# APPENDIX H

# Ecological Risk Assessment Information and Data

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# TABLE OF CONTENTS

# LIST OF TABLES

Table H-1. Historical ERA COPEC Screen for Soil at Load Line 7 ..... 1
Table H-2. Checklist of Important Ecological Places and Resources at Load Line 7 ..... 2
Table H-3. Natural Resources Management Goals (OHARNG 2014) ..... 4
Table H-4. Ecological Screening Values for Chemical Analytes in Soil ..... 8
Table H-5. SRC and Integrated COPEC Screening with Maximum Ratio for Shallow Surface Soil (0-1 ft bgs ISM Samples) at Load Line 7 ..... 21

REFERENCES ..... 23

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| Ag | Silver |
| Al | Aluminum |
| AOC | Area of Concern |
| As | Arsenic |
| ASL | Above Screening Level |
| Ba | Barium |
| Be | Beryllium |
| bgs | Below ground surface |
| BHC | Benzene Hexachloride |
| BLBKG | Below Background |
| BRAC | Base Realignment And Closure |
| BSL | Below Screening Level |
| CAS | Chemical Abstract Service |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| Co | Cobalt |
| COPC | Chemical of Potential Concern |
| COPEC | Chemical of Potential Ecological Concern |
| Cr | Chromium |
| Cu | Copper |
| DDD | Dichlorodiphenyldichloroethane |
| DDE | Dichlorodiphenyldichloroethylene |
| DDT | Dichlorodiphenyltrichloroethane |
| DOE | Department of Energy |
| DOW | Department of Wildlife |
| EcoSSL | Ecological Soil Screening Level |
| EDQL | Environmental Data Quality Level |
| ESL | Ecological Screening Levels |
| ESV | Ecological Screening Values |
| Fe | Iron |
| Ft | feet |
| GIS | Geographic Information System |
| HMX | Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine |
| HMW | High Molecular Weight |
| HTRW | Hazardous, Toxic and Radioactive Waste |
| INRMP | Integrated Natural Resource Management Plan |
| mg/kg | milligrams per kilogram |
| Mn | Manganese |
| NA | Not Applicable |
| Ni | Nitrogen |
| NSL | No Screening Level |
| NUT | Nutrient |
| OAC | Ohio Administrative Code |

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ODNR | Ohio Department of Natural Resources |
| OHARNG | Ohio Army National Guard |
| Ohio EPA | Ohio Environmental Protection Agency |
| PAH | Polycyclic Aromatic Hydrocarbon |
| PBT | Persistent, Bioaccumulative, and Toxic |
| PCB | Polychlorinated biphenyl |
| PCDD | Polychlorinated Dibenzodioxins |
| PCDF | Polychlorinated Dibenzofurans |
| PCP | Pentachlorophenol |
| PETN | Pentaerythrite Tetranitrate |
| PLS | Planning Level Survey |
| PRG | Preliminary Remediation Goal |
| RDX | Cyclotrimethylenetrinitramine |
| RVAAP | Ravenna Army Ammunition Plant |
| Se | Selenium |
| SRC | Site-related Contaminant |
| SVOC | Semi-volatile Organic Compound |
| TCDD | 2,3,7,8-Tetrachlorodibenzo-p-dioxin |
| TCDF | Tetrachlorodibenzofuran |
| TNT | 2,4,6-Trinitrotoluene |
| USEPA | U.S. Environmental Protection Agency |
| VOC | Volatile Organic Compound |

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## Table H-1. Historical ERA COPEC Screen for Soil at Load Line 7

**Table LL7-14**
**Load Line 7 Ecological Risk Screening Tables for Surface Soil (0-1 ft)**
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| Group | Parameter | Frequency of Detection | Average Concentration | Maximum Detected Concentration | Units | Surface Soil Background Concentration | Maximum Concentration > Background | Screening Value | Maximum Concentration > Screening value | PBT | COPC | COPC Rationale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metals | Aluminum | 46 / 46 | 10304 | 18000 | mg/kg | 17700 | Yes | 600 ss2 | Yes | No | Yes | ASL |
| | Arsenic | 46 / 46 | 10 | 16 | mg/kg | 15.4 | Yes | 9.9 ss1 | Yes | No | Yes | ASL |
| | Barium | 46 / 46 | 80 | 160 | mg/kg | 88.4 | Yes | 283 ss1 | No | No | No | BSL |
| | Beryllium | 46 / 46 | 0.89 | 2.8 | mg/kg | 0.88 | Yes | 10 ss1 | No | No | No | BSL |
| | Cadmium | 23 / 46 | 0.24 | 1.4 | mg/kg | 0.00 | Yes | 4 ss1 | No | No | No | BSL |
| | Calcium | 46 / 46 | 10848 | 77000 | mg/kg | 15800 | Yes | NUT | No | No | No | BSL |
| | Chromium | 46 / 46 | 20 | 33 | mg/kg | 17.4 | Yes | 0.4 ss1 | Yes | No | Yes | ASL |
| | Cobalt | 46 / 46 | 8.4 | 13 | mg/kg | 10.4 | Yes | 20 ss1 | No | No | No | BSL |
| | Copper | 46 / 46 | 18 | 88 | mg/kg | 17.7 | Yes | 60 ss1 | Yes | No | Yes | ASL |
| | Iron | 46 / 46 | 19326 | 29000 | mg/kg | 23100 | Yes | 200 ss2 | Yes | No | Yes | ASL |
| | Lead | 46 / 46 | 33 | 160 | mg/kg | 26.1 | Yes | 40.5 ss1 | Yes | No | Yes | ASL |
| | Magnesium | 46 / 46 | 2689 | 9700 | mg/kg | 3030 | Yes | NUT | No | No | No | BSL |
| | Manganese | 46 / 46 | 755 | 1600 | mg/kg | 1450 | Yes | 100 ss2 | Yes | No | Yes | ASL |
| | Nickel | 46 / 46 | 18 | 29 | mg/kg | 21.1 | Yes | 30 ss1 | No | No | No | BSL |
| | Potassium | 46 / 46 | 945 | 1800 | mg/kg | 927 | Yes | NUT | No | No | No | BSL |
| | Selenium | 46 / 46 | 0.83 | 1.4 | mg/kg | 1.4 | No | 0.21 ss1 | Yes | No | No | BLBKG |
| | Silver | 3 / 46 | 2.3 | 80 | mg/kg | 0.00 | Yes | 2 ss1 | Yes | No | Yes | ASL |
| | Sodium | 36 / 46 | 271 | 670 | mg/kg | 123 | Yes | NUT | No | No | No | BSL |
| | Vanadium | 46 / 46 | 18 | 28 | mg/kg | 31.1 | No | 2 ss1 | Yes | No | No | BLBKG |
| | Zinc | 46 / 46 | 73 | 180 | mg/kg | 61.8 | Yes | 8.5 ss1 | Yes | No | Yes | ASL |
| | Antimony | 10 / 44 | 0.69 | 0.72 | mg/kg | 0.96 | No | 5 ss1 | No | No | No | BLBKG |
| | Mercury | 45 / 46 | 0.064 | 0.4 | mg/kg | 0.04 | Yes | 0.00051 ss1 | Yes | Yes | Yes | ASL |
| | Thallium | 5 / 46 | 0.30 | 0.31 | mg/kg | 0.00 | Yes | 1 ss1 | No | No | No | BSL |
| PCBs | Aroclor 1254 | 1 / 5 | 0.027 | 0.07 | mg/kg | -- | NA | 0.000332 ss4 | Yes | No | Yes | ASL |
| VOCs | Acetone | 1 / 6 | 0.0098 | 0.011 | mg/kg | -- | NA | 2.5 ss4 | No | No | No | BSL |
| SVOCs | 2-Methylnaphthalene | 3 / 5 | 0.050 | 0.1 | mg/kg | -- | NA | 3.24 ss4 | No | No | No | BSL |
| | 4-Methylphenol | 1 / 5 | 0.030 | 0.014 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | Acenaphthene | 3 / 5 | 0.39 | 0.97 | mg/kg | -- | NA | 20 ss1 | No | No | No | BSL |
| | Anthracene | 4 / 5 | 0.73 | 1.8 | mg/kg | -- | NA | 148 ss4 | No | No | No | BSL |
| | Benzo(a)anthracene | 5 / 5 | 1.5 | 3.6 | mg/kg | -- | NA | 5.21 ss4 | No | No | No | BSL |
| | Benzo(a)pyrene | 5 / 5 | 1.2 | 2.9 | mg/kg | -- | NA | 1.52 ss4 | Yes | No | Yes | ASL |
| | Benzo(b)fluoranthene | 5 / 5 | 1.4 | 3.4 | mg/kg | -- | NA | 59.8 ss4 | No | No | No | BSL |
| | Benzo(g,h,i)perylene | 5 / 5 | 0.48 | 1.2 | mg/kg | -- | NA | 119 ss4 | No | No | No | BSL |
| | Benzo(k)fluoranthene | 5 / 5 | 0.86 | 2 | mg/kg | -- | NA | 148 ss4 | No | No | No | BSL |
| | Benzyl alcohol | 2 / 5 | 0.43 | 0.77 | mg/kg | -- | NA | 658 ss4 | No | No | No | BSL |
| | Carbazole | 2 / 5 | 0.42 | 1 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | Chrysene | 5 / 5 | 1.6 | 4 | mg/kg | -- | NA | 4.73 ss4 | No | No | No | BSL |
| | Dibenzo(a,h)anthracene | 4 / 5 | 0.19 | 0.46 | mg/kg | -- | NA | 18.4 ss4 | No | No | No | BSL |
| | Dibenzofuran | 3 / 5 | 0.12 | 0.25 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | Fluoranthene | 5 / 5 | 3.7 | 9 | mg/kg | -- | NA | 122 ss4 | No | No | No | BSL |
| | Fluorene | 3 / 5 | 0.23 | 0.53 | mg/kg | -- | NA | 122 ss4 | No | No | No | BSL |
| | Indeno(1,2,3-cd)pyrene | 5 / 5 | 0.42 | 1 | mg/kg | -- | NA | 109 ss4 | No | No | No | BSL |
| | Naphthalene | 3 / 5 | 0.085 | 0.2 | mg/kg | -- | NA | 0.0994 ss4 | Yes | No | Yes | ASL |
| | Phenanthrene | 5 / 5 | 2.5 | 6.1 | mg/kg | -- | NA | 45.7 ss4 | No | No | No | BSL |
| | Pyrene | 5 / 5 | 2.7 | 6.5 | mg/kg | -- | NA | 78.5 ss4 | No | No | No | BSL |
| Explosives | 2,4,6-TNT | 3 / 46 | 0.13 | 2.7 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | 2,6-Dinitrotoluene | 2 / 46 | 0.10 | 0.28 | mg/kg | -- | NA | 0.0328 ss4 | Yes | No | Yes | ASL |
| | 2-Amino-4,6-Dinitrotoluene | 1 / 46 | 0.100 | 0.1 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | 2-Nitrotoluene | 1 / 46 | 0.10 | 0.11 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | 3-Nitrotoluene | 1 / 46 | 0.10 | 0.13 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | HMX | 4 / 46 | 0.30 | 7.9 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | RDX | 5 / 46 | 1.2 | 45 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| Propellants | Nitrocellulose | 3 / 23 | 8.1 | 156 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | Nitroglycerine | 2 / 24 | 1.1 | 18 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| Other Analytes | Nitrate as N (NO3-N) | 41 / 46 | 1.9 | 9.1 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |

Notes:
-- - no value available
mg/kg - means milligrams per Kilogram (parts per million - ppm)
ss1 - Preliminary Remediation Goals (Efroymson et al , 1997a)
ss2 - Toxicologgical Benchmarks for Soil and Litter Invertebrates (Efroymson et al. 1997b)
ss3 - Toxicologgical Benchmarks for Terrestrial Plants (Efroymson et al 1997c)
ss4- Ecological Data Quality Level (USEPA Region 5, 1999)
NA - not applicable

NUT - nutrient
BLBKG - below background concentration
PBT - persistent, bioaccumulative and toxic
NSL - no screening level
ASL- above screening level
BSL - below screening level

AOC = Area of Concern.
COPC = Chemical of Potential Concern.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
PCB = Polychlorinated Biphenyl.
RDX = Cyclotrimethylenetrinitramine.
SVOC = Semi-volatile Organic Compound.
TNT = 2,4,6-Trinitrotoluene.
VOC = Volatile Organic Compound.

**Table H-2. Checklist of Important Ecological Places and Resources at Load Line 7**

| Resource | Army (2005) | Ohio EPA (2008) | Load Line 7 | |
|---|---|---|---|---|
| | | | Absent | Present |
| National Park | X | X | X | |
| Designated Federal Wilderness Area | X | X | X | |
| National Lakeshore Recreational Area | X | X | X | |
| Habitat known to be used by federal designated or proposed threatened or endangered species | X | X | X | |
| National or state wildlife refuge | X | X | X | |
| Federal land designated for protection of natural ecosystems | X | X | X | |
| Habitat known to be used by state designated threatened or endangered species | X | X | X | |
| Federally-designated scenic or wild river | X | X | X | |
| State land designated for wildlife or game management | X | X | X | |
| State-designated Scenic or Wild River | X | X | X | |
| **Wetlands and waters of the state**[a] | X | X | X | |
| National preserve | X | X[b] | X | |
| State-designated natural areas | X | X[b] | X | |
| Spawning areas critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters | X | X[c] | X | |
| Migratory pathways and feeding areas critical for maintenance of anadromous fish species[d] | X | X[c] | X | |
| Terrestrial areas used for breeding by large or dense aggregations of animals | X | X[c] | X | |
| **Particular areas, relatively small in size, important to maintenance of unique biotic communities**[e] | X | X[c] | X | |
| **Locally important ecological place**[f] | X | | X | |
| Critical habitat for federal designated threatened or endangered species | X | | X | |
| Marine sanctuary | X | | X | |
| Areas identified under the Coastal Zone Management Act | X | | X | |
| Sensitive areas identified under the National Estuary Program or Near Coastal Waters Program | X | | X | |
| Critical areas identified under the Clean Lakes Program | X | | X | |
| National monument | X | | X | |
| National seashore recreational area | X | | X | |
| Unit of coastal barrier resources system | X | | X | |
| Coastal barrier (undeveloped) | X | | X | |
| Coastal barrier (partially developed) | X | | X | |
| Administratively Proposed Federal Wilderness Area | X | | X | |
| National river reach designated as recreational | X | | X | |
| Habitat known to be used by species under review as to its federal threatened or endangered status | X | | X | |
| State-designated areas for protection or maintenance of aquatic life | X | | X | |
| Fragile landscapes, land sensitive to degradation if vegetative habitat or cover diminishes | X | | X | |
| State, local, or private land designated for protection of natural ecosystems | | X | X | |
| Federal land designated for wildlife or game management | | X | X | |
| Surface water, as that term is used in Chapter 3745-1 of the OAC | | X | X | |

**Table H-2. Checklist of Important Ecological Places and Resources at Load Line 7 (continued)**

| Resource | Army (2005) | Ohio EPA (2008) | Load Line 7 | |
|---|---|---|---|---|
| | | | Absent | Present |
| Federally-listed or state-listed threatened or endangered species | | X | X | |
| State of Ohio special interest or declining species and its associated habitat | | X | X | |
| State park | | X | X | |

U.S. Army Biological Technical Assistance Group, *Technical Document for Ecological Risk Assessment: Process for Developing Management Goals*. August 2005.

Ohio EPA. *Guidance for Conducting Ecological Risk Assessments (Ohio EPA)*. Division of Emergency and Remedial Response. April 2008.

[a] For Ohio EPA 2008, as qualified by "regulated under federal law and state of Ohio's water quality laws."

[b] Ohio EPA does not restrict preserves and natural areas to national or state.

[c] Ohio EPA lists "wildlife populations and their associated important nesting areas and food resources, taking into consideration land use and the quality and extent of habitat on and in the vicinity of the site."

[d] Within river reaches or areas in lakes or coastal tidal waters in which fish spend extended periods of time.

[e] Identified by the Integrated Natural Resource Management Plan (INRMP), Base Realignment and Closure (BRAC) Cleanup Plan or Redevelopment Plan, or other official land management plans.

[f] The Ohio Army National Guard (OHARNG 2014) has five special interest areas (important resources) at Camp Ravenna: Unit 1 - mixed valuable communities, Unit 2 - Wadsworth Glen, Unit 3 – mixed mature woods, Unit 4 - mixed swamp forest, and Unit 5 - oak/maple swamp forest. Also, the OHARNG recognizes the importance of federal and state-listed threatened and endangered plant and animal species.

X = Designated as important and **when bolded there are possible qualifiers.**

OAC = Ohio Administrative Code.

Ohio EPA = Ohio Environmental Protection Agency.

**Table H-3. Natural Resources Management Goals (OHARNG 2014)**

| Goals and Objectives of Ohio Army National Guard | Comments on Goals Relative to HTRW Work at Former RVAAP |
|---|---|
| **Goal 1.** Manage natural resources in a manner that is compatible with and supports the military mission while complying with applicable federal and state laws and Army regulations and policies.<br><br>Objective 1.1: Initiate programs and projects that enhance the training land and training opportunities and/or do not unnecessarily limit training land availability.<br><br>Objective 1.2: Continue to educate Camp Ravenna users regarding the natural resources at the Camp Ravenna and their part in ensuring sustainable use of the site in perpetuity. | U.S. Army committed to natural resources management in a manner that is compatible with and supports the military mission and complies with federal and state laws and Army regulations and policies. |
| **Goal 2.** Maintain and foster positive working relationships with the U.S. Fish and Wildlife Service, the ODNR DOW, and other federal, state, and local natural resources management agencies and organizations for the benefit of the military mission, the natural resources being managed, and the citizens of Ohio and the nation.<br><br>Objective 2.1: Effectively communicate mission needs to cooperating agencies and solicit input/review on projects with the potential to impact natural resources, especially in areas of regulatory primacy.<br><br>Objective 2.2: Provide copies of biological surveys to interested cooperating agencies.<br><br>Objective 2.3: Facilitate cooperative management programs and projects that are compatible with the military mission and within the capabilities of the Camp Ravenna staff. | The U.S. Army works and coordinates with other federal and state agencies as necessary if mission or projects have the potential to impact natural resources. |
| **Goal 3.** Monitor the condition of the natural resources and the implied impacts from training and the natural resources management program on the natural resources at the Camp Ravenna.<br><br>Objective 3.1: Maintain current species inventories and other PLSs through periodic reoccurring surveys and inventories. | The U.S. Army conducts natural resource management activities at the facility to monitor potential impacts from training or other disturbance activities. |
| **Goal 4.** Protect and maintain populations of rare plant and animal species on the Camp Ravenna in compliance with federal and state laws and regulations.<br><br>Objective 4.1: Avoid negative impacts to federally listed species and avoid/minimize impacts to state listed and otherwise rare species. | The U.S. Army protects and maintains populations of rare plant and animal species by implementing a natural resource management plan at the facility and by avoiding and/or not disturbing areas with rare species. |

**Table H-3. Natural Resources Management Goals (OHARNG 2014) (continued)**

| Goals and Objectives of Ohio Army National Guard | Comments on Goals Relative to HTRW Work at Former RVAAP |
|---|---|
| **Goal 5.** Sustain usable training lands and native natural resources by managing non-native and invasive species, vegetation and plant communities, and nuisance wildlife species.<br><br>Objective 5.1: Manage populations of invasive plant species where they hinder training and/or habitat management objectives.<br><br>Objective 5.2: Manage non-native and invasive insect species that pose a threat to forest resources.<br><br>Objective 5.3: Manage terrestrial vegetation to support training, encourage native plant communities, and prevent damage to training site facilities and infrastructure.<br><br>Objective 5.4: Manage the beaver population to prevent damage to training site facilities and infrastructure and maintain the quality warm water habitats of Hinkley Creek, Sand Creek, and South Fork Eagle Creek.<br><br>Objective 5.5: Manage other nuisance animals that negatively impact the ecosystem. | The U.S. Army sustains usable training lands and native natural resources by implementing a natural resource management plan which incorporates invasive species and nuisance species management and by utilizing native species mixes for re-vegetation after ground disturbance activities. |
| **Goal 6.** Manage wildlife resources in a manner compatible with the military mission and within the limits of the natural habitat.<br><br>Objective 6.1: Cooperatively manage wildlife resources with the Ohio DOW.<br><br>Objective 6.2: Provide opportunity for wildlife recreation to the public that is compatible with the military mission.<br><br>Objective 6.3: Maintain wildlife population without augmenting the habitat with artificial food plots. | The U.S. Army minimizes habitat disturbance during HTRW activities and utilizes sustainability practices when disturbance is required in order to properly manage and maintain wildlife populations and resources. |

**Table H-3. Natural Resources Management Goals (OHARNG 2014) (continued)**

| Goals and Objectives of Ohio Army National Guard | Comments on Goals Relative to HTRW Work at Former RVAAP |
|---|---|
| **Goal 7**. Manage the Camp Ravenna whitetail deer population in a manner that minimizes impacts on the military mission, is ecologically sustainable, provides for public hunting, and is in accordance with Army regulations and state law.<br><br>Objective 7.1: Census the deer herd.<br><br>Objective 7.2: Determine winter carrying capacity for whitetail deer at Camp Ravenna.<br><br>Objective 7.3: Maintain the white-tailed deer population at or near carrying capacity and at a buck to doe ratio close to 1:2 (acceptable ratio is dependent on population size) with a maximum of six hunter's dates per year. | The U.S. Army manages populations of white-tailed deer by implementing a natural resource management plan at the facility in a manner that is compatible with and supports the military mission and complies with state laws and Army regulations and policies. |
| **Goal 8.** Manage forest resources to the benefit of the military mission, to perpetuate the ecosystem functions, support regional ecosystem needs, and for the production of forest products.<br><br>Objective 8.1: Maintain current forest resource data.<br><br>Objective 8.2: Implement forest management strategies identified in the Camp Ravenna INRMP. | The U.S. Army sustains and manages forest resources by implementing a natural resource management plan. During HTRW activities, efforts are made by the U.S. Army to minimize impacts to forest communities. |
| **Goal 9.** Manage wetlands and other surface waters in accordance with applicable federal, state, and local regulations and protect water quality and ecological functions while facilitating the military mission.<br><br>Objective 9.1: Avoid wetland fills.<br><br>Objective 9.2: Minimize and mitigate unavoidable wetland fills.<br><br>Objective 9.3: Maintain healthy aquatic ecosystems in ponds.<br><br>Objective 9.4: Restore, enhance, and create wetlands when possible and compatible with the military mission. | Wetlands and other surface waters are to be protected during disturbance activities in accordance with federal, state, and local regulations. Avoidance measures will be implemented as practical. Some AOCs have wetlands. |
| **Goal 10.** Manage soil to maintain productivity and prevent and repair erosion in accordance with state and federal laws and regulations so that the Camp Ravenna can support doctrinally required military training in perpetuity.<br><br>Objective 10.1: Conduct training and other activities in locations with soil most suitable for supporting the activity.<br><br>Objective 10.2: Rehabilitate, repair, and maintain areas damaged by training and other activities. | Management of soil relevant to remedial activities under CERCLA. Appropriate storm water and erosion controls are to be utilized during activities that require ground disturbance. |

**Table H-3. Natural Resources Management Goals (OHARNG 2014) (continued)**

| Goals and Objectives of Ohio Army National Guard | Comments on Goals Relative to HTRW Work at Former RVAAP |
|---|---|
| **Goal 11.** Manage cultural resources on the Camp Ravenna in accordance with state and federal laws and regulations while implementing the natural resources management program.<br><br>Objective 11.1: Comply with federal, state, and local laws and regulations pertaining to cultural resources found on the training site. | The U.S. Army utilizes a cultural resource management plan to manage and protect cultural resources at the facility. Coordination with state and federal agencies regarding cultural resources is conducted as necessary. Restoration contractors are also advised to utilize the Camp Ravenna Policy for Inadvertent Discoveries for reporting purposes should they come upon a cultural item. |
| **Goal 12.** Develop, maintain, and manage data regarding natural resources at the Camp Ravenna through the use of GIS for efficient data storage, retrieval, analysis, and presentation.<br><br>Objective 12.1: Develop accurate and usable natural resources GIS data. | Natural resource data is collected and managed by the OHARNG. This data may be utilized during restoration activities in order to provide an accurate portrait of natural resources at an AOC. |

OHARNG. *Integrated Natural Resources Management Plan and Environmental Assessment for the Ravenna Training and Logistics Site, Portage and Trumbull Counties, Ohio*. December 2014.

AOC = Area of Concern.
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act.
DOW = Department of Wildlife.
GIS = Geographic Information System.
HTRW = Hazardous, Toxic and Radioactive Waste.
INRMP = Integrated Natural Resources Management Plan.
ODNR = Ohio Department of Natural Resources.
OHARNG = Ohio Army National Guard.
Ohio EPA = Ohio Environmental Protection Agency.
PLS = Planning Level Survey (Wetland).
RVAAP = Ravenna Army Ammunition Plant.

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| ***Inorganic Chemicals*** | | | | | | | | | |
| Aluminum | 7429-90-5 | --* | Al EcoSSL | 50 | PRGs[b] | -- | -- | 50 | PRGs |
| Antimony | 7440-36-0 | 0.27 | mammalian EcoSSL for Sb | 5 | PRGs | 0.142 | USEPA Reg 5 | 2.70E-01 | mammalian EcoSSL for Sb |
| Arsenic | 7440-38-2 | 18 | plant EcoSSL for As | 9.9 | PRGs | 5.7 | USEPA Reg 5 | 1.80E+01 | plant EcoSSL for As |
| Barium | 7440-39-3 | 330 | soil invert EcoSSL for Ba | 283 | PRGs | 1.04 | USEPA Reg 5 | 3.30E+02 | soil invert EcoSSL for Ba |
| Beryllium | 7440-41-7 | 21 | mammalian EcoSSL for Be | 10 | PRGs | 1.06 | USEPA Reg 5 | 2.10E+01 | mammalian EcoSSL for Be |
| Bismuth | 7440-69-9 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Boron | 7440-42-8 | -- | -- | 0.5 | PRGs | -- | -- | 5.00E-01 | PRGs |
| Bromine | 7726-95-6 | -- | -- | 10 | PRGs | -- | -- | 1.00E+01 | PRGs |
| Cadmium | 7440-43-9 | 0.36 | mammalian EcoSSL for Cd | 4 | PRGs | 0.00222 | USEPA Reg 5 | 3.60E-01 | mammalian EcoSSL for Cd |
| Calcium | 7440-70-2 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Chromium | 16065-83-1 | 26 | avian EcoSSL for Cr III | 0.4 | PRGs | 0.4 | ESL for Cr+3 | 2.60E+01 | avian EcoSSL for Cr III |

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| Chromium, hexavalent | 18540-29-9 | 130 | mammalian EcoSSL for Cr VI | -- | -- | -- | -- | 1.30E+02 | mammalian EcoSSL for Cr VI |
| Cobalt | 7440-48-4 | 13 | plant EcoSSL for Co | 20 | PRGs | 0.14 | USEPA Reg 5 | 1.30E+01 | plant EcoSSL for Co |
| Copper | 7440-50-8 | 28 | avian EcoSSL for Cu | 60 | PRGs | 5.4 | USEPA Reg 5 | 2.80E+01 | avian EcoSSL for Cu |
| Cyanide | 57-12-5 | -- | -- | -- | -- | 1.33 | USEPA Reg 5 | 1.33E+00 | USEPA Reg 5 |
| Fluorine | 7782-41-4 | -- | -- | 200 | PRGs | -- | -- | 2.00E+02 | PRGs |
| Iodine | 7553-56-2 | -- | -- | 4 | PRGs | -- | -- | 4.00E+00 | PRGs |
| Iron | 7439-89-6 | --** | Fe EcoSSL | -- | -- | -- | -- | No ESV | No Source |
| Lanthanum | 7439-91-0 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Lead | 7439-92-1 | 11 | avian EcoSSL for Pb | 40.5 | PRGs | 0.0537 | USEPA Reg 5 | 1.10E+01 | avian EcoSSL for Pb |
| Lithium | 7439-93-2 | -- | -- | 2 | PRGs | -- | -- | 2.00E+00 | PRGs |
| Magnesium | 7439-95-4 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Manganese | 7439-96-5 | 220 | plant EcoSSL for Mn | 500 | PRGs[b] | -- | -- | 2.20E+02 | plant EcoSSL for Mn |
| Mercury | 7439-97-6 | -- | -- | 0.00051 | PRGs | 0.1 | USEPA Reg 5 | 5.10E-04 | PRGs |
| Mercury, methyl | 22967-92-6 | -- | -- | -- | -- | 0.00158 | USEPA Reg 5 | 1.58E-03 | USEPA Reg 5 |
| Molybdenum | 7439-98-7 | -- | -- | 2 | PRGs | -- | -- | 2.00E+00 | PRGs |
| Nickel | 7440-02-0 | 38 | plant EcoSSL for Ni | 30 | PRGs | 13.6 | USEPA Reg 5 | 3.80E+01 | plant EcoSSL for Ni |
| Potassium | 7440-09-7 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Selenium | 7782-49-2 | 0.52 | plant EcoSSL for Se | 0.21 | PRGs | 0.0276 | USEPA Reg 5 | 5.20E-01 | plant EcoSSL for Se |
| Silver | 7440-22-4 | 4.2 | avian EcoSSL for Ag | 2 | PRGs | 4.04 | USEPA Reg 5 | 4.20E+00 | avian EcoSSL for Ag |
| Sodium | 7440-23-5 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Technetium | 7440-26-8 | -- | -- | 0.2 | PRGs | -- | -- | 2.00E-01 | PRGs |

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| Tellurium | 13494-80-9 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Thallium | 7440-28-0 | -- | -- | 1 | PRGs | 0.0569 | USEPA Reg 5 | 1.00E+00 | PRGs |
| Tin | 7440-31-5 | -- | -- | 50 | PRGs | 7.62 | USEPA Reg 5 | 5.00E+01 | PRGs |
| Titanium | 7440-32-6 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Tungsten | 7440-33-7 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Uranium | 7440-61-1 | -- | -- | 5 | PRGs | -- | -- | 5.00E+00 | PRGs |
| Vanadium | 7440-62-2 | 7.8 | avian EcoSSL for V | 2 | PRGs | 1.59 | USEPA Reg 5 | 7.80E+00 | avian EcoSSL for V |
| Zinc | 7440-66-6 | 46 | avian EcoSSL for Zn | 8.5 | PRGs | 6.62 | USEPA Reg 5 | 4.60E+01 | avian EcoSSL for Zn |
| ***Anions*** | | | | | | | | | |
| Nitrate | 14797-55-8 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Sulfide | 18496-25-8 | -- | -- | -- | -- | 0.00358 | USEPA Reg 5 | 3.58E-03 | USEPA Reg 5 |
| ***Organic Chemicals*** | | | | | | | | | |
| Acenaphthene | 83-32-9 | -- | -- | 20 | PRGs | 682 | USEPA Reg 5 | 2.00E+01 | PRGs |
| Acenaphthylene | 208-96-8 | -- | -- | -- | -- | 682 | USEPA Reg 5 | 6.82E+02 | USEPA Reg 5 |
| Acetone | 67-64-1 | -- | -- | -- | -- | 2.5 | USEPA Reg 5 | 2.50E+00 | USEPA Reg 5 |
| Acetonitrile | 75-05-8 | -- | -- | -- | -- | 1.37 | USEPA Reg 5 | 1.37E+00 | USEPA Reg 5 |
| Acetophenone | 98-86-2 | -- | -- | -- | -- | 300 | USEPA Reg 5 | 3.00E+02 | USEPA Reg 5 |
| Acetylaminofluorene[2-] | 53-96-3 | -- | -- | -- | -- | 0.596 | USEPA Reg 5 | 5.96E-01 | USEPA Reg 5 |
| Acrolein | 107-02-8 | -- | -- | -- | -- | 5.27 | USEPA Reg 5 | 5.27E+00 | USEPA Reg 5 |
| Acrylonitrile | 107-13-1 | -- | -- | -- | -- | 0.0239 | USEPA Reg 5 | 2.39E-02 | USEPA Reg 5 |
| Aldrin | 309-00-2 | -- | -- | -- | -- | 0.00332 | USEPA Reg 5 | 3.32E-03 | USEPA Reg 5 |
| 2-Amino-4,6-dinitrotoluene | 35572-78-2 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| 4-Amino-2,6-dinitrotoluene | 19406-51-0 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| 4-Aminobiphenyl | 92-67-1 | -- | -- | -- | -- | 0.00305 | USEPA Reg 5 | 3.05E-03 | USEPA Reg 5 |
| Aniline | 62-53-3 | -- | -- | -- | -- | 0.0568 | USEPA Reg 5 | 5.68E-02 | USEPA Reg 5 |
| Anthracene | 120-12-7 | -- | -- | -- | -- | 1480 | USEPA Reg 5 | 1.48E+03 | USEPA Reg 5 |
| Aramite | 140-57-8 | -- | -- | -- | -- | 166 | USEPA Reg 5 | 1.66E+02 | USEPA Reg 5 |
| Azobenzene[p-(dimethylamino)] | 60-11-7 | -- | -- | -- | -- | 0.04 | USEPA Reg 5 | 4.00E-02 | USEPA Reg 5 |
| PCB-1016 | 12674-11-2 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Arochlor-1221 | 11104-28-2 | -- | -- | -- | -- | -- | -- | No ESV | No Source |

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| Arochlor-1232 | 11141-16-5 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Arochlor-1242 | 53469-21-9 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Arochlor-1248 | 12672-29-6 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| PCB-1254 | 11097-69-1 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| PCB-1260 | 11096-82-5 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Benzene | 71-43-2 | -- | -- | -- | -- | 0.255 | USEPA Reg 5 | 2.55E-01 | USEPA Reg 5 |
| Benzenemethanol | 100-51-6 | -- | -- | -- | -- | 65.8 | USEPA Reg 5 | 6.58E+01 | USEPA Reg 5 |
| Benz(a)anthracene | 56-55-3 | -- | -- | -- | -- | 5.21 | USEPA Reg 5 | 5.21E+00 | USEPA Reg 5 |
| Benzo(a)pyrene | 50-32-8 | -- | -- | -- | -- | 1.52 | USEPA Reg 5 | 1.52E+00 | USEPA Reg 5 |
| Benzo(b)fluoranthene | 205-99-2 | -- | -- | -- | -- | 59.8 | USEPA Reg 5 | 5.98E+01 | USEPA Reg 5 |
| Benzo(ghi)perylene | 191-24-2 | -- | -- | -- | -- | 119 | USEPA Reg 5 | 1.19E+02 | USEPA Reg 5 |
| Benzo(k)fluoranthene | 207-08-9 | -- | -- | -- | -- | 148 | USEPA Reg 5 | 1.48E+02 | USEPA Reg 5 |
| BHC | 608-73-1 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| BHC, alpha | 319-84-6 | -- | -- | -- | -- | 0.0994 | USEPA Reg 5 | 9.94E-02 | USEPA Reg 5 |
| BHC, beta | 319-85-7 | -- | -- | -- | -- | 0.00398 | USEPA Reg 5 | 3.98E-03 | USEPA Reg 5 |
| BHC, delta | 319-86-8 | -- | -- | -- | -- | 9.94 | USEPA Reg 5 | 9.94E+00 | USEPA Reg 5 |
| BHC, gamma (Lindane) | 58-89-9 | -- | -- | -- | -- | 0.005 | USEPA Reg 5 | 5.00E-03 | USEPA Reg 5 |
| Biphenyl | 92-52-4 | -- | -- | 60 | PRGs | -- | -- | 6.00E+01 | PRGs |
| bis(2-chloroethoxy) methane | 111-91-1 | -- | -- | -- | -- | 0.302 | USEPA Reg 5 | 3.02E-01 | USEPA Reg 5 |
| bis(2-Chloroethyl) ether | 111-44-4 | -- | -- | -- | -- | 23.7 | USEPA Reg 5 | 2.37E+01 | USEPA Reg 5 |
| bis(2-Ethylhexyl)phthalate | 117-81-7 | -- | -- | -- | -- | 0.925 | USEPA Reg 5 | 9.25E-01 | USEPA Reg 5 |
| 4-Bromoaniline | 106-40-1 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Bromodichloromethane | 75-27-4 | -- | -- | -- | -- | 0.54 | USEPA Reg 5 | 5.40E-01 | USEPA Reg 5 |
| Bromoform | 75-25-2 | -- | -- | -- | -- | 15.9 | USEPA Reg 5 | 1.59E+01 | USEPA Reg 5 |
| Bromomethane | 74-83-9 | -- | -- | -- | -- | 0.235 | USEPA Reg 5 | 2.35E-01 | USEPA Reg 5 |
| 4-bromophenyl-phenylether | 101-55-3 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| 2-Butanone | 78-93-3 | -- | -- | -- | -- | 89.6 | USEPA Reg 5 | 8.96E+01 | USEPA Reg 5 |
| Butylbenzyl phthalate | 85-68-7 | -- | -- | -- | -- | 0.239 | USEPA Reg 5 | 2.39E-01 | USEPA Reg 5 |
| N-Nitrosodi-n-Butylamine | 924-16-3 | -- | -- | -- | -- | 0.267 | USEPA Reg 5 | 2.67E-01 | USEPA Reg 5 |
| Carbazole | 86-74-8 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Carbon disulfide | 75-15-0 | -- | -- | -- | -- | 0.0941 | USEPA Reg 5 | 9.41E-02 | USEPA Reg 5 |
| Carbon tetrachloride | 56-23-5 | -- | -- | -- | -- | 2.98 | USEPA Reg 5 | 2.98E+00 | USEPA Reg 5 |

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| Chlordane | 12789-03-6 | -- | -- | -- | -- | 0.224 | USEPA Reg 5 | 2.24E-01 | USEPA Reg 5 |
| alpha-Chlordane | 12789-03-6 | -- | -- | -- | -- | 0.224 | USEPA Reg 5 | 2.24E-01 | USEPA Reg 5 |
| gamma-Chlordane | 12789-03-6 | -- | -- | -- | -- | 0.224 | USEPA Reg 5 | 2.24E-01 | USEPA Reg 5 |
| Chloroacetamide | 79-07-2 | -- | -- | 2 | PRGs[c] | -- | -- | 2.00E+00 | PRGs |
| 3-Chloroaniline | 108-42-9 | -- | -- | 20 | PRGs | -- | -- | 2.00E+01 | PRGs |
| 4-Chloroaniline | 106-47-8 | -- | -- | -- | -- | 1.1 | USEPA Reg 5 | 1.10E+00 | USEPA Reg 5 |
| Chlorobenzene | 108-90-7 | -- | -- | 40 | PRGs | 13.1 | USEPA Reg 5 | 4.00E+01 | PRGs |
| Chlorobenzilate | 510-15-6 | -- | -- | -- | -- | 5.05 | USEPA Reg 5 | 5.05E+00 | USEPA Reg 5 |
| Chloroethane | 75-00-3 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Chloroform | 67-66-3 | -- | -- | -- | -- | 1.19 | USEPA Reg 5 | 1.19E+00 | USEPA Reg 5 |
| Chloromethane | 74-87-3 | -- | -- | -- | -- | 10.4 | USEPA Reg 5 | 1.04E+01 | USEPA Reg 5 |
| 2-Chloronaphthalene | 91-58-7 | -- | -- | -- | -- | 0.0122 | USEPA Reg 5 | 1.22E-02 | USEPA Reg 5 |
| 2-Chlorophenol | 95-57-8 | -- | -- | -- | -- | 0.243 | USEPA Reg 5 | 2.43E-01 | USEPA Reg 5 |
| 3-Chlorophenol | 108-43-0 | -- | -- | 7 | PRGs | -- | -- | 7.00E+00 | PRGs |
| 4-Chlorophenol | 106-48-9 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| 4-Chlorophenyl-phenyl ether | 7005-72-3 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| 4-chloro-3-methylphenol | 59-50-7 | -- | -- | -- | -- | 7.95 | USEPA Reg 5 | 7.95E+00 | USEPA Reg 5 |
| Chloropropene | 107-05-1 | -- | -- | -- | -- | 0.0134 | USEPA Reg 5 | 1.34E-02 | USEPA Reg 5 |
| Chloroprene | 126-99-8 | -- | -- | -- | -- | 0.0029 | USEPA Reg 5 | 2.90E-03 | USEPA Reg 5 |
| Chrysene | 218-01-9 | -- | -- | -- | -- | 4.73 | USEPA Reg 5 | 4.73E+00 | USEPA Reg 5 |
| m-Cresol | 108-39-4 | -- | -- | -- | -- | 3.49 | USEPA Reg 5 | 3.49E+00 | USEPA Reg 5 |
| 2,4-D | 94-75-7 | -- | -- | -- | -- | 0.0272 | USEPA Reg 5 | 2.72E-02 | USEPA Reg 5 |
| 4,4'-DDD | 72-54-8 | 0.021 | mammalian EcoSSL for DDT and metabolites | -- | -- | 0.758 | USEPA Reg 5 | 2.10E-02 | mammalian EcoSSL for DDT and metabolites |
| 4,4'-DDE | 72-55-9 | 0.021 | mammalian EcoSSL for DDT and metabolites | -- | -- | 0.596 | USEPA Reg 5 | 2.10E-02 | mammalian EcoSSL for DDT and metabolites |

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| 4,4'-DDT | 50-29-3 | 0.021 | mammalian EcoSSL for DDT and metabolites | -- | -- | 0.0035 | USEPA Reg 5 | 2.10E-02 | mammalian EcoSSL for DDT and metabolites |
| Diallate | 2303-16-4 | -- | -- | -- | -- | 0.452 | USEPA Reg 5 | 4.52E-01 | USEPA Reg 5 |
| Diazinon | 333-41-5 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Dibenz(a,h)anthracene | 53-70-3 | -- | -- | -- | -- | 18.4 | USEPA Reg 5 | 1.84E+01 | USEPA Reg 5 |
| Dibenzofuran | 132-64-9 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| 1,2-Dibromo-3-Chloropropane | 96-12-8 | -- | -- | -- | -- | 0.0352 | USEPA Reg 5 | 3.52E-02 | USEPA Reg 5 |
| Dibromochloromethane | 124-48-1 | -- | -- | -- | -- | 2.05 | USEPA Reg 5 | 2.05E+00 | USEPA Reg 5 |
| Dibromoethane | 106-93-4 | -- | -- | -- | -- | 1.23 | USEPA Reg 5 | 1.23E+00 | USEPA Reg 5 |
| 2,4-Dichloroaniline | 554-00-7 | -- | -- | 100 | PRGs[c] | -- | -- | 1.00E+02 | PRGs |
| 3,4-Dichloroaniline | 95-76-1 | -- | -- | 20 | PRGs[c] | -- | -- | 2.00E+01 | PRGs |
| 1,2-Dichlorobenzene | 95-50-1 | -- | -- | -- | -- | 2.96 | USEPA Reg 5 | 2.96E+00 | USEPA Reg 5 |
| 1,3-Dichlorobenzene | 541-73-1 | -- | -- | -- | -- | 37.7 | USEPA Reg 5 | 3.77E+01 | USEPA Reg 5 |
| 1,4-Dichlorobenzene | 106-46-7 | -- | -- | 20 | PRGs | 0.546 | USEPA Reg 5 | 2.00E+01 | PRGs |
| 3,3'-Dichlorobenzidine | 91-94-1 | -- | -- | -- | -- | 0.646 | USEPA Reg 5 | 6.46E-01 | USEPA Reg 5 |
| Cis-1,4-dichloro-2-butene | 1476-11-5 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Trans-1,4-dichloro-2-butene | 110-57-6 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Dichlorodifluromethane | 75-71-8 | -- | -- | -- | -- | 39.5 | USEPA Reg 5 | 3.95E+01 | USEPA Reg 5 |
| 1,1-Dichloroethane | 75-34-3 | -- | -- | -- | -- | 20.1 | USEPA Reg 5 | 2.01E+01 | USEPA Reg 5 |
| 1,2-Dichloroethane | 107-06-2 | -- | -- | -- | -- | 21.2 | USEPA Reg 5 | 2.12E+01 | USEPA Reg 5 |
| 1,1-Dichloroethene | 75-35-4 | -- | -- | -- | -- | 8.28 | USEPA Reg 5 | 8.28E+00 | USEPA Reg 5 |
| 1,2-Dichloroethene | 540-59-0 | -- | -- | -- | -- | 0.784 | USEPA Reg 5 (for trans form) | 7.84E-01 | USEPA Reg 5 (for trans form) |
| 2,4-Dichlorophenol | 120-83-2 | -- | -- | -- | -- | 87.5 | USEPA Reg 5 | 8.75E+01 | USEPA Reg 5 |
| 2,6-Dichlorophenol | 87-65-0 | -- | -- | -- | -- | 1.17 | USEPA Reg 5 | 1.17E+00 | USEPA Reg 5 |
| 3,4-Dichlorophenol | 95-77-2 | -- | -- | 20 | PRGs | -- | -- | 2.00E+01 | PRGs |
| 1,2-Dichloropropane | 78-87-5 | -- | -- | 700 | PRGs[c] | 32.7 | USEPA Reg 5 | 7.00E+02 | PRGs |
| cis-1,3-Dichloropropene | 10061-01-5 | -- | -- | -- | -- | 0.398 | USEPA Reg 5 | 3.98E-01 | USEPA Reg 5 |
| trans-1,3-Dichloropropene | 10061-02-6 | -- | -- | -- | -- | 0.398 | USEPA Reg 5 | 3.98E-01 | USEPA Reg 5 |

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| Dieldrin | 60-57-1 | 0.0049 | mammalian EcoSSL for Dieldrin | -- | -- | 0.00238 | USEPA Reg 5 | 4.90E-03 | mammalian EcoSSL for Dieldrin |
| O,O-Diethyl O-2-pyrazinylphosphorothioate | 297-97-2 | -- | -- | -- | -- | 0.799 | USEPA Reg 5 | 7.99E-01 | USEPA Reg 5 |
| Diethylphthalate | 84-66-2 | -- | -- | 100 | PRGs | 24.8 | USEPA Reg 5 | 1.00E+02 | PRGs |
| Dimethoate | 60-51-5 | -- | -- | -- | -- | 0.218 | USEPA Reg 5 | 2.18E-01 | USEPA Reg 5 |
| Dimethylphthalate | 131-11-3 | -- | -- | 200 | PRGs[c] | 734 | USEPA Reg 5 | 2.00E+02 | PRGs |
| 3,3'-Dimethylbenzidine | 119-93-7 | -- | -- | -- | -- | 0.104 | USEPA Reg 5 | 1.04E-01 | USEPA Reg 5 |
| 7,12'-Dimethylbenz(a)anthracene | 57-97-6 | -- | -- | -- | -- | 16.3 | USEPA Reg 5 | 1.63E+01 | USEPA Reg 5 |
| alpha,alpha-Dimethylphenethylamine | 122-09-8 | -- | -- | -- | -- | 0.3 | USEPA Reg 5 | 3.00E-01 | USEPA Reg 5 |
| 2,4-Dimethylphenol | 105-67-9 | -- | -- | -- | -- | 0.01 | USEPA Reg 5 | 1.00E-02 | USEPA Reg 5 |
| Di-n-butyl phthalate | 84-74-2 | -- | -- | 200 | PRGs | 0.15 | USEPA Reg 5 | 2.00E+02 | PRGs |
| Di-n-octylphthalate | 117-84-0 | -- | -- | -- | -- | 709 | USEPA Reg 5 | 7.09E+02 | USEPA Reg 5 |
| 1,3-Dinitrobenzene | 99-65-0 | -- | -- | -- | -- | 0.655 | USEPA Reg 5 | 6.55E-01 | USEPA Reg 5 |
| 2,4-Dinitrophenol | 51-28-5 | -- | -- | 20 | PRGs | 0.0609 | USEPA Reg 5 | 2.00E+01 | PRGs |
| 2,4-Dinitrotoluene | 121-14-2 | -- | -- | -- | -- | 1.28 | USEPA Reg 5 | 1.28E+00 | USEPA Reg 5 |
| 2,6-Dinitrotoluene | 606-20-2 | -- | -- | -- | -- | 0.0328 | USEPA Reg 5 | 3.28E-02 | USEPA Reg 5 |
| 4,6-Dinitro-2-methylphenol | 534-52-1 | -- | -- | -- | -- | 0.144 | USEPA Reg 5 | 1.44E-01 | USEPA Reg 5 |
| Dinoseb | 88-85-7 | -- | -- | -- | -- | 0.0218 | USEPA Reg 5 | 2.18E-02 | USEPA Reg 5 |
| 1,4-Dioxane | 123-91-1 | -- | -- | -- | -- | 2.05 | USEPA Reg 5 | 2.05E+00 | USEPA Reg 5 |
| Diphenylamine | 122-39-4 | -- | -- | -- | -- | 1.01 | USEPA Reg 5 | 1.01E+00 | USEPA Reg 5 |
| Disulfoton | 298-04-4 | -- | -- | -- | -- | 0.0199 | USEPA Reg 5 | 1.99E-02 | USEPA Reg 5 |
| Endosulfan I (alpha) | 959-98-8 | -- | -- | -- | -- | 0.119 | USEPA Reg 5 | 1.19E-01 | USEPA Reg 5 |
| Endosulfan II (beta) | 33213-65-9 | -- | -- | -- | -- | 0.119 | USEPA Reg 5 | 1.19E-01 | USEPA Reg 5 |
| Endosulfan, mixed isomers | 115-29-7 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Endosulfan sulfate | 1031-07-8 | -- | -- | -- | -- | 0.0358 | USEPA Reg 5 | 3.58E-02 | USEPA Reg 5 |
| Endrin | 72-20-8 | -- | -- | -- | -- | 0.0101 | USEPA Reg 5 | 1.01E-02 | USEPA Reg 5 |
| Endrin aldehyde | 7421-93-4 | -- | -- | -- | -- | 0.0105 | USEPA Reg 5 | 1.05E-02 | USEPA Reg 5 |
| Ethyl metharcrylate | 97-63-2 | -- | -- | -- | -- | 30 | USEPA Reg 5 | 3.00E+01 | USEPA Reg 5 |
| Ethylbenzene | 100-41-4 | -- | -- | -- | -- | 5.16 | USEPA Reg 5 | 5.16E+00 | USEPA Reg 5 |
| Famphur | 52-85-7 | -- | -- | -- | -- | 0.0497 | USEPA Reg 5 | 4.97E-02 | USEPA Reg 5 |
| Fluoranthene | 206-44-0 | -- | -- | -- | -- | 122 | USEPA Reg 5 | 1.22E+02 | USEPA Reg 5 |
| Fluorene | 86-73-7 | -- | -- | 30 | PRGs[c] | 122 | USEPA Reg 5 | 3.00E+01 | PRGs |

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| Furan | 110-00-9 | -- | -- | 600 | PRGs | -- | -- | 6.00E+02 | PRGs |
| Heptane | 142-82-5 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Heptachlor | 76-44-8 | -- | -- | -- | -- | 0.00598 | USEPA Reg 5 | 5.98E-03 | USEPA Reg 5 |
| Heptachlor Epoxide | 1024-57-3 | -- | -- | -- | -- | 0.152 | USEPA Reg 5 | 1.52E-01 | USEPA Reg 5 |
| Hexachlorobenzene | 118-74-1 | -- | -- | -- | -- | 0.199 | USEPA Reg 5 | 1.99E-01 | USEPA Reg 5 |
| Hexachlorobutadiene | 87-68-3 | -- | -- | -- | -- | 0.0398 | USEPA Reg 5 | 3.98E-02 | USEPA Reg 5 |
| Hexachlorocyclopentadiene | 77-47-4 | -- | -- | 10 | PRGs | 0.755 | USEPA Reg 5 | 1.00E+01 | PRGs |
| Hexachloroethane | 67-72-1 | -- | -- | -- | -- | 0.596 | USEPA Reg 5 | 5.96E-01 | USEPA Reg 5 |
| Hexachorophene | 70-30-4 | -- | -- | -- | -- | 0.199 | USEPA Reg 5 | 1.99E-01 | USEPA Reg 5 |
| 2-Hexanone | 591-78-6 | -- | -- | -- | -- | 12.6 | USEPA Reg 5 | 1.26E+01 | USEPA Reg 5 |
| HMX | 2691-41-0 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | -- | -- | -- | -- | 109 | USEPA Reg 5 | 1.09E+02 | USEPA Reg 5 |
| Isobutyl alcohol | 78-83-1 | -- | -- | -- | -- | 20.8 | USEPA Reg 5 | 2.08E+01 | USEPA Reg 5 |
| Isodrin | 465-73-6 | -- | -- | -- | -- | 0.00332 | USEPA Reg 5 | 3.32E-03 | USEPA Reg 5 |
| Isophorone | 78-59-1 | -- | -- | -- | -- | 139 | USEPA Reg 5 | 1.39E+02 | USEPA Reg 5 |
| Isosafrole | 120-58-1 | -- | -- | -- | -- | 9.94 | USEPA Reg 5 | 9.94E+00 | USEPA Reg 5 |
| Kepone | 143-50-0 | -- | -- | -- | -- | 0.0327 | USEPA Reg 5 | 3.27E-02 | USEPA Reg 5 |
| Malathion | 121-75-5 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Methacrylonitrile | 126-98-7 | -- | -- | -- | -- | 0.057 | USEPA Reg 5 | 5.70E-02 | USEPA Reg 5 |
| Methapyrilene | 91-80-5 | -- | -- | -- | -- | 2.78 | USEPA Reg 5 | 2.78E+00 | USEPA Reg 5 |
| Methoxychlor | 72-43-5 | -- | -- | -- | -- | 0.0199 | USEPA Reg 5 | 1.99E-02 | USEPA Reg 5 |
| Methyl iodide | 74-88-4 | -- | -- | -- | -- | 1.23 | USEPA Reg 5 | 1.23E+00 | USEPA Reg 5 |
| Methyl methacrylate | 80-62-6 | -- | -- | -- | -- | 984 | USEPA Reg 5 | 9.84E+02 | USEPA Reg 5 |
| Methyl methanesulfanate | 66-27-3 | -- | -- | -- | -- | 0.315 | USEPA Reg 5 | 3.15E-01 | USEPA Reg 5 |
| Methyl parathion | 298-00-0 | -- | -- | -- | -- | 0.00029 | USEPA Reg 5 | 2.92E-04 | USEPA Reg 5 |
| 4-Methyl-2-pentanone | 108-10-1 | -- | -- | -- | -- | 443 | USEPA Reg 5 | 4.43E+02 | USEPA Reg 5 |
| 3-Methylcholanthrene | 56-49-5 | -- | -- | -- | -- | 0.0779 | USEPA Reg 5 | 7.79E-02 | USEPA Reg 5 |
| Methylene bromide | 74-95-3 | -- | -- | -- | -- | 65 | USEPA Reg 5 | 6.50E+01 | USEPA Reg 5 |
| Methylene chloride | 75-09-2 | -- | -- | -- | -- | 4.05 | USEPA Reg 5 | 4.05E+00 | USEPA Reg 5 |
| 2-Methylnaphthalene | 91-57-6 | -- | -- | -- | -- | 3.24 | USEPA Reg 5 | 3.24E+00 | USEPA Reg 5 |
| 2-Methylphenol | 95-48-7 | -- | -- | -- | -- | 40.4 | USEPA Reg 5 | 4.04E+01 | USEPA Reg 5 |
| 4-Methylphenol | 106-44-5 | -- | -- | -- | -- | 163 | USEPA Reg 5 | 1.63E+02 | USEPA Reg 5 |

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| Mirex | 2385-85-5 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Naphthalene | 91-20-3 | -- | -- | -- | -- | 0.0994 | USEPA Reg 5 | 9.94E-02 | USEPA Reg 5 |
| 1,4-Naphthoquinone | 130-15-4 | -- | -- | -- | -- | 1.67 | USEPA Reg 5 | 1.67E+00 | USEPA Reg 5 |
| 1-Naphthylamine | 134-32-7 | -- | -- | -- | -- | 9.34 | USEPA Reg 5 | 9.34E+00 | USEPA Reg 5 |
| 2-Naphthylamine | 91-59-8 | -- | -- | -- | -- | 3.03 | USEPA Reg 5 | 3.03E+00 | USEPA Reg 5 |
| 2-Nitroaniline | 88-74-4 | -- | -- | -- | -- | 74.1 | USEPA Reg 5 | 7.41E+01 | USEPA Reg 5 |
| 3-Nitroaniline | 99-09-2 | -- | -- | -- | -- | 3.16 | USEPA Reg 5 | 3.16E+00 | USEPA Reg 5 |
| 4-Nitroaniline | 100-01-6 | -- | -- | -- | -- | 21.9 | USEPA Reg 5 | 2.19E+01 | USEPA Reg 5 |
| Nitrobenzene | 99-95-3 | -- | -- | 40 | PRGs[c] | 1.31 | USEPA Reg 5 | 4.00E+01 | PRGs |
| Nitrocellulose | 9004-70-0 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Nitroglycerin | 55-63-0 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Nitroguanidine | 556-88-7 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| 2-Nitrophenol | 88-75-5 | -- | -- | -- | -- | 1.6 | USEPA Reg 5 | 1.60E+00 | USEPA Reg 5 |
| 4-Nitrophenol | 100-02-7 | -- | -- | 7 | PRGs | 5.12 | USEPA Reg 5 | 7.00E+00 | PRGs |
| 4-Nitroquinoline-1-oxide | 56-57-5 | -- | -- | -- | -- | 0.122 | USEPA Reg 5 | 1.22E-01 | USEPA Reg 5 |
| 3-Nitrotoluene | 99-08-1 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| N-Nitrosodiethylamine | 55-18-5 | -- | -- | -- | -- | 0.0693 | USEPA Reg 5 | 6.93E-02 | USEPA Reg 5 |
| N-Nitrosodimethylamine | 62-75-9 | -- | -- | -- | -- | 3.2E-05 | USEPA Reg 5 | 3.21E-05 | USEPA Reg 5 |
| N-Nitrosodiphenylamine | 86-30-6 | -- | -- | 20 | PRGs[c] | 0.545 | USEPA Reg 5 | 2.00E+01 | PRGs |
| N-Nitrosomethylethylamine | 10595-95-6 | -- | -- | -- | -- | 0.00166 | USEPA Reg 5 | 1.66E-03 | USEPA Reg 5 |
| N-Nitrosomorpholine | 59-89-2 | -- | -- | -- | -- | 0.0706 | USEPA Reg 5 | 7.06E-02 | USEPA Reg 5 |
| N-Nitrosopiperidine | 100-75-4 | -- | -- | -- | -- | 0.00665 | USEPA Reg 5 | 6.65E-03 | USEPA Reg 5 |
| N-Nitrosopyrrolidine | 930-55-2 | -- | -- | -- | -- | 0.0126 | USEPA Reg 5 | 1.26E-02 | USEPA Reg 5 |
| N-nitroso-di-n-propylamine | 621-64-7 | -- | -- | -- | -- | 0.544 | USEPA Reg 5 | 5.44E-01 | USEPA Reg 5 |
| 2-Nitrotoluene | 88-72-2 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| 5-nitro-o-Toluidine | 99-55-8 | -- | -- | -- | -- | 8.73 | USEPA Reg 5 | 8.73E+00 | USEPA Reg 5 |
| 2,2'- oxybis(1-Chloropropane) | 108-60-1 | -- | -- | -- | -- | 19.9 | USEPA Reg 5 | 1.99E+01 | USEPA Reg 5 |
| Parathion | 56-38-2 | -- | -- | -- | -- | 0.00034 | USEPA Reg 5 | 3.40E-04 | USEPA Reg 5 |
| PCDDs | PCDD-S | -- | -- | -- | -- | 2E-07 | USEPA Reg 5 | 1.99E-07 | USEPA Reg 5 |
| Pentachloroaniline | 527-20-8 | -- | -- | 100 | PRGs[c] | -- | -- | 1.00E+02 | PRGs |
| Pentachlorobenzene | 608-93-5 | -- | -- | 20 | PRGs | 0.497 | USEPA Reg 5 | 2.00E+01 | PRGs |
| Pentachloroethane | 76-01-7 | -- | -- | -- | -- | 10.7 | USEPA Reg 5 | 1.07E+01 | USEPA Reg 5 |

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| Pentachloronitrobenzene | 82-68-8 | -- | -- | -- | -- | 7.09 | USEPA Reg 5 | 7.09E+00 | USEPA Reg 5 |
| Pentachlorophenol | 87-86-5 | 2.1 | avian EcoSSL for PCP | 3 | PRGs | 0.119 | USEPA Reg 5 | 2.10E+00 | avian EcoSSL for PCP |
| PETN | 78-11-5 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Phenacetin | 62-44-2 | -- | -- | -- | -- | 11.7 | USEPA Reg 5 | 1.17E+01 | USEPA Reg 5 |
| Phenanthrene | 85-01-8 | -- | -- | -- | -- | 45.7 | USEPA Reg 5 | 4.57E+01 | USEPA Reg 5 |
| Phenol | 108-95-2 | -- | -- | 30 | PRGs | 120 | USEPA Reg 5 | 3.00E+01 | PRGs |
| p-Phenylenediamine | 106-50-3 | -- | -- | -- | -- | 6.16 | USEPA Reg 5 | 6.16E+00 | USEPA Reg 5 |
| Phorate | 298-02-2 | -- | -- | -- | -- | 0.0005 | USEPA Reg 5 | 4.96E-04 | USEPA Reg 5 |
| 2-Picoline | 109-06-8 | -- | -- | -- | -- | 9.9 | USEPA Reg 5 | 9.90E+00 | USEPA Reg 5 |
| Polychlorinated biphenyls | 1336-36-3 | -- | -- | 0.371 | PRGs | 0.00033 | USEPA Reg 5 | 3.71E-01 | PRGs |
| Polychlorinated dibenzofurans | 51207-31-9 | -- | -- | -- | -- | 3.9E-05 | USEPA Reg 5 | 3.86E-05 | USEPA Reg 5 |
| Polycyclic aromatic hydrocarbons | 130498-29-2 | 1.1 | mammalian EcoSSL for HMW PAHs | -- | -- | -- | -- | 1.10E+00 | mammalian EcoSSL for HMW PAHs |
| Pronamide | 23950-58-5 | -- | -- | -- | -- | 0.0136 | USEPA Reg 5 | 1.36E-02 | USEPA Reg 5 |
| Propionitrile | 107-12-0 | -- | -- | -- | -- | 0.0498 | USEPA Reg 5 | 4.98E-02 | USEPA Reg 5 |
| 4-Nitrotoluene | 99-99-0 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Pyrene | 129-00-0 | -- | -- | -- | -- | 78.5 | USEPA Reg 5 | 7.85E+01 | USEPA Reg 5 |
| Pyridine | 110-86-1 | -- | -- | -- | -- | 1.03 | USEPA Reg 5 | 1.03E+00 | USEPA Reg 5 |
| RDX | 121-82-4 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Safrole | 94-59-7 | -- | -- | -- | -- | 0.404 | USEPA Reg 5 | 4.04E-01 | USEPA Reg 5 |
| Silvex (2,4,5-TP) | 93-72-1 | -- | -- | -- | -- | 0.109 | USEPA Reg 5 | 1.09E-01 | USEPA Reg 5 |
| Styrene | 100-42-5 | -- | -- | 300 | PRGs | 4.69 | USEPA Reg 5 | 3.00E+02 | PRGs |
| TCDD (2,3,7,8-Tetrachlorodibenzo-p-dioxin) | 1746-01-6 | -- | -- | 3.15E-06 | PRGs | 2E-07 | USEPA Reg 5 | 3.15E-06 | PRGs |
| TCDF | 51207-31-9 | -- | -- | 8.40E-04 | PRGs | 3.9E-05 | USEPA Reg 5 | 8.40E-04 | PRGs |
| 2,3,5,6-Tetrachloroaniline | 3481-20-7 | -- | -- | 20 | PRGs | -- | -- | 2.00E+01 | PRGs |
| 1,2,4,5-Tetrachlorobenzene | 95-94-3 | -- | -- | -- | -- | 2.02 | USEPA Reg 5 | 2.02E+00 | USEPA Reg 5 |
| 1,2,3,4-Tetrachlorobenzene | 634-66-2 | -- | -- | 10 | PRGs | -- | -- | 1.00E+01 | PRGs |
| 1,1,1,2-Tetrachloroethane | 630-20-6 | -- | -- | -- | -- | 225 | USEPA Reg 5 | 2.25E+02 | USEPA Reg 5 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | -- | -- | -- | -- | 0.127 | USEPA Reg 5 | 1.27E-01 | USEPA Reg 5 |
| Tetrachloroethene | 127-18-4 | -- | -- | -- | -- | 9.92 | USEPA Reg 5 | 9.92E+00 | USEPA Reg 5 |

**Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)**

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| 2,3,4,5-Tetrachlorophenol | 4901-51-3 | -- | -- | 20 | PRGs | -- | -- | 2.00E+01 | PRGs |
| 2,3,4,6-Tetrachlorophenol | 58-90-2 | -- | -- | -- | -- | 0.199 | USEPA Reg 5 | 1.99E-01 | USEPA Reg 5 |
| Tetraethyl dithiopyrophosphate | 3689-24-5 | -- | -- | -- | -- | 0.596 | USEPA Reg 5 | 5.96E-01 | USEPA Reg 5 |
| Tetryl | 479-45-8 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Toluene | 108-88-3 | -- | -- | 200 | PRGs | 5.45 | USEPA Reg 5 | 2.00E+02 | PRGs |
| o-Toluidine | 95-53-4 | -- | -- | -- | -- | 2.97 | USEPA Reg 5 | 2.97E+00 | USEPA Reg 5 |
| 4-Toluidine | 106-49-0 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Toxaphene | 8001-35-2 | -- | -- | -- | -- | 0.119 | USEPA Reg 5 | 1.19E-01 | USEPA Reg 5 |
| 2,4,5-Trichloroaniline | 636-30-6 | -- | -- | 20 | PRGs | -- | -- | 2.00E+01 | PRGs |
| 1,2,3-Trichlorobenzene | 87-61-6 | -- | -- | 20 | PRGs | -- | -- | 2.00E+01 | PRGs |
| 1,2,4-Trichlorobenzene | 120-82-1 | -- | -- | 20 | PRGs | 11.1 | USEPA Reg 5 | 2.00E+01 | PRGs |
| 1,1,1-Trichloroethane | 71-55-6 | -- | -- | -- | -- | 29.8 | USEPA Reg 5 | 2.98E+01 | USEPA Reg 5 |
| 1,1,2-Trichloroethane | 79-00-5 | -- | -- | -- | -- | 28.6 | USEPA Reg 5 | 2.86E+01 | USEPA Reg 5 |
| Trichloroethene | 79-01-6 | -- | -- | -- | -- | 12.4 | USEPA Reg 5 | 1.24E+01 | USEPA Reg 5 |
| Trichlorofluoromethane | 75-69-4 | -- | -- | -- | -- | 16.4 | USEPA Reg 5 | 1.64E+01 | USEPA Reg 5 |
| 2,4,5-Trichlorophenol | 95-95-4 | -- | -- | 9 | PRGs | 14.1 | USEPA Reg 5 | 9.00E+00 | PRGs |
| 2,4,6-Trichlorophenol | 88-06-2 | -- | -- | 4 | PRGs | 9.94 | USEPA Reg 5 | 4.00E+00 | PRGs |
| 1,2,3-Trichloropropane | 96-18-4 | -- | -- | -- | -- | 3.36 | USEPA Reg 5 | 3.36E+00 | USEPA Reg 5 |
| 2,4,5-Trichlorophenoxyacetic acid | 93-76-5 | -- | -- | -- | -- | 0.596 | USEPA Reg 5 | 5.96E-01 | USEPA Reg 5 |
| O,O,O-Triethyl phosphorothioate | 126-68-1 | -- | -- | -- | -- | 0.818 | USEPA Reg 5 | 8.18E-01 | USEPA Reg 5 |
| 1,3,5-Trinitrobenzene | 99-35-4 | -- | -- | -- | -- | 0.376 | USEPA Reg 5 | 3.76E-01 | USEPA Reg 5 |
| 2,4,6-Trinitrotoluene | 118-96-7 | -- | -- | -- | -- | -- | -- | No ESV | No Source |
| Vinyl acetate | 108-05-4 | -- | -- | -- | -- | 12.7 | USEPA Reg 5 | 1.27E+01 | USEPA Reg 5 |
| Vinyl chloride | 75-01-4 | -- | -- | -- | -- | 0.646 | USEPA Reg 5 | 6.46E-01 | USEPA Reg 5 |

## Table H-4. Ecological Screening Values for Chemical Analytes in Soil (continued)

| Analyte | CAS Registry Number | Soil Screening Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | USEPA EcoSSLs | | DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a] | | USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs) | | Preferred Ecological Screening Value (ESV)[d] | |
| | | Number (mg/kg dry soil) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source | Number (mg/kg) | Source |
| Xylenes (total) | 1330-20-7 | -- | -- | -- | -- | 10 | USEPA Reg 5 | 1.00E+01 | USEPA Reg 5 |

Hierarchy of values found in updated Ohio EPA Risk Assessment Guidance, section 3.3.5: http://www.epa.ohio.gov/portals/30/rules/RR-031.pdf.
EcoSSLs: http://www.epa.gov/ecotox/ecossl/ (USEPA 2010).
Ecological Screening Levels (ESLs), USEPA Region 5, 2003: http://www.epa.gov/reg5rcra/ca/edql.htm

[a] United States Department of Energy (DOE) (1997a). *Preliminary Remediation Goals for Ecological Endpoints.* ES/ER/TM-162/R2. August 1997. http://www.esd.ornl.gov/programs/ecorisk/documents/tm162r2.pdf.

[b] Values for which plant benchmark is lowest. According to DOE (1997a), the PRG is the lowest of three values (earthworm, plant, or wildlife). The only values shown in DOE 1997a are the ones for which the calculated value is lower than earthworm and plant values. Plant values found in DOE 1997b. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants.* ES/ER/TM-85/R3. November 1997.

[c] Values for which earthworm benchmark is lowest. According to DOE (1997a), the PRG is the lowest of three values (earthworm, plant, or wildlife). The only values shown in DOE 1997a are the ones for which the calculated value is lower than earthworm and plant values. Earthworm values found in DOE 1997c. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process.* ES/ER/TM-126/R2.

[d] The preferred soil value is the EcoSSLs, followed by DOE (1997a), followed by USEPA Region 5 ESLs.

*Aluminum is identified as a chemical of potential concern (COPC) only at sites where the soil pH is less than 5.5.

**In well-aerated soils between pH 5 and 8, iron is not expected to be toxic to plants. A determination of the geochemical conditions (i.e., pH and Eh at a minimum) of the environmental setting, as well as the presence of iron floc and the toxic metals, is critical to the determination of the relative importance of iron at an area of concern (AOC).

-- = No value.

Al = Aluminum.
Ag = Silver.
As = Arsenic.
Ba = Barium.
Be = Beryllium.
BHC = Benzene Hexachloride
CAS = Chemical Abstract Service.
COPEC = Chemical of Potential Ecological Concern.
Co = Cobalt.
Cr = Chromium.
Cu = Copper.
DDD = Dichlorodiphenyldichloroethane.
DDT = Dichlorodiphenyltrichloroethane.
EcoSSL = Ecological Soil Screening Level.
EDQL = Environmental Data Quality Level.
ESV = Ecological screening value.
Fe = Iron.
HMW = High Molecular Weight.
mg/kg = Milligrams per kilogram.
Mn = Manganese.
Ni = Nitrogen.
Ohio EPA = Ohio Environmental Protection Agency.
PAH = Polycyclic aromatic hydrocarbon.
PCB = Polychlorinated biphenyl.
PCDD = Polychlorinated Dibenzodioxins.
PCP = Pentachlorophenol.
PETN = Pentaerythrite Tetranitrate.
PRG = Preliminary Remediation Goal.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
Reg = Region.
Se = Selenium.
TCDD = 2,3,7,8-Tetrachlorodibenzo-p-Dioxin.
TCDF = Tetrachlorodibenzofuran.
USEPA = United States Environmental Protection Agency.
Zn = Zinc.

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**Table H-5. SRC and Integrated COPEC Screening with Maximum Ratio for Shallow Surface Soil (0-1 ft bgs ISM Samples) at Load Line 7**

| Analyte (mg/kg) | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria[a] | PBT[b] Compound? (yes/no) | SRC? (yes/no) | SRC Justification | ESV | ESV Source[c] | COPEC? (yes/no) | COPEC Justification | Ratio of Max to ESV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Inorganic Chemicals*** | | | | | | | | | | | | | | |
| **Aluminum** | **7429-90-5** | **62/ 62** | **5100** | **18000** | **9690** | **17700** | **No** | **Yes** | **Exceeds background** | **50** | **PRGs** | **Yes** | **Exceeds ESV** | **360** |
| Antimony | 7440-36-0 | 23/ 61 | 0.092 | 0.72 | 1.48 | 0.96 | No | No | Below background | 0.27 | EcoSSL | No | Below background | 2.67 |
| Arsenic | 7440-38-2 | 62/ 62 | 7.9 | 16 | 11.1 | 15.4 | No | Yes | Exceeds background | 18 | EcoSSL | No | Below ESV | 0.89 |
| Barium | 7440-39-3 | 62/ 62 | 40.3 | 160 | 70.2 | 88.4 | No | Yes | Exceeds background | 330 | EcoSSL | No | Below ESV | 0.48 |
| Beryllium | 7440-41-7 | 49/ 62 | 0.5 | 2.8 | 0.751 | 0.88 | No | Yes | Exceeds background | 21 | EcoSSL | No | Below ESV | 0.13 |
| **Cadmium** | **7440-43-9** | **40/ 62** | **0.08** | **8.5** | **0.456** | **0** | **No** | **Yes** | **Exceeds background** | **0.36** | **EcoSSL** | **Yes** | **Exceeds ESV** | **23.61** |
| Calcium | 7440-70-2 | 62/ 62 | 561 | 77000 | 9750 | 15800 | No | No | Essential Nutrient | No ESV | No Source | No | Essential Nutrient | No ESV |
| **Chromium** | **7440-47-3** | **62/ 62** | **12** | **97.5** | **23.7** | **17.4** | **No** | **Yes** | **Exceeds background** | **26** | **EcoSSL** | **Yes** | **Exceeds ESV** | **3.75** |
| Cobalt | 7440-48-4 | 62/ 62 | 3.8 | 13 | 7.82 | 10.4 | No | Yes | Exceeds background | 13 | EcoSSL | No | Max = ESV | 1.00 |
| **Copper** | **7440-50-8** | **62/ 62** | **9.4** | **88** | **18.2** | **17.7** | **No** | **Yes** | **Exceeds background** | **28** | **EcoSSL** | **Yes** | **Exceeds ESV** | **3.14** |
| Iron | 7439-89-6 | 62/ 62 | 12000 | 29000 | 19800 | 23100 | No | No | Essential Nutrient | No ESV | No Source | No | Essential Nutrient | No ESV |
| **Lead** | **7439-92-1** | **62/ 62** | **11** | **160** | **31.6** | **26.1** | **No** | **Yes** | **Exceeds background** | **11** | **EcoSSL** | **Yes** | **Exceeds ESV** | **14.55** |
| Magnesium | 7439-95-4 | 62/ 62 | 1590 | 9700 | 2640 | 3030 | No | No | Essential Nutrient | No ESV | No Source | No | Essential Nutrient | No ESV |
| **Manganese** | **7439-96-5** | **62/ 62** | **290** | **1600** | **601** | **1450** | **No** | **Yes** | **Exceeds background** | **220** | **EcoSSL** | **Yes** | **Exceeds ESV** | **7.27** |
| **Mercury** | **7439-97-6** | **59/ 62** | **0.016** | **0.4** | **0.0516** | **0.036** | **Yes** | **Yes** | **Exceeds background, PBT Compound** | **0.00051** | **PRGs** | **Yes** | **Exceeds ESV, PBT Compound** | **784.31** |
| Nickel | 7440-02-0 | 62/ 62 | 13 | 31.1 | 20.3 | 21.1 | No | Yes | Exceeds background | 38 | EcoSSL | No | Below ESV | 0.82 |
| Potassium | 7440-09-7 | 56/ 62 | 520 | 1800 | 860 | 927 | No | No | Essential Nutrient | No ESV | No Source | No | Essential Nutrient | No ESV |
| **Selenium** | **7782-49-2** | **49/ 62** | **0.46** | **2.5** | **0.786** | **1.4** | **No** | **Yes** | **Exceeds background** | **0.52** | **EcoSSL** | **Yes** | **Exceeds ESV** | **4.81** |
| **Silver** | **7440-22-4** | **14/ 62** | **0.026** | **80** | **1.86** | **0** | **No** | **Yes** | **Exceeds background** | **4.2** | **EcoSSL** | **Yes** | **Exceeds ESV** | **19.05** |
| Sodium | 7440-23-5 | 39/ 62 | 26.5 | 670 | 171 | 123 | No | No | Essential Nutrient | No ESV | No Source | No | Essential Nutrient | No ESV |
| Thallium | 7440-28-0 | 21/ 62 | 0.1 | 0.31 | 0.416 | 0 | No | Yes | Exceeds background | 1 | PRGs | No | Below ESV | 0.31 |
| Vanadium | 7440-62-2 | 62/ 62 | 8.2 | 28 | 16.8 | 31.1 | No | No | Below background | 7.8 | EcoSSL | No | Below background | 3.59 |
| **Zinc** | **7440-66-6** | **62/ 62** | **38** | **999** | **88.5** | **61.8** | **No** | **Yes** | **Exceeds background** | **46** | **EcoSSL** | **Yes** | **Exceeds ESV** | **21.72** |
| ***Anions*** | | | | | | | | | | | | | | |
| **Nitrate** | **14797-55-8** | **26/ 32** | **0.25** | **9.1** | **1.94** | **0** | **No** | **Yes** | **Exceeds background** | **No ESV** | **No Source** | **Yes** | **Exceeds background** | **No ESV** |
| ***Explosives*** | | | | | | | | | | | | | | |
| **2,4,6-Trinitrotoluene** | **118-96-7** | **3/ 62** | **0.09** | **2.7** | **0.142** | **0** | **No** | **Yes** | **Detected organic** | **No ESV** | **No Source** | **Yes** | **Detected organic** | **No ESV** |
| **2,6-Dinitrotoluene** | **606-20-2** | **1/ 62** | **0.28** | **0.28** | **0.114** | **0** | **No** | **Yes** | **Detected organic** | **0.0328** | **USEPA Reg 5** | **Yes** | **Exceeds ESV** | **8.54** |
| **2-Amino-4,6-Dinitrotoluene** | **35572-78-2** | **1/ 62** | **0.1** | **0.1** | **0.111** | **0** | **No** | **Yes** | **Detected organic** | **No ESV** | **No Source** | **Yes** | **Detected organic** | **No ESV** |
| **3-Nitrotoluene** | **99-08-1** | **5/ 62** | **0.018** | **0.13** | **0.105** | **0** | **No** | **Yes** | **Detected organic** | **No ESV** | **No Source** | **Yes** | **Detected organic** | **No ESV** |
| **HMX** | **2691-41-0** | **6/ 62** | **0.039** | **7.9** | **0.274** | **0** | **No** | **Yes** | **Detected organic** | **No ESV** | **No Source** | **Yes** | **Detected organic** | **No ESV** |
| **Nitrocellulose** | **9004-70-0** | **5/ 20** | **3** | **156** | **9.58** | **0** | **No** | **Yes** | **Detected organic** | **No ESV** | **No Source** | **Yes** | **Detected organic** | **No ESV** |
| **Nitroglycerin** | **55-63-0** | **2/ 46** | **2.9** | **18** | **0.691** | **0** | **No** | **Yes** | **Detected organic** | **No ESV** | **No Source** | **Yes** | **Detected organic** | **No ESV** |
| **RDX** | **121-82-4** | **5/ 62** | **0.08** | **45** | **0.85** | **0** | **No** | **Yes** | **Detected organic** | **No ESV** | **No Source** | **Yes** | **Detected organic** | **No ESV** |
| **Tetryl** | **479-45-8** | **4/ 62** | **0.017** | **0.033** | **0.156** | **0** | **No** | **Yes** | **Detected organic** | **No ESV** | **No Source** | **Yes** | **Detected organic** | **No ESV** |
| ***Semi-volatile Organic Compounds*** | | | | | | | | | | | | | | |
| 2-Methylnaphthalene | 91-57-6 | 3/ 8 | 0.018 | 0.088 | 0.143 | 0 | No | Yes | Detected organic | 3.24 | USEPA Reg 5 | No | Below ESV | 0.03 |
| Acenaphthene | 83-32-9 | 10/ 23 | 0.0072 | 0.83 | 0.073 | 0 | No | Yes | Detected organic | 20 | PRGs | No | Below ESV | 0.04 |
| Anthracene | 120-12-7 | 13/ 23 | 0.0093 | 1.5 | 0.127 | 0 | No | Yes | Detected organic | 1480 | USEPA Reg 5 | No | Below ESV | 0.001 |

**Table H-5. SRC and Integrated COPEC Screening with Maximum Ratio for Shallow Surface Soil (0-1 ft bgs ISM Samples) at Load Line 7 (continued)**

| Analyte (mg/kg) | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria[a] | PBT[b] Compound? (yes/no) | SRC? (yes/no) | SRC Justification | ESV | ESV Source[c] | COPEC? (yes/no) | COPEC Justification | Ratio of Max to ESV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benz(a)anthracene | 56-55-3 | 22/ 23 | 0.01 | 3.1 | 0.275 | 0 | No | Yes | Detected organic | 5.21 | USEPA Reg 5 | No | Below ESV | 0.60 |
| Benzenemethanol | 100-51-6 | 2/ 6 | 0.32 | 0.77 | 0.433 | 0 | No | Yes | Detected organic | 65.8 | USEPA Reg 5 | No | Below ESV | 0.01 |
| **Benzo(a)pyrene** | **50-32-8** | **22/ 23** | **0.0071** | **2.3** | **0.219** | **0** | **No** | **Yes** | **Detected organic** | **1.52** | **USEPA Reg 5** | **Yes** | **Exceeds ESV** | **1.51** |
| Benzo(b)fluoranthene | 205-99-2 | 21/ 23 | 0.011 | 3 | 0.293 | 0 | No | Yes | Detected organic | 59.8 | USEPA Reg 5 | No | Below ESV | 0.05 |
| Benzo(ghi)perylene | 191-24-2 | 20/ 23 | 0.0078 | 0.88 | 0.109 | 0 | No | Yes | Detected organic | 119 | USEPA Reg 5 | No | Below ESV | 0.01 |
| Benzo(k)fluoranthene | 207-08-9 | 19/ 23 | 0.0095 | 1.9 | 0.153 | 0 | No | Yes | Detected organic | 148 | USEPA Reg 5 | No | Below ESV | 0.01 |
| Bis(2-ethylhexyl)phthalate | 117-81-7 | 1/ 8 | 0.61 | 0.61 | 0.241 | 0 | No | Yes | Detected organic | 0.925 | USEPA Reg 5 | No | Below ESV | 0.66 |
| **Carbazole** | **86-74-8** | **1/ 8** | **0.85** | **0.85** | **0.194** | **0** | **No** | **Yes** | **Detected organic** | **No ESV** | **No Source** | **Yes** | **Detected organic** | **No ESV** |
| Chrysene | 218-01-9 | 20/ 23 | 0.014 | 3.3 | 0.28 | 0 | No | Yes | Detected organic | 4.73 | USEPA Reg 5 | No | Below ESV | 0.70 |
| Dibenz(a,h)anthracene | 53-70-3 | 12/ 23 | 0.0081 | 0.42 | 0.0525 | 0 | No | Yes | Detected organic | 18.4 | USEPA Reg 5 | No | Below ESV | 0.02 |
| **Dibenzofuran** | **132-64-9** | **2/ 8** | **0.06** | **0.21** | **0.186** | **0** | **No** | **Yes** | **Detected organic** | **No ESV** | **No Source** | **Yes** | **Detected organic** | **No ESV** |
| Diethylphthalate | 84-66-2 | 1/ 8 | 0.016 | 0.016 | 0.141 | 0 | No | Yes | Detected organic | 100 | PRGs | No | Below ESV | 0.0002 |
| Fluoranthene | 206-44-0 | 22/ 23 | 0.013 | 8.2 | 0.698 | 0 | No | Yes | Detected organic | 122 | USEPA Reg 5 | No | Below ESV | 0.07 |
| Fluorene | 86-73-7 | 14/ 23 | 0.007 | 0.45 | 0.0566 | 0 | No | Yes | Detected organic | 30 | PRGs | No | Below ESV | 0.02 |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | 20/ 23 | 0.0075 | 0.83 | 0.106 | 0 | No | Yes | Detected organic | 109 | USEPA Reg 5 | No | Below ESV | 0.01 |
| **Naphthalene** | **91-20-3** | **17/ 23** | **0.012** | **0.17** | **0.0472** | **0** | **No** | **Yes** | **Detected organic** | **0.0994** | **USEPA Reg 5** | **Yes** | **Exceeds ESV** | **1.71** |
| Phenanthrene | 85-01-8 | 22/ 23 | 0.0093 | 5.2 | 0.452 | 0 | No | Yes | Detected organic | 45.7 | USEPA Reg 5 | No | Below ESV | 0.11 |
| Pyrene | 129-00-0 | 22/ 23 | 0.01 | 5.9 | 0.51 | 0 | No | Yes | Detected organic | 78.5 | USEPA Reg 5 | No | Below ESV | 0.08 |
| ***Pesticides/PCBs*** | | | | | | | | | | | | | | |
| **PCB-1254** | **11097-69-1** | **1/ 8** | **0.07** | **0.07** | **0.0255** | **0** | **Yes** | **Yes** | **Detected organic, PBT Compound** | **No ESV** | **No Source** | **Yes** | **PBT Compound** | **No ESV** |
| ***Volatile Organic Compounds*** | | | | | | | | | | | | | | |
| Acetone | 67-64-1 | 1/ 8 | 0.011 | 0.011 | 0.0112 | 0 | No | Yes | Detected organic | 2.5 | USEPA Reg 5 | No | Below ESV | 0.004 |
| Dimethylbenzene[d] | 1330-20-7 | 1/ 8 | 0.0018 | 0.0018 | 0.00545 | 0 | No | Yes | Detected organic | 10 | USEPA Reg 5 | No | Below ESV | 0.0002 |
| Ethylbenzene | 100-41-4 | 1/ 8 | 0.00034 | 0.00034 | 0.00282 | 0 | No | Yes | Detected organic | 5.16 | USEPA Reg 5 | No | Below ESV | 0.0001 |

[a] Background criteria for soil 0-1 ft bgs from final facility-wide background values for former RVAAP, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).
[b] PBT compounds are defined by Ohio EPA 2008 as: aldrin/dieldrin, chlordane,1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE), hexachlorobenzene, hexachlorobutadiene (hexachloro-1,3-butadiene), hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC), lindane (gammahexachlorocyclohexane), alkyl-lead, mercury and its compounds, mirex, photomirex, octachlorostyrene, PCBs, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), dioxin, PCDF (furans), 1,2,3,4-tetrachlorobenzene, 1,2,4,5-tetrachlorobenzene, toxaphene, and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.
[c] Screening Level Source: See soil ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is EcoSSLs, followed by United States Department of Energy (DOE) (1997a) *Preliminary Remediation Goals for Ecological Endpoints*, followed by Region 5 ESLs.
[d] Dimethylbenzene is listed in the ESV table as Xylenes (total); the CAS numbers for both substances match.

**Bold** = Chemical is a COPEC.
bgs = Below ground surface.
CAS = Chemical Abstract Service.
COPEC = Chemical of Potential Ecological Concern.
DDD = Dichlorodiphenyldichloroethane.
DDE = Dichlorodiphenyldichloroethylene.
EcoSSL = Ecological Soil Screening Level.
ESL = Ecological Screening Level.
ESV = Ecological Screening Value.
ft = Feet.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
Max = Maximum concentration.
mg/kg = Milligrams per kilograms.
Ohio EPA = Ohio Environmental Protection Agency.
PBT = Persistent, Bioaccumulative, and Toxic.
PCB = Polychlorinated Biphenyl.
PCDF = Polychlorinated Dibenzofurans.
PRG = Preliminary Remediation Goal.
RDX = Cyclotrimethylenetrinitramine.
Reg = Region.
RVAAP = Ravenna Army Ammunition Plant.
SRC = Site-related Contaminant.
USEPA = United States Environmental Protection Agency.

# REFERENCES


BTAG (U.S. Army Biological Technical Assistance Group) 2005. *Technical Document for Ecological Risk Assessment: Process for Developing Management Goals*. August 2005.

DOE 1997a. *Preliminary Remediation Goals for Ecological Endpoints*. Oak Ridge National Laboratory, Oak Ridge Tennessee. August 1997.

DOE 1997b. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process; 1997 Revision.* Oak Ridge National Laboratory, Oak Ridge Tennessee. November 1997.

DOE 1997c. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision.* Oak Ridge National Laboratory, Oak Ridge, Tennessee. November 1997.

Efroymson, R.A., G.W. Suter II, B.E. Sample, and D.S. Jones 1997a. *Preliminary Remediation Goals for Ecological Endpoints*. Oak Ridge National Laboratory, Oak Ridge Tennessee. August 1997. [See DOE 1997a]

Efroymson, R.A., M.E. Will, and G.W. Suter II 1997b. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process; 1997 Revision.* Oak Ridge National Laboratory, Oak Ridge Tennessee. November 1997. [See DOE 1997b]

Efroymson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten 1997c. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision.* Oak Ridge National Laboratory, Oak Ridge, Tennessee. November 1997. [See DOE 1997c]

OHARNG (Ohio Army National Guard) 2014. *Integrated Natural Resources Management Plan and Environmental Assessment for the Ravenna Training and Logistics Site, Portage and Trumbull Counties, Ohio*. December 2014.

Ohio EPA (Ohio Environmental Protection Agency) 2008. *Guidance for Conducting Ecological Risk Assessments (Ohio EPA)*. Division of Emergency and Remedial Response. April 2008.

USACE (United States Army Corps of Engineers) 2001. *Phase II Remedial Investigation Report for the Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio.* April 2001.

USEPA (United States Environmental Protection Agency) 1998. *Technical Approach for Developing EDQLs for Resource Conservation and Recovery Act (RCRA) Appendix IX Constituents and Other Significant Contaminants of Ecological Concern.* USEPA, Region 5. April 1998.

USEPA 2003. *Ecological Screening Levels*. USEPA, Region 5. Located at http://www.epa.gov/reg5rcra/ca/edql.htm. August 2003.

USEPA 2010. *Ecological Soil Screening Levels (Eco-SSLs).* Office of Solid Waste and Emergency Response, Washington, D.C. 2010. http://www.epa.gov/ecotox/ecossl/ 2010.