49E+01	1.98E+01	2.57E-01	1.98E+00	0.00E+00	2.23E+00	8.70E-02	2.62E+00	0.00E+00	2.71E+00
Potassium	1.71E+03	8.48E+02	0.00E+00	0.00E+00	1.00E+00	1.71E+03	8.48E+02	1.04E+01	2.26E+02	0.00E+00	2.37E+02	5.16E+00	1.12E+02	0.00E+00	1.17E+02
Selenium	1.00E+00	9.33E-01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	9.28E-01	8.82E-01	6.09E-03	1.23E-01	0.00E+00	1.29E-01	5.68E-03	1.17E-01	0.00E+00	1.22E-01
Silver	2.00E+00	8.10E-01	0.00E+00	0.00E+00	1.53E+01	3.06E+01	1.24E+01	1.22E-02	4.05E+00	0.00E+00	4.06E+00	4.93E-03	1.64E+00	0.00E+00	1.64E+00
Sodium	2.71E+02	1.65E+02	0.00E+00	0.00E+00	1.00E+00	2.71E+02	1.65E+02	1.65E+00	3.59E+01	0.00E+00	3.75E+01	1.00E+00	2.18E+01	0.00E+00	2.28E+01
Thallium	1.10E+00	1.01E+00	0.00E+00	0.00E+00	1.00E+00	1.10E+00	1.01E+00	6.69E-03	1.46E-01	0.00E+00	1.52E-01	6.15E-03	1.34E-01	0.00E+00	1.40E-01
Tin	0.00E+00	0.00E+00	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.76E+02	9.61E+01	0.00E+00	0.00E+00	8.80E-01	1.55E+02	8.46E+01	1.07E+00	2.05E+01	0.00E+00	2.16E+01	5.85E-01	1.12E+01	0.00E+00	1.18E+01
Zinc	6.03E+02	8.42E+01	0.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	6.98E+02	3.66E+02	3.67E+00	9.24E+01	0.00E+00	9.61E+01	5.12E-01	4.84E+01	0.00E+00	4.90E+01
PAHs															
2-Methylnaphthalene	NO COPC	NO COPC	NO COPC	NO COPC	2.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	NO COPC	NO COPC	NO COPC	NO COPC	2.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	3.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	2.70E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	3.40E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	2.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NO COPC	NO COPC	NO COPC	NO COPC	1.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	2.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	NO COPC	NO COPC	NO COPC	NO COPC	4.40E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	4.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	3.70E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluorene	NO COPC	NO COPC	NO COPC	NO COPC	2.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	4.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	NO COPC	NO COPC	NO COPC	NO COPC	2.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	NO COPC	NO COPC	NO COPC	NO COPC	2.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	3.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total LMW PAHs	NO COPC	NO COPC	NO COPC	NO COPC	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	NO COPC	NO COPC	NO COPC	NO COPC	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PCBs															
Aroclor-1260	NO COPC	NO COPC	NO COPC	NO COPC	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pesticides															
4,4'-DDD	5.02E-01	4.22E-02	0.00E+00	0.00E+00	9.00E+00	4.52E+00	3.80E-01	3.05E-03	5.98E-01	0.00E+00	6.01E-01	2.57E-04	5.02E-02	0.00E+00	5.05E-02
4,4'-DDE	6.50E-01	5.56E-02	0.00E+00	0.00E+00	9.00E+00	5.85E+00	5.00E-01	3.96E-03	7.74E-01	0.00E+00	7.78E-01	3.38E-04	6.62E-02	0.00E+00	6.65E-02
4,4'-DDT	1.98E-01	1.77E-02	0.00E+00	0.00E+00	9.00E+00	1.78E+00	1.59E-01	1.20E-03	2.36E-01	0.00E+00	2.37E-01	1.08E-04	2.11E-02	0.00E+00	2.12E-02
DDTr	--	--	--	--	--	--	--	8.22E-03	1.61E+00	0.00E+00	1.62E+00	7.03E-04	1.38E-01	0.00E+00	1.38E-01
Alpha-Chlordane	9.00E-03	1.23E-03	0.00E+00	0.00E+00	1.00E+00	9.00E-03	1.23E-03	5.48E-05	1.19E-03	0.00E+00	1.25E-03	7.49E-06	1.63E-04	0.00E+00	1.70E-04
Dieldrin	NO COPC	NO COPC	NO COPC	NO COPC	1.79E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Endosulfan I	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor	NO COPC	NO COPC	NO COPC	NO COPC	4.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor Epoxide	NO COPC	NO COPC	NO COPC	NO COPC	4.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
trans-Chlordane	8.50E-03	1.09E-03	0.00E+00	0.00E+00	1.00E+00	8.50E-03	1.09E-03	5.17E-05	1.12E-03	0.00E+00	1.18E-03	6.63E-06	1.44E-04	0.00E+00	1.51E-04
Furans															
Dibenzofuran	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Herbicides															
2,4-D	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dichlorprop	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SVOCs															
Bis(2-ethylhexyl)phthalate	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pentachlorophenol	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOCs															
1,1-dichloroethene	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Butanone	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetone	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Isobutyl alcohol	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	NO COPC	NO COPC	NO COPC	NO COPC	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table A-97
Wildlife Exposure Modeling of Doses to Predatory Birds (Red-tailed hawk) from Media
for Background Exposure

Exposure Parameters

Soil Ingestion Rate (kg dry wt./kg bw-day):	0.00E+00	kg/kg-day
Food Ingestion Rate (kg dry wt./kg bw-day):	2.75E-02	kg/kg-day
Water Ingestion Rate (L/kg bw-day):	5.70E-02	L/kg-day

Sulfide

Chemical	Soil Concentration (mg/kg dry wt.)		Water Concentration (mg/L dry wt.)		Dose to Small Mammal (mg/kg bw-day)		Food Item (Small Mammal) Uptake			Maximum Case Scenario Doses				Mean Case Scenario Doses			
	Maximum	Mean	Maximum	Mean	Maximum	Mean	Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Mean Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Inorganics																	
Cyanide (Total)	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfide	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Metals																	
Aluminum	3.40E+04	2.31E+04	0.00E+00	0.00E+00	9.86E+01	6.70E+01	7.32E-02	2.49E+03	1.69E+03	0.00E+00	6.84E+01	0.00E+00	6.84E+01	0.00E+00	4.65E+01	0.00E+00	4.65E+01
Antimony	2.20E+00	9.39E-01	NO COPC	NO COPC	5.85E-02	2.50E-02	2.12E-04	4.66E-04	1.99E-04	0.00E+00	1.28E-05	0.00E+00	1.28E-05	0.00E+00	5.47E-06	0.00E+00	5.47E-06
Arsenic	4.71E+01	1.63E+01	0.00E+00	0.00E+00	2.59E-01	1.19E-01	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	1.84E-01	7.72E-02	0.00E+00	5.06E-03	0.00E+00	5.06E-03	0.00E+00	2.12E-03	0.00E+00	2.12E-03
Barium	1.18E+02	6.18E+01	NO COPC	NO COPC	2.42E+00	1.27E+00	ln(dry mammal conc, mg/kg) = (-1.412+0.7*ln(soil conc))	6.87E+00	4.37E+00	0.00E+00	1.89E-01	0.00E+00	1.89E-01	0.00E+00	1.20E-01	0.00E+00	1.20E-01
Beryllium	7.70E-01	3.68E-01	NO COPC	NO COPC	2.79E-03	1.33E-03	2.12E-04	1.63E-04	7.80E-05	0.00E+00	4.49E-06	0.00E+00	4.49E-06	0.00E+00	2.15E-06	0.00E+00	2.15E-06
Cadmium	3.05E+00	6.14E-01	0.00E+00	0.00E+00	1.45E-01	5.90E-02	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	1.12E+00	5.13E-01	0.00E+00	3.08E-02	0.00E+00	3.08E-02	0.00E+00	1.41E-02	0.00E+00	1.41E-02
Calcium	1.17E+05	2.79E+04	0.00E+00	0.00E+00	4.98E+04	1.19E+04	1.48E-04	1.73E+01	4.13E+00	0.00E+00	4.76E-01	0.00E+00	4.76E-01	0.00E+00	1.14E-01	0.00E+00	1.14E-01
Chromium	8.97E+01	4.38E+01	0.00E+00	0.00E+00	2.98E-01	1.46E-01	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	6.29E+00	3.72E+00	0.00E+00	1.73E-01	0.00E+00	1.73E-01	0.00E+00	1.02E-01	0.00E+00	1.02E-01
Cobalt	2.80E+01	1.11E+01	0.00E+00	0.00E+00	1.35E-01	5.36E-02	1.00E-01	2.80E+00	1.11E+00	0.00E+00	7.70E-02	0.00E+00	7.70E-02	0.00E+00	3.05E-02	0.00E+00	3.05E-02
Copper	1.11E+02	4.30E+01	0.00E+00	0.00E+00	1.78E+00	1.14E+00	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.52E+01	1.33E+01	0.00E+00	4.18E-01	0.00E+00	4.18E-01	0.00E+00	3.65E-01	0.00E+00	3.65E-01
Iron	5.43E+04	3.02E+04	0.00E+00	0.00E+00	1.57E+02	8.76E+01	4.24E-03	2.30E+02	1.28E+02	0.00E+00	6.33E+00	0.00E+00	6.33E+00	0.00E+00	3.52E+00	0.00E+00	3.52E+00
Lead	1.52E+02	2.75E+01	0.00E+00	0.00E+00	9.03E-01	2.72E-01	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	9.95E+00	4.67E+00	0.00E+00	2.74E-01	0.00E+00	2.74E-01	0.00E+00	1.28E-01	0.00E+00	1.28E-01
Magnesium	8.92E+03	3.00E+03	0.00E+00	0.00E+00	1.10E+03	3.70E+02	1.06E-03	9.46E+00	3.18E+00	0.00E+00	2.60E-01	0.00E+00	2.60E-01	0.00E+00	8.75E-02	0.00E+00	8.75E-02
Manganese	1.28E+03	7.07E+02	0.00E+00	0.00E+00	4.17E+01	2.31E+01	5.87E-02	7.51E+01	4.15E+01	0.00E+00	2.07E+00	0.00E+00	2.07E+00	0.00E+00	1.14E+00	0.00E+00	1.14E+00
Mercury	1.10E+00	1.84E-01	0.00E+00	0.00E+00	4.96E-02	1.82E-02	1.92E-01	2.11E-01	3.53E-02	0.00E+00	5.81E-03	0.00E+00	5.81E-03	0.00E+00	9.72E-04	0.00E+00	9.72E-04
Nickel	4.23E+01	1.43E+01	0.00E+00	0.00E+00	3.17E-01	1.30E-01	ln(dry mammal conc, mg/kg) = (-0.2462+0.4658*ln(soil conc))	4.47E+00	2.70E+00	0.00E+00	1.23E-01	0.00E+00	1.23E-01	0.00E+00	7.42E-02	0.00E+00	7.42E-02
Potassium	1.71E+03	8.48E+02	0.00E+00	0.00E+00	2.11E+02	1.04E+02	4.24E-03	7.25E+00	3.60E+00	0.00E+00	1.99E-01	0.00E+00	1.99E-01	0.00E+00	9.89E-02	0.00E+00	9.89E-02
Selenium	1.00E+00	9.33E-01	0.00E+00	0.00E+00	6.37E-02	5.91E-02	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	6.60E-01	6.43E-01	0.00E+00	1.81E-02	0.00E+00	1.81E-02	0.00E+00	1.77E-02	0.00E+00	1.77E-02
Silver	2.00E+00	8.10E-01	0.00E+00	0.00E+00	1.01E-01	4.11E-02	5.01E-01	1.00E+00	4.06E-01	0.00E+00	2.76E-02	0.00E+00	2.76E-02	0.00E+00	1.12E-02	0.00E+00	1.12E-02
Sodium	2.71E+02	1.65E+02	0.00E+00	0.00E+00	3.11E+00	1.89E+00	1.17E-02	3.17E+00	1.93E+00	0.00E+00	8.72E-02	0.00E+00	8.72E-02	0.00E+00	5.31E-02	0.00E+00	5.31E-02
Thallium	1.10E+00	1.01E+00	0.00E+00	0.00E+00	3.19E-03	2.93E-03	1.23E-01	1.35E-01	1.24E-01	0.00E+00	3.72E-03	0.00E+00	3.72E-03	0.00E+00	3.42E-03	0.00E+00	3.42E-03
Tin	0.00E+00	0.00E+00	NO COPC	NO COPC	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	1.76E+02	9.61E+01	0.00E+00	0.00E+00	5.42E-01	2.96E-01	1.79E-01	3.15E+01	1.72E+01	0.00E+00	8.66E-01	0.00E+00	8.66E-01	0.00E+00	4.73E-01	0.00E+00	4.73E-01
Zinc	6.03E+02	8.42E+01	0.00E+00	0.00E+00	2.18E+01	7.04E+00	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.40E+02	1.21E+02	0.00E+00	3.86E+00	0.00E+00	3.86E+00	0.00E+00	3.34E+00	0.00E+00	3.34E+00
PAHs																	
2-Methylnaphthalene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	3.79E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	4.37E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.54E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	2.77E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	5.73E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(b)Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	8.27E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)Perylene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	2.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	8.27E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	2.77E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)Anthracene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	2.02E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	5.07E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluorene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	8.11E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-Cd)Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	2.47E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pyrene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	4.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total LMW PAHs	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total HMW PAHs	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PCBs																	
Aroclor-1260	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.36E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pesticides																	
4,4'-DDD	5.02E-01	4.22E-02	0.00E+00	0.00E+00	2.16E-03	1.82E-04	6.46E-03	3.24E-03	2.73E-04	0.00E+00	8.92E-05	0.00E+00	8.92E-05	0.00E+00	7.50E-06	0.00E+00	7.50E-06
4,4'-DDE	6.50E-01	5.56E-02	0.00E+00	0.00E+00	2.61E-03	2.23E-04	2.95E-03	1.92E-03	1.64E-04	0.00E+00	5.27E-05	0.00E+00	5.27E-05	0.00E+00	4.51E-06	0.00E+00	4.51E-06
4,4'-DDT	1.98E-01	1.77E-02	0.00E+00	0.00E+00	5.89E-04	5.26E-05	1.45E-02	2.87E-03	2.57E-04	0.00E+00	7.90E-05	0.00E+00	7.90E-05	0.00E+00	7.06E-06	0.00E+00	7.06E-06
DDTr	--	--	--	--	5.36E-03	4.57E-04	--	--	--	0.00E+00	2.21E-04	0.00E+00	2.21E-04	0.00E+00	1.91E-05	0.00E+00	1.91E-05
Alpha-Chlordane	9.00E-03	1.23E-03	0.00E+00	0.00E+00	3.19E-05	4.36E-06	2.06E-03	1.85E-05	2.53E-06	0.00E+00	5.10E-07	0.00E+00	5.10E-07	0.00E+00	6.97E-08	0.00E+00	6.97E-08
Dieldrin	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.96E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Endosulfan I	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	3.53E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor Epoxide	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.48E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
trans-Chlordane	8.50E-03	1.09E-03	0.00E+00	0.00E+00	3.01E-05	3.86E-06	4.57E-02	3.89E-04	4.98E-05	0.00E+00	1.07E-05	0.00E+00	1.07E-05	0.00E+00	1.37E-06	0.00E+00	1.37E-06
Furans																	
Dibenzofuran	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	7.04E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Herbicides																	
2,4-D	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.62E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dichlorprop	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	6.76E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SVOCs																	
Bis(2-ethylhexyl)phthalate	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	7.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pentachlorophenol	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	3.31E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOCs																	
1,1-dichloroethene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	3.39E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Butanone	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	7.78E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetone	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	2.21E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	6.19E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	8.04E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	7.00E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Isobutyl alcohol	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.45E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	NO COPC	NO COPC	NO COPC	NO COPC	0.00E+00	0.00E+00	1.75E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00