

5. RISK EVALUATION

5.1 INTRODUCTION

A risk evaluation process has been applied to the Phase I sampling results to determine the potential magnitude of risk associated with contamination detected at each AOC. This process involves the following steps:

- For inorganics, identify chemicals that passed the background screening process (see Section 4).
- Identify potential migration and exposure pathways associated with the site and identify potential exposure scenarios that should be used to select screening levels (Section 5.3).
- Identify risk-based and ARAR-based screening levels for each contaminant detected at least once above background levels at each sampled media at each AOC (Section 5.4).
- Compare site-related concentrations to action levels to determine if site conditions warrant additional characterization or action (Section 5.5).

5.2 DATA QUALITY ASSESSMENT

Appendix F presents a detailed assessment of the quality of the Phase I sampling analytical results. For the purpose of the risk evaluation, it is necessary to address the impact of any data quality issues on the use of the data for decision-making purposes. As indicated in Appendix F, a major data quality issue stemmed from the need to dilute samples for explosives analysis because of the high concentrations of TNT in the samples. As the samples were diluted (generally 10 or 100 times) in order to be able to quantify results, the sample detection limit increased, generally on the same order as the dilution. In several samples, the dilutions resulted in unacceptable detection limits for several analytes, primarily DNT.

As indicated in **Table 5.1** (all tables are provided at the end of this chapter), several of the elevated detection limits for the explosives exceed risk-based screening criteria that are used in the risk evaluation (see Section 5.4.1). In this situation, it is impossible to determine whether the analyte is present in the sample at levels above or below the risk-based screening values and, thus, the results cannot be used to determine if action is necessary to address that analyte.

In no case at Ravenna does this situation lead to the identification of a false negative finding, e.g., the evaluation never suggests “no further action” when action is necessary. The reason these false negatives are avoided is that in cases where elevated detection limits occur with explosives, the reason for the dilution—a high concentration of TNT—also drives the need for further action.

5.3 EXPOSURE PATHWAY ANALYSIS

The RVAAP is located approximately 4.8 km (3 miles) east/northeast of the Town of Ravenna, and 1.6 km (1 mile) northwest of the Town of Newton Falls. Additional sparsely populated communities border the installation, including Windham which borders the north, Garrettsville which is 9.7 km (6 miles) to the northwest, Charleston which borders the southwest, and Wayland which is 4.8 km (3 miles) to the northeast.

5.3.1 Current Land Use

The RVAAP facility is located in two counties of northeastern Ohio, Portage County and Trumbull County, with a majority of the facility lying in Portage County. According to the 1990 Census, the total population of Portage and Trumbull counties was 142,585 and 227,813, respectively. The largest population centers in the area are the town of Ravenna (population 12,069), located approximately 3.2 km (2 miles) to the west, and Newton Falls (population 4,866), located approximately 1.6 km (1 mile) to the southeast.

Land use within the facility is restricted access industrial. In addition, the Ohio National Guard uses portions of the facility for deployment and training exercises. Site workers infrequently visit the AOCs for maintenance purposes, e.g., mowing. Current on-site use of surface water is limited to use by wildlife. On-site recreational use of surface water is limited to a managed fishing program. Additional activities include controlled deer hunting, timbering, and harvesting of hay fields. Based on conversations with site personnel, it is likely that some recreational trespassers use of surface water does occur on a limited basis, primarily associated with fishing.

Groundwater from on-site production wells was used during operations at the site (SAIC 1996). All but two production wells have been abandoned at the site. These wells, located in the central portion of the facility, provide sanitary water to the facility. The Sharon Conglomerate is the major producing aquifer at the site.

The land use immediately surrounding the facility is primarily rural. Approximately 55 percent of Portage County is either woodland or farmland (Portage County Soil and Water Conservation District Resources Inventory 1985; Census Bureau 1992). To the south of the facility is the Michael J. Kirwan Reservoir, which serves as a potable water source and is used for recreational purposes. The Reservoir is south of the site, across State Route 5. The Reservoir is fed by the West Branch of the Mahoning River, which flows south along the western edge of the installation. Several small surface water drainages that pass through Load Lines 1, 2, and 4 drain directly off site to the Reservoir. Hinkley Creek flows south across the western portion of the facility and eventually flows into the West Branch of the Mahoning River. The major surface drainages at RVAAP, Sand Creek, and the South Fork of Eagle Creek exit the facility property and eventually flow east to the Mahoning River.

Residential groundwater use occurs outside of the facility, with most of the residential wells tapping into the Sharon Conglomerate. Some off-site wells draw from the shallow unconsolidated units.

5.3.2 Future Land Use

At the present time, the RVAAP is an inactive facility maintained by a contracted caretaker, Mason and Hanger-Silas Co., Inc. Future use of the site has not been determined. For the purposes of this risk evaluation, it is assumed that the RVAAP land could revert back to rural farmland in the future.

5.3.3 Selected Exposure Pathways

Phase I risk screening methods generally require the use of the most conservative potential land use assumption for a site (EPA 1991 and 1996; ASTM 1995). This ensures that a site with a potential future hazard will not be identified as needing "no further action" too early in the CERCLA process. Based on this approach, the land use assumed for the risk evaluation is rural residential farmland, and the following pathways have been selected as the basis for the Phase I risk screen:

Soil

- Soil ingestion—for carcinogenic effects the receptor of concern is an adult who ingests an average of 114 mg soil/day for 70 years; for noncarcinogenic effects, the receptor of concern is a child who ingests 200 mg soil/day for 6 years.
- Leaching of contaminants to groundwater, with subsequent ingestion of groundwater.

Groundwater

- Ingestion of groundwater.
- Inhalation while showering has not been considered since no volatile organics were detected in groundwater.

Because of the high degree of modeling uncertainty associated with the gardening/irrigation exposure pathway, it is not evaluated in the Phase I risk evaluation screen. It may be identified as a complete pathway and evaluated in the Phase II baseline risk assessment (BRA).

5.4 SCREENING LEVELS

Tables 5.2, 5.3, and 5.4 list screening levels for soils, sediment, and groundwater data, respectively. These levels reflect Tier 1-type screening values (ASTM 1995), e.g., values that are easily obtainable and, due to their conservative nature, can be used with a high degree of confidence to indicate sites for which no further action is required. The regulatory screening values as well as the calculated risk-based values reflect a residential land use and, thus, are appropriate for a Phase I evaluation. Screening levels based on industrial land use are also provided for reference. Future land use will be more thoroughly addressed as part of the Phase II BRA.

The following sections present the screening levels and the comparison methods used in the risk evaluation. Screening levels are provided for each media for any chemical detected at least once in that media.

5.4.1 Screening Levels

Soil

Soil screening levels listed in Table 5.2 represent screening values developed by EPA Region IX (EPA 1997). The EPA Region IX soil screening values reflect the following:

- residential and industrial land use;
- soil screening levels for protection of groundwater, obtained directly from EPA's Soil Screening Guidance (EPA 1996); and
- risk target goals of 10^{-6} for carcinogens and a hazard quotient of 1 for noncarcinogens.

The residential and industrial Region IX values have been adjusted to reflect the OEPA target screening goals of 10^{-7} and a hazard quotient of 0.1. The Region IX values reflect the following exposure pathways:

- ingestion,
- inhalation of particulates,
- inhalation of volatiles, and
- dermal absorption.

The industrial values are provided but should be carefully applied in a RVAAP Phase I risk evaluation since use of these values implies that some action—*land use restrictions*—must be implemented. The soil screening levels developed for protection of groundwater were obtained from the EPA Soil Screening Guidance (EPA 1996). These values backcalculate an acceptable concentration in soil based on acceptable groundwater concentrations. They incorporate several sensitive assumptions and, thus, should be used with caution. Some of the more important assumptions used in developing these values include:

- the site is a large volume source [12 ha (30 acres)];
- soil contamination extends to the top of the aquifer, thus there is no accounting for dilution/attenuation in the unsaturated zone; and
- use of a default dilution/attenuation factor in the saturated zone of 10 suggests unconfined, unconsolidated conditions in the aquifer.

Based on the geology underlying Ravenna (see Section 3.1), these assumptions are extremely conservative. As noted in Table 5.2, values based on leaching to groundwater are significantly lower than other values and, thus, should be applied with caution.

Soil screening values for lead reflect current EPA guidance (EPA 1994a and 1994b). The values were developed by EPA using the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Groundwater

Groundwater action levels also reflect a combination of both ARAR-based and risk-based values (Table 5.3). The ARAR-based values are primarily State of Ohio Maximum Contaminant Levels (MCLs) and federal Safe Drinking Water Act (SDWA) MCLs. Some values do not reflect promulgated MCLs, rather they should be considered "to-be-considered" (TBC), e.g., the technology action level for lead. The calculated risk-based values presented in the table reflect the default exposure pathways and parameters identified by EPA (EPA 1991). For most chemicals, the risk-based value reflects the groundwater ingestion scenario.

Sediment

Sediment screening levels reflect levels protective of ecological receptors rather than human receptors. The sediment screening levels include (Table 5.4):

- EPA Region IV Sediment criteria (EPA 1992). EPA Region IV sediment levels were used since no Region V or State of Ohio values are available.
- Toxicity benchmark values were developed by Oak Ridge National Laboratory (Efroymson 1996). These values are provided as references for chemicals for which no Region IV criteria exist. Since the values and the methods/parameters used to develop them have not been adopted by regulatory agencies, they will not be used to identify COPCs.

5.4.2 Screening Level Comparison

The screening level comparison is a systematic screening of sample results against the screening levels. Chemicals that do not get screened out during this process are considered potential site-related COPCs.

Soil

The following criteria are used to screen chemicals detected in soils:

- Chemicals detected within the range of background are not considered to be COPCs. This screening is presented in Section 4.
- Some essential human nutrients (calcium, iron, potassium, and sodium) are not considered COPCs. In some assessments, magnesium is screened out as an essential element, however, magnesium is process-related at Ravenna and, therefore, is retained in the assessment.

- If any result exceeds any screening level, the chemical is retained as a COPC, with the exception of the soil leaching screen. Chemicals exceeding the soil leach screen are noted but not identified as definitive COPCs because of the high degree of uncertainty and conservatism inherent in this screen (see Section 5.4.1).

Groundwater

Chemicals detected in groundwater are identified as COPCs using the following criteria:

- If the chemical is detected above the Ohio MCL, it is considered a COPC.
- If no state MCL exists, the chemical is screened against the federal MCL.
- If no state or federal MCL exists, the chemical is screened against the risk-based screening level. In this case, if a chemical is detected above the risk-based screening level, it is considered a COPC.

Although many of the detected inorganics occur naturally in groundwater, no background groundwater levels are available for screening Ravenna site data at this time. Because of the limited nature of the groundwater data sets, all chemicals detected in subsequent phases will be addressed in the BRA.

Sediment

Any chemicals detected above one of these screening levels are noted in the sediment screening summary table. Chemicals that exceed the EPA Region IV sediment screening values are identified as COPCs.

5.5 RISK EVALUATION RESULTS

Table 5.5 presents a summary of the COPCs identified during the Phase I risk screening process. **Figures 5.1 and 5.2** present a site-wide summary of the results of the risk evaluation for explosives and metals, respectively. The figure indicates in which areas of the Ravenna facility and in what media chemicals have been detected above screening levels. Detections 100 times greater than screening levels are denoted in red; detection 2 to 100 times screening levels are identified with yellow, and detection <2 times the level are indicated by green. In some cases with metals, a single metal was detected at 100 times the screening level while all other detections were significantly less. These are also denoted on the figure. A figure was not developed for the other two primary COPC groups, pesticides/PCBs and PAHs, since detections above screening levels all fell within the "<2 times screening level" group.

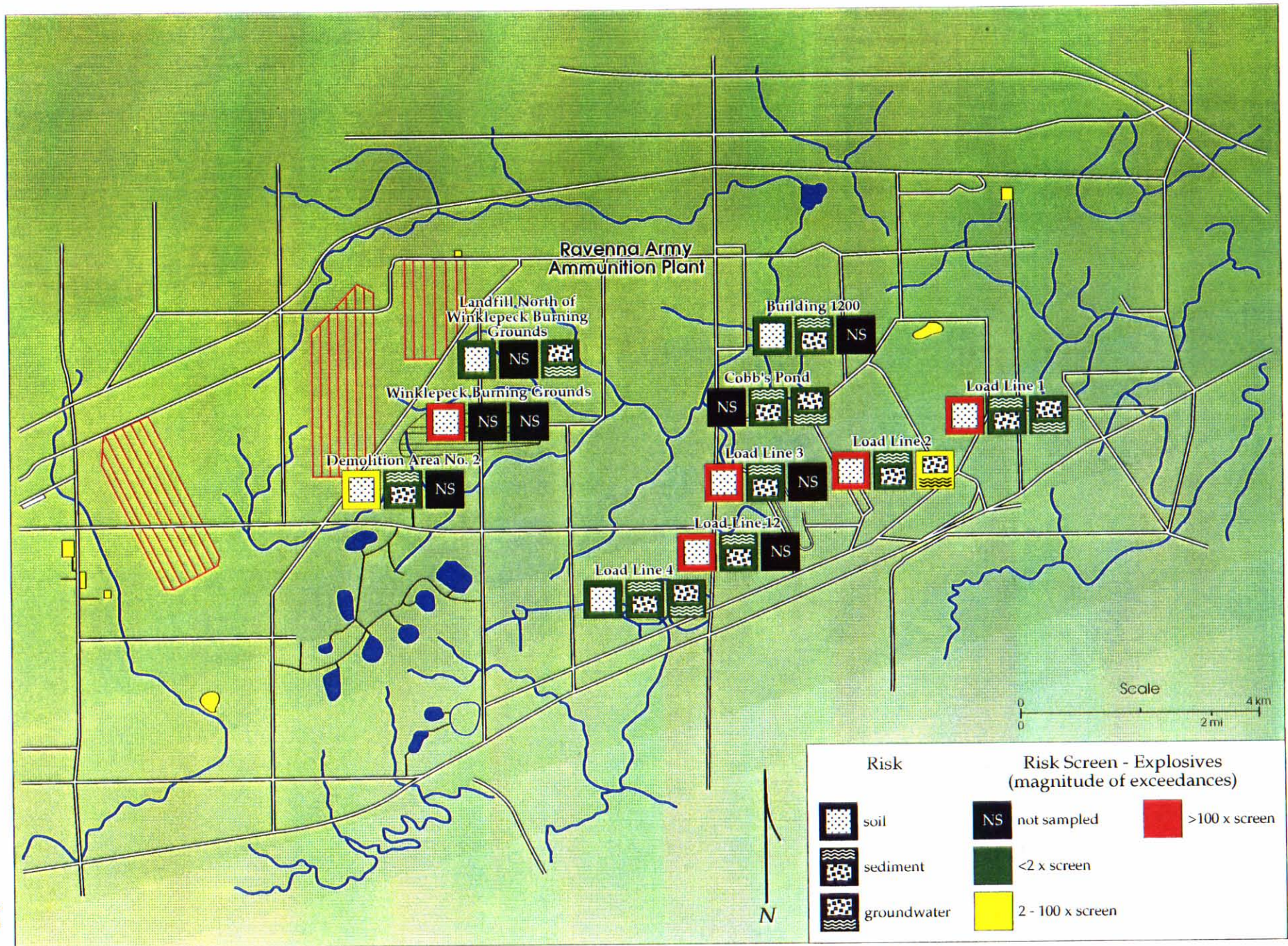


Figure 5.1. Site-Wide Summary of Results of Risk Evaluation for Explosives

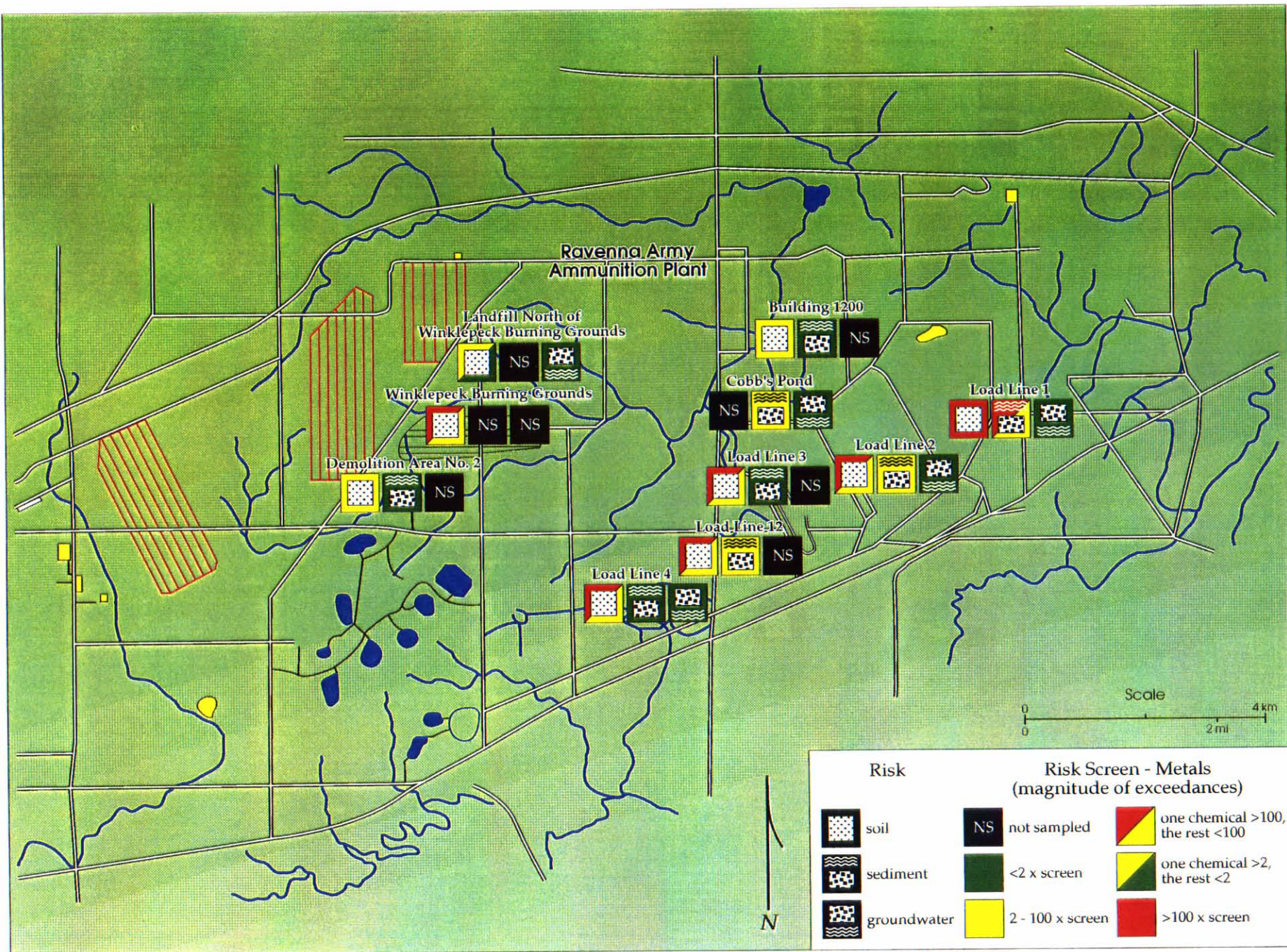


Figure 5.2. Site-Wide Summary of Results of Risk Evaluation for Metals

The following points summarize the major findings.

- The greatest exceedances of risk-based screening levels are associated with explosives detected in soils near the load lines. TNT, DNT, and RDX were detected at levels that exceeded residential-based and industrial-based screening levels by several orders of magnitude. Explosives were also high in the Winklepeck Burning Grounds.
- Metals were detected in soils above actions levels at the same locations. The primary metals of concern appear to be arsenic, beryllium, cadmium, chromium, and lead. In addition to the load lines and the burning grounds, metals were detected above action levels at the Demolition Area #2. Screening levels for two metals, beryllium and thallium, are within the range of background levels for these metals and, thus, are difficult to identify these chemicals as COPCs.
- Although some site-related chemicals are detected in sediments downgradient and downstream of sources, the migration appears to be limited. Sediment concentrations for most site-related chemicals are generally low, with a few exceedances slightly above screening levels. This suggests chemicals are not migrating away from the source area in large masses.
- There does not appear to be widespread groundwater contamination at the site, however, this conclusion is based on limited data. The lack of contamination in collected samples is likely related to the physical/chemical characteristics of chemical detected in the source soils—immobile, explosives, metals, and PAHs. The only chemical detected in groundwater above screening levels with any regularity was manganese. It has not been determined whether the elevated manganese reflects relatively high background levels in the region; however, source soil sampling does not indicate elevated manganese in the source area soils.
- In several cases metals exceeded only the soil screening levels developed for protection of groundwater. These values are highly conservative, assuming fairly mobile forms of the metals. There may be a systematic problem with applying some metals screening levels in both soils and sediments since the screening levels are considered site-related based on comparison to site background data, but are within the range of naturally occurring concentrations, as defined by the USGS background soil study. These metals include arsenic, beryllium, and thallium in soils; and copper and silver in sediments.

The results of the risk evaluation are used to support the relative risk site evaluation presented in Appendix K. The relative risk site evaluation is used by DoD to prioritize projects for available funding.

Provided below is a site-by-site summary of the risk evaluation results. The tables summarizing the results of the area-specific, media-specific risk screens (**Tables 5.6 through 5.29**) are provided at this end of this chapter.

5.5.1 Demolition Area #2

Tables 5.6 and 5.7 present the results of the risk evaluation screen for Demolition Area #2. Media analyzed included soil and sediment. As indicated in the table, several metals were detected above soil screening values in both surface soils (0 to 2 feet) and subsurface soils (>2 feet). Many of the metals only exceeded the screening value based on leaching to groundwater screening values, which as indicated previously, are extremely conservative values.

- The metals that exceeded screening values based on direct contact exposures (e.g., soil ingestion) were arsenic, beryllium, chromium, and lead, with lead appearing to be the greatest concern. The maximum site-related lead concentration is 1,900 mg/kg versus the 400 mg/kg soil screening level.
- TNT was detected in the soil slightly above the soil screening levels. The maximum detected TNT value is 4.4 mg/kg. DNT screening levels are low because of the relatively high cancer potency of the chemical.
- No chemicals were detected above screening levels in the sediments.

5.5.2 Winklepeck Burning Grounds

Soil and sediment screening results for Winklepeck Burning Grounds are presented in **Tables 5.8 and 5.9**, respectively.

- Several explosives were detected at levels significantly above soil screening levels, including TNB, TNT, DNT, and RDX. The TNT and RDX detections are two orders of magnitude greater than the screening values.
- Several metals were detected above soil screening levels, including arsenic, cadmium, chromium, and lead, four chemicals that are elevated at several other AOCs.
- No chemicals were detected above screening levels in sediment samples.

5.5.3 Load Line 1 and Dilution/Settling Pond

Tables 5.10, 5.11, and 5.12 show the result of risk screening for soils, sediments, and groundwater at Load Line 1.

- Several explosives were detected in soils above screening levels, including TNT, TNB, and RDX. The maximum detected TNT value is over 5,000 times greater than the residential screening level.
- Several metals also exceed risk screening levels. The chromium detection of 394 mg/kg exceeds all screening values. The maximum lead detection is 3,610 mg/kg.

- Several pesticides and PCBs were detected above soil screening levels. All of the detected pesticides levels are low (e.g., < 1 mg/kg). These chemicals are relatively potent carcinogens, therefore, low concentrations may be a risk hazard.
- Low levels of PAHs were detected at the site. Carcinogenic PAHs were detected above soil screens for residential exposures. These soil concentrations (< 1 mg/kg) may represent ubiquitous, anthropogenic PAH levels that are often associated with asphalt or combustion activities.
- Explosives and pesticides were not detected above screening levels in sediment; however, many of the same inorganics and few of the PAHs detected in soils were detected above sediment screening levels.
- Arsenic was detected in groundwater once above the MCL. The detected value was 64 $\mu\text{g/L}$ versus the 50 $\mu\text{g/L}$ MCL. Manganese was detected in one sample at a level twice the risk-based screening level. Both of these chemicals were detected in well LL1wp-068.

5.5.4 Load Line 2 and Dilution/Settling Pond

Tables 5.13, 5.14, and 5.15 show the results of soil, sediment, and groundwater sampling at Load Line 2.

- As with Load line 1, several explosives, metals, pesticides/PCBs, and PAHs exceed the risk screening levels. Explosives concentrations in soils are even higher than at Load Line 1, with a TNT detection that is almost 10,000 times greater than the residential screening level.
- Pesticides and PAHs are present at low levels. Because of the potency of these chemicals, low levels may be a risk concern.
- Three metals, copper, silver, and zinc, were detected in sediments slightly above ecological screening levels. PAH concentrations in sediments exceed screening levels by an order of magnitude.
- DNT was detected in groundwater at this site (Table 5.15), the only detection of any explosive in groundwater during Phase I sampling. Although the detection was low, 0.3 $\mu\text{g/L}$, it is above the DNT groundwater screening level. DNT is a relatively potent carcinogen, hence, the low-risk-based screening levels.

5.5.5 Load Line 3 and Dilution/Settling Pond

Tables 5.16 and 5.17 provide the results of the soils and sediment screening for Load Line 3.

- The highest concentration of TNT in soil was detected at Load Line 3 with 390,000 mg/kg. This value is almost 100,000 times greater than the residential soil screening value.
- The maximum detected lead soil concentration was 2,620 mg/kg. The residential screening level is 400 mg/kg; the industrial screening value is 1,200 mg/kg.
- Low levels of pesticides/PCBs and semivolatiles were detected in the soils. Although the detections were low, some hits exceeded screening levels.
- TNT was detected in sediments in six of nine samples. No sediment criteria were available for the risk comparison. The maximum detected concentration of 4.6 mg/kg is less than the residential screening value for TNT in soil.
- Silver and zinc detections in sediments exceeded ecological screening criteria. These exceedances may represent a systematic problem with the screening values themselves, e.g., the screening value for silver (1.8 to 2.2 mg/kg) is within the range of silver in background soils.
- No other organics were detected in the sediment above screening values.

5.5.6 Load Line 4 and Dilution/Settling Pond

Tables 5.18, 5.19, and 5.20 present the results of the risk evaluation of Load Line 4 soils, sediments, and groundwater, respectively.

- Load Line 4 differs from the other load lines in that soil concentrations of explosives are relatively low. The highest TNT detection was 2.2 mg/kg, which is slightly above the screening level. Beryllium and thallium, as well as a few pesticides and PAHs, exceeded soils screening levels. Most of the exceedances are no more than 2 times the screening value.
- No chemicals exceeded sediments screening values at Load Line 4.
- The only chemical detected above groundwater screening levels at Load Line 4 is manganese. Two samples indicated concentrations above the risk-based screening level of 1.7 mg/L. Since manganese was not identified as a COPC in soils, it is uncertain whether the groundwater detections reflect naturally-occurring concentrations or contamination.

5.5.7 Load Line 12 and Dilution/Settling Pond

The risk evaluation of Load Line 12 soils and sediments is presented in Tables 5.21 and 5.22.

- As with the other load lines, several explosives are present in soils at levels that greatly exceed screening levels. The maximum TNT concentration is 19,000 mg/kg. Cadmium, lead, and several other metals are present at levels above screening levels.
- Low levels of pesticides/PCB and semivolatiles were detected in soils, some of which exceed the screening value. Most of these values are so low (≥ 1 mg/kg) that they would not indicate the need for aggressive action.

5.5.8 Building 1200

The risk evaluation on soils and sediments near Building 1200 is presented in **Tables 5.23 and 5.24**.

- Two metals, beryllium and thallium, and several PAHs exceeded the soil screening levels for residential land use.
- No explosives were detected in soils above soil screening levels in this area.
- Although low levels of explosives were detected in downgradient sediments at the site, no chemicals were identified as COPCs.

5.5.9 Landfill North of Winklepeck Burning Grounds

Risk screening results for soils and sediments at the site are presented in **Tables 5.25 and 5.26**. There does not appear to be a risk associated with either soils or sediments at the Landfill North of Winklepeck Burning Grounds. A single detection of beryllium was slightly above the screening level; however, the beryllium screens are extremely conservative.

A single chemical, nickel, was detected in groundwater above the State of Ohio MCLs (**Table 5.27**); however, the maximum detected value, 110 $\mu\text{g/L}$, is within the range of analytical noise of the 100 $\mu\text{g/L}$ screening level.

5.5.10 Upper and Lower Cobbs Pond

Sediment and groundwater risk evaluation results are presented in **Tables 5.28 and 5.29**, respectively, for Upper and Lower Cobbs Pond.

- Two metals were detected in sediments at concentrations above screening levels: chromium and copper. These hits were from samples in the center of the ponds. Nitrobenzene was detected in one sediment sample. No sediment screening level exists for this chemical. The hit was below soil screening values for nitrobenzene. No other organics were detected above screening levels in pond sediments.
- Manganese was the only detected chemical exceeding a groundwater screening level. This sample was collected from well CPCwp-013 near the stream leaving Lower Cobbs Pond. This was the same location that elevated manganese was detected in stream sediments.

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Table 5.1. Explosives Detection Limits for Soils Analysis

Analyte	Minimum Detection Limit (mg/kg)	Maximum Detection Limit (mg/kg)	Soil Screening Levels (mg/kg)	
			Residential	Industrial
1,3,5-Trinitrobenzene	0.13	2.85	0.33	3
1,3-Dinitrobenzene	0.13	625	0.65	7
2,4,6-Trinitrotoluene	0.13	0.13	1.5	6
2,4-Dinitrotoluene	0.13	625	13	136
2,6-Dinitrotoluene	0.13	650	7	68
2-Nitrotoluene	0.13	625	65	681
3-Nitrotoluene	0.13	625	65	681
4-Nitrotoluene	0.13	625	65	681
HMX	1.00	5,000	326	3,406
Nitrobenzene	0.13	650	2	9
RDX	0.50	2,500	0.4	2
Tetryl	0.33	1,625	65	681

Table 5.2. Soil Screening Levels

Parameters	EPA Region IX PRGs (mg/kg)		Soil Screening Guidance (mg/kg)
	Residential	Industrial	Leaching to GW
Ravenna Explosives			
1,3,5-Trinitrobenzene	0.33	3	.
1,3-Dinitrobenzene	0.65	7	.
2,4,6-Trinitrotoluene	1.5	6	.
2,4-Dinitrotoluene	13	136	0.000004
2,6-Dinitrotoluene	7	68	0.000003
2-Nitrotoluene	65	681	.
3-Nitrotoluene	65	681	.
4-Nitrotoluene	65	681	.
HMX	326	3406	.
Nitrobenzene	2	9	0.0007
RDX	0.40	2	.
Tetryl	65	681	.
Ravenna Metals			
Aluminum	7667	10000	.
Antimony	3	68	0.03
Arsenic	0.04	0.24	0.1
Barium	527	10000	8.2
Beryllium	0.014	0.11	0.3
Cadmium	4	85	0.04
Calcium	.	.	.
Chromium	3	6	0.2
Cobalt	457	9704	.
Copper	285	6326	.
Cyanide	130	1363	0.2
Iron	.	.	.
Lead	40	100	.
Magnesium	.	.	.
Manganese	318	4310	.
Mercury	0.65	7	.
Nickel	.	1108	.
Potassium	.	.	.
Selenium	38	852	0.03
Silver	38	852	0.2
Sodium	.	.	.
Thallium	0.61	14	0.04

Table 5.2 (continued)

Parameters	EPA Region IX PRGs (mg/kg)		Soil Screening Guidance (mg/kg)
	Residential	Industrial	Leaching to GW
Vanadium	54	1192	30
Zinc	2300	10000	62
Ravenna Organics			
1,1,1-Trichloroethane	122	300	0.01
1,1,2,2-Tetrachloroethane	0.04	0.11	0.00002
1,1,2-Trichloroethane	0.07	0.15	0.00009
1,1-Dichloroethane	50	173	0.1
1,1-Dichloroethene	0.004	0.008	0.0003
1,2,4-Trichlorobenzene	57	550	0.03
1,2-Dichlorobenzene	70	70	0.09
1,2-Dichloroethane	0.03	0.06	0.0001
1,2-Dichloropropane	0.03	0.07	0.0001
1,2-cis-Dichloroethene	3	10	0.002
1,2-trans-Dichloroethene	8	27	0.003
1,3-Dichlorobenzene	50	86	.
1,3-cis-Dichloropropene	.	.	.
1,3-trans-Dichloropropene	.	.	.
1,4-Dichlorobenzene	0.36	0.85	0.01
2,2'-oxybis (1-chloropropane)	.	.	.
2,4,5-Trichlorophenol	652	6813	1.4
2,4,6-Trichlorophenol	4	17	0.0008
2,4-Dichlorophenol	20	204	0.005
2,4-Dimethylphenol	130	1363	0.04
2,4-Dinitrophenol	13	136	0.001
2-Butanone	710	2652	.
2-Chloronaphthalene	11	11	.
2-Chlorophenol	9	37	0.02
2-Hexanone	.	.	.
2-Methylnaphthalene	.	.	.
2-Methylphenol	326	3406	0.08
2-Nitroaniline	0.39	4	.
2-Nitrophenol	.	.	.
3,3'-Dichlorobenzidine	0.099	0.42	0.00003
3-Nitroaniline	.	.	.
4,4'-DDD	0.19	0.79	0.08
4,4'-DDE	0.13	0.56	0.3
4,4'-DDT	0.13	0.56	0.2

Table 5.2 (continued)

Parameters	EPA Region IX PRGs (mg/kg)		Soil Screening Guidance (mg/kg)
	Residential	Industrial	Leaching to GW
4,6-Dinitro-o-Cresol	.	.	.
4-Bromophenyl-phenyl Ether	.	.	.
4-Chloroaniline	26	273	0.003
4-Chlorophenyl-phenylether	.	.	.
4-Methyl-2-pentanone	.	.	.
4-Methylphenol	33	341	.
4-Nitroaniline	.	.	.
4-Nitrophenol	.	.	.
4-chloro-3-methylphenol	.	.	.
Acenaphthene	11	11	2.9
Acenaphthylene	.	.	.
Acetone	209	875	0.08
Aldrin	0.003	0.011	59
Alpha Chlordane	0.03	0.15	0.05
Alpha-BHC	.	.	.
Anthracene	0.57	0.57	59
Aroclor-1254	0.14	2	.
Aroclor-1260	0.14	2	.
Benzene	0.06	0.14	0.0002
Benzo(a)anthracene	0.06	0.26	0.008
Benzo(a)pyrene	0.006	0.026	0.04
Benzo(b)fluoranthene	0.06	0.26	0.02
Benzo(g,h,i)perylene	.	.	.
Benzo(k)fluoranthene	0.61	3	0.2
Beta-BHC	.	.	.
Bis(2-chloroethoxy)methane	.	.	.
Bis(2-chloroethyl)ether	0.004	0.010	0.000002
Bis(2-ethylhexyl)phthalate	3	14	.
Bromodichloromethane	0.06	0.14	0.003
Bromoform	6	24	0.004
Bromomethane	0.68	2	0.001
Butyl Benzyl Phthalate	93	93	81
Carbazole	2	10	0.003
Carbon Disulfide	0.75	2	0.2
Carbon Tetrachloride	0.02	0.05	0.0003
Chlorobenzene	6	22	0.007
Chloroethane	.	.	.

Table 5.2 (continued)

Parameters	EPA Region IX PRGs (mg/kg)		Soil Screening Guidance (mg/kg)
	Residential	Industrial	Leaching to GW
Chloroform	0.02	0.05	0.003
Chloromethane	0.12	0.26	.
Chrysene	0.72	0.72	0.8
Delta-BHC	.	.	.
Di-n-butyl Phthalate	.	.	.
Di-n-octyl Phthalate	130	1000	1000
Dibenzo(a,h)anthracene	0.006	0.026	0.008
Dibenzofuran	14	14	.
Dibromochloromethane	1	2	0.002
Dieldrin	0.003	0.012	0.00002
Diethyl Phthalate	5214	10000	.
Dimethyl Phthalate	10000	10000	.
Endosulfan I	39	409	0.09
Endosulfan II	39	409	0.09
Endosulfan Sulfate	.	.	.
Endrin	2	20	0.005
Endrin Aldehyde	.	.	.
Endrin Ketone	.	.	.
Ethylbenzene	23	23	0.07
Fluoranthene	261	2725	21
Fluorene	9	9	2.8
Gamma Chlordane	0.03	0.15	0.05
Gamma-BHC (Lindane)	.	.	.
Heptachlor	0.01	0.04	0.1
Heptachlor Epoxide	0.005	0.02	0.003
Hexachlorobenzene	0.03	0.12	0.01
Hexachlorobutadiene	0.57	2	0.01
Hexachlorocyclopentadiene	45	461	2
Hexachloroethane	3	14	0.002
Indeno(1,2,3-cd)pyrene	0.06	0.26	0.07
Isophorone	47	201	0.003
Methoxychlor	33	341	0.8
Methylene Chloride	0.78	2	0.0001
N-Nitroso-di-n-propylamine	0.006	0.03	0
N-Nitrosodiphenylamine	9	39	0.006
Naphthalene	24	24	0.4
Pentachlorophenol	0.25	0.79	0.0001

Table 5.2 (continued)

Parameters	EPA Region IX PRGs (mg/kg)		Soil Screening Guidance (mg/kg)
	Residential	Industrial	Leaching to GW
Phenanthrene	.	.	.
Phenol	3911	10000	0.5
Pyrene	10	10	21
Styrene	68	68	0.02
Tetrachloroethene	0.54	2	0.0003
Toluene	79	88	0.06
Toxaphene	0.04	0.17	0.2
Trichloroethene	0.32	0.70	0.0003
Vinyl Chloride	0.002	0.003	0.00007
Xylenes, Total	32	32	1
o-Xylene	32	32	0.9

^a Region IX 1997

^b EPA 1996

Table 5.3. Groundwater Screening Levels

Analyte	Groundwater Screening Levels				Selected Screening Level (mg/L) ^e
	Ohio State MCLs (mg/L) ^a	Federal MCLs (mg/L) ^b	Risk-based Levels (mg/L) ^c	Target Effect ^d	
<i>Explosives</i>					
2,4-Dinitrotoluene	--	--	0.00013	ILCR	0.00013
<i>Inorganics</i>					
Aluminum	--	--	--	--	--
Antimony	0.006	0.006	0.015	HI	0.006
Arsenic	0.05	0.05	0.015	HI	0.05
Barium	2	2	2.6	HI	2
Beryllium	0.004	0.004	0.18	ILCR	0.004
Calcium	--	--	--	--	--
Cobalt	--	--	--	--	--
Copper	--	1.3	--	--	1.3
Iron	--	--	--	--	--
Lead	--	0.015	--	--	0.015
Magnesium	--	--	--	--	--
Manganese	--	--	1.7	HI	1.7
Mercury	0.002	0.002	0.011	HI	0.002
Nickel	0.1	0.1	0.73	HI	0.1
Potassium	--	--	--	--	--
Sodium	--	--	--	--	--
Thallium	0.002	0.002	0.0029	HI	0.002
Vanadium	--	--	0.26	HI	0.26
Zinc	--	--	11	HI	11

Table 5.3 (continued)

Analyte	Groundwater Screening Levels				Selected Screening Level (mg/L) ^e
	Ohio State MCLs (mg/L) ^a	Federal MCLs (mg/L) ^b	Risk-based Levels (mg/L) ^c	Target Effect ^d	
<i>Organics</i>					
Acetone	--	--	3.7	HI	3.7
Bis(2-ethylhexyl)phthalate	.006	--	0.0061	ILCR	0.0061
4-Chloro-3-methylphenol	--	--	--	--	--
Diethyl phthalate	--	--	29	HI	29
2,4-Dimethylphenol	--	--	0.73	HI	0.73
Fluoranthene	--	--	0.38	HI	0.38
Heptachlor	.0004	0.0004	0.000019	ILCR	0.0004
Heptachlor epoxide	.0002	0.0002	0.0000094	ILCR	0.0002
Methylene chloride	.005	--	0.011	ILCR	0.011

^a State of Ohio Maximum Contaminant Levels.

^b Federal Maximum Contaminant Levels, Safe Drinking Water Act, 40 CFR 141.

^c Region IX 1997.

^d ILCR signifies values representing a cancer-based screening level; HI signifies a screening level based on preventing toxic effects.

^e The priority used for selecting the action level for the groundwater screen was (1) Ohio MCL, (2) federal MCL, and (3) risk-based value.

Table 5.4. Sediment Screening Levels

Analyte	Region IV Sediment Criteria (mg/kg) ^a	Ecological Benchmark (mg/kg) ^b
<i>Explosives</i>		
1,3,5-Trinitrobenzene		--
2,4,6-Trinitrotoluene		--
HMX		--
RDX		--
<i>Inorganics</i>		
Aluminum		--
Antimony	24	--
Arsenic	85	42
Barium		--
Beryllium		--
Cadmium	9	4.2
Calcium		--
Chromium	145	160
Cobalt		--
Copper	390	110
Cyanide		--
Iron		--
Lead	110	110
Magnesium		--
Manganese		--
Mercury	1.3	0.7
Nickel	50	43
Nitrobenzene		--
Potassium		--
Selenium		--
Silver	2.2	1.8
Sodium		--
Thallium		--
Vanadium		--
Zinc	270	270

Table 5.4 (continued)

Analyte	Region IV Sediment Criteria (mg/kg) ^a	Ecological Benchmark (mg/kg) ^b
<i>Organics</i>		
Acetone		0.0091
Benzo(a)anthracene	1.6	0.69
Benzo(a)pyrene	2.5	0.76
Benzo(b)fluoranthene	2.5	--
Benzo(g,h,i)perylene	2.5	--
Benzo(k)fluoranthene	2.5	--
Chloroform		0.96
Chrysene	2.8	0.85
Fluoranthene	3.6	1.5
Indeno(1,2,3-cd)pyrene	2.5	--
Methylene Chloride		18
Pyrene	2.2	1.4
4,4'-DDD	0.02	0.0078
4,4'-DDE	0.015	0.027
4,4'-DDT	0.007	0.052
Endrin	0.045	0.045
Endrin aldehyde	--	--
Gamma chlordane	0.006	0.0048
Alpha chlordane	--	0.0048
Phenanthrene	1.38	0.54
Dibenzo(a,h)anthracene	0.26	0.14
Toluene	--	0.05
Bis(2-ethylhexyl)phthalate	--	2.7
Heptachlor	--	13
Aroclor-1254	0.4	72
N-nitrosodiphenylamine	--	--
2-Butanone	--	0.27
Carbon disulfide	--	0.0009
Chloroform	--	0.96
Carbazole	--	--
Di-n-butyl phthalate	--	0.24
2-Methylnaphthalene	0.67	--

^a EPA Region IV 1992.^b Efroymsen 1996.

Table 5.5. Chemicals of Potential Concern at RVAAP

Area of Concern	Soil COPCs ^a	Sediment COPCs ^b	Groundwater COPCs
Building 1200	Beryllium, B(a)P	—	NS ^c
Demolition Area #2	Arsenic, beryllium, lead, DNT	—	NS
Landfill North of Winklepeck Burning Grounds	Beryllium	—	Nickel
Load Line 1	TNT, DNT, TNB, RDX, arsenic, barium, beryllium, cadmium, chromium, lead, thallium, vanadium, PCBs, dieldrin, PAHs	Antimony, cadmium, chromium, copper, lead, mercury, nickel, silver, zinc; pesticides, PCB, PAHs	Arsenic, manganese
Load Line 2	TNT, TNB, RDX, beryllium, cadmium, lead, thallium, chlordane, PCBs, PAHs	Silver, zinc, PAHs	2,4-DNT
Load Line 3	TNT, TNB, arsenic, beryllium, lead, thallium, vanadium, heptachlor, chlordane, PCBs, PAHs	Silver, zinc, DDT,	NS
Load Line 4	Beryllium, thallium, aldrin, PCBs, PAHs	—	Manganese
Load Line 12	TNT, DNT, RDX, beryllium, lead, PCBs, PAHs	Arsenic, copper, nickel, silver, zinc	^d
Upper and Lower Cobbs Pond	NS	Chromium, copper	Manganese
Winklepeck Burning Grounds	TNB, TNT, RDX, arsenic, barium, beryllium, cadmium, lead	—	NS

^a Chemicals exceeding Ohio, federal, or risk-based soil screening levels for residential exposures are identified as COPCs. Chemicals that exceeded screening levels based on leaching to groundwater are summarized in Tables 5.6 through 5.29. The following COPCs were identified above the soil screening levels; however, screening values may be within the range of naturally-occurring levels: arsenic, beryllium, and thallium.

^b Chemicals detected above the EPA Region IV benchmarks are identified as COPCs for sediment. Silver was identified above sediment screening levels; however, the silver screening value may be within the range of naturally-occurring background levels.

^c Not sampled.

^d One sample was collected and analyzed for volatile organics.

Table 5.6. Demolition Area #2 (Surface and Subsurface Soil)
(concentrations in mg/kg)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
<i>SURFACE SOIL</i>							
2,4,6-Trinitrotoluene	0.54	4.4	1.5	6	.	Yes	Max Detect > = A
Tetryl	3.5	3.5	65	681	.	No	Max Detect < A B
Aluminum	7730	19900	7667	10000	.	Yes	Max Detect > = AB
Arsenic	11.1	25.7	0.04	0.24	0.1	Yes	Max Detect > = ABC
Barium	27.1	266	527	10000	8.2	No	Max Detect < A B
Beryllium	0.51	0.51	0.014	0.11	0.3	Yes	Max Detect > = ABC
Cadmium	0.13	3.1	4	85	0.04	No	Max Detect < A B
Chromium	9.7	25.8	3	6	0.2	Yes	Max Detect > = ABC
Cobalt	9.8	9.8	457	9704	.	No	Max Detect < A B
Copper	67.4	67.4	285	6326	.	No	Max Detect < A B
Iron	23500	23500	.	.	.	No	Max Detect < A B
Lead	12.2	1900	40	100	.	Yes	Max Detect > = AB
Manganese	188	1120	318	4310	.	Yes	Max Detect > = A
Mercury	0.04	0.28	0.65	7	.	No	Max Detect < A B
Nickel	22	22	.	1108	.	No	Max Detect < A B
Thallium	1.1	1.1	0.61	14	0.04	Yes	Max Detect > = A C
Vanadium	14	14	54	1192	30	No	Max Detect < A B
Zinc	57.9	375	2300	10000	62	No	Max Detect < A B
<i>SUBSURFACE SOIL</i>							
2,4,6-Trinitrotoluene	0.42	2.3	1.5	6	.	Yes	Max Detect > = A
2,4-Dinitrotoluene	2.6	2.6	13	136	0.000004	No	Max Detect < A B
Tetryl	0.42	4.3	65	681	.	No	Max Detect < A B
Arsenic	10.7	30.8	0.04	0.24	0.1	Yes	Max Detect > = ABC

Table 5.6 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
Barium	29.9	593	527	10000	8.2	Yes	Max Detect > = A C
Beryllium	0.71	0.83	0.014	0.11	0.3	Yes	Max Detect > = ABC
Cadmium	0.11	2.9	4	85	0.04	No	Max Detect < A B
Chromium	10	21.9	3	6	0.2	Yes	Max Detect > = ABC
Cobalt	10.7	12.4	457	9704	.	No	Max Detect < A B
Copper	20.6	23.3	285	6326	.	No	Max Detect < A B
Iron	24600	25900	.	.	.	No	Max Detect < A B
Lead	9.6	87.2	40	100	.	Yes	Max Detect > = A
Manganese	132	1080	318	4310	.	Yes	Max Detect > = A
Mercury	0.04	1	0.65	7	.	Yes	Max Detect > = A
Nickel	21.8	29.7	.	1108	.	No	Max Detect < A B
Thallium	0.82	1.2	0.61	14	0.04	Yes	Max Detect > = A C
Vanadium	17.5	20.5	54	1192	30	No	Max Detect < A B
Zinc	45.8	235	2300	10000	62	No	Max Detect < A B
Bis(2-ethylhexyl)phthalate	0.05	0.05	3	14	.	No	Max Detect < A B
Methylene Chloride	0.006	0.006	0.78	2	0.0001	No	Max Detect < A B
Toluene	0.17	0.17	79	88	0.06	No	Max Detect < A B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) Leaching values reflect EPA soil screening levels (EPA 1996).

(D) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(E) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > the soil screening level for leaching to groundwater.

Table 5.7. Demolition Area #2 (Sediment)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
SEDIMENT						
Cyanide	0.15	0.15	.	.	No	Max Detect < All Screens
Cobalt	2	2	.	.	No	Max Detect < All Screens
Copper	3.6	3.6	390	110	No	Max Detect < All Screens
Iron	4730	4730	.	.	No	Max Detect < All Screens
Nickel	4	4	50	43	No	Max Detect < All Screens
Thallium	0.4	0.4	.	.	No	Max Detect < All Screens
Vanadium	2.6	2.6	.	.	No	Max Detect < All Screens
Chloroform	0.002	0.002	.	0.96	No	Max Detect < All Screens

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(D) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.8. Winklepock Burning Grounds (Surface Soil)
(concentrations in mg/kg)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
SURFACE SOIL							
Cyanide	0.23	0.59	130	1363	0.2	No	Max Detect < A B
1,3,5-Trinitrobenzene	0.49	490	0.33	3	.	Yes	Max Detect > = AB
2,4,6-Trinitrotoluene	0.23	3800	1.5	6	.	Yes	Max Detect > = AB
2,4-Dinitrotoluene	0.31	0.31	13	136	0.000004	No	Max Detect < A B
HMX	1.9	1700	326	3406	.	Yes	Max Detect > = A
RDX	6.5	9500	0.40	2	.	Yes	Max Detect > = AB
Aluminum	1410	30400	7667	10000	.	Yes	Max Detect > = AB
Antimony	2.6	2.6	3	68	0.03	No	Max Detect < A B
Arsenic	2.5	21.6	0.04	0.24	0.1	Yes	Max Detect > = ABC
Barium	11.7	7780	527	10000	8.2	Yes	Max Detect > = A C
Beryllium	0.47	2.6	0.014	0.11	0.3	Yes	Max Detect > = ABC
Cadmium	0.06	877	4	85	0.04	Yes	Max Detect > = ABC
Chromium	5.4	118	3	6	0.2	Yes	Max Detect > = ABC
Cobalt	4.6	8.9	457	9704	.	No	Max Detect < A B
Copper	9.3	29.3	285	6326	.	No	Max Detect < A B
Iron	12800	27300	.	.	.	No	Max Detect < A B
Lead	10.2	916	40	100	.	Yes	Max Detect > = AB
Manganese	65.4	3910	318	4310	.	Yes	Max Detect > = A
Mercury	0.03	0.28	0.65	7	.	No	Max Detect < A B
Nickel	7.4	18.5	.	1108	.	No	Max Detect < A B
Silver	0.22	6.4	38	852	0.2	No	Max Detect < A B
Thallium	1.4	3.1	0.61	14	0.04	Yes	Max Detect > = A C
Vanadium	12.7	19.6	54	1192	30	No	Max Detect < A B

Table 5.8 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
Zinc	28.6	1050	2300	10000	62	No	Max Detect < A B
2-Methylnaphthalene	0.08	0.08	.	.	.	No	Max Detect < A B
Bis(2-ethylhexyl)phthalate	0.034	0.034	3	14	.	No	Max Detect < A B
Di-n-butyl phthalate	0.053	0.053	.	.	.	No	Max Detect < A B
Fluoranthene	0.04	0.04	261	2725	21	No	Max Detect < A B
Naphthalene	0.076	0.076	24	24	0.4	No	Max Detect < A B
Phenanthrene	0.07	0.07	.	.	.	No	Max Detect < A B
Pyrene	0.036	0.036	10	10	21	No	Max Detect < A B
Chloroform	0.002	0.002	0.02	0.05	0.003	No	Max Detect < A B
Methylene Chloride	0.012	0.012	0.78	2	0.0001	No	Max Detect < A B
Toluene	0.017	0.17	79	88	0.06	No	Max Detect < A B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) Leaching values reflect EPA soil screening levels (EPA 1996).

(D) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(E) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen,

C = site value > soil screening level for leaching to groundwater.

Table 5.9. Winklepeck Burning Grounds (Sediment)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
SEDIMENT						
Cyanide	0.11	0.11	.	.	No	Max Detect < All Screens
2,4,6-Trinitrotoluene	0.36	0.97	.	.	No	Max Detect < All Screens
Aluminum	4740	16100	.	.	No	Max Detect < All Screens
Antimony	0.32	0.32	25	.	No	Max Detect < All Screens
Barium	36.8	528	.	.	No	Max Detect < All Screens
Beryllium	0.45	0.6	.	.	No	Max Detect < All Screens
Cadmium	0.06	0.56	9	4.2	No	Max Detect < All Screens
Cobalt	8.6	10.4	.	.	No	Max Detect < All Screens
Copper	18.6	18.8	390	110	No	Max Detect < All Screens
Iron	18200	24000	.	.	No	Max Detect < All Screens
Lead	10.2	27.3	110	110	No	Max Detect < All Screens
Manganese	183	1050	.	.	No	Max Detect < All Screens
Nickel	15.9	28.3	50	43	No	Max Detect < All Screens
Thallium	1.5	1.8	.	.	No	Max Detect < All Screens
Vanadium	13	15.9	.	.	No	Max Detect < All Screens
Zinc	38.3	155	270	270	No	Max Detect < All Screens

Table 5.9 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Chloroform	0.002	0.002	.	0.96	No	Max Detect < All Screens
Toluene	0.025	0.025	.	0.05	No	Max Detect < All Screens

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(D) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.10. Load Line 1 (Surface Soil)
(concentrations in mg/kg)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching(C)	COPC (D)	Justification (E)
<i>SURFACE SOIL</i>							
Cyanide	0.11	112	130	1363	0.2	No	Max Detect < A B
1,3,5-Trinitrobenzene	0.55	110	0.33	3	.	Yes	Max Detect > = AB
2,4,6-Trinitrotoluene	0.26	5800	1.5	6	.	Yes	Max Detect > = AB
2,4-Dinitrotoluene	0.1	1.5	13	136	0.000004	No	Max Detect < A B
HMX	2.6	9.1	326	3406	.	No	Max Detect < A B
RDX	1.8	49	0.40	2	.	Yes	Max Detect > = AB
Aluminum	1860	47600	7667	10000	.	Yes	Max Detect > = AB
Antimony	0.45	8.8	3	68	0.03	Yes	Max Detect > = A C
Arsenic	4.5	77	0.04	0.24	0.1	Yes	Max Detect > = ABC
Barium	22.2	1380	527	10000	8.2	Yes	Max Detect > = A C
Beryllium	0.2	2.5	0.014	0.11	0.3	Yes	Max Detect > = ABC
Cadmium	0.15	23.5	4	85	0.04	Yes	Max Detect > = A C
Chromium	4.8	394	3	6	0.2	Yes	Max Detect > = ABC
Cobalt	3.9	33.7	457	9704	.	No	Max Detect < A B
Copper	11.3	110	285	6326	.	No	Max Detect < A B
Iron	13500	75600	.	.	.	No	Max Detect < A B
Lead	10.8	3610	40	100	.	Yes	Max Detect > = AB
Manganese	113	2140	318	4310	.	Yes	Max Detect > = A
Mercury	0.03	1.4	0.65	7	.	Yes	Max Detect > = A
Nickel	9.4	45.8	.	1108	.	No	Max Detect < A B
Selenium	0.32	4.3	38	852	0.03	No	Max Detect < A B
Thallium	0.84	7.9	0.61	14	0.04	Yes	Max Detect > = A C
Vanadium	5.5	92.9	54	1192	30	Yes	Max Detect > = A C

Table 5.10 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching(C)	COPC (D)	Justification (E)
Zinc	34.1	1560	2300	10000	62	No	Max Detect < A B
4,4'-DDD	0.042	0.25	0.19	0.79	0.08	Yes	Max Detect > = A C
4,4'-DDE	0.0033	0.84	0.13	0.56	0.3	Yes	Max Detect > = ABC
4,4'-DDT	0.063	0.45	0.13	0.56	0.2	Yes	Max Detect > = A C
Aldrin	0.0025	0.0025	0.003	0.011	59	No	Max Detect < A B
Alpha Chlordane	0.019	0.14	0.03	0.15	0.05	Yes	Max Detect > = A C
Aroclor-1254	0.095	36	0.14	2	.	Yes	Max Detect > = AB
Aroclor-1260	0.68	0.68	0.14	2	.	Yes	Max Detect > = A
Dieldrin	0.17	0.17	0.003	0.012	0.00002	Yes	Max Detect > = ABC
Endosulfan I	0.04	0.04	39	409	0.09	No	Max Detect < A B
Endosulfan II	0.0087	0.0087	39	409	0.09	No	Max Detect < A B
Endrin	0.037	0.037	2	20	0.005	No	Max Detect < A B
Endrin aldehyde	0.0096	0.053	.	.	0.005	No	Max Detect < A B
Gamma chlordane	0.0019	0.25	0.03	0.15	0.05	Yes	Max Detect > = ABC
Heptachlor epoxide	0.0023	0.0023	0.005	0.02	0.003	No	Max Detect < A B
Anthracene	0.06	0.06	0.57	0.57	59	No	Max Detect < A B
Benzo(a)anthracene	0.077	0.33	0.06	0.26	0.008	Yes	Max Detect > = ABC
Benzo(a)pyrene	0.086	0.42	0.006	0.026	0.04	Yes	Max Detect > = ABC
Benzo(b)fluoranthene	0.1	0.4	0.06	0.26	0.02	Yes	Max Detect > = ABC
Benzo(g,h,i)perylene	0.074	0.53	.	.	.	No	Max Detect < A B
Benzo(k)fluoranthene	0.094	0.5	0.61	3	0.2	No	Max Detect < A B
Bis(2-ethylhexyl)phthalate	0.042	1.4	3	14	.	No	Max Detect < A B
Carbazole	0.036	0.036	2	10	0.003	No	Max Detect < A B
Chrysene	0.09	0.6	0.72	0.72	0.8	No	Max Detect < A B
Di-n-butyl phthalate	0.41	14	.	.	.	No	Max Detect < A B

Table 5.10 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching(C)	COPC (D)	Justification (E)
Dibenzo(a,h)anthracene	0.04	0.16	0.006	0.03	0.008	Yes	Max Detect > = ABC
Dimethyl phthalate	1.9	1.9	10000	10000	.	No	Max Detect < A B
Fluoranthene	0.12	1	261	2725	21	No	Max Detect < A B
Indeno(1,2,3-cd)pyrene	0.074	0.31	0.06	0.26	0.07	Yes	Max Detect > = ABC
N-Nitrosodiphenylamine	0.11	0.27	9	39	.	No	Max Detect < A B
Pentachlorophenol	3.9	3.9	0.25	0.79	0.0001	Yes	Max Detect > = ABC
Phenanthrene	0.067	0.5	.	.	.	No	Max Detect < A B
Pyrene	0.11	0.89	10	10	21	No	Max Detect < A B
Acetone	0.27	0.27	209	875	0.08	No	Max Detect < A B
Chloroform	0.002	0.002	0.02	0.05	0.003	No	Max Detect < A B
Toluene	0.006	0.031	79	88	0.06	No	Max Detect < A B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) Leaching values reflect EPA soil screening levels (EPA 1996).

(D) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(E) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.11. Load Line 1 (Sediment)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
SEDIMENT						
Cyanide	0.35	1.1	.	.	No	Max Detect < All Screens
1,3,5-Trinitrobenzene	0.38	6.8	.	.	No	Max Detect < All Screens
2,4,6-Trinitrotoluene	0.43	770	.	.	No	Max Detect < All Screens
HMX	2.8	12	.	.	No	Max Detect < All Screens
RDX	0.43	16	.	.	No	Max Detect < All Screens
Aluminum	3400	19900	.	.	No	Max Detect < All Screens
Antimony	15.3	2460	25	.	Yes	Max Detect > = A
Arsenic	6.9	67.1	85	42	NA	Max Detect > = B
Barium	38.5	269	.	.	No	Max Detect < All Screens
Beryllium	0.38	1.7	.	.	No	Max Detect < All Screens
Cadmium	0.21	26.9	9	4.2	Yes	Max Detect > = A B
Chromium	9.5	345	145	160	Yes	Max Detect > = A B
Cobalt	4.7	43.2	.	.	No	Max Detect < All Screens
Copper	9	558	390	110	Yes	Max Detect > = A B
Iron	9340	199000	.	.	No	Max Detect < All Screens
Lead	12.9	2220	110	110	Yes	Max Detect > = A B

Table 5.11 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Manganese	80.1	2340	.	.	No	Max Detect < All Screens
Mercury	0.05	1.4	1.3	0.7	Yes	Max Detect > = A B
Nickel	9.8	108	50	43	Yes	Max Detect > = A B
Selenium	0.43	10.3	.	.	No	Max Detect < All Screens
Silver	1.5	3.9	2.2	1.8	Yes	Max Detect > = A B
Thallium	0.8	8.1	.	.	No	Max Detect < All Screens
Vanadium	11.9	14.5	.	.	No	Max Detect < All Screens
Zinc	48.2	2530	270	270	Yes	Max Detect > = A B
4,4'-DDD	0.012	0.012	0.02	0.0078	NA	Max Detect > = B
4,4'-DDE	0.74	0.74	0.015	0.027	Yes	Max Detect > = A B
4,4'-DDT	0.44	0.44	0.007	0.052	Yes	Max Detect > = A B
Alpha chlordane	0.0099	0.0099	.	0.0048	NA	Max Detect > = B
Aroclor-1254	0.29	44	0.4	72	Yes	Max Detect > = A
Endrin	0.16	0.16	0.045	0.045	Yes	Max Detect > = A B
Endrin aldehyde	0.32	0.32	.	.	No	Max Detect < All Screens
Gamma chlordane	0.011	0.13	0.006	0.0048	Yes	Max Detect > = A B
Heptachlor	0.0034	0.0034	.	13	No	Max Detect < All Screens

Table 5.11 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Anthracene	0.26	0.26	0.96	0.25	NA	Max Detect > = B
Benzo(a)anthracene	0.26	0.86	1.6	0.69	NA	Max Detect > = B
Benzo(a)pyrene	0.35	1.3	2.5	0.76	NA	Max Detect > = B
Benzo(b)fluoranthene	0.6	3	2.5	.	Yes	Max Detect > = A
Benzo(g,h,i)perylene	0.46	1.4	2.5	.	No	Max Detect < All Screens
Benzo(k)fluoranthene	0.5	1.5	2.5	.	No	Max Detect < All Screens
Bis(2-ethylhexyl)phthalate	0.12	0.49	.	2.7	No	Max Detect < All Screens
Carbazole	0.24	0.24	.	.	No	Max Detect < All Screens
Chrysene	0.13	1.8	2.8	0.85	NA	Max Detect > = B
Di-n-butyl phthalate	0.87	0.87	.	0.24	NA	Max Detect > = B
Dibenzo(a,h)anthracene	0.18	0.56	0.26	0.14	Yes	Max Detect > = A B
Fluoranthene	0.51	2.1	3.6	1.5	NA	Max Detect > = B
Indeno(1,2,3-cd)pyrene	0.44	1.1	2.5	.	No	Max Detect < All Screens
Phenanthrene	0.19	0.38	1.38	0.54	No	Max Detect < All Screens
Pyrene	0.14	1.4	2.2	1.4	No	Max Detect < All Screens
Acetone	0.11	0.11	.	0.0091	NA	Max Detect > = B

Table 5.11 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Chloroform	0.004	0.004	.	0.96	No	Max Detect < All Screens

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(D) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.12. Load Line 1 (Groundwater)

Analyte	Minimum Detect ($\mu\text{g/L}$)	Maximum Detect ($\mu\text{g/L}$)	Ohio ($\mu\text{g/L}$) (A)	Federal ($\mu\text{g/L}$) (B)	Risk-based ($\mu\text{g/L}$) (C)	Selected Action Level ($\mu\text{g/L}$) (D)	Detects > Action Level
GROUNDWATER							
Cyanide	2.9	2.9	.	200	730	200	0/ 7
Aluminum	27.8	235	.	.	.	.
Arsenic	8.4	64.1	50	50	0.5	50	1/ 7
Barium	20.3	105	2000	2000	2600	2000	0/ 7
Beryllium	0.33	0.43	4	4	180	4	0/ 6
Calcium	4050	196000	.	.	.	.
Cobalt	1.4	27.5	.	.	.	.
Copper	0.93	7.4	.	1300	.	1300	0/ 6
Magnesium	2590	80700	.	.	.	.
Manganese	130	3120	.	.	1700	1700	1/ 7
Mercury	0.1	0.13	2	2	11	2	0/ 7
Nickel	1.6	73.2	100	100	730	100	0/ 6
Zinc	9.1	82.5	.	.	11000	11000	0/ 7
Heptachlor	0.05	0.05	.	0.4	0.019	0.4	0/ 6
2,4-Dimethylphenol	1	1	.	.	730	730	0/ 5
Diethyl phthalate	1	1	.	.	29000	29000	0/ 6

Table 5.12 (continued)

Analyte	Minimum Detect ($\mu\text{g/L}$)	Maximum Detect ($\mu\text{g/L}$)	Ohio ($\mu\text{g/L}$) (A)	Federal ($\mu\text{g/L}$) (B)	Risk-based ($\mu\text{g/L}$) (C)	Selected Action Level ($\mu\text{g/L}$) (D)	Detects > Action Level
Acetone	18	18	.	.	3700	3700	0/ 4
Methylene chloride	11	11	.	.	11	11	0/ 7

(A) Values represent State of Ohio MCL.

(B) Values represent federal MCL.

(C) Risk-based action level developed using RAGS Part B Guidance (EPA 1991)

(D) Action levels selected using the following logic: if available, use the Ohio MCL; otherwise, use the federal MCL. If no MCL exists, use the risk-based level.

Table 5.13. Load Line 2 (Surface Soil)
(concentrations in mg/kg)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
<i>SURFACE SOIL</i>							
Cyanide	0.1	5	130	1363	0.2	No	Max Detect < A B
1,3,5-Trinitrobenzene	0.32	160	0.33	3	.	Yes	Max Detect > = AB
2,4,6-Trinitrotoluene	0.24	12000	1.5	6	.	Yes	Max Detect > = AB
HMX	2.8	1500	326	3406	.	Yes	Max Detect > = A
RDX	0.4	9800	0.40	2	.	Yes	Max Detect > = AB
Antimony	0.33	1.2	3	68	0.03	No	Max Detect < A B
Barium	19.4	297	527	10000	8.2	No	Max Detect < A B
Beryllium	0.28	2.9	0.014	0.11	0.3	Yes	Max Detect > = ABC
Cadmium	0.05	22.7	4	85	0.04	Yes	Max Detect > = A C
Chromium	5.5	116	3	6	0.2	Yes	Max Detect > = ABC
Cobalt	3.3	17	457	9704	.	No	Max Detect < A B
Copper	11.7	53.4	285	6326	.	No	Max Detect < A B
Iron	12200	55500	.	.	.	No	Max Detect < A B
Lead	7	881	40	100	.	Yes	Max Detect > = AB
Manganese	146	4240	318	4310	.	Yes	Max Detect > = A
Nickel	7	41.9	.	1108	.	No	Max Detect < A B
Thallium	0.81	7.6	0.61	14	0.04	Yes	Max Detect > = A C
Vanadium	7.2	24.8	54	1192	30	No	Max Detect < A B
Zinc	29.8	892	2300	10000	62	No	Max Detect < A B
4,4'-DDD	0.012	0.012	0.19	0.79	0.08	No	Max Detect < A B
4,4'-DDE	0.0039	0.081	0.13	0.56	0.3	No	Max Detect < A B
4,4'-DDT	0.0062	0.17	0.13	0.56	0.2	Yes	Max Detect > = A
Aldrin	0.0022	0.024	0.003	0.011	59	Yes	Max Detect > = AB

Table 5.13 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
Alpha chlordane	0.57	0.57	0.03	0.15	0.05	Yes	Max Detect > = ABC
Aroclor-1254	0.15	2.5	0.14	2	.	Yes	Max Detect > = AB
Aroclor-1260	0.24	6	0.14	2	.	Yes	Max Detect > = AB
Delta-BHC	0.0022	0.0022	.	.	.	No	Max Detect < A B
Dieldrin	0.0031	0.027	0.003	0.012	0.00002	Yes	Max Detect > = ABC
Endrin	0.0056	0.0056	2	20	0.005	No	Max Detect < A B
Endrin aldehyde	0.015	0.12	.	.	0.005	No	Max Detect < A B
Gamma chlordane	0.0056	0.0075	0.03	0.15	0.05	No	Max Detect < A B
Gamma-BHC (lindane)	0.0048	0.0048	.	.	.	No	Max Detect < A B
Heptachlor epoxide	0.0042	0.0042	0.005	0.021	0.003	No	Max Detect < A B
2-Methylnaphthalene	0.12	0.12	.	.	.	No	Max Detect < A B
Acenaphthene	0.74	0.74	11	11	2.9	No	Max Detect < A B
Anthracene	1.9	1.9	0.57	0.57	59	Yes	Max Detect > = AB
Benzo(a)anthracene	0.052	2.9	0.06	0.26	0.008	Yes	Max Detect > = ABC
Benzo(a)pyrene	0.059	2.3	0.006	0.026	0.04	Yes	Max Detect > = ABC
Benzo(b)fluoranthene	0.043	0.17	0.06	0.26	0.02	Yes	Max Detect > = A C
Benzo(g,h,i)perylene	0.038	1.1	.	.	.	No	Max Detect < A B
Benzo(k)fluoranthene	0.054	3.2	0.61	3	0.2	Yes	Max Detect > = ABC
Bis(2-ethylhexyl)phthalate	0.086	0.19	3	14	.	No	Max Detect < A B
Butyl Benzyl Phthalate	0.084	0.81	93	93	81	No	Max Detect < A B
Carbazole	1.2	1.2	2	10	0.003	No	Max Detect < A B
Chrysene	0.06	2.7	0.72	0.72	0.8	Yes	Max Detect > = ABC
Di-n-butyl phthalate	0.068	0.11	.	.	.	No	Max Detect < A B
Dibenzo(a,h)anthracene	0.048	0.72	0.006	0.03	0.008	Yes	Max Detect > = ABC
Dibenzofuran	0.54	0.54	14	14	.	No	Max Detect < A B

Table 5.13 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
Fluoranthene	0.039	7.7	261	2725	21	No	Max Detect < A B
Fluorene	0.91	0.91	9	9	2.8	No	Max Detect < A B
Indeno(1,2,3-cd)pyrene	0.049	1.3	0.06	0.26	0.07	Yes	Max Detect > = ABC
Naphthalene	0.27	0.27	24	24	0.4	No	Max Detect < A B
Phenanthrene	0.056	6.4	.	.	.	No	Max Detect < A B
Pyrene	0.07	5	10	10	21	No	Max Detect < A B
Chloroform	0.002	0.003	0.02	0.05	0.003	No	Max Detect < A B
Methylene Chloride	0.006	0.006	0.78	2	0.0001	No	Max Detect < A B
Toluene	0.005	0.005	79	88	0.06	No	Max Detect < A B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) Leaching values reflect EPA soil screening levels (EPA 1996).

(D) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(E) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.14. Load Line 2 (Sediment)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
SEDIMENT						
2,4,6-Trinitrotoluene	0.35	0.86	.	.	No	Max Detect < All Screens
Aluminum	3160	18000	.	.	No	Max Detect < All Screens
Antimony	10.2	10.2	25	.	No	Max Detect < All Screens
Arsenic	3.5	19.8	85	42	No	Max Detect < All Screens
Barium	32.4	178	.	.	No	Max Detect < All Screens
Beryllium	0.32	1.2	.	.	No	Max Detect < All Screens
Cadmium	0.26	0.99	9	4.2	No	Max Detect < All Screens
Chromium	6.2	129	145	160	No	Max Detect < All Screens
Cobalt	3.7	12.2	.	.	No	Max Detect < All Screens
Copper	21.6	167	390	110	NA	Max Detect > = B
Iron	19800	38800	.	.	No	Max Detect < All Screens
Lead	8.8	85.1	110	110	No	Max Detect < All Screens
Manganese	74	877	.	.	No	Max Detect < All Screens
Mercury	0.05	0.09	1.3	0.7	No	Max Detect < All Screens
Nickel	12.1	36	50	43	No	Max Detect < All Screens
Silver	23.1	23.1	2.2	1.8	Yes	Max Detect > = A B

Table 5.14 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Thallium	1	4.2	.	.	No	Max Detect < All Screens
Vanadium	9.3	20.1	.	.	No	Max Detect < All Screens
Zinc	35.1	299	270	270	Yes	Max Detect > = A B
Endrin	0.022	0.022	0.045	0.045	No	Max Detect < All Screens
2-Methylnaphthalene	0.17	0.17	0.67	.	No	Max Detect < All Screens
Acenaphthene	1.4	1.4	0.65	0.089	Yes	Max Detect > = A B
Acenaphthylene	0.31	0.31	.	0.13	NA	Max Detect > = B
Anthracene	2.6	2.6	0.96	0.25	Yes	Max Detect > = A B
Benzo(a)anthracene	0.076	9.5	1.6	0.69	Yes	Max Detect > = A B
Benzo(a)pyrene	15	15	2.5	0.76	Yes	Max Detect > = A B
Benzo(b)fluoranthene	0.13	14	2.5	.	Yes	Max Detect > = A
Benzo(g,h,i)perylene	11	11	2.5	.	Yes	Max Detect > = A
Benzo(k)fluoranthene	0.088	19	2.5	.	Yes	Max Detect > = A
Carbazole	3	3	.	.	No	Max Detect < All Screens
Chrysene	0.11	15	2.8	0.85	Yes	Max Detect > = A B
Di-n-butyl phthalate	0.11	0.11	.	0.24	No	Max Detect < All Screens
Dibenzo(a,h)anthracene	5.4	5.4	0.26	0.14	Yes	Max Detect > = A B

Table 5.14 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Dibenzofuran	0.5	0.5	.	.	No	Max Detect < All Screens
Fluoranthene	0.13	30	3.6	1.5	Yes	Max Detect > = A B
Fluorene	1.1	1.1	0.64	0.14	Yes	Max Detect > = A B
Indeno(1,2,3-cd)pyrene	9.9	9.9	2.5	.	Yes	Max Detect > = A
Phenanthrene	13	13	1.38	0.54	Yes	Max Detect > = A B
Pyrene	0.082	25	2.2	1.4	Yes	Max Detect > = A B
Acetone	0.099	0.099	.	0.0091	NA	Max Detect > = B
Chloroform	0.003	0.003	.	0.96	No	Max Detect < All Screens
Toluene	0.006	0.006	.	0.05	No	Max Detect < All Screens

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(D) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.15. Load Line 2 (Groundwater)

Analyte	Minimum Detect ($\mu\text{g/L}$)	Maximum Detect ($\mu\text{g/L}$)	Ohio ($\mu\text{g/L}$) (A)	Federal ($\mu\text{g/L}$) (B)	Risk-based ($\mu\text{g/L}$) (C)	Selected Action Level ($\mu\text{g/L}$) (D)	Detects > Action Level
GROUNDWATER							
Cyanide	8.7	8.7	.	200	730	200	0/ 2
2,4-Dinitrotoluene	0.34	0.34	.	.	0.13	0.13	1/ 2
Aluminum	27.4	27.4	.	.	.	.
Arsenic	2.6	2.6	50	50	0.5	50	0/ 2
Barium	13.3	18.7	2000	2000	2600	2000	0/ 2
Cobalt	0.87	14.7	.	.	.	.
Magnesium	7510	9900	.	.	.	.
Manganese	106	642	.	.	1700	1700	0/ 2
Nickel	3.8	17.9	100	100	730	100	0/ 2
Zinc	7.8	8.4	.	.	11000	11000	0/ 2
Bis(2-ethylhexyl)phthalate	2	.	2	6	6.1	6.1	0/ 2

(A) Values represent State of Ohio MCL.

(B) Values represent federal MCL.

(C) Risk-based action level developed using RAGS Part B Guidance (EPA 1991)

(D) Action levels selected using the following logic: if available, use the Ohio MCL; otherwise, use the federal MCL. If no MCL exists, use the risk-based level.

Table 5.16. Load Line 3 (Surface Soil)
(concentrations in mg/kg)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
SURFACE SOIL							
Cyanide	0.12	0.38	130	1363	0.2	No	Max Detect < A B
1,3,5-Trinitrobenzene	0.253	110	0.33	3	.	Yes	Max Detect > = AB
2,4,6-Trinitrotoluene	0.142	390000	1.5	6	.	Yes	Max Detect > = AB
HMX	14	14	326	3406	.	No	Max Detect < A B
RDX	10	10	0.40	2	.	Yes	Max Detect > = AB
Antimony	3.4	30	3	68	0.03	Yes	Max Detect > = A C
Arsenic	7	23.2	0.04	0.24	0.1	Yes	Max Detect > = ABC
Barium	16.1	447	527	10000	8.2	No	Max Detect < A B
Beryllium	0.31	1.2	0.014	0.11	0.3	Yes	Max Detect > = ABC
Cadmium	0.06	4.1	4	85	0.04	Yes	Max Detect > = A C
Chromium	4.9	150	3	6	0.2	Yes	Max Detect > = ABC
Cobalt	3.7	8.7	457	9704	.	No	Max Detect < A B
Copper	8.9	99.4	285	6326	.	No	Max Detect < A B
Iron	14900	26100	.	.	.	No	Max Detect < A B
Lead	11.1	2620	40	100	.	Yes	Max Detect > = AB
Manganese	75.3	4800	318	4310	.	Yes	Max Detect > = AB
Mercury	0.04	0.2	0.65	7	.	No	Max Detect < A B
Nickel	7	21.9	.	1108	.	No	Max Detect < A B
Silver	0.28	2.4	38	852	0.2	No	Max Detect < A B
Thallium	0.78	3.5	0.61	14	0.04	Yes	Max Detect > = A C
Vanadium	9.9	22.5	54	1192	30	No	Max Detect < A B
Zinc	30.9	626	2300	10000	62	No	Max Detect < A B
4,4'-DDE	0.0038	0.012	0.13	0.56	0.3	No	Max Detect < A B

Table 5.16 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
4,4'-DDT	0.011	0.077	0.13	0.56	0.2	No	Max Detect < A B
Alpha chlordane	0.59	0.59	0.03	0.15	0.05	Yes	Max Detect > = ABC
Aroclor-1254	0.17	21	0.14	2	.	Yes	Max Detect > = AB
Beta-BHC	0.03	0.03	.	.	.	No	Max Detect < A B
Endosulfan II	0.0045	0.0045	39	409	0.09	No	Max Detect < A B
Endrin	0.01	3.2	2	20	0.005	Yes	Max Detect > = A C
Endrin aldehyde	0.0048	0.0048	.	.	0.005	No	Max Detect < A B
Gamma chlordane	0.11	0.11	0.03	0.15	0.05	Yes	Max Detect > = A C
Heptachlor	0.0016	0.0016	0.010	0.04	0.1	No	Max Detect < A B
Heptachlor epoxide	0.094	0.094	0.00	0.02	0.003	Yes	Max Detect > = ABC
2-Methylnaphthalene	0.048	0.048	.	.	.	No	Max Detect < A B
Acenaphthene	0.066	0.095	11	11	2.9	No	Max Detect < A B
Acenaphthylene	0.054	0.058	.	.	.	No	Max Detect < A B
Anthracene	0.16	0.32	0.57	0.57	59	No	Max Detect < A B
Benzo(a)anthracene	0.039	1.2	0.06	0.26	0.008	Yes	Max Detect > = ABC
Benzo(a)pyrene	0.036	1	0.006	0.026	0.04	Yes	Max Detect > = ABC
Benzo(b)fluoranthene	0.035	1.1	0.06	0.26	0.02	Yes	Max Detect > = ABC
Benzo(g,h,i)perylene	0.44	0.61	.	.	.	No	Max Detect < A B
Benzo(k)fluoranthene	0.038	1	0.61	3	0.2	Yes	Max Detect > = A C
Bis(2-ethylhexyl)phthalate	0.098	0.44	3	14	.	No	Max Detect < A B
Butyl benzyl phthalate	0.088	0.088	93	93	81	No	Max Detect < A B
Carbazole	0.11	0.25	2	10	0.003	No	Max Detect < A B
Chrysene	0.045	1.5	0.72	0.72	0.8	Yes	Max Detect > = ABC
Di-n-butyl phthalate	0.11	0.19	.	.	.	No	Max Detect < A B
Dibenzo(a,h)anthracene	0.15	0.25	0.006	0.026	0.008	Yes	Max Detect > = ABC

Table 5.16 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
Dibenzofuran	0.057	0.057	14	14	.	No	Max Detect < A B
Fluoranthene	0.051	2.2	261	2725	21	No	Max Detect < A B
Fluorene	0.058	0.094	9	9	2.8	No	Max Detect < A B
Indeno(1,2,3-cd)pyrene	0.46	0.59	0.06	0.26	0.07	Yes	Max Detect > = ABC
Naphthalene	0.043	0.052	24	24	0.4	No	Max Detect < A B
Phenanthrene	0.072	1.2	.	.	.	No	Max Detect < A B
Pyrene	0.044	1.8	10	10	21	No	Max Detect < A B
Methylene chloride	0.002	0.004	0.78	2	0.0001	No	Max Detect < A B
Toluene	0.014	0.038	79	88	0.06	No	Max Detect < A B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) Leaching values reflect EPA soil screening levels (EPA 1996).

(D) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(E) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen,

C = site value > soil screening level for leaching to groundwater.

Table 5.17. Load Line 3 (Sediment)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
SEDIMENT						
2,4,6-Trinitrotoluene	0.45	4.6	.	.	No	Max Detect < All Screens
Antimony	0.97	0.97	25	.	No	Max Detect < All Screens
Barium	39.8	115	.	.	No	Max Detect < All Screens
Beryllium	0.68	0.68	.	.	No	Max Detect < All Screens
Cadmium	0.06	1.6	9	4.2	No	Max Detect < All Screens
Cobalt	6.5	6.5	.	.	No	Max Detect < All Screens
Copper	18.3	18.3	390	110	No	Max Detect < All Screens
Iron	18500	18500	.	.	No	Max Detect < All Screens
Lead	8.8	63	110	110	No	Max Detect < All Screens
Manganese	134	2310	.	.	No	Max Detect < All Screens
Nickel	16	16	50	43	No	Max Detect < All Screens
Silver	0.23	2.4	2.2	1.8	Yes	Max Detect > = A B
Thallium	0.89	0.89	.	.	No	Max Detect < All Screens
Vanadium	19.4	19.4	.	.	No	Max Detect < All Screens
Zinc	45.2	560	270	270	Yes	Max Detect > = A B

Table 5.17 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
4,4'-DDE	0.0032	0.0032	0.015	0.027	No	Max Detect < All Screens
4,4'-DDT	0.0081	0.0081	0.007	0.052	Yes	Max Detect > = A
Endrin	0.01	0.01	0.045	0.045	No	Max Detect < All Screens
Gamma chlordane	0.0029	0.0029	0.006	0.0048	No	Max Detect < All Screens
Benzo(a)anthracene	0.1	0.1	1.6	0.69	No	Max Detect < All Screens
Benzo(a)pyrene	0.14	0.14	2.5	0.76	No	Max Detect < All Screens
Benzo(b)fluoranthene	0.13	0.13	2.5	.	No	Max Detect < All Screens
Benzo(g,h,i)perylene	0.088	0.088	2.5	.	No	Max Detect < All Screens
Benzo(k)fluoranthene	0.14	0.14	2.5	.	No	Max Detect < All Screens
Bis(2-ethylhexyl)phthalate	0.054	0.054	.	2.7	No	Max Detect < All Screens
Chrysene	0.13	0.13	2.8	0.85	No	Max Detect < All Screens
Dibenzo(a,h)anthracene	0.055	0.055	0.26	0.14	No	Max Detect < All Screens
Fluoranthene	0.24	0.24	3.6	1.5	No	Max Detect < All Screens
Indeno(1,2,3-cd)pyrene	0.11	0.11	2.5	.	No	Max Detect < All Screens
Phenanthrene	0.091	0.091	1.38	0.54	No	Max Detect < All Screens
Pyrene	0.18	0.18	2.2	1.4	No	Max Detect < All Screens

Table 5.17 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Toluene	0.004	0.004	.	0.05	No	Max Detect < All Screens

- (A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.
 (B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.
 (C) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.
 (D) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

**Table 5.18. Load Line 4 (Surface Soil)
(concentrations in mg/kg)**

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
<i>SURFACE SOIL</i>							
Cyanide	0.11	0.51	130	1363	0.2	No	Max Detect < A B
2,4,6-Trinitrotoluene	0.24	2.2	1	6	.	Yes	Max Detect > = A
HMX	1	1	326	3406	.	No	Max Detect < A B
RDX	0.27	0.27	0.40	2	.	No	Max Detect < A B
Barium	17.3	238	527	10000	8.2	No	Max Detect < A B
Beryllium	0.25	3.6	0.014	0.11	0.3	Yes	Max Detect > = ABC
Cadmium	0.04	5.2	4	85	0.04	Yes	Max Detect > = A C
Cobalt	3	10.4	457	9704	.	No	Max Detect < A B
Copper	7.7	106	285	6326	.	No	Max Detect < A B
Iron	7850	28700	.	.	.	No	Max Detect < A B
Lead	8.1	384	40	100	.	Yes	Max Detect > = AB
Manganese	43.5	2830	318	4310	.	Yes	Max Detect > = A
Nickel	7.8	32.1	.	1108	.	No	Max Detect < A B
Thallium	0.46	13.3	0.61	14	0.04	Yes	Max Detect > = A C
Vanadium	8.9	19.7	54	1192	30	No	Max Detect < A B
Zinc	25.4	1850	2300	10000	62	No	Max Detect < A B
4,4'-DDD	0.0098	0.0098	0.19	0.79	0.08	No	Max Detect < A B
4,4'-DDE	0.018	0.019	0.13	0.56	0.3	No	Max Detect < A B
4,4'-DDT	0.0087	0.23	0.13	0.56	0.2	Yes	Max Detect > = A C
Aldrin	0.017	0.043	0.003	0.011	59	Yes	Max Detect > = AB
Alpha chlordane	0.0056	0.034	0.03	0.15	0.05	No	Max Detect < A B
Aroclor-1254	0.11	3.2	0.14	2	.	Yes	Max Detect > = AB
Aroclor-1260	4.5	4.5	0.14	2	.	Yes	Max Detect > = AB

Table 5.18 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
Dieldrin	0.0048	0.0048	0.00	0	0.00002	Yes	Max Detect > = A C
Endosulfan II	0.037	0.037	39	409	0.09	No	Max Detect < A B
Endrin	0.0075	0.018	2	20	0.005	No	Max Detect < A B
Endrin aldehyde	0.0045	0.0045	.	.	0.005	No	Max Detect < A B
Gamma chlordane	0.0016	0.019	0.03	0.15	0.05	No	Max Detect < A B
Acenaphthylene	0.27	0.56	.	.	.	No	Max Detect < A B
Anthracene	0.19	1.2	0.57	0.57	59	Yes	Max Detect > = AB
Benzo(a)anthracene	0.45	2.1	0.06	0.26	0.008	Yes	Max Detect > = ABC
Benzo(a)pyrene	0.04	2.7	0.006	0.026	0.04	Yes	Max Detect > = ABC
Benzo(b)fluoranthene	0.04	7.2	0.06	0.26	0.02	Yes	Max Detect > = ABC
Benzo(g,h,i)perylene	0.24	3.8	.	.	.	No	Max Detect < A B
Benzo(k)fluoranthene	0.33	5	0.61	3	0.2	Yes	Max Detect > = ABC
Bis(2-ethylhexyl)phthalate	0.043	0.17	3	14	.	No	Max Detect < A B
Carbazole	0.12	1.4	2	10	0.003	No	Max Detect < A B
Chrysene	0.038	6.4	0.72	0.72	0.8	Yes	Max Detect > = ABC
Di-n-butyl phthalate	0.92	0.92	.	.	.	No	Max Detect < A B
Dibenzo(a,h)anthracene	0.14	1.2	0.006	0.026	0.008	Yes	Max Detect > = ABC
Fluoranthene	0.038	8.1	261	2725	21	No	Max Detect < A B
Fluorene	0.064	0.12	9	9	2.8	No	Max Detect < A B
Indeno(1,2,3-cd)pyrene	0.23	3.7	0.06	0.26	0.07	Yes	Max Detect > = ABC
Phenanthrene	0.14	2.3	.	.	.	No	Max Detect < A B
Pyrene	0.035	5.4	10	10	21	No	Max Detect < A B
Acetone	0.05	0.05	209	875	0.08	No	Max Detect < A B
Chloroform	0.002	0.002	0	0	0.003	No	Max Detect < A B

Table 5.18 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
Toluene	0.005	0.012	79	88	0.06	No	Max Detect < A B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) Leaching values reflect EPA soil screening levels (EPA 1996).

(D) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(E) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.19. Load Line 4 (Sediment)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
SEDIMENT						
Cyanide	0.16	0.16	.	.	No	Max Detect < All Screens
2,4,6-Trinitrotoluene	0.19	8.7	.	.	No	Max Detect < All Screens
Barium	15.8	107	.	.	No	Max Detect < All Screens
Beryllium	0.27	0.62	.	.	No	Max Detect < All Screens
Cadmium	0.07	0.72	9	4.2	No	Max Detect < All Screens
Cobalt	5.1	9.1	.	.	No	Max Detect < All Screens
Copper	10.4	16.2	390	110	No	Max Detect < All Screens
Iron	10400	21600	.	.	No	Max Detect < All Screens
Lead	7.8	21.4	110	110	No	Max Detect < All Screens
Manganese	91.9	895	.	.	No	Max Detect < All Screens
Mercury	0.05	0.11	1.3	0.7	No	Max Detect < All Screens
Nickel	10.8	18	50	43	No	Max Detect < All Screens
Thallium	1.3	1.3	.	.	No	Max Detect < All Screens
Vanadium	6.2	15.9	.	.	No	Max Detect < All Screens
Zinc	39.1	208	270	270	No	Max Detect < All Screens
2-Butanone	0.053	0.053	.	0.27	No	Max Detect < All Screens

Table 5.19 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Acetone	0.25	0.25	.	0.0091	NA	Max Detect > = B
Carbon disulfide	0.013	0.013	.	0.0009	NA	Max Detect > = B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(D) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.20. Load Line 4 (Groundwater)

Analyte	Minimum Detect ($\mu\text{g/L}$)	Maximum Detect ($\mu\text{g/L}$)	Ohio ($\mu\text{g/L}$) (A)	Federal ($\mu\text{g/L}$) (B)	Risk-based ($\mu\text{g/L}$) (C)	Selected Action Level ($\mu\text{g/L}$) (D)	Detects > Action Level
GROUNDWATER							
Cyanide	2.7	7.7	.	200	730	200	0/ 3
Aluminum	23.7	271	.	.	.	.
Arsenic	5.1	12	50	50	0.5	50	0/ 3
Barium	36.1	80	2000	2000	2600	2000	0/ 3
Beryllium	0.33	0.34	4	4	180	4	0/ 3
Cobalt	1	1.6	.	.	.	.
Lead	1.9	1.9	.	15	.	15	0/ 3
Magnesium	18500	50400	.	.	.	.
Manganese	183	2670	.	.	1700	1700	2/ 3
Nickel	0.85	3.9	100	100	730	100	0/ 3
Vanadium	0.67	0.67	.	.	260	260	0/ 3
Zinc	10.1	14.2	.	.	11000	11000	0/ 3

(A) Values represent State of Ohio MCL.

(B) Values represent federal MCL.

(C) Risk-based action level developed using RAGS Part B Guidance (EPA 1991)

(D) Action levels selected using the following logic: if available, use the Ohio MCL; otherwise, use the federal MCL. If no MCL exists, use the risk-based level.

Table 5.21. Load Line 12 (Surface Soil)
(concentrations in mg/kg)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
<i>SURFACE SOIL</i>							
Cyanide	0.15	1.6	130	1363	0.2	No	Max Detect < A B
1,3,5-Trinitrobenzene	0.25	4.6	0.33	3	.	Yes	Max Detect > = AB
2,4,6-Trinitrotoluene	0.45	19000	1.5	6	.	Yes	Max Detect > = AB
2,4-Dinitrotoluene	13	13	13	136	0.000004	No	Max Detect < A B
HMX	1.3	180	326	3406	.	No	Max Detect < A B
RDX	2.8	6800	0.40	2	.	Yes	Max Detect > = AB
Aluminum	2190	105000	7667	10000	.	Yes	Max Detect > = AB
Antimony	0.86	5.9	3	68	0.03	Yes	Max Detect > = A C
Barium	20.2	274	527	10000	8.2	No	Max Detect < A B
Beryllium	0.27	1.5	0.014	0.11	0.3	Yes	Max Detect > = ABC
Cadmium	0.09	6.6	4	85	0.04	Yes	Max Detect > = A C
Chromium	7	163	3	6	0.2	Yes	Max Detect > = ABC
Cobalt	3.6	13.8	457	9704	.	No	Max Detect < A B
Copper	14.8	3610	285	6326	.	Yes	Max Detect > = A
Iron	13700	26700	.	.	.	No	Max Detect < A B
Lead	13.2	589	40	100	.	Yes	Max Detect > = AB
Manganese	42.7	1760	318	4310	.	Yes	Max Detect > = A
Mercury	0.04	0.32	0.65	7	.	No	Max Detect < A B
Nickel	10.2	199	.	1108	.	No	Max Detect < A B
Silver	0.5	4.7	38	852	0.2	No	Max Detect < A B
Thallium	0.91	4.3	0.61	14	0.04	Yes	Max Detect > = A C
Vanadium	5.7	26.9	54	1192	30	No	Max Detect < A B
Zinc	33.9	1030	2300	10000	62	No	Max Detect < A B

Table 5.21 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
4,4'-DDE	0.0049	0.039	0.13	0.56	0.3	No	Max Detect < A B
4,4'-DDT	0.0035	0.025	0.13	0.56	0.2	No	Max Detect < A B
Alpha chlordane	0.02	0.038	0.03	0.15	0.05	Yes	Max Detect > = A
Aroclor-1254	0.76	1.7	0.14	2	.	Yes	Max Detect > = A
Aroclor-1260	2.6	2.6	0.14	2	.	Yes	Max Detect > = AB
Endosulfan II	0.0033	0.0033	39	409	0.09	No	Max Detect < A B
Endrin	0.0047	0.11	2	20	0.005	No	Max Detect < A B
Endrin aldehyde	0.031	0.031	.	.	0.005	No	Max Detect < A B
Endrin ketone	0.038	0.038	.	.	0.005	No	Max Detect < A B
Gamma chlordane	0.0072	0.038	0.03	0.15	0.05	Yes	Max Detect > = A
Gamma-BHC (lindane)	0.015	0.015	.	.	.	No	Max Detect < A B
Heptachlor	0.0019	0.0081	0.010	0.04	0.1	No	Max Detect < A B
Heptachlor epoxide	0.0028	0.0028	0.005	0.02	0.003	No	Max Detect < A B
Methoxychlor	0.047	0.047	33	341	0.8	No	Max Detect < A B
1,2,4-Trichlorobenzene	0.085	0.085	57	550	0.03	No	Max Detect < A B
2-Methylnaphthalene	0.081	0.26	.	.	.	No	Max Detect < A B
Acenaphthene	0.044	2.7	11	11	2.9	No	Max Detect < A B
Acenaphthylene	0.081	0.28	.	.	.	No	Max Detect < A B
Anthracene	0.12	8.7	0.57	0.57	59	Yes	Max Detect > = AB
Benzo(a)anthracene	0.24	14	0.06	0.26	0.008	Yes	Max Detect > = ABC
Benzo(a)pyrene	0.24	12	0.006	0.026	0.04	Yes	Max Detect > = ABC
Benzo(b)fluoranthene	0.29	11	0.06	0.26	0.02	Yes	Max Detect > = ABC
Benzo(g,h,i)perylene	0.16	8.5	.	.	.	No	Max Detect < A B
Benzo(k)fluoranthene	0.17	14	0.61	3	0.2	Yes	Max Detect > = ABC
Bis(2-ethylhexyl)phthalate	0.04	0.22	3	14	.	No	Max Detect < A B

Table 5.21 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
Carbazole	0.11	3.8	2	10	0.003	Yes	Max Detect > = A C
Chrysene	0.24	13	0.72	0.72	0.8	Yes	Max Detect > = ABC
Dibenzo(a,h)anthracene	0.066	4.4	0.006	0.03	0.008	Yes	Max Detect > = ABC
Dibenzofuran	0.28	1.9	14	14	.	No	Max Detect < A B
Fluoranthene	0.073	30	261	2725	21	No	Max Detect < A B
Fluorene	0.042	3.2	9	9	2.8	No	Max Detect < A B
Indeno(1,2,3-cd)pyrene	0.13	9.2	0.06	0.26	0.07	Yes	Max Detect > = ABC
Naphthalene	0.13	0.27	24	24	0.4	No	Max Detect < A B
Phenanthrene	0.14	23	.	.	.	No	Max Detect < A B
Pyrene	0.38	25	10	10	21	Yes	Max Detect > = ABC
Acetone	0.055	0.099	209	875	0.08	No	Max Detect < A B
Toluene	0.007	0.016	79	88	0.06	No	Max Detect < A B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) Leaching values reflect EPA soil screening levels (EPA 1996).

(D) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(E) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.22. Load Line 12 (Sediment)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
SEDIMENT						
Cyanide	1.4	1.4	.	.	No	Max Detect < All Screens
1,3,5-Trinitrobenzene	0.66	0.66	.	.	No	Max Detect < All Screens
2,4,6-Trinitrotoluene	0.16	170	.	.	No	Max Detect < All Screens
Aluminum	6870	18500	.	.	No	Max Detect < All Screens
Antimony	2.6	2.6	25	.	No	Max Detect < All Screens
Arsenic	4	217	85	42	Yes	Max Detect > = A B
Barium	26.7	170	.	.	No	Max Detect < All Screens
Beryllium	0.66	2.5	.	.	No	Max Detect < All Screens
Cadmium	0.09	2	9	4.2	No	Max Detect < All Screens
Chromium	8.2	27.7	145	160	No	Max Detect < All Screens
Cobalt	8	27.7	.	.	No	Max Detect < All Screens
Copper	28.9	399	390	110	Yes	Max Detect > = A B
Iron	19400	48800	.	.	No	Max Detect < All Screens
Lead	10.3	88.7	110	110	No	Max Detect < All Screens
Manganese	53.7	1170	.	.	No	Max Detect < All Screens
Mercury	0.06	1.2	1.3	0.7	NA	Max Detect > = B

Table 5.22 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Nickel	19	59.7	50	43	Yes	Max Detect > = A B
Silver	0.47	58	2.2	1.8	Yes	Max Detect > = A B
Thallium	0.74	2.4	.	.	No	Max Detect < All Screens
Vanadium	16.1	22.7	.	.	No	Max Detect < All Screens
Zinc	57.3	794	270	270	Yes	Max Detect > = A B
Aroclor-1254	0.31	0.31	0.4	72	No	Max Detect < All Screens
Heptachlor	0.0019	0.0019	.	13	No	Max Detect < All Screens
Anthracene	0.35	0.35	0.96	0.25	NA	Max Detect > = B
Benzo(a)anthracene	0.46	0.46	1.6	0.69	No	Max Detect < All Screens
Benzo(a)pyrene	0.34	0.34	2.5	0.76	No	Max Detect < All Screens
Benzo(b)fluoranthene	0.32	0.32	2.5	.	No	Max Detect < All Screens
Benzo(g,h,i)perylene	0.24	0.24	2.5	.	No	Max Detect < All Screens
Benzo(k)fluoranthene	0.35	0.35	2.5	.	No	Max Detect < All Screens
Chrysene	0.62	0.62	2.8	0.85	No	Max Detect < All Screens
Fluoranthene	1.6	1.6	3.6	1.5	NA	Max Detect > = B
Indeno(1,2,3-cd)pyrene	0.28	0.28	2.5	.	No	Max Detect < All Screens
N-nitrosodiphenylamine	2	2	.	.	No	Max Detect < All Screens

Table 5.22 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Phenanthrene	0.54	0.54	1.38	0.54	No	Max Detect < All Screens
Pyrene	0.98	0.98	2.2	1.4	No	Max Detect < All Screens
2-Butanone	0.44	0.44	.	0.27	NA	Max Detect > = B
Acetone	0.15	0.87	.	0.0091	NA	Max Detect > = B
Carbon disulfide	0.18	0.18	.	0.0009	NA	Max Detect > = B

- (A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.
 (B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.
 (C) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.
 (D) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.23. Building 1200 (Surface Soil)
(concentrations in mg/kg)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
<i>SURFACE SOIL</i>							
Cyanide	0.21	0.21	130	1363	0.2	No	Max Detect < A B
Antimony	1.1	1.1	3	68	0.03	No	Max Detect < A B
Barium	69.9	75.8	527	10000	8.2	No	Max Detect < A B
Beryllium	0.6	0.6	0.014	0.11	0.3	Yes	Max Detect > = ABC
Cobalt	8.8	8.8	457	9704	.	No	Max Detect < A B
Copper	15	15	285	6326	.	No	Max Detect < A B
Iron	22800	22800	.	.	.	No	Max Detect < A B
Lead	17.4	24.7	40	100	.	No	Max Detect < A B
Nickel	18.6	18.6	.	1108	.	No	Max Detect < A B
Thallium	1.5	1.5	0.61	14	0.04	Yes	Max Detect > = A C
Vanadium	22.1	22.1	54	1192	30	No	Max Detect < A B
Alpha chlordane	0.24	0.24	0.03	0.15	0.05	Yes	Max Detect > = ABC
Gamma chlordane	0.23	0.23	0.03	0.15	0.05	Yes	Max Detect > = ABC
Benzo(a)anthracene	0.14	0.14	0.06	0.26	0.008	Yes	Max Detect > = A C
Benzo(a)pyrene	0.16	0.16	0.006	0.026	0.04	Yes	Max Detect > = ABC
Benzo(b)fluoranthene	0.14	0.14	0.06	0.26	0.02	Yes	Max Detect > = A C
Benzo(g,h,i)perylene	0.095	0.095	.	.	.	No	Max Detect < A B
Benzo(k)fluoranthene	0.13	0.13	0.61	3	0.2	No	Max Detect < A B
Bis(2-ethylhexyl)phthalate	0.04	0.04	3	14	.	No	Max Detect < A B
Chrysene	0.16	0.16	0.72	0.72	0.8	No	Max Detect < A B
Dibenzo(a,h)anthracene	0.048	0.048	0.006	0.026	0.008	Yes	Max Detect > = ABC
Fluoranthene	0.13	0.13	261	2725	21	No	Max Detect < A B
Indeno(1,2,3-cd)pyrene	0.096	0.096	0.06	0.26	0.07	Yes	Max Detect > = A C

Table 5.23 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
Pyrene	0.13	0.13	10	10	21	No	Max Detect < A B
Methylene chloride	0.003	0.003	0.78	2	0.0001	No	Max Detect < A B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) Leaching values reflect EPA soil screening levels (EPA 1996).

(D) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(E) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.24. Building 1200 (Sediment)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
SEDIMENT						
2,4,6-Trinitrotoluene	0.28	2.2	.	.	No	Max Detect < All Screens
Barium	64.5	101	.	.	No	Max Detect < All Screens
Beryllium	0.45	0.84	.	.	No	Max Detect < All Screens
Cadmium	0.09	0.51	9	4.2	No	Max Detect < All Screens
Cobalt	4	12.7	.	.	No	Max Detect < All Screens
Copper	13.2	22.5	390	110	No	Max Detect < All Screens
Iron	21800	28700	.	.	No	Max Detect < All Screens
Lead	11.9	19	110	110	No	Max Detect < All Screens
Nickel	10.4	29.8	50	43	No	Max Detect < All Screens
Thallium	0.93	1.4	.	.	No	Max Detect < All Screens
Vanadium	18.7	20.4	.	.	No	Max Detect < All Screens
Zinc	39.2	92.5	270	270	No	Max Detect < All Screens
Acetone	0.073	0.073	.	0.0091	NA	Max Detect >= B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(D) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.25. Landfill North of Winklepeck Burning Grounds (Soil)
(concentrations in mg/kg)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
SOIL							
Cyanide	0.14	0.25	130	1363	0.2	No	Max Detect < A B
Antimony	1.3	1.3	3	68	0.03	No	Max Detect < A B
Beryllium	0.35	0.53	0.014	0.11	0.3	Yes	Max Detect > = ABC
Cadmium	0.15	0.52	4	85	0.04	No	Max Detect < A B
Cobalt	6.1	9.4	457	9704	.	No	Max Detect < A B
Copper	13.1	32.2	285	6326	.	No	Max Detect < A B
Iron	17300	28400	.	.	.	No	Max Detect < A B
Lead	9.9	28.4	40	100	.	No	Max Detect < A B
Nickel	11.8	19.3	.	1108	.	No	Max Detect < A B
Thallium	0.98	2.4	0.61	14	0.04	Yes	Max Detect > = A C
Vanadium	11.1	17.5	54	1192	30	No	Max Detect < A B
Zinc	40	212	2300	10000	62	No	Max Detect < A B
4,4'-DDD	0.062	0.062	0.19	0.79	0.08	No	Max Detect < A B
4,4'-DDE	0.0034	0.11	0.13	0.56	0.3	No	Max Detect < A B
4,4'-DDT	0.0026	0.037	0.13	0.56	0.2	No	Max Detect < A B
Aroclor-1254	0.087	0.087	0.14	2	.	No	Max Detect < A B
Delta-BHC	0.0049	0.0049	.	.	.	No	Max Detect < A B
Endrin aldehyde	0.0027	0.0027	.	.	0.005	No	Max Detect < A B
Heptachlor	0.0016	0.0019	0.01	0.04	0.1	No	Max Detect < A B
1,4-Dichlorobenzene	0.13	0.13	0.36	0.85	0.01	No	Max Detect < A B
Bis(2-ethylhexyl)phthalate	0.037	0.1	3	14	.	No	Max Detect < A B
Di-n-butyl phthalate	0.036	0.036	.	.	.	No	Max Detect < A B
Chlorobenzene	0.15	0.15	6	22	0.007	No	Max Detect < A B

Table 5.25 (continued)

Analyte	Minimum Detect	Maximum Detect	Residential (A)	Industrial (B)	Leaching (C)	COPC (D)	Justification (E)
Methylene chloride	0.004	0.019	0.78	2	0.0001	No	Max Detect < A B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) Leaching values reflect EPA soil screening levels (EPA 1996).

(D) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(E) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.26. Landfill North of Winklepeck Burning Grounds (Sediment)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
SEDIMENT						
Cyanide	0.34	0.34	.	.	No	Max Detect < All Screens
Aluminum	3660	16500	.	.	No	Max Detect < All Screens
Barium	30.3	186	.	.	No	Max Detect < All Screens
Beryllium	0.7	0.7	.	.	No	Max Detect < All Screens
Cadmium	0.11	1.3	9	4.2	No	Max Detect < All Screens
Chromium	6.2	20.6	145	160	No	Max Detect < All Screens
Cobalt	8.1	8.1	.	.	No	Max Detect < All Screens
Copper	13.4	13.4	390	110	No	Max Detect < All Screens
Iron	20800	20800	.	.	No	Max Detect < All Screens
Lead	10.3	54.5	110	110	No	Max Detect < All Screens
Manganese	209	1130	.	.	No	Max Detect < All Screens
Mercury	0.05	0.11	1.3	0.7	No	Max Detect < All Screens
Nickel	16.7	16.7	50	43	No	Max Detect < All Screens
Selenium	0.43	2.7	.	.	No	Max Detect < All Screens
Silver	0.61	0.61	2.2	1.8	No	Max Detect < All Screens
Thallium	3.2	3.2	.	.	No	Max Detect < All Screens

Table 5.26 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Vanadium	20.1	20.1	.	.	No	Max Detect < All Screens
Zinc	45.1	133	270	270	No	Max Detect < All Screens
Toluene	0.005	0.005	.	0.05	No	Max Detect < All Screens

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(D) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.27. Landfill North of Winklepeck Burning Grounds (Groundwater)

Analyte	Minimum Detect ($\mu\text{g/L}$)	Maximum Detect ($\mu\text{g/L}$)	Ohio ($\mu\text{g/L}$) (A)	Federal ($\mu\text{g/L}$) (B)	Risk-based ($\mu\text{g/L}$) (C)	Selected Action Level ($\mu\text{g/L}$) (D)	Detects > Action Level
GROUNDWATER							
Aluminum	19.3	140	.	.	.	.
Antimony	3.9	3.9	6	6	15	6	0/ 2
Arsenic	9.2	9.2	50	50	0.5	50	0/ 2
Barium	14.6	72.1	2000	2000	2600	2000	0/ 2
Beryllium	0.35	0.35	4	4	180	4	0/ 2
Lead	1.5	1.5	.	15	.	15	0/ 2
Magnesium	8880	17800	.	.	.	.
Manganese	37.1	187	.	.	1700	1700	0/ 2
Nickel	3.5	110	100	100	730	100	1/ 2
Zinc	23.1	23.1	.	.	11000	11000	0/ 2
Heptachlor epoxide	0.06	0.06	0.2	0.2	0.0094	0.2	0/ 1
Acetone	11	27	.	.	3700	3700	0/ 2

(A) Values represent State of Ohio MCL.

(B) Values represent federal MCL.

(C) Risk-based action level developed using RAGS Part B Guidance (EPA 1991)

(D) Action levels selected using the following logic: if available, use the Ohio MCL; otherwise, use the federal MCL. If no MCL exists, use the risk-based level.

Table 5.28. Upper and Lower Cobbs Pond (Sediment)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
SEDIMENT						
Nitrobenzene	0.38	0.38	.	.	No	Max Detect < All Screens
Antimony	1.9	1.9	25	.	No	Max Detect < All Screens
Arsenic	4.9	23.4	85	42	No	Max Detect < All Screens
Barium	40.8	100	.	.	No	Max Detect < All Screens
Beryllium	0.73	0.73	.	.	No	Max Detect < All Screens
Cadmium	0.54	1.4	9	4.2	No	Max Detect < All Screens
Chromium	7.9	329	145	160	Yes	Max Detect > = AB
Cobalt	11.1	11.1	.	.	No	Max Detect < All Screens
Copper	316	316	390	110	NA	Max Detect > = B
Iron	19600	19600	.	.	No	Max Detect < All Screens
Lead	8.8	37.8	110	110	No	Max Detect < All Screens
Manganese	171	816	.	.	No	Max Detect < All Screens
Mercury	0.08	0.23	1.3	0.7	No	Max Detect < All Screens
Nickel	20.9	20.9	50	43	No	Max Detect < All Screens
Selenium	1.1	2.9	.	.	No	Max Detect < All Screens
Silver	0.38	1.7	2.2	1.8	No	Max Detect < All Screens

Table 5.28 (continued)

Analyte	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Region IV Sediment Criteria (mg/kg) (A)	Ecological Benchmark (mg/kg) (B)	COPC (C)	Justification (D)
Thallium	2.3	2.3	.	.	No	Max Detect < All Screens
Vanadium	15.1	15.1	.	.	No	Max Detect < All Screens
Zinc	46.2	254	270	270	No	Max Detect < All Screens
Benzo(a)anthracene	0.21	0.21	1.6	0.69	No	Max Detect < All Screens
Benzo(a)pyrene	0.26	0.26	2.5	0.76	No	Max Detect < All Screens
Benzo(b)fluoranthene	0.56	0.56	2.5	.	No	Max Detect < All Screens
Benzo(g,h,i)perylene	0.2	0.2	2.5	.	No	Max Detect < All Screens
Chrysene	0.27	0.27	2.8	0.85	No	Max Detect < All Screens
Fluoranthene	0.38	0.38	3.6	1.5	No	Max Detect < All Screens
Indeno(1,2,3-cd)pyrene	0.19	0.19	2.5	.	No	Max Detect < All Screens
Pyrene	0.27	0.27	2.2	1.4	No	Max Detect < All Screens
Acetone	0.33	0.33	.	0.0091	NA	Max Detect > = B

(A) Residential values reflect EPA Region IX soil residential PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(B) Industrial values reflect EPA Region IX soil industrial PRGs and a target risk of 10^{-7} and target hazard quotient of 0.1.

(C) COPC = chemical of potential concern. Chemicals that exceed the residential screening values are identified as COPCs.

(D) Justification explains which screens have been exceeded for COPCs. A = site value > residential screen, B = site value > industrial screen, C = site value > soil screening level for leaching to groundwater.

Table 5.29. Upper and Lower Cobbs Pond (Groundwater)

Analyte	Minimum Detect ($\mu\text{g/L}$)	Maximum Detect ($\mu\text{g/L}$)	Ohio ($\mu\text{g/L}$) (A)	Federal ($\mu\text{g/L}$) (B)	Risk-based ($\mu\text{g/L}$) (C)	Selected Action Level ($\mu\text{g/L}$) (D)	Detects > Action Level
GROUNDWATER							
Cyanide	3.8	3.8	.	200	730	200	0/ 3
Aluminum	17.6	21	.	.	.	.
Arsenic	2.8	15	50	50	0.5	50	0/ 3
Barium	36	115	2000	2000	2600	2000	0/ 3
Beryllium	0.35	0.36	4	4	180	4	0/ 3
Calcium	67400	118000	.	.	.	.
Iron	1200	8760	.	.	.	.
Magnesium	6690	40200	.	.	.	.
Manganese	332	3020	.	.	1700	1700	1/ 3
Nickel	1.4	13.8	100	100	730	100	0/ 3
Potassium	1800	3860	.	.	.	.
Sodium	15700	48000	.	.	.	.
Thallium	1.1	1.1	2	2	2.9	2	0/ 3
Zinc	7.6	67.1	.	.	11000	11000	0/ 3
4-Chloro-3-methyl-phenol	2	2	.	.	.	.

(A) Values represent State of Ohio MCL.

(B) Values represent federal MCL.

(C) Risk-based action level developed using RAGS Part B Guidance (EPA 1991)

(D) Action levels selected using the following logic: if available, use the Ohio MCL; otherwise, use the federal MCL. If no MCL exists, use the risk-based level.

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SEDIMENT - HUMAN

CONTAMINANT HAZARD FACTOR (CHF):

<u>Contaminant</u>	<u>Max Concentration (ppb)</u>	<u>Standard (ppb)</u>	<u>Ratio</u>
No Contaminants			0.00
Total			0.00

Significant (If Total > 100):
 Moderate (If Total 2-100):
 Minimum (If Total < 2):

MIGRATION PATHWAY FACTOR (MPF):

- Evident** - Analytical data or observable evidence indicates that contamination in the media is present at, moving toward, or has moved to a point of exposure
- Potential** - Possibility for contamination to be present at or migrate to a point of exposure; or information is not sufficient to make a determination of Evident or Confined
- Confined** - Information Indicates that the potential for contaminant migration from the source is limited (due geological structures or physical controls).

Evident:
 Potential:
 Confined:

Brief rationale/source for selection: No chemicals detected in downgradient sediments.

RECEPTOR FACTOR (RF)

- Identified** - Receptors identified that have access to surface water or sediment
- Potential** - Potential for receptors to have access to surface water or sediment
- Limited** - Little or no potential for receptors t have access to surface water or sediment

Identified:
 Potential:
 Limited:

Brief rationale/source for selection: Sites drain off-site to downgradient Reservoir.

Sediment - Human Category: LOW

SEDIMENT - ECOLOGICAL

CONTAMINANT HAZARD FACTOR (CHF):

<u>Contaminant</u>	<u>Max Concentration (ppb)</u>	<u>Standard (ppb)</u>	<u>Ratio</u>
No Contaminants			
	Total		

Significant (If Total > 100):
 Moderate (If Total 2-100):
 Minimum (If Total < 2):

MIGRATION PATHWAY FACTOR (MPF):

- Evident** - Analytical data or observable evidence indicates that contamination in the media is present at, moving toward, or has moved to a point of exposure
- Potential** - Possibility for contamination to be present at or migrate to a point of exposure; or information is not sufficient to make a determination of Evident or Confined
- Confined** - Information Indicates that the potential for contaminant migration from the source is limited (due geological structures or physical controls).

Evident:
 Potential: X
 Confined:

Brief rationale/source for selection: No chemicals detected in downgradient sediments.

RECEPTOR FACTOR (RF)

- Identified** - Receptors identified that have access to surface water or sediment
- Potential** - Potential for receptors to have access to surface water or sediment
- Limited** - Little or no potential for receptors to have access to surface water or sediment

Identified: X
 Potential:
 Limited:

Brief rationale/source for selection: Site drains off-site to downgradient Reservoir.

Sediment - Ecological Category:

LOW

SOIL

CONTAMINANT HAZARD FACTOR (CHF):

Significant (If Total > 100):
Moderate (If Total 2-100):
Minimum (If Total < 2): X

<u>Contaminant</u>	<u>Max Concentration (ppb)</u>	<u>Standard (ppb)</u>	<u>Ratio</u>
Thallium	13,300.00		0.00
Benzo(a)pyrene	2,700.00	6,100.00	0.44
Polychlorinated biphenyls (PCBs)	4,500.00	6,600.00	0.68
Beryllium and compounds	3,600.00	14,000.00	0.26
Aldrin	43.00	2,600.00	0.02
		Total	1.40

MIGRATION PATHWAY FACTOR (MPF)

- Evident** - Analytical data or observable evidence that contamination is present at, is moving towards, or has moved to a point of exposure.
- Potential** - Possibility for contamination to be present at or migrate to a point of exposure; or information is not sufficient to make a determination of Evident or Confined.
- Confined** - Low possibility for contamination to be present at or migrate to a point of exposure

Evident:
Potential: X
Confined:

Brief rationale/source for selection: No soil contamination detected in sediments; potential for migration off-site exists.

RECEPTOR FACTOR (RF):

- Identified** - Receptors identified that have access to contaminated soil
- Potential** - Potential for receptors to have access to contaminated soil
- Limited** - Little or no potential for receptors to have access to contaminated soil

Identified:
Potential: X
Limited

Brief rationale/source for selection: Downgradient receptors; site drains to Reservoir.

Soil Category: LOW

RELATIVE RISK EVALUATION WORKSHEET

PROJECT BACKGROUND INFORMATION

Property Name for FUDS:

RVAAP

Location (City/County and State):

Ravenna, Ohio

Project Name/ RMIS ID:

Winkelpeck Burning Ground

Point of Contact (Name/Phone):

/ WBGRVAAP-05

Date Entered (month/day/year):

3/28/97

Media Evaluated (GW, SW, Sediment, Soil):

SOIL, SED

Site Type:

AB

Phase of Execution (SI, RI, FS, EE/CA, IRA, RD/RA, or equivalent RCRA Stage):

RI

Agreement Status (enter the appropriate DERP regulatory agreement code):

Z - No agreements

NPL/Proposed NPL (Y/N):

Overall Project Risk: **HIGH**

PROJECT SUMMARY

Brief Project Description (include site type, materials disposed, dates of operation, and other relevant information)

The burning grounds have been in operation since 1941, and occupy ~ 80.9 ha (200 acres). Prior to 1980, ordnance waste burning was carried out in 4 pits, burning pads, and occasionally along roads. Seventy burning pads were identified from historical drawings and aerial photographs; the actual number of pads is unknown. The pads consisted of 6 x 12.2 m (20 x 40 feet) areas without berms. The pits consisted of areas bermed on three sides, ~ 15.2 x 22.9 m (50 x 75 feet) in size. Burns were conducted using scrap wood, straw, and No. 2 fuel oil. The fire would cause the explosives to melt and flow out of the projectiles and burn. Occasionally, projectiles would explode and be ejected into the surrounding area. Many of the further flung projectiles are still in the field. In some instances, high energy material such as black powder and explosives were laid out in a string along a road and burned.

Brief Description of Pathways (Groundwater, Soil, Surface Water (human), Surface Water (ecological), Sediment (human), Sediment (ecological)):
Contamination mainly in surface soils; may migrate to nearby ditch sediments; groundwater not sampled during Phase 1.

Brief Description of Receptors (Human and Ecological):

Limited access by work force. Limited terrestrial species.

GROUNDWATER

CONTAMINANT HAZARD FACTOR (CHF):

Significant (If Total > 100):
 Moderate (If Total 2-100):
 Minimum (If Total < 2):

<u>Contaminant</u>	<u>Max Concentration (ppb)</u>	<u>Standard (ppb)</u>	<u>Ratio</u>
No Contaminants	0.00		
	Total		

MIGRATION PATHWAY FACTOR (MPF):

- Evident** - Analytical data or observable evidence indicates that contamination in the media is moving away from the source.
- Potential** - Possibility for contamination to be present at or migrate to a point of exposure; or information is not sufficient to make a determination of Evident or Confined.
- Confined** - Information indicates that the potential for contaminant migration from the source is limited (due to geological structures or physical controls).

Evident:
 Potential:
 Confined:

Brief rationale/source for selection:

RECEPTOR FACTOR (RF):

- Identified** - There is a threatened or potentially threatened water supply downgradient of the source. The groundwater (contaminated or not) is a current source of drinking water or source of water for other beneficial uses such as irrigation/agricultures (equivalent to Class I or IIA aquifer).
- Potential** - There is no potentially threatened water supply well downgradient of the source. The groundwater is potentially usable for drinking water, irrigation, or agricultures, but is not presently used (equivalent to Class IIB aquifer).
- Limited** - There is no potentially threatened water supply well downgradient of the source. The groundwater is not considered a potential source of drinking water or is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only)

Identified:
 Potential:
 Limited:

Brief rationale/source for selection:

Groundwater Category:

NE

SURFACE WATER - HUMAN

CONTAMINANT HAZARD FACTOR (CHF):

Significant (If Total > 100):
Moderate (If Total 2-100):
Minimum (If Total < 2):

<u>Contaminant</u>	<u>Max Concentration (ppb)</u>	<u>Standard (ppb)</u>	<u>Ratio</u>
No Contaminants			<hr/> Total

MIGRATION PATHWAY FACTOR (MPF):

- Evident** - Analytical data or observable evidence indicates that contamination in the media is present at, or moving toward, has moved to a point of exposure.
- Potential** - Possibility for contamination to be present at or migrate to a point of exposure; or information is not sufficient to make a determination of Evident or Confined.
- Confined** - Information indicates that the potential for contaminant migration from the source is limited (due to geological structures or physical controls).

Evident:
Potential:
Confined:

Brief rationale/source for selection:

RECEPTOR FACTOR (RF):

- Identified** - Receptors identified that have access to surface water or sediment.
- Potential** - Potential for receptors to have access to surface water or sediment.
- Limited** - Little or no potential for receptors to have access to surface water or sediment.

Identified:
Potential:
Limited:

Brief rationale/source for selection:

Surface Water - Human Category: NE

SURFACE WATER - ECOLOGICAL

CONTAMINANT HAZARD FACTOR (CHF):

Significant (If Total > 100):
Moderate (If Total 2-100):
Minimum (If Total < 2):

<u>Contaminant</u>	<u>Max Concentration (ppb)</u>	<u>Standard (ppb)</u>	<u>Ratio</u>
No Contaminants			
		<u>Total</u>	

MIGRATION PATHWAY FACTOR (MPF):

- Evident** - Analytical data or observable evidence indicates that contamination in the media is present at, or moving toward, has moved to a point of exposure.
- Potential** - Possibility for contamination to be present at or migrate to a point of exposure; or information is not sufficient to make a determination of Evident or Confined.
- Confined** - Information indicates that the potential for contaminant migration from the source is limited (due to geological structures or physical controls).

Evident:
Potential:
Confined:

Brief rationale/source for selection:

RECEPTOR FACTOR (RF):

- Identified** - Receptors identified that have access to surface water or sediment.
- Potential** - Potential for receptors to have access to surface water of sediment.
- Limited** - Little or no potential for receptors to have access to surface water or sediment.

Identified:
Potential:
Limited:

Brief rationale/source for selection:

Surface Water - Ecological Category:

NE

SEDIMENT - HUMAN

CONTAMINANT HAZARD FACTOR (CHF):

<u>Contaminant</u>	<u>Max Concentration (ppb)</u>	<u>Standard (ppb)</u>	<u>Ratio</u>
No Contaminants			0.00
		<u>Total</u>	0.00

Significant (If Total > 100):
 Moderate (If Total 2-100):
 Minimum (If Total < 2):

MIGRATION PATHWAY FACTOR (MPF):

- Evident** - Analytical data or observable evidence indicates that contamination in the media is present at, moving toward, or has moved to a point of exposure
- Potential** - Possibility for contamination to be present at or migrate to a point of exposure; or information is not sufficient to make a determination of Evident or Confined
- Confined** - Information Indicates that the potential for contaminant migration from the source is limited (due geological structures or physical controls).

Evident:
 Potential:
 Confined:

Brief rationale/source for selection:

RECEPTOR FACTOR (RF)

- Identified** - Receptors identified that have access to surface water or sediment
- Potential** - Potential for receptors to have access to surface water or sediment
- Limited** - Little or no potential for receptors to have access to surface water or sediment

Identified:
 Potential:
 Limited:

Brief rationale/source for selection:

Sediment - Human Category: LOW

SEDIMENT - ECOLOGICAL

CONTAMINANT HAZARD FACTOR (CHF):

Significant (If Total > 100):
 Moderate (If Total 2-100):
 Minimum (If Total < 2):

<u>Contaminant</u>	<u>Max Concentration (ppb)</u>	<u>Standard (ppb)</u>	<u>Ratio</u>
No Contaminants			<u>Total</u>

MIGRATION PATHWAY FACTOR (MPF):

- Evident** - Analytical data or observable evidence indicates that contamination in the media is present at, moving toward, or has moved to a point of exposure
- Potential** - Possibility for contamination to be present at or migrate to a point of exposure; or information is not sufficient to make a determination of Evident or Confined
- Confined** - Information Indicates that the potential for contaminant migration from the source is limited (due geological structures or physical controls).

Evident:
 Potential:
 Confined:

Brief rationale/source for selection:

RECEPTOR FACTOR (RF)

- Identified** - Receptors identified that have access to surface water or sediment
- Potential** - Potential for receptors to have access to surface water or sediment
- Limited** - Little or no potential for receptors to have access to surface water or sediment

Identified:
 Potential:
 Limited:

Brief rationale/source for selection:

Sediment - Ecological Category:

LOW

SOIL

CONTAMINANT HAZARD FACTOR (CHF):

Significant (If Total > 100): X
 Moderate (If Total 2-100):
 Minimum (If Total < 2):

<u>Contaminant</u>	<u>Max Concentration (ppb)</u>	<u>Standard (ppb)</u>	<u>Ratio</u>
2,4,6-Trinitrotoluene	3,800,000.00	4,800,000.00	0.79
1,3,5-Trinitrobenzene	490,000.00	3,300.00	148.48
RDX (Cyclonite)	9,500,000.00	400,000.00	23.75
Lead	916,000.00	400,000.00	2.29
Cadmium and compounds	877,000.00	38,000.00	23.08
Beryllium and compounds	2,600.00	14,000.00	0.19
Barium and compounds	7,780,000.00	5,300,000.00	1.47
Arsenic	21,600.00	22,000.00	1.66
		Total	201.71

MIGRATION PATHWAY FACTOR (MPF)

- Evident** - Analytical data or observable evidence that contamination is present at, is moving towards, or has moved to a point of exposure.
- Potential** - Possibility for contamination to be present at or migrate to a point of exposure; or information is not sufficient to make a determination of Evident or Confined.
- Confined** - Low possibility for contamination to be present at or migrate to a point of exposure

Evident: X
 Potential:
 Confined:

Brief rationale/source for selection: evident

RECEPTOR FACTOR (RF):

- Identified** - Receptors identified that have access to contaminated soil
- Potential** - Potential for receptors to have access to contaminated soil
- Limited** - Little or no potential for receptors to have access to contaminated soil

Identified: X
 Potential:
 Limited:

Brief rationale/source for selection: identified

Soil Category: HIGH