

## **APPENDIX H**

### **Ecological Risk Assessment Information and Data**

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**Photograph H-2. North of Active Area at Confluence of Two Channels Between  
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(looking east from the top of a beaver dam on May 18, 2010)**



**Photograph H-3. Winter Scene of North of Active Area at Load Line 12  
(looking north from Newton Falls Road on November 23, 2008)**

Site: LL12 Wetland

Rater(s): J. Grafton

Date: 11/10/2010

|            |          |
|------------|----------|
| 3          | 3        |
| max 6 pts. | subtotal |

**Metric 1. Wetland Area (size).**

- Select one size class and assign score.
- ☐ >50 acres (>20.2ha) (6 pts)
  - ☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)
  - ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
  - ☒ 3 to <10 acres (1.2 to <4ha) (3 pts)
  - ☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
  - ☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
  - ☐ <0.1 acres (0.04ha) (0 pts)

Wetland between LL12 and  
Paris - Windham Rd RVAAP  
Field Survey May 18, 2010

|             |          |
|-------------|----------|
| 5           | 8        |
| max 14 pts. | subtotal |

**Metric 2. Upland buffers and surrounding land use.**

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- ☐ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
  - ☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
  - ☒ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
  - ☐ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- ☒ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
  - ☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)
  - ☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
  - ☐ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

|             |          |
|-------------|----------|
| 20          | 28       |
| max 30 pts. | subtotal |

**Metric 3. Hydrology.**

- 3a. Sources of Water. Score all that apply.
- ☒ High pH groundwater (5)
  - ☐ Other groundwater (3)
  - ☐ Precipitation (1)
  - ☐ Seasonal/Intermittent surface water (3)
  - ☒ Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- ☒ 100 year floodplain (1)
  - ☒ Between stream/lake and other human use (1)
  - ☒ Part of wetland/upland (e.g. forest), complex (1)
  - ☒ Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- ☒ >0.7 (27.6in) (3)
  - ☐ 0.4 to 0.7m (15.7 to 27.6in) (2)
  - ☐ <0.4m (<15.7in) (1)
- 3d. Duration inundation/saturation. Score one or dbl check.
- ☒ Semi- to permanently inundated/saturated (4)
  - ☐ Regularly inundated/saturated (3)
  - ☐ Seasonally inundated (2)
  - ☐ Seasonally saturated in upper 30cm (12in) (1)
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- ☐ None or none apparent (12)
  - ☒ Recovered (7)
  - ☐ Recovering (3)
  - ☐ Recent or no recovery (1)

| Check all disturbances observed           |                                                       |
|-------------------------------------------|-------------------------------------------------------|
| <input checked="" type="checkbox"/> ditch | <input type="checkbox"/> point source (nonstormwater) |
| <input type="checkbox"/> tile             | <input type="checkbox"/> filling/grading              |
| <input type="checkbox"/> dike             | <input checked="" type="checkbox"/> road bed/RR track |
| <input type="checkbox"/> weir             | <input type="checkbox"/> dredging                     |
| <input type="checkbox"/> stormwater input | <input type="checkbox"/> other                        |

|             |          |
|-------------|----------|
| 9           | 37       |
| max 20 pts. | subtotal |

**Metric 4. Habitat Alteration and Development.**

- 4a. Substrate disturbance. Score one or double check and average.
- ☐ None or none apparent (4)
  - ☐ Recovered (3)
  - ☒ Recovering (2)
  - ☐ Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- ☐ Excellent (7)
  - ☐ Very good (6)
  - ☐ Good (5)
  - ☒ Moderately good (4)
  - ☐ Fair (3)
  - ☐ Poor to fair (2)
  - ☐ Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- ☐ None or none apparent (9)
  - ☒ Recovered (6)
  - ☒ Recovering (3)
  - ☐ Recent or no recovery (1)

| Check all disturbances observed                      |                                                         |
|------------------------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> mowing                      | <input type="checkbox"/> shrub/sapling removal          |
| <input type="checkbox"/> grazing                     | <input type="checkbox"/> herbaceous/aquatic bed removal |
| <input type="checkbox"/> clearcutting                | <input type="checkbox"/> sedimentation                  |
| <input type="checkbox"/> selective cutting           | <input checked="" type="checkbox"/> dredging            |
| <input type="checkbox"/> woody debris removal        | <input type="checkbox"/> farming                        |
| <input checked="" type="checkbox"/> toxic pollutants | <input type="checkbox"/> nutrient enrichment            |

|                    |
|--------------------|
| 37                 |
| subtotal this page |

last revised 1 February 2001 jim

Figure H-1. Ohio Rapid Assessment Method Worksheet for the Load Line 12 Wetland

ORAM v. 5.0 Field Form Quantitative Rating

Site: LL12 Rater(s): J. Gorton Date: 11/10/2010

37  
subtotal first page

0 37  
max 10 pts. subtotal

**Metric 5. Special Wetlands.**

Check all that apply and score as indicated.

- ☐ Bog (10)
- ☐ Fen (10)
- ☐ Old growth forest (10)
- ☐ Mature forested wetland (5)
- ☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- ☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
- ☐ Lake Plain Sand Prairies (Oak Openings) (10)
- ☐ Relict Wet Prairies (10)
- ☐ Known occurrence state/federal threatened or endangered species (10)
- ☐ Significant migratory songbird/water fowl habitat or usage (10)
- ☐ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

14 51  
max 20 pts. subtotal

**Metric 6. Plant communities, interspersions, microtopography.**

6a. Wetland Vegetation Communities. Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- 2 ☒ Emergent
- 2 ☒ Shrub
- 2 ☒ Forest
- ☐ Mudflats
- ☐ Open water
- ☐ Other

6b. horizontal (plan view) Interspersion. Select only one.

- ☐ High (5)
- ☐ Moderately high (4)
- 3 ☒ Moderate (3)
- ☐ Moderately low (2)
- ☐ Low (1)
- ☐ None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- ☐ Extensive >75% cover (-5)
- 1 ☒ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☐ Nearly absent <5% cover (0)
- ☐ Absent (1)

6d. Microtopography. Score all present using 0 to 3 scale.

- 1 ☒ Vegetated hummocks/tussucks
- 2 ☒ Coarse woody debris >15cm (6in)
- 2 ☒ Standing dead >25cm (10in) dbh
- 1 ☒ Amphibian breeding pools

**Vegetation Community Cover Scale**

|   |                                                                                                                                                   |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 | Absent or comprises <0.1ha (0.2471 acres) contiguous area                                                                                         |
| 1 | Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality |
| 2 | Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality |
| 3 | Present and comprises significant part, or more, of wetland's vegetation and is of high quality                                                   |

**Narrative Description of Vegetation Quality**

|      |                                                                                                                                                                                                                                                        |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| low  | Low spp diversity and/or predominance of nonnative or disturbance tolerant native species                                                                                                                                                              |
| mod  | Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp |
| high | A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp                          |

**Mudflat and Open Water Class Quality**

|   |                                         |
|---|-----------------------------------------|
| 0 | Absent <0.1ha (0.247 acres)             |
| 1 | Low 0.1 to <1ha (0.247 to 2.47 acres)   |
| 2 | Moderate 1 to <4ha (2.47 to 9.88 acres) |
| 3 | High 4ha (9.88 acres) or more           |

**Microtopography Cover Scale**

|   |                                                                                                |
|---|------------------------------------------------------------------------------------------------|
| 0 | Absent                                                                                         |
| 1 | Present very small amounts or if more common of marginal quality                               |
| 2 | Present in moderate amounts, but not of highest quality or in small amounts of highest quality |
| 3 | Present in moderate or greater amounts and of highest quality                                  |

51 Category 2

**End of Quantitative Rating. Complete Categorization Worksheets.**

Wetland between  
LL12 and Paris-Windham  
Road RVAAP  
Field Survey May 18, 2010

Figure H-1. Ohio Rapid Assessment Method Worksheet for the Load Line 12 Wetland (continued)

ORAM v. 5.0 Field Form Quantitative Rating

**Site:** Upper Cobbs Pond **Rater(s):** J. Gorton **Date:** 11/10/2010

**Metric 1. Wetland Area (size).**

3 3  
max 6 pts. subtotal

Select one size class and assign score.

3 ☒ >50 acres (>20.2ha) (6 pts)  
☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)  
☐ 10 to <25 acres (4 to <10.1ha) (4 pts)  
☐ 3 to <10 acres (1.2 to <4ha) (3 pts)  
☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)  
☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)  
☐ <0.1 acres (0.04ha) (0 pts)

Wetland between Upper Cobbs Pond, Paris-Windham Road, and Newton Falls Road (North of LL12)

**Metric 2. Upland buffers and surrounding land use.**

10 13  
max 14 pts. subtotal

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

5 ☒ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)  
☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)  
☐ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)  
☐ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

5 ☒ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)  
☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)  
☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)  
☐ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

**Metric 3. Hydrology.**

20 33  
max 30 pts. subtotal

3a. Sources of Water. Score all that apply.

6 ☒ High pH groundwater (5)  
☒ Other groundwater (3)  
☐ Precipitation (1)  
☒ Seasonal/intermittent surface water (3)  
☒ Perennial surface water (lake or stream) (5)

3c. Maximum water depth. Select only one and assign score.

3 ☒ >0.7 (27.6in) (3)  
☐ 0.4 to 0.7m (15.7 to 27.6in) (2)  
☐ <0.4m (<15.7in) (1)

3b. Connectivity. Score all that apply.

3 ☒ 100 year floodplain (1)  
☒ Between stream/lake and other human use (1)  
☒ Part of wetland/upland (e.g. forest), complex (1)  
☐ Part of riparian or upland corridor (1)

3d. Duration inundation/saturation. Score one or dbl check.

3 ☒ Semi- to permanently inundated/saturated (4)  
☐ Regularly inundated/saturated (3)  
☐ Seasonally inundated (2)  
☐ Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

5 ☒ None or none apparent (12)  
☐ Recovered (7)  
☐ Recovering (3)  
☐ Recent or no recovery (1)

Check all disturbances observed

☒ ditch ☐ point source (nonstormwater)  
☒ tile ☐ filling/grading  
☒ dike ☐ road bed/RR track  
☐ weir ☐ dredging  
☐ stormwater input ☐ other

**Metric 4. Habitat Alteration and Development.**

11 44  
max 20 pts. subtotal

4a. Substrate disturbance. Score one or double check and average.

3 ☒ None or none apparent (4)  
☐ Recovered (3)  
☐ Recovering (2)  
☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

3 ☐ Excellent (7)  
☐ Very good (6)  
☐ Good (5)  
☐ Moderately good (4)  
☒ Fair (3)  
☐ Poor to fair (2)  
☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

5 ☒ None or none apparent (9)  
☐ Recovered (6)  
☐ Recovering (3)  
☐ Recent or no recovery (1)

Check all disturbances observed

☒ mowing ☒ shrub/sapling removal  
☒ grazing ☐ herbaceous/aquatic bed removal  
☐ clearcutting ☐ sedimentation  
☐ selective cutting ☐ dredging  
☐ woody debris removal ☐ farming  
☐ toxic pollutants ☐ nutrient enrichment

44  
subtotal this page

last revised 1 February 2001 jjm

Figure H-2. Ohio Rapid Assessment Method Worksheet for the Upper Cobbs Pond Wetland

ORAM v. 5.0 Field Form Quantitative Rating

Site: Upper Cobbs Pond Rater(s): J. Grafton Date: 11/10/2010

44  
subtotal first page

0 0  
max 10 pts. subtotal

**Metric 5. Special Wetlands.** Check all that apply and score as indicated.

☐ Bog (10)  
☐ Fen (10)  
☐ Old growth forest (10)  
☐ Mature forested wetland (5)  
☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)  
☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)  
☐ Lake Plain Sand Prairies (Oak Openings) (10)  
☐ Relict Wet Prairies (10)  
☐ Known occurrence state/federal threatened or endangered species (10)  
☐ Significant migratory songbird/water fowl habitat or usage (10)  
☐ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

Wetland between Upper Cobbs Pond, Paris-Windham Road, and Newton Falls Road (North of LL 12)  
Field survey May 18, 2010

8 52  
max 20 pts. subtotal

**Metric 6. Plant communities, interspersions, microtopography.**

6a. Wetland Vegetation Communities. Score all present using 0 to 3 scale.

☒ Aquatic bed  
☒ Emergent  
☒ Shrub  
☒ Forest  
☐ Mudflats  
☐ Open water  
☐ Other

6b. horizontal (plan view) Interspersions. Select only one.

☐ High (5)  
☒ Moderately high (4)  
☐ Moderate (3)  
☐ Moderately low (2)  
☐ Low (1)  
☐ None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

☐ Extensive >75% cover (-5)  
☐ Moderate 25-75% cover (-3)  
☒ Sparse 5-25% cover (-1)  
☐ Nearly absent <5% cover (0)  
☐ Absent (1)

6d. Microtopography. Score all present using 0 to 3 scale.

☒ Vegetated hummocks/tussocks  
☐ Coarse woody debris >15cm (6in)  
☐ Standing dead >25cm (10in) dbh  
☐ Amphibian breeding pools

**Vegetation Community Cover Scale**

|   |                                                                                                                                                   |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 | Absent or comprises <0.1ha (0.2471 acres) contiguous area                                                                                         |
| 1 | Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality |
| 2 | Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality |
| 3 | Present and comprises significant part, or more, of wetland's vegetation and is of high quality                                                   |

**Narrative Description of Vegetation Quality**

|      |                                                                                                                                                                                                                                                        |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| low  | Low spp diversity and/or predominance of nonnative or disturbance tolerant native species                                                                                                                                                              |
| mod  | Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp |
| high | A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp                          |

**Mudflat and Open Water Class Quality**

|   |                                         |
|---|-----------------------------------------|
| 0 | Absent <0.1ha (0.247 acres)             |
| 1 | Low 0.1 to <1ha (0.247 to 2.47 acres)   |
| 2 | Moderate 1 to <4ha (2.47 to 9.88 acres) |
| 3 | High 4ha (9.88 acres) or more           |

**Microtopography Cover Scale**

|   |                                                                                                |
|---|------------------------------------------------------------------------------------------------|
| 0 | Absent                                                                                         |
| 1 | Present very small amounts or if more common of marginal quality                               |
| 2 | Present in moderate amounts, but not of highest quality or in small amounts of highest quality |
| 3 | Present in moderate or greater amounts and of highest quality                                  |

52 Category 2

**End of Quantitative Rating. Complete Categorization Worksheets.**

Figure H-2. Ohio Rapid Assessment Method Worksheet for the Upper Cobbs Pond Wetland (continued)

**Table H-1. Historical Active Area Channel ESV Screening Table for Sediment at Load Line 12**

| <b>Analytes that are SRCs</b>                 | <b>CAS registry number</b> | <b>Sediment maximum concentrations (mg/kg)</b> | <b>Preferred ecological screening value (mg/kg)</b> | <b>Reference</b>         | <b>Is maximum above or below the preferred ecological screening value?</b> | <b>Is analyte a PBT compound?<sup>a</sup></b> | <b>Analytes remaining after the EU specific ESV and PBT screen?<sup>b</sup></b> |
|-----------------------------------------------|----------------------------|------------------------------------------------|-----------------------------------------------------|--------------------------|----------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------|
| <b>Inorganics</b>                             |                            |                                                |                                                     |                          |                                                                            |                                               |                                                                                 |
| Aluminum                                      | 7429-90-5                  | 1.46E+04                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Antimony                                      | 7440-36-0                  | 2.80E+00                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Beryllium                                     | 7440-41-7                  | 6.30E-01                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Cadmium                                       | 7440-43-9                  | 3.70E-01                                       | 9.90E-01                                            | MacDonald et al.         | below                                                                      | yes                                           | yes                                                                             |
| Calcium                                       | 7440-70-2                  | 9.76E+03                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Chromium                                      | 7440-47-3                  | 1.91E+01                                       | 4.34E+01                                            | MacDonald et al.         | below                                                                      | no                                            | no                                                                              |
| Cobalt                                        | 7440-48-4                  | 1.36E+01                                       | 5.00E+01                                            | EDQL EPA Region 5 (1998) | below                                                                      | no                                            | no                                                                              |
| Copper                                        | 7440-50-8                  | 4.26E+01                                       | 3.16E+01                                            | MacDonald et al.         | above                                                                      | no                                            | yes                                                                             |
| Cyanide                                       | 57-12-5                    | 2.80E+00                                       | 1.00E-04                                            | EDQL EPA Region 5 (1998) | above                                                                      | no                                            | yes                                                                             |
| Lead                                          | 7439-92-1                  | 7.61E+01                                       | 3.58E+01                                            | MacDonald et al.         | above                                                                      | yes                                           | yes                                                                             |
| Magnesium                                     | 7439-95-4                  | 3.55E+03                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Mercury                                       | 7487-94-6                  | 3.70E-01                                       | 1.80E-01                                            | MacDonald et al.         | above                                                                      | yes                                           | yes                                                                             |
| Nickel                                        | 7440-02-0                  | 2.58E+01                                       | 2.27E+01                                            | MacDonald et al.         | above                                                                      | no                                            | yes                                                                             |
| Selenium                                      | 7782-49-2                  | 1.90E+00                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Silver                                        | 7440-22-4                  | 3.97E+02                                       | 5.00E-01                                            | EDQL EPA Region 5 (1998) | above                                                                      | no                                            | yes                                                                             |
| <b>Semivolatile Organic Compounds (SVOCs)</b> |                            |                                                |                                                     |                          |                                                                            |                                               |                                                                                 |
| PCB-1254                                      | 11097-69-1                 | 1.50E-01                                       | No ESV                                              | No Source                | no screening value                                                         | yes                                           | yes                                                                             |
| 1,2,4-Trichlorobenzene                        | 120-82-1                   | 6.40E-02                                       | 1.17E+01                                            | EDQL EPA Region 5 (1998) | below                                                                      | yes                                           | yes                                                                             |
| 1,2-Dichlorobenzene                           | 95-50-1                    | 9.20E-02                                       | 2.31E-01                                            | EDQL EPA Region 5 (1998) | below                                                                      | no                                            | no                                                                              |
| Benzo(a)anthracene                            | 56-55-3                    | 8.70E-02                                       | 1.08E-01                                            | MacDonald et al.         | below                                                                      | yes                                           | yes                                                                             |
| Benzo(a)pyrene                                | 50-32-8                    | 9.70E-02                                       | 1.50E-01                                            | MacDonald et al.         | below                                                                      | yes                                           | yes                                                                             |
| Benzo(b)fluoranthene                          | 205-99-2                   | 1.70E-01                                       | 1.04E+01                                            | EDQL EPA Region 5 (1998) | below                                                                      | yes                                           | yes                                                                             |
| Benzo(g,h,i)perylene                          | 191-24-2                   | 7.60E-02                                       | 1.70E-01                                            | EDQL EPA Region 5 (1998) | below                                                                      | yes                                           | yes                                                                             |
| Benzo(k)fluoranthene                          | 207-08-9                   | 5.90E-02                                       | 2.40E-01                                            | EDQL EPA Region 5 (1998) | below                                                                      | yes                                           | yes                                                                             |
| Chrysene                                      | 218-01-9                   | 1.20E-01                                       | 1.66E-01                                            | MacDonald et al.         | below                                                                      | yes                                           | yes                                                                             |
| Fluoranthene                                  | 206-44-0                   | 1.40E-01                                       | 4.23E-01                                            | MacDonald et al.         | below                                                                      | yes                                           | yes                                                                             |
| Indeno(1,2,3-cd)pyrene                        | 193-39-5                   | 7.20E-02                                       | 2.00E-01                                            | EDQL EPA Region 5 (1998) | below                                                                      | No Kow                                        | no                                                                              |
| Phenanthrene                                  | 85-01-8                    | 1.00E-01                                       | 2.04E-01                                            | MacDonald et al.         | below                                                                      | yes                                           | yes                                                                             |

**Table H-1. Historical Active Area Channel ESV Screening Table for Sediment at Load Line 12 (continued)**

| Analytes that are SRCs | CAS registry number | Sediment maximum concentrations (mg/kg) | Preferred ecological screening value (mg/kg) | Reference                | Is maximum above or below the preferred ecological screening value? | Is analyte a PBT compound? <sup>a</sup> | Analytes remaining after the EU specific ESV and PBT screen? <sup>b</sup> |
|------------------------|---------------------|-----------------------------------------|----------------------------------------------|--------------------------|---------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------|
| Pyrene                 | 129-00-0            | 1.60E-01                                | 1.95E-01                                     | MacDonald et al.         | below                                                               | yes                                     | yes                                                                       |
| Methylene chloride     | 75-09-2             | 4.30E-03                                | 1.26E+00                                     | EDQL EPA Region 5 (1998) | below                                                               | no                                      | no                                                                        |
| <b>Miscellaneous</b>   |                     |                                         |                                              |                          |                                                                     |                                         |                                                                           |
| Total Organic Carbon   | N997                | 1.60E+04                                | No ESV                                       | No Source                | no screening value                                                  | No Kow                                  | yes                                                                       |

SRCs = Site Related Chemicals

Max = Maximum detected concentration

ESV = Preferred Ecological Screening Value

PBT = Persistent, bioaccumulative, and toxic compounds

EU = Exposure Unit

<sup>a</sup>yes = BAF<sub>max</sub> ≥ 2 for inorganics or Log Kow ≥ 4 for organics; no = BAF<sub>max</sub> ≤ 2 for inorganics or Log Kow ≤ 4 for organics

<sup>b</sup>yes = Max ≥ ESV, or analyte doesn't have an ESV, or the analyte is a PBT compound; no = Max < ESV and analyte is not a PBT compound

BAF<sub>max</sub> = Bioaccumulation factor (maximum)

K<sub>ow</sub> = Octanol-water partition coefficient

Source: Appendix Table T-8. Active Area Channel Aggregate ESV Screening Table for Sediment at Load Line 12, RVAAP, Ravenna, Ohio from U.S. Army Corps of Engineers. *Phase II Remedial Investigation Report for Load Line 12 at the Ravenna Army Ammunition Plant*. March 2004.

**Table H-2. Historical North of Active Area ESV Screening Table for Sediment at Load Line 12**

| <b>Analytes that are SRCs</b>                 | <b>CAS registry number</b> | <b>Sediment maximum concentrations (mg/kg)</b> | <b>Preferred ecological screening value (mg/kg)</b> | <b>Reference</b>         | <b>Is maximum above or below the preferred ecological screening value?</b> | <b>Is analyte a PBT compound?<sup>a</sup></b> | <b>Analytes remaining after the EU specific ESV and PBT screen?<sup>b</sup></b> |
|-----------------------------------------------|----------------------------|------------------------------------------------|-----------------------------------------------------|--------------------------|----------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------|
| <b>Inorganics</b>                             |                            |                                                |                                                     |                          |                                                                            |                                               |                                                                                 |
| Aluminum                                      | 7429-90-5                  | 1.93E+04                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Antimony                                      | 7440-36-0                  | 9.60E-01                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Barium                                        | 7440-39-3                  | 1.29E+02                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Beryllium                                     | 7440-41-7                  | 7.80E-01                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Cadmium                                       | 7440-43-9                  | 1.30E+00                                       | 9.90E-01                                            | MacDonald et al.         | above                                                                      | yes                                           | yes                                                                             |
| Calcium                                       | 7440-70-2                  | 7.98E+03                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Chromium                                      | 7440-47-3                  | 2.34E+01                                       | 4.34E+01                                            | MacDonald et al.         | below                                                                      | no                                            | no                                                                              |
| Chromium, hexavalent                          | 18540-29-9                 | 1.60E+00                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Cobalt                                        | 7440-48-4                  | 1.86E+01                                       | 5.00E+01                                            | EDQL EPA Region 5 (1998) | below                                                                      | no                                            | no                                                                              |
| Copper                                        | 7440-50-8                  | 4.09E+01                                       | 3.16E+01                                            | MacDonald et al.         | above                                                                      | no                                            | yes                                                                             |
| Mercury                                       | 7487-94-6                  | 1.20E-01                                       | 1.80E-01                                            | MacDonald et al.         | below                                                                      | yes                                           | yes                                                                             |
| Nickel                                        | 7440-02-0                  | 2.41E+01                                       | 2.27E+01                                            | MacDonald et al.         | above                                                                      | no                                            | yes                                                                             |
| Selenium                                      | 7782-49-2                  | 2.50E+00                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Silver                                        | 7440-22-4                  | 2.75E+01                                       | 5.00E-01                                            | EDQL EPA Region 5 (1998) | above                                                                      | no                                            | yes                                                                             |
| Vanadium                                      | 7440-62-2                  | 3.21E+01                                       | No ESV                                              | No Source                | no screening value                                                         | no                                            | yes                                                                             |
| Zinc                                          | 7440-66-6                  | 5.42E+02                                       | 1.21E+02                                            | MacDonald et al.         | above                                                                      | yes                                           | yes                                                                             |
| <b>Semivolatile Organic Compounds (SVOCs)</b> |                            |                                                |                                                     |                          |                                                                            |                                               |                                                                                 |
| Benzo(a)anthracene                            | 56-55-3                    | 1.50E-01                                       | 1.08E-01                                            | MacDonald et al.         | above                                                                      | yes                                           | yes                                                                             |
| Benzo(a)pyrene                                | 50-32-8                    | 1.80E-01                                       | 1.50E-01                                            | MacDonald et al.         | above                                                                      | yes                                           | yes                                                                             |
| Benzo(b)fluoranthene                          | 205-99-2                   | 2.70E-01                                       | 1.04E+01                                            | EDQL EPA Region 5 (1998) | below                                                                      | yes                                           | yes                                                                             |
| Benzo(g,h,i)perylene                          | 191-24-2                   | 1.00E-01                                       | 1.70E-01                                            | EDQL EPA Region 5 (1998) | below                                                                      | yes                                           | yes                                                                             |
| Benzo(k)fluoranthene                          | 207-08-9                   | 1.00E-01                                       | 2.40E-01                                            | EDQL EPA Region 5 (1998) | below                                                                      | yes                                           | yes                                                                             |
| Bis(2-ethylhexyl)phthalate                    | 117-81-7                   | 2.30E-01                                       | 1.82E-01                                            | EDQL EPA Region 5 (1998) | above                                                                      | yes                                           | yes                                                                             |
| Chrysene                                      | 218-01-9                   | 1.90E-01                                       | 1.66E-01                                            | MacDonald et al.         | above                                                                      | yes                                           | yes                                                                             |
| Fluoranthene                                  | 206-44-0                   | 2.00E-01                                       | 4.23E-01                                            | MacDonald et al.         | below                                                                      | yes                                           | yes                                                                             |
| Indeno(1,2,3-cd)pyrene                        | 193-39-5                   | 1.00E-01                                       | 2.00E-01                                            | EDQL EPA Region 5 (1998) | below                                                                      | No Kow                                        | no                                                                              |
| Phenanthrene                                  | 85-01-8                    | 7.70E-02                                       | 2.04E-01                                            | MacDonald et al.         | below                                                                      | yes                                           | yes                                                                             |
| Pyrene                                        | 129-00-0                   | 2.40E-01                                       | 1.95E-01                                            | MacDonald et al.         | above                                                                      | yes                                           | yes                                                                             |

**Table H-2. Historical North of Active Area ESV Screening Table for Sediment at Load Line 12 (continued)**

| <b>Analytes that are SRCs</b>            | <b>CAS registry number</b> | <b>Sediment maximum concentrations (mg/kg)</b> | <b>Preferred ecological screening value (mg/kg)</b> | <b>Reference</b>         | <b>Is maximum above or below the preferred ecological screening value?</b> | <b>Is analyte a PBT compound?<sup>a</sup></b> | <b>Analytes remaining after the EU specific ESV and PBT screen?<sup>b</sup></b> |
|------------------------------------------|----------------------------|------------------------------------------------|-----------------------------------------------------|--------------------------|----------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------|
| <b>Volatile Organic Compounds (VOCs)</b> |                            |                                                |                                                     |                          |                                                                            |                                               |                                                                                 |
| 2-Butanone                               | 78-93-3                    | 1.70E-02                                       | 1.37E-01                                            | EDQL EPA Region 5 (1998) | below                                                                      | no                                            | no                                                                              |
| Acetone                                  | 67-64-1                    | 6.40E-02                                       | 4.53E-01                                            | EDQL EPA Region 5 (1998) | below                                                                      | no                                            | no                                                                              |
| Methylene chloride                       | 75-09-2                    | 3.20E-03                                       | 1.26E+00                                            | EDQL EPA Region 5 (1998) | below                                                                      | no                                            | no                                                                              |
| Toluene                                  | 108-88-3                   | 2.60E-03                                       | 5.25E+01                                            | EDQL EPA Region 5 (1998) | below                                                                      | no                                            | no                                                                              |
| <b>Miscellaneous</b>                     |                            |                                                |                                                     |                          |                                                                            |                                               |                                                                                 |
| Total Organic Carbon                     | N997                       | 2.90E+04                                       | No ESV                                              | No Source                | no screening value                                                         | No Kow                                        | yes                                                                             |
| <b>Explosives</b>                        |                            |                                                |                                                     |                          |                                                                            |                                               |                                                                                 |
| 1,3-Dinitrobenzene                       | 99-65-0                    | 5.90E-02                                       | 9.24E-04                                            | EDQL EPA Region 5 (1998) | above                                                                      | no                                            | yes                                                                             |

SRCs = Site Related Chemicals

Max = Maximum detected concentration

ESV = Preferred Ecological Screening Value

PBT = Persistent, bioaccumulative, and toxic compounds

EU = Exposure Unit

<sup>a</sup>yes = BAF<sub>max</sub> ≥ 2 for inorganics or Log K<sub>ow</sub> ≥ 4 for organics; no = BAF<sub>max</sub> ≤ 2 for inorganics or Log K<sub>ow</sub> ≤ 4 for organics

<sup>b</sup>yes = Max ≥ ESV, or analyte doesn't have an ESV, or the analyte is a PBT compound; no = Max < ESV and analyte is not a PBT compound

BAF<sub>max</sub> = Bioaccumulation factor (maximum)

K<sub>ow</sub> = Octanol-water partition coefficient

Source: Appendix Table T-11. North of Active Area Aggregate ESV Screening Table for Sediment at Load Line 12, RVAAP, Ravenna, Ohio from U.S. Army Corps of Engineers. *Phase II Remedial Investigation Report for Load Line 12 at the Ravenna Army Ammunition Plant*. March 2004.

**Table H-3. Historical Active Area Channel ESV Screening Table for Surface Water at Load Line 12**

| <b>Analytes that are SRCs</b>            | <b>CAS registry number</b> | <b>Surface water maximum concentrations (µg/L)</b> | <b>Preferred ecological screening value (µg/L)</b> | <b>Reference</b>          | <b>Is Maximum above or below the Ohio code value or preferred ecological screening value?</b> | <b>Is analyte a PBT compound?<sup>a</sup></b> | <b>Analytes remaining after the EU-specific ESV or Ohio code and PBT screen?<sup>b</sup></b> |
|------------------------------------------|----------------------------|----------------------------------------------------|----------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>Inorganics</b>                        |                            |                                                    |                                                    |                           |                                                                                               |                                               |                                                                                              |
| Aluminum                                 | 7429-90-5                  | 6.90E+03                                           | 8.70E+01                                           | NAWQC (Suter & Tsao 1996) | above                                                                                         | no                                            | yes                                                                                          |
| Barium                                   | 7440-39-3                  | 1.10E+02                                           | 4.00E+00                                           | Ohio Administrative Code  | above                                                                                         | no                                            | yes                                                                                          |
| Cadmium                                  | 7440-43-9                  | 9.10E-01                                           | 4.30E+00                                           | Ohio Administrative Code  | below                                                                                         | no                                            | no                                                                                           |
| Calcium                                  | 7440-70-2                  | 1.84E+05                                           | No ESV                                             | No Source                 | no screening value                                                                            | no                                            | yes                                                                                          |
| Chromium                                 | 7440-47-3                  | 8.70E+00                                           | 1.80E+03                                           | Ohio Administrative Code  | below                                                                                         | no                                            | no                                                                                           |
| Cobalt                                   | 7440-48-4                  | 7.40E+00                                           | 6.60E+01                                           | Ohio Administrative Code  | below                                                                                         | no                                            | no                                                                                           |
| Copper                                   | 7440-50-8                  | 2.10E+01                                           | 1.40E+01                                           | Ohio Administrative Code  | above                                                                                         | no                                            | yes                                                                                          |
| Iron                                     | 7439-89-6                  | 1.01E+04                                           | 1.00E+03                                           | NAWQC (Suter & Tsao 1996) | above                                                                                         | no                                            | yes                                                                                          |
| Lead                                     | 7439-92-1                  | 2.20E+01                                           | 1.20E+02                                           | Ohio Administrative Code  | below                                                                                         | no                                            | no                                                                                           |
| Magnesium                                | 7439-95-4                  | 4.95E+04                                           | No ESV                                             | No Source                 | no screening value                                                                            | no                                            | yes                                                                                          |
| Manganese                                | 7439-96-5                  | 3.60E+03                                           | 9.80E+02                                           | Ohio Administrative Code  | above                                                                                         | no                                            | yes                                                                                          |
| Nickel                                   | 7440-02-0                  | 2.10E+01                                           | 4.70E+02                                           | Ohio Administrative Code  | below                                                                                         | no                                            | no                                                                                           |
| Potassium                                | 7440-09-7                  | 6.20E+03                                           | No ESV                                             | No Source                 | no screening value                                                                            | yes                                           | yes                                                                                          |
| Selenium                                 | 7782-49-2                  | 6.40E+00                                           | 5.00E+00                                           | Ohio Administrative Code  | above                                                                                         | no                                            | yes                                                                                          |
| Silver                                   | 7440-22-4                  | 9.20E+01                                           | 1.40E+00                                           | Ohio Administrative Code  | above                                                                                         | no                                            | yes                                                                                          |
| Sodium                                   | 7440-23-5                  | 2.50E+04                                           | No ESV                                             | No Source                 | no screening value                                                                            | no                                            | yes                                                                                          |
| Vanadium                                 | 7440-62-2                  | 1.10E+01                                           | 2.50E+02                                           | Ohio Administrative Code  | below                                                                                         | no                                            | no                                                                                           |
| Zinc                                     | 7440-66-6                  | 1.50E+02                                           | 1.20E+02                                           | Ohio Administrative Code  | above                                                                                         | yes                                           | yes                                                                                          |
| <b>Anions</b>                            |                            |                                                    |                                                    |                           |                                                                                               |                                               |                                                                                              |
| Nitrate                                  | 14797-55-8                 | 2.11E+04                                           | No ESV                                             | No Source                 | no screening value                                                                            | no                                            | yes                                                                                          |
| <b>Volatile Organic Compounds (VOCs)</b> |                            |                                                    |                                                    |                           |                                                                                               |                                               |                                                                                              |
| Methylene chloride                       | 75-09-2                    | 3.10E+00                                           | 9.70E+03                                           | Ohio Administrative Code  | below                                                                                         | no                                            | no                                                                                           |
| <b>Explosives</b>                        |                            |                                                    |                                                    |                           |                                                                                               |                                               |                                                                                              |
| 1,3,5-Trinitrobenzene                    | 99-35-4                    | 9.00E+00                                           | No ESV                                             | No Source                 | no screening value                                                                            | no                                            | yes                                                                                          |

**Table H-3. Historical Active Area Channel ESV Screening Table for Surface Water at Load Line 12 (continued)**

| Analytes that are SRCs     | CAS registry number | Surface water maximum concentrations (µg/L) | Preferred ecological screening value (µg/L) | Reference                | Is Maximum above or below the Ohio code value or preferred ecological screening value? | Is analyte a PBT compound? <sup>a</sup> | Analytes remaining after the EU-specific ESV or Ohio code and PBT screen? <sup>b</sup> |
|----------------------------|---------------------|---------------------------------------------|---------------------------------------------|--------------------------|----------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------|
| 2,4,6-Trinitrotoluene      | 118-96-7            | 1.10E+01                                    | No ESV                                      | No Source                | no screening value                                                                     | no                                      | yes                                                                                    |
| 2,4-Dinitrotoluene         | 121-14-2            | 1.60E+00                                    | 1.20E+03                                    | Ohio Administrative Code | below                                                                                  | no                                      | no                                                                                     |
| 2,6-Dinitrotoluene         | 606-20-2            | 5.40E-01                                    | 9.50E+02                                    | Ohio Administrative Code | below                                                                                  | no                                      | no                                                                                     |
| 2-Amino-4,6-Dinitrotoluene | 35572-78-2          | 1.60E-01                                    | No ESV                                      | No Source                | no screening value                                                                     | No Kow                                  | yes                                                                                    |
| 2-Nitrotoluene             | 88-72-2             | 9.70E-01                                    | No ESV                                      | No Source                | no screening value                                                                     | no                                      | yes                                                                                    |
| 3-Nitrotoluene             | 99-08-1             | 1.60E-01                                    | No ESV                                      | No Source                | no screening value                                                                     | no                                      | yes                                                                                    |
| 4-Nitrotoluene             | 99-99-0             | 9.10E-01                                    | No ESV                                      | No Source                | no screening value                                                                     | no                                      | yes                                                                                    |
| HMX                        | 2691-41-0           | 1.90E+00                                    | No ESV                                      | No Source                | no screening value                                                                     | No Kow                                  | yes                                                                                    |
| RDX                        | 121-82-4            | 6.60E+00                                    | No ESV                                      | No Source                | no screening value                                                                     | no                                      | yes                                                                                    |
| Tetryl                     | 479-45-8            | 8.70E+00                                    | No ESV                                      | No Source                | no screening value                                                                     | No Kow                                  | yes                                                                                    |

SRCs = Site Related Chemicals

Max = Maximum detected concentration

ESV = Preferred Ecological Screening Value

PBT = Persistent, bioaccumulative, and toxic compounds

EU = Exposure Unit

<sup>a</sup>yes = BCF<sub>max</sub> ≥ 500 for inorganics or Log Kow ≥ 4 for organics; no = BCF<sub>max</sub> < 500 for inorganics or Log Kow < 4 for organics

<sup>b</sup>yes = Max ≥ ESV, or analyte doesn't have an ESV, or the analyte is a PBT compound; no = Max < ESV and analyte is not a PBT compound

BAF<sub>max</sub> = Bioaccumulation factor (maximum)

K<sub>ow</sub> = Octanol-water partition coefficient

Source: Appendix Table T-13. Active Area Channel Aggregate ESV Screening Table for Surface Water at Load Line 1, RVAAP, Ravenna, Ohio from U.S. Army Corps of Engineers. *Phase II Remedial Investigation Report for Load Line 12 at the Ravenna Army Ammunition Plant*. March 2004.

**Table H-4. Historical North of Active Area ESV Screening Table for Surface Water at Load Line 12**

| <b>Analytes that are SRCs</b>                 | <b>CAS<br/>registry<br/>number</b> | <b>Surface water<br/>maximum<br/>concentrations<br/>(µg/L)</b> | <b>Preferred<br/>ecological<br/>screening<br/>value<br/>(µg/L)</b> | <b>Reference</b>          | <b>Is Maximum<br/>above or below<br/>the Ohio code<br/>value or<br/>preferred<br/>ecological<br/>screening value?</b> | <b>Is analyte a<br/>PBT<br/>compound?<sup>a</sup></b> | <b>Analytes<br/>remaining<br/>after the EU-<br/>specific ESV<br/>or Ohio code<br/>and PBT<br/>screen?<sup>b</sup></b> |
|-----------------------------------------------|------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Inorganics</b>                             |                                    |                                                                |                                                                    |                           |                                                                                                                       |                                                       |                                                                                                                       |
| Aluminum                                      | 7429-90-5                          | 4.60E+03                                                       | 8.70E+01                                                           | NAWQC (Suter & Tsao 1996) | above                                                                                                                 | no                                                    | yes                                                                                                                   |
| Arsenic                                       | 7440-38-2                          | 7.90E+00                                                       | 3.40E+02                                                           | Ohio Administrative Code  | below                                                                                                                 | no                                                    | no                                                                                                                    |
| Barium                                        | 7440-39-3                          | 8.60E+01                                                       | 4.00E+00                                                           | Ohio Administrative Code  | above                                                                                                                 | no                                                    | yes                                                                                                                   |
| Cadmium                                       | 7440-43-9                          | 3.60E-01                                                       | 4.30E+00                                                           | Ohio Administrative Code  | below                                                                                                                 | no                                                    | no                                                                                                                    |
| Calcium                                       | 7440-70-2                          | 1.03E+05                                                       | No ESV                                                             | No Source                 | no screening                                                                                                          | no                                                    | yes                                                                                                                   |
| Chromium                                      | 7440-47-3                          | 5.50E+00                                                       | 1.80E+03                                                           | Ohio Administrative Code  | below                                                                                                                 | no                                                    | no                                                                                                                    |
| Cobalt                                        | 7440-48-4                          | 3.90E+00                                                       | 6.60E+01                                                           | Ohio Administrative Code  | below                                                                                                                 | no                                                    | no                                                                                                                    |
| Copper                                        | 7440-50-8                          | 1.30E+01                                                       | 1.40E+01                                                           | Ohio Administrative Code  | below                                                                                                                 | no                                                    | no                                                                                                                    |
| Iron                                          | 7439-89-6                          | 9.70E+03                                                       | 1.00E+03                                                           | NAWQC (Suter & Tsao 1996) | above                                                                                                                 | no                                                    | yes                                                                                                                   |
| Lead                                          | 7439-92-1                          | 8.40E+00                                                       | 1.20E+02                                                           | Ohio Administrative Code  | below                                                                                                                 | no                                                    | no                                                                                                                    |
| Magnesium                                     | 7439-95-4                          | 1.24E+04                                                       | No ESV                                                             | No Source                 | no screening                                                                                                          | no                                                    | yes                                                                                                                   |
| Manganese                                     | 7439-96-5                          | 9.30E+02                                                       | 9.80E+02                                                           | Ohio Administrative Code  | below                                                                                                                 | no                                                    | no                                                                                                                    |
| Nickel                                        | 7440-02-0                          | 7.20E+00                                                       | 4.70E+02                                                           | Ohio Administrative Code  | below                                                                                                                 | no                                                    | no                                                                                                                    |
| Potassium                                     | 7440-09-7                          | 4.80E+03                                                       | No ESV                                                             | No Source                 | no screening                                                                                                          | yes                                                   | yes                                                                                                                   |
| Selenium                                      | 7782-49-2                          | 4.70E+00                                                       | 5.00E+00                                                           | Ohio Administrative Code  | below                                                                                                                 | no                                                    | no                                                                                                                    |
| Silver                                        | 7440-22-4                          | 1.20E+01                                                       | 1.40E+00                                                           | Ohio Administrative Code  | above                                                                                                                 | no                                                    | yes                                                                                                                   |
| Vanadium                                      | 7440-62-2                          | 7.90E+00                                                       | 2.50E+02                                                           | Ohio Administrative Code  | below                                                                                                                 | no                                                    | no                                                                                                                    |
| Zinc                                          | 7440-66-6                          | 1.30E+02                                                       | 1.20E+02                                                           | Ohio Administrative Code  | above                                                                                                                 | yes                                                   | yes                                                                                                                   |
| <b>Anions</b>                                 |                                    |                                                                |                                                                    |                           |                                                                                                                       |                                                       |                                                                                                                       |
| Nitrate                                       | 14797-55-8                         | 2.70E+02                                                       | No ESV                                                             | No Source                 | no screening                                                                                                          | no                                                    | yes                                                                                                                   |
| <b>Semivolatile Organic Compounds (SVOCs)</b> |                                    |                                                                |                                                                    |                           |                                                                                                                       |                                                       |                                                                                                                       |
| Bis(2-ethylhexyl)phthalate                    | 117-81-7                           | 1.00E+01                                                       | 1.10E+03                                                           | Ohio Administrative Code  | below                                                                                                                 | yes                                                   | yes                                                                                                                   |

**Table H-4. Historical North of Active Area ESV Screening Table for Surface Water at Load Line 12 (continued)**

|                                          | CAS<br>registry<br>number | Surface water<br>maximum<br>concentrations<br>(µg/L) | Preferred<br>ecological<br>screening<br>value<br>(µg/L) | Reference                | Is Maximum<br>above or below<br>the Ohio code<br>value or<br>preferred<br>ecological<br>screening value? | Is analyte a<br>PBT<br>compound? <sup>a</sup> | Analytes<br>remaining<br>after the EU-<br>specific ESV<br>or Ohio code<br>and PBT<br>screen? <sup>b</sup> |
|------------------------------------------|---------------------------|------------------------------------------------------|---------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Analytes that are SRCs</b>            |                           |                                                      |                                                         |                          |                                                                                                          |                                               |                                                                                                           |
| <b>Volatile Organic Compounds (VOCs)</b> |                           |                                                      |                                                         |                          |                                                                                                          |                                               |                                                                                                           |
| Methylene chloride                       | 75-09-2                   | 1.80E+00                                             | 9.70E+03                                                | Ohio Administrative Code | below                                                                                                    | no                                            | no                                                                                                        |
| <b>Explosives</b>                        |                           |                                                      |                                                         |                          |                                                                                                          |                                               |                                                                                                           |
| 2,4-Dinitrotoluene                       | 121-14-2                  | 2.20E-01                                             | 1.20E+03                                                | Ohio Administrative Code | below                                                                                                    | no                                            | no                                                                                                        |
| RDX                                      | 121-82-4                  | 6.80E-01                                             | No ESV                                                  | No Source                | no screening                                                                                             | no                                            | yes                                                                                                       |

SRCs = Site Related Chemicals

Max = Maximum detected concentration

ESV = Preferred Ecological Screening Value

PBT = Persistent, bioaccumulative, and toxic compounds

EU = Exposure Unit

<sup>a</sup>yes = BCF<sub>max</sub> ≥ 500 for inorganics or Log K<sub>ow</sub> ≥ 4 for organics; no = BCF<sub>max</sub> < 500 for inorganics or Log K<sub>ow</sub> < 4 for organics

<sup>b</sup>yes = Max ≥ ESV, or analyte doesn't have an ESV, or the analyte is a PBT compound; no = Max < ESV and analyte is not a PBT compound

BAF<sub>max</sub> = Bioaccumulation factor (maximum)

K<sub>ow</sub> = Octanol-water partition coefficient

NAWQC = National Ambient Water Quality Criteria

Source: Appendix Table T-16. North of Active Area Aggregate ESV Screening Table for Surface Water at Load Line 12, RVAAP, Ravenna, Ohio from U.S. Army Corps of Engineers. *Phase II Remedial Investigation Report for Load Line 12 at the Ravenna Army Ammunition Plant*. March 2004.

**Table H-5. Checklist of Important Ecological Places and Resources at Load Line 12**

| Resource                                                                                                             | Army<br>(2005) | Ohio EPA<br>(2008) | Load Line 12 |         |
|----------------------------------------------------------------------------------------------------------------------|----------------|--------------------|--------------|---------|
|                                                                                                                      |                |                    | Absent       | Present |
| National Park                                                                                                        | X              | X                  | X            |         |
| Designated Federal Wilderness Area                                                                                   | X              | X                  | X            |         |
| National Lakeshore Recreational Area                                                                                 | X              | X                  | X            |         |
| Habitat known to be used by federal designated or proposed threatened or endangered species                          | X              | X                  | X            |         |
| National or State Wildlife Refuge                                                                                    | X              | X                  | X            |         |
| Federal land designated for protection of natural ecosystems                                                         | X              | X                  | X            |         |
| Habitat known to be used by state designated threatened or endangered species                                        | X              | X                  | X            |         |
| Federally-designated scenic or wild river                                                                            | X              | X                  | X            |         |
| State land designated for wildlife or game management                                                                | X              | X                  | X            |         |
| State-designated scenic or wild river                                                                                | X              | X                  | X            |         |
| <b>Wetlands and waters of the state<sup>a</sup></b>                                                                  | X              | X                  |              | X       |
| National preserve                                                                                                    | X              | X <sup>b</sup>     | X            |         |
| State-designated natural areas                                                                                       | X              | X <sup>b</sup>     | X            |         |
| Spawning areas critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters    | X              | X <sup>c</sup>     | X            |         |
| Migratory pathways and feeding areas critical for maintenance of anadromous fish species <sup>d</sup>                | X              | X <sup>c</sup>     | X            |         |
| Terrestrial areas used for breeding by large or dense aggregations of animals                                        | X              | X <sup>c</sup>     | X            |         |
| <b>Particular areas, relatively small in size, important to maintenance of unique biotic communities<sup>e</sup></b> | X              | X <sup>c</sup>     | X            |         |
| <b>Locally important ecological place<sup>f</sup></b>                                                                | X              |                    | X            |         |
| Critical habitat for federal designated threatened or endangered species                                             | X              |                    | X            |         |
| Marine sanctuary                                                                                                     | X              |                    | X            |         |
| Areas identified under the Coastal Zone Management Act                                                               | X              |                    | X            |         |
| Sensitive Areas identified under the National Estuary Program or Near Coastal Waters Program                         | X              |                    | X            |         |
| Critical areas identified under the Clean Lakes Program                                                              | X              |                    | X            |         |
| National monument                                                                                                    | X              |                    | X            |         |
| National seashore recreational area                                                                                  | X              |                    | X            |         |
| Unit of coastal barrier resources system                                                                             | X              |                    | X            |         |
| Coastal barrier (undeveloped)                                                                                        | X              |                    | X            |         |
| Coastal barrier (partially developed)                                                                                | X              |                    | X            |         |
| Administratively proposed federal wilderness area                                                                    | X              |                    | X            |         |
| National river reach designated as Recreational                                                                      | X              |                    | X            |         |
| Habitat known to be used by species under review as to its federal threatened or endangered status                   | X              |                    | X            |         |
| State-designated areas for protection or maintenance of aquatic life                                                 | X              |                    | X            |         |
| Fragile landscapes, land sensitive to degradation if vegetative habitat or cover diminishes                          | X              |                    | X            |         |
| State, local, or private land designated for protection of natural ecosystems                                        |                | X                  | X            |         |
| Federal land designated for wildlife or game management                                                              |                | X                  | X            |         |

**Table H-5. Checklist of Important Ecological Places and Resources at Load Line 12 (continued)**

| Resource                                                                       | Army<br>(2005) | Ohio EPA<br>(2008) | Load Line 12 |         |
|--------------------------------------------------------------------------------|----------------|--------------------|--------------|---------|
|                                                                                |                |                    | Absent       | Present |
| Surface water, as that term is used in Chapter 3745-1 of the OAC               |                | X                  |              | X       |
| Federally-listed or state-listed threatened or endangered species              |                | X                  | X            |         |
| State of Ohio special interest or declining species and its associated habitat |                | X                  | X            |         |
| State park                                                                     |                | X                  | X            |         |

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

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

<sup>a</sup>For Ohio EPA 2008, as qualified by “regulated under federal law and state of Ohio's water quality laws.”

<sup>b</sup>Ohio EPA does not restrict preserves and natural areas to national or state.

<sup>c</sup>Ohio EPA lists “wildlife populations and their associated important nesting areas and food resources, taking into consideration land use and the quality and extent of habitat on and in the vicinity of the site.”

<sup>d</sup>Within river reaches or areas in lakes or coastal tidal waters in which fish spend extended periods of time.

<sup>e</sup>Identified by the Integrated Natural Resource Management Plan (INRMP), Base Realignment and Closure Cleanup Plan or Redevelopment Plan, or other official land management plans.

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

OAC = Ohio Administrative Code.

Ohio EPA = Ohio Environmental Protection Agency.

RVAAP = Ravenna Army Ammunition Plant.

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

**Table H-6. Natural Resources Management Goals (OHARNG 2014)**

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

**Table H-6. Natural Resources Management Goals (OHARNG 2014) (continued)**

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

**Table H-6. Natural Resources Management Goals (OHARNG 2014) (continued)**

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

**Table H-6. Natural Resources Management Goals (OHARNG 2014) (continued)**

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

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

AOC = Area of concern.

Camp Ravenna = Camp Ravenna Joint Military Training Center.

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act.

DOW = Department of Wildlife.

GIS = Geographic Information System.

HTRW = Hazardous, Toxic and Radioactive Waste.

INRMP = Integrated Natural Resources Management Plan.

ODNR = Ohio Department of Natural Resources.

OHARNG = Ohio Army National Guard.

Ohio EPA = Ohio Environmental Protection Agency.

PLS = Planning Level Survey (Wetland).

RVAAP = Ravenna Army Ammunition Plant.

**Table H-7. Sediment Reference Values for RVAAP**

| <b>Chemical</b> | <b>SRV (mg/kg)</b> |
|-----------------|--------------------|
| Aluminum        | 2.90E+04           |
| Antimony        | 1.30E+00           |
| Arsenic         | 2.50E+01           |
| Barium          | 1.90E+02           |
| Beryllium       | 8.00E-01           |
| Cadmium         | 7.90E-01           |
| Calcium         | 2.10E+04           |
| Chromium        | 2.90E+01           |
| Cobalt          | 1.20E+01           |
| Copper          | 3.20E+01           |
| Iron            | 4.10E+04           |
| Lead            | 4.70E+01           |
| Magnesium       | 7.10E+03           |
| Manganese       | 1.50E+03           |
| Mercury         | 1.20E-01           |
| Nickel          | 3.30E+01           |
| Potassium       | 6.80E+03           |
| Selenium        | 1.70E+00           |
| Silver          | 4.30E-01           |
| Strontium       | 6.20E+01           |
| Thallium        | 4.70E+00           |
| Vanadium        | 4.00E+01           |
| Zinc            | 1.60E+02           |

Values are EOLP (Erie/Ontario Lake Plain) or statewide from Table 2 of Appendix H, Ohio Environmental Protection Agency 2008 *Guidance for Conducting Ecological Risk Assessments*, April 2008.

RVAAP = Ravenna Army Ammunition Plant.

SRV = Sediment reference value

Table H-8. Ecological Screening Values for Chemical Analytes in Sediment

| Analyte              | CAS Registry Number | Sediment Screening Values     |                  |                                                                   |             |                            |                  |
|----------------------|---------------------|-------------------------------|------------------|-------------------------------------------------------------------|-------------|----------------------------|------------------|
|                      |                     | MacDonald et al. <sup>a</sup> |                  | USEPA Region 5 ESLs (2003) <sup>b</sup><br>(update of 1998 EDQLs) |             | Preferred ESV <sup>c</sup> |                  |
|                      |                     | Number (mg/kg)                | Reference        | Number (mg/kg)                                                    | Reference   | Number (mg/kg)             | Reference        |
| Inorganic Chemicals  |                     |                               |                  |                                                                   |             |                            |                  |
| Aluminum             | 7429-90-5           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Antimony             | 7440-36-0           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Arsenic              | 7440-38-2           | 9.79                          | MacDonald et al. | 9.79                                                              | USEPA Reg 5 | 9.79E+00                   | MacDonald et al. |
| Barium               | 7440-39-3           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Beryllium            | 7440-41-7           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Cadmium              | 7440-43-9           | 0.99                          | MacDonald et al. | 0.99                                                              | USEPA Reg 5 | 9.90E-01                   | MacDonald et al. |
| Calcium              | 7440-70-2           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Chromium, trivalent  | 7440-47-3           | 43.4                          | MacDonald et al. | 43.4                                                              | USEPA Reg 5 | 4.34E+01                   | MacDonald et al. |
| Chromium, hexavalent | --                  | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Cobalt               | 7440-48-4           | --                            | --               | 50                                                                | USEPA Reg 5 | 5.00E+01                   | USEPA Reg 5      |
| Copper               | 7440-50-8           | 31.6                          | MacDonald et al. | 31.6                                                              | USEPA Reg 5 | 3.16E+01                   | MacDonald et al. |
| Cyanide              | 57-12-5             | --                            | --               | 0.0001                                                            | USEPA Reg 5 | 1.00E-04                   | USEPA Reg 5      |
| Iron                 | 7439-89-6           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Lead                 | 7439-92-1           | 35.8                          | MacDonald et al. | 35.8                                                              | USEPA Reg 5 | 3.58E+01                   | MacDonald et al. |
| Magnesium            | 7439-95-4           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Manganese            | 7439-96-5           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Mercury              | 7439-97-6           | 0.18                          | MacDonald et al. | 0.174                                                             | USEPA Reg 5 | 1.80E-01                   | MacDonald et al. |
| Mercury, methyl      | 22967-92-6          | --                            | --               | 0.00001                                                           | USEPA Reg 5 | 1.00E-05                   | USEPA Reg 5      |
| Nickel               | 7440-02-0           | 22.7                          | MacDonald et al. | 22.7                                                              | USEPA Reg 5 | 2.27E+01                   | MacDonald et al. |
| Potassium            | 7440-07-7           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Selenium             | 7782-49-2           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Silver               | 7440-22-4           | --                            | --               | 0.5                                                               | USEPA Reg 5 | 5.00E-01                   | USEPA Reg 5      |
| Sodium               | 7440-23-5           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Thallium             | 7440-28-0           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Vanadium             | 7440-62-2           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Zinc                 | 7440-66-6           | 121                           | MacDonald et al. | 121                                                               | USEPA Reg 5 | 1.21E+02                   | MacDonald et al. |
| Organic Chemicals    |                     |                               |                  |                                                                   |             |                            |                  |
| Acenaphthene         | 83-32-9             | --                            | --               | 0.00671                                                           | USEPA Reg 5 | 6.71E-03                   | USEPA Reg 5      |

**Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)**

| Analyte                       | CAS Registry Number | Sediment Screening Values     |                  |                                                                   |             |                            |                  |
|-------------------------------|---------------------|-------------------------------|------------------|-------------------------------------------------------------------|-------------|----------------------------|------------------|
|                               |                     | MacDonald et al. <sup>a</sup> |                  | USEPA Region 5 ESLs (2003) <sup>b</sup><br>(update of 1998 EDQLs) |             | Preferred ESV <sup>c</sup> |                  |
|                               |                     | Number (mg/kg)                | Reference        | Number (mg/kg)                                                    | Reference   | Number (mg/kg)             | Reference        |
| Acenaphthylene                | 208-96-8            | --                            | --               | 0.00587                                                           | USEPA Reg 5 | 5.87E-03                   | USEPA Reg 5      |
| Acetone                       | 67-64-1             | --                            | --               | 0.0099                                                            | USEPA Reg 5 | 9.90E-03                   | USEPA Reg 5      |
| Acetonitrile                  | 75-05-8             | --                            | --               | 0.056                                                             | USEPA Reg 5 | 5.60E-02                   | USEPA Reg 5      |
| Acetylaminofluorene[2-]       | 53-96-3             | --                            | --               | 0.0153                                                            | USEPA Reg 5 | 1.53E-02                   | USEPA Reg 5      |
| Acrolein                      | 107-02-8            | --                            | --               | 1.52E-06                                                          | USEPA Reg 5 | 1.52E-06                   | USEPA Reg 5      |
| Acrylonitrile                 | 107-13-1            | --                            | --               | 0.0012                                                            | USEPA Reg 5 | 1.20E-03                   | USEPA Reg 5      |
| Aldrin                        | 309-00-2            | --                            | --               | 0.002                                                             | USEPA Reg 5 | 2.00E-03                   | USEPA Reg 5      |
| Aniline                       | 62-53-3             | --                            | --               | 0.00031                                                           | USEPA Reg 5 | 3.10E-04                   | USEPA Reg 5      |
| Anthracene                    | 120-12-7            | 0.0572                        | MacDonald et al. | 0.0572                                                            | USEPA Reg 5 | 5.72E-02                   | MacDonald et al. |
| PCB-1016                      | 12674-11-2          | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Arochlor-1221                 | 11104-28-2          | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Arochlor-1232                 | 11141-16-5          | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Arochlor-1242                 | 53469-21-9          | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Arochlor-1248                 | 12672-29-6          | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| PCB-1254                      | 11097-69-1          | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| PCB-1260                      | 11096-82-5          | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Aramite                       | 140-57-8            | --                            | --               | 1.11E-06                                                          | USEPA Reg 5 | 1.11E-06                   | USEPA Reg 5      |
| Azobenzene[p-(dimethylamino)] | 60-11-7             | --                            | --               | 0.318                                                             | USEPA Reg 5 | 3.18E-01                   | USEPA Reg 5      |
| Benzene                       | 71-43-2             | --                            | --               | 0.142                                                             | USEPA Reg 5 | 1.42E-01                   | USEPA Reg 5      |
| Benzenemethanol               | 100-51-6            | --                            | --               | 0.00104                                                           | USEPA Reg 5 | 1.04E-03                   | USEPA Reg 5      |
| Benz(a)anthracene             | 56-55-3             | 0.108                         | MacDonald et al. | 0.108                                                             | USEPA Reg 5 | 1.08E-01                   | MacDonald et al. |
| Benzo(a)pyrene                | 50-32-8             | 0.15                          | MacDonald et al. | 0.15                                                              | USEPA Reg 5 | 1.50E-01                   | MacDonald et al. |
| Benzo(b)fluoranthene          | 205-99-2            | --                            | --               | 10.4                                                              | USEPA Reg 5 | 1.04E+01                   | USEPA Reg 5      |
| Benzo(g,h,i)perylene          | 191-24-2            | --                            | --               | 0.17                                                              | USEPA Reg 5 | 1.70E-01                   | USEPA Reg 5      |
| Benzo(k)fluoranthene          | 207-08-9            | --                            | --               | 0.24                                                              | USEPA Reg 5 | 2.40E-01                   | USEPA Reg 5      |
| BHC                           | 608-73-1            | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| BHC, alpha                    | 319-84-6            | --                            | --               | 0.006                                                             | USEPA Reg 5 | 6.00E-03                   | USEPA Reg 5      |
| BHC, beta                     | 319-85-7            | --                            | --               | 0.005                                                             | USEPA Reg 5 | 5.00E-03                   | USEPA Reg 5      |

**Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)**

| Analyte                     | CAS Registry Number | Sediment Screening Values     |                  |                                                                   |                     |                            |                     |
|-----------------------------|---------------------|-------------------------------|------------------|-------------------------------------------------------------------|---------------------|----------------------------|---------------------|
|                             |                     | MacDonald et al. <sup>a</sup> |                  | USEPA Region 5 ESLs (2003) <sup>b</sup><br>(update of 1998 EDQLs) |                     | Preferred ESV <sup>c</sup> |                     |
|                             |                     | Number (mg/kg)                | Reference        | Number (mg/kg)                                                    | Reference           | Number (mg/kg)             | Reference           |
| BHC, delta                  | 319-86-8            | --                            | --               | 71.5                                                              | USEPA Reg 5         | 7.15E+01                   | USEPA Reg 5         |
| BHC, gamma (lindane)        | 58-89-9             | 0.00237                       | MacDonald et al. | 0.00237                                                           | USEPA Reg 5         | 2.37E-03                   | MacDonald et al.    |
| Biphenyl                    | 92-52-4             | --                            | --               | --                                                                | --                  | No ESV                     | No Source           |
| Bis(2-chloroethoxy) methane | 111-91-1            | --                            | --               | --                                                                | --                  | No ESV                     | No Source           |
| Bis(2-chloroethyl) ether    | 111-44-4            | --                            | --               | 3.52                                                              | USEPA Reg 5         | 3.52E+00                   | USEPA Reg 5         |
| Bis(2-ethylhexyl)phthalate  | 117-81-7            | --                            | --               | 0.182                                                             | USEPA Reg 5         | 1.82E-01                   | USEPA Reg 5         |
| Bromodichloromethane        | 74-97-5             | --                            | --               | --                                                                | --                  | No ESV                     | No Source           |
| Bromoform                   | 75-25-2             | --                            | --               | 0.492                                                             | USEPA Reg 5         | 4.92E-01                   | USEPA Reg 5         |
| Bromomethane                | 74-83-9             | --                            | --               | 0.0137                                                            | USEPA Reg 5         | 1.37E-02                   | USEPA Reg 5         |
| 4-Bromophenyl-phenylether   | 101-55-3            | --                            | --               | 1.55                                                              | USEPA Reg 5         | 1.55E+00                   | USEPA Reg 5         |
| 2-Butanone                  | 78-93-3             | --                            | --               | 0.0424                                                            | USEPA Reg 5         | 4.24E-02                   | USEPA Reg 5         |
| Butylbenzylphthalate        | 85-68-7             | --                            | --               | 1.97                                                              | USEPA Reg 5         | 1.97E+00                   | USEPA Reg 5         |
| Carbazole                   | 86-74-8             | --                            | --               | --                                                                | --                  | No ESV                     | No Source           |
| Carbon Disulfide            | 75-15-0             | --                            | --               | 0.0239                                                            | USEPA Reg 5         | 2.39E-02                   | USEPA Reg 5         |
| Carbon Tetrachloride        | 56-23-5             | --                            | --               | 1.45                                                              | USEPA Reg 5         | 1.45E+00                   | USEPA Reg 5         |
| Chlordane                   | 57-74-9             | 0.00324                       | MacDonald et al. | 0.00324                                                           | USEPA Reg 5         | 3.24E-03                   | MacDonald et al.    |
| gamma-Chlordane             | 12789-03-6          | --                            | --               | 0.00324                                                           | Value for chlordane | 3.24E-03                   | Value for chlordane |
| Total Organic Carbon        | --                  | --                            | --               | --                                                                | --                  | No ESV                     | No Source           |
| 4-Chloroaniline             | 106-47-8            | --                            | --               | 0.146                                                             | USEPA Reg 5         | 1.46E-01                   | USEPA Reg 5         |
| Chlorobenzene               | 108-90-7            | --                            | --               | 0.291                                                             | USEPA Reg 5         | 2.91E-01                   | USEPA Reg 5         |
| Chlorobenzilate             | 510-15-6            | --                            | --               | 0.86                                                              | USEPA Reg 5         | 8.60E-01                   | USEPA Reg 5         |
| Chloroethane                | 75-00-3             | --                            | --               | --                                                                | --                  | No ESV                     | No Source           |
| Chloroform                  | 67-66-3             | --                            | --               | 0.121                                                             | USEPA Reg 5         | 1.21E-01                   | USEPA Reg 5         |
| Chloromethane               | 74-87-3             | --                            | --               | --                                                                | --                  | No ESV                     | No Source           |
| 2-Chloronaphthalene         | 91-58-7             | --                            | --               | 0.417                                                             | USEPA Reg 5         | 4.17E-01                   | USEPA Reg 5         |
| 2-Chlorophenol              | 95-57-8             | --                            | --               | 0.0319                                                            | USEPA Reg 5         | 3.19E-02                   | USEPA Reg 5         |
| 4-Chlorophenyl-phenyl ether | 7005-72-3           | --                            | --               | --                                                                | --                  | No ESV                     | No Source           |
| 4-Chloro-3-methylphenol     | 59-50-7             | --                            | --               | 0.388                                                             | USEPA Reg 5         | 3.88E-01                   | USEPA Reg 5         |

**Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)**

| Analyte                         | CAS Registry Number | Sediment Screening Values     |                  |                                                                   |                              |                            |                              |
|---------------------------------|---------------------|-------------------------------|------------------|-------------------------------------------------------------------|------------------------------|----------------------------|------------------------------|
|                                 |                     | MacDonald et al. <sup>a</sup> |                  | USEPA Region 5 ESLs (2003) <sup>b</sup><br>(update of 1998 EDQLs) |                              | Preferred ESV <sup>c</sup> |                              |
|                                 |                     | Number (mg/kg)                | Reference        | Number (mg/kg)                                                    | Reference                    | Number (mg/kg)             | Reference                    |
| Chrysene                        | 218-01-9            | 0.166                         | MacDonald et al. | 0.166                                                             | USEPA Reg 5                  | 1.66E-01                   | MacDonald et al.             |
| m-Cresol                        | 108-39-4            | --                            | --               | 0.0524                                                            | USEPA Reg 5                  | 5.24E-02                   | USEPA Reg 5                  |
| 2,4-D                           | 94-75-7             | --                            | --               | 1.273                                                             | USEPA Reg 5                  | 1.27E+00                   | USEPA Reg 5                  |
| 4,4'-DDD                        | 72-54-8             | 0.00488                       | MacDonald et al. | 0.00488                                                           | USEPA Reg 5                  | 4.88E-03                   | MacDonald et al.             |
| 4,4'-DDE                        | 72-55-9             | 0.00316                       | MacDonald et al. | 0.00316                                                           | USEPA Reg 5                  | 3.16E-03                   | MacDonald et al.             |
| 4,4'-DDT                        | 50-29-3             | 0.00416                       | MacDonald et al. | 0.00416                                                           | USEPA Reg 5                  | 4.16E-03                   | MacDonald et al.             |
| Diazinon                        | 333-41-5            | --                            | --               | --                                                                | --                           | No ESV                     | No Source                    |
| Dibenz(a,h)anthracene           | 53-70-3             | 0.033                         | MacDonald et al. | 0.033                                                             | USEPA Reg 5                  | 3.30E-02                   | MacDonald et al.             |
| Dibenzofuran                    | 132-64-9            | --                            | --               | 0.449                                                             | USEPA Reg 5                  | 4.49E-01                   | USEPA Reg 5                  |
| Dibromochloromethane            | 124-48-1            | --                            | --               | --                                                                | --                           | No ESV                     | No Source                    |
| 1,2-Dichlorobenzene             | 95-50-1             | --                            | --               | 0.294                                                             | USEPA Reg 5                  | 2.94E-01                   | USEPA Reg 5                  |
| 1,3-Dichlorobenzene             | 541-73-1            | --                            | --               | 1.315                                                             | USEPA Reg 5                  | 1.32E+00                   | USEPA Reg 5                  |
| 1,4-Dichlorobenzene             | 106-46-7            | --                            | --               | 0.318                                                             | USEPA Reg 5                  | 3.18E-01                   | USEPA Reg 5                  |
| 3,3'-Dichlorobenzidine          | 91-94-1             | --                            | --               | 0.127                                                             | USEPA Reg 5                  | 1.27E-01                   | USEPA Reg 5                  |
| 1,1-Dichloroethane              | 75-34-3             | --                            | --               | 0.000575                                                          | USEPA Reg 5                  | 5.75E-04                   | USEPA Reg 5                  |
| 1,2-Dichloroethane              | 107-06-2            | --                            | --               | 0.26                                                              | USEPA Reg 5                  | 2.60E-01                   | USEPA Reg 5                  |
| 1,1-Dichloroethene              | 75-35-4             | --                            | --               | 0.0194                                                            | USEPA Reg 5                  | 1.94E-02                   | USEPA Reg 5                  |
| 1,2-Dichloroethene              | 540-59-0            | --                            | --               | 0.654                                                             | USEPA Reg 5 (for trans form) | 6.54E-01                   | USEPA Reg 5 (for trans form) |
| 2,4-Dichlorophenol              | 120-83-2            | --                            | --               | 0.0817                                                            | USEPA Reg 5                  | 8.17E-02                   | USEPA Reg 5                  |
| 1,2-Dichloropropane             | 78-87-5             | --                            | --               | 0.333                                                             | USEPA Reg 5                  | 3.33E-01                   | USEPA Reg 5                  |
| cis-1,3-Dichloropropene         | 10061-02-6          | --                            | --               | --                                                                | --                           | No ESV                     | No Source                    |
| trans-1,3-Dichloropropene       | 10061-02-6          | --                            | --               | --                                                                | --                           | No ESV                     | No Source                    |
| Dieldrin                        | 60-57-1             | 0.0019                        | MacDonald et al. | 0.0019                                                            | USEPA Reg 5                  | 1.90E-03                   | MacDonald et al.             |
| Diethylphthalate                | 84-66-2             | --                            | --               | 0.295                                                             | USEPA Reg 5                  | 2.95E-01                   | USEPA Reg 5                  |
| Dimethylphthalate               | 131-11-3            | --                            | --               | --                                                                | --                           | No ESV                     | No Source                    |
| 7,12'-Dimethylbenz(a)anthracene | 57-97-6             | --                            | --               | 66.4                                                              | USEPA Reg 5                  | 6.64E+01                   | USEPA Reg 5                  |
| 2,4-Dimethylphenol              | 105-67-9            | --                            | --               | 0.304                                                             | USEPA Reg 5                  | 3.04E-01                   | USEPA Reg 5                  |
| Di-n-butylphthalate             | 84-74-2             | --                            | --               | 1.114                                                             | USEPA Reg 5                  | 1.11E+00                   | USEPA Reg 5                  |

**Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)**

| Analyte                    | CAS Registry Number | Sediment Screening Values     |                  |                                                                   |             |                            |                  |
|----------------------------|---------------------|-------------------------------|------------------|-------------------------------------------------------------------|-------------|----------------------------|------------------|
|                            |                     | MacDonald et al. <sup>a</sup> |                  | USEPA Region 5 ESLs (2003) <sup>b</sup><br>(update of 1998 EDQLs) |             | Preferred ESV <sup>c</sup> |                  |
|                            |                     | Number (mg/kg)                | Reference        | Number (mg/kg)                                                    | Reference   | Number (mg/kg)             | Reference        |
| Di-n-octylphthalate        | 117-84-0            | --                            | --               | 40.6                                                              | USEPA Reg 5 | 4.06E+01                   | USEPA Reg 5      |
| 1,3-Dinitrobenzene         | 99-65-0             | --                            | --               | 0.00861                                                           | USEPA Reg 5 | 8.61E-03                   | USEPA Reg 5      |
| 2,4-Dinitrophenol          | 51-28-5             | --                            | --               | 0.00621                                                           | USEPA Reg 5 | 6.21E-03                   | USEPA Reg 5      |
| 2,4-Dinitrotoluene         | 121-14-2            | --                            | --               | 0.0144                                                            | USEPA Reg 5 | 1.44E-02                   | USEPA Reg 5      |
| 2,6-Dinitrotoluene         | 606-20-2            | --                            | --               | 0.0398                                                            | USEPA Reg 5 | 3.98E-02                   | USEPA Reg 5      |
| 2-Amino-4,6-Dinitrotoluene | 35572-78-2          | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| 4-Amino-2,6-Dinitrotoluene | 19406-51-0          | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| 4,6-Dinitro-2-methylphenol | 534-52-1            | --                            | --               | 0.0104                                                            | USEPA Reg 5 | 1.04E-02                   | USEPA Reg 5      |
| Dinoseb                    | 88-85-7             | --                            | --               | 0.0145                                                            | USEPA Reg 5 | 1.45E-02                   | USEPA Reg 5      |
| 1,4-Dioxane                | 123-91-1            | --                            | --               | 0.119                                                             | USEPA Reg 5 | 1.19E-01                   | USEPA Reg 5      |
| Diphenylamine              | 122-39-4            | --                            | --               | 0.0346                                                            | USEPA Reg 5 | 3.46E-02                   | USEPA Reg 5      |
| Disulfoton                 | 298-04-4            | --                            | --               | 0.324                                                             | USEPA Reg 5 | 3.24E-01                   | USEPA Reg 5      |
| Endosulfan I (alpha)       | 959-98-8            | --                            | --               | 0.00326                                                           | USEPA Reg 5 | 3.26E-03                   | USEPA Reg 5      |
| Endosulfan II (beta)       | 33213-65-9          | --                            | --               | 0.00194                                                           | USEPA Reg 5 | 1.94E-03                   | USEPA Reg 5      |
| Endosulfan, mixed isomers  | 115-29-7            | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Endosulfan Sulfate         | 1031-07-8           | --                            | --               | 0.0346                                                            | USEPA Reg 5 | 3.46E-02                   | USEPA Reg 5      |
| Endrin                     | 72-20-8             | 0.00222                       | MacDonald et al. | 0.00222                                                           | USEPA Reg 5 | 2.22E-03                   | MacDonald et al. |
| Endrin Aldehyde            | 7421-93-4           | --                            | --               | 0.48                                                              | USEPA Reg 5 | 4.80E-01                   | USEPA Reg 5      |
| Ethylbenzene               | 100-41-4            | --                            | --               | 0.175                                                             | USEPA Reg 5 | 1.75E-01                   | USEPA Reg 5      |
| Fluoranthene               | 206-44-0            | 0.423                         | MacDonald et al. | 0.423                                                             | USEPA Reg 5 | 4.23E-01                   | MacDonald et al. |
| Fluorene                   | 86-73-7             | 0.0774                        | MacDonald et al. | 0.0774                                                            | USEPA Reg 5 | 7.74E-02                   | MacDonald et al. |
| Heptachlor                 | 76-44-8             | --                            | --               | 0.0006                                                            | USEPA Reg 5 | 6.00E-04                   | USEPA Reg 5      |
| Heptachlor Epoxide         | 1024-57-3           | 0.00247                       | MacDonald et al. | 0.00247                                                           | USEPA Reg 5 | 2.47E-03                   | MacDonald et al. |
| Hexachlorobenzene          | 118-74-1            | --                            | --               | 0.02                                                              | USEPA Reg 5 | 2.00E-02                   | USEPA Reg 5      |
| Hexachlorobutadiene        | 87-68-3             | --                            | --               | 0.0265                                                            | USEPA Reg 5 | 2.65E-02                   | USEPA Reg 5      |
| Hexachlorocyclopentadiene  | 77-47-4             | --                            | --               | 0.901                                                             | USEPA Reg 5 | 9.01E-01                   | USEPA Reg 5      |
| Hexachloroethane           | 67-72-1             | --                            | --               | 0.584                                                             | USEPA Reg 5 | 5.84E-01                   | USEPA Reg 5      |
| Hexachlorophene            | 70-30-4             | --                            | --               | 231                                                               | USEPA Reg 5 | 2.31E+02                   | USEPA Reg 5      |

**Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)**

| Analyte                | CAS Registry Number | Sediment Screening Values     |                  |                                                                   |             |                            |                  |
|------------------------|---------------------|-------------------------------|------------------|-------------------------------------------------------------------|-------------|----------------------------|------------------|
|                        |                     | MacDonald et al. <sup>a</sup> |                  | USEPA Region 5 ESLs (2003) <sup>b</sup><br>(update of 1998 EDQLs) |             | Preferred ESV <sup>c</sup> |                  |
|                        |                     | Number (mg/kg)                | Reference        | Number (mg/kg)                                                    | Reference   | Number (mg/kg)             | Reference        |
| 2-Hexanone             | 591-78-6            | --                            | --               | 0.0582                                                            | USEPA Reg 5 | 5.82E-02                   | USEPA Reg 5      |
| HMX                    | 2691-41-0           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Indeno(1,2,3-cd)pyrene | 193-39-5            | --                            | --               | 0.2                                                               | USEPA Reg 5 | 2.00E-01                   | USEPA Reg 5      |
| Isodrin                | 465-73-6            | --                            | --               | 0.0552                                                            | USEPA Reg 5 | 5.52E-02                   | USEPA Reg 5      |
| Isophorone             | 78-59-1             | --                            | --               | 0.432                                                             | USEPA Reg 5 | 4.32E-01                   | USEPA Reg 5      |
| Kepone                 | 143-50-0            | --                            | --               | 0.00331                                                           | USEPA Reg 5 | 3.31E-03                   | USEPA Reg 5      |
| Malathion              | 121-75-5            | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Methoxychlor           | 72-43-5             | --                            | --               | 0.0136                                                            | USEPA Reg 5 | 1.36E-02                   | USEPA Reg 5      |
| Methyl Methacrylate    | 80-62-6             | --                            | --               | 0.168                                                             | USEPA Reg 5 | 1.68E-01                   | USEPA Reg 5      |
| 4-Methyl-2-pentanone   | 108-10-1            | --                            | --               | 0.0251                                                            | USEPA Reg 5 | 2.51E-02                   | USEPA Reg 5      |
| 3-Methylcholanthrene   | 56-49-5             | --                            | --               | 8190                                                              | USEPA Reg 5 | 8.19E+03                   | USEPA Reg 5      |
| Methylene Chloride     | 75-09-2             | --                            | --               | 0.159                                                             | USEPA Reg 5 | 1.59E-01                   | USEPA Reg 5      |
| 2-Methylnaphthalene    | 91-57-6             | --                            | --               | 0.0202                                                            | USEPA Reg 5 | 2.02E-02                   | USEPA Reg 5      |
| 2-Methylphenol         | 95-48-7             | --                            | --               | 0.0554                                                            | USEPA Reg 5 | 5.54E-02                   | USEPA Reg 5      |
| 4-Methylphenol         | 106-44-5            | --                            | --               | 0.0202                                                            | USEPA Reg 5 | 2.02E-02                   | USEPA Reg 5      |
| Mirex                  | 2385-85-5           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Naphthalene            | 91-20-3             | 0.176                         | MacDonald et al. | 0.176                                                             | USEPA Reg 5 | 1.76E-01                   | MacDonald et al. |
| 2-Nitroaniline         | 88-74-4             | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| 3-Nitroaniline         | 99-09-2             | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| 4-Nitroaniline         | 100-01-6            | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Nitrobenzene           | 99-95-3             | --                            | --               | 0.145                                                             | USEPA Reg 5 | 1.45E-01                   | USEPA Reg 5      |
| Nitrocellulose         | 9004-70-0           | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Nitroglycerin          | 55-63-0             | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Nitroguanidine         | 556-88-7            | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| 2-Nitrophenol          | 88-75-5             | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| 4-Nitrophenol          | 100-02-7            | --                            | --               | 0.0133                                                            | USEPA Reg 5 | 1.33E-02                   | USEPA Reg 5      |
| m-Nitrotoluene         | 99-08-1             | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| N-Nitrosodiethylamine  | 55-18-5             | --                            | --               | 0.0228                                                            | USEPA Reg 5 | 2.28E-02                   | USEPA Reg 5      |

**Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)**

| Analyte                                    | CAS Registry Number | Sediment Screening Values     |                  |                                                                   |             |                            |                  |
|--------------------------------------------|---------------------|-------------------------------|------------------|-------------------------------------------------------------------|-------------|----------------------------|------------------|
|                                            |                     | MacDonald et al. <sup>a</sup> |                  | USEPA Region 5 ESLs (2003) <sup>b</sup><br>(update of 1998 EDQLs) |             | Preferred ESV <sup>c</sup> |                  |
|                                            |                     | Number (mg/kg)                | Reference        | Number (mg/kg)                                                    | Reference   | Number (mg/kg)             | Reference        |
| N-nitroso-di-n-dipropylamine               | 621-64-7            | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| N-nitrosodiphenylamine                     | 86-30-6             | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| o-Nitrotoluene                             | 88-72-2             | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| 2,2'-oxybis(1-Chloropropane)               | 108-60-1            | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Parathion                                  | 56-38-2             | --                            | --               | 0.000757                                                          | USEPA Reg 5 | 7.57E-04                   | USEPA Reg 5      |
| PCDDs                                      | PCDD-S              | --                            | --               | 0.000011                                                          | USEPA Reg 5 | 1.10E-05                   | USEPA Reg 5      |
| Pentachlorobenzene                         | 608-93-5            | --                            | --               | 0.024                                                             | USEPA Reg 5 | 2.40E-02                   | USEPA Reg 5      |
| Pentachloroethane                          | 76-01-7             | --                            | --               | 0.689                                                             | USEPA Reg 5 | 6.89E-01                   | USEPA Reg 5      |
| Pentachlorophenol                          | 87-86-5             | --                            | --               | 23                                                                | USEPA Reg 5 | 2.30E+01                   | USEPA Reg 5      |
| Phenanthrene                               | 85-01-8             | 0.204                         | MacDonald et al. | 0.204                                                             | USEPA Reg 5 | 2.04E-01                   | MacDonald et al. |
| Phenol                                     | 108-95-2            | --                            | --               | 0.0491                                                            | USEPA Reg 5 | 4.91E-02                   | USEPA Reg 5      |
| Phorate                                    | 298-02-2            | --                            | --               | 0.000861                                                          | USEPA Reg 5 | 8.61E-04                   | USEPA Reg 5      |
| PAH                                        | 130498-29-2         | 1.61                          | MacDonald et al. | --                                                                | --          | 1.61E+00                   | MacDonald et al. |
| PCBs                                       | 1336-36-3           | 0.0598                        | MacDonald et al. | 0.0598                                                            | USEPA Reg 5 | 5.98E-02                   | MacDonald et al. |
| p-Nitrotoluene                             | 99-99-0             | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Pyrene                                     | 129-00-0            | 0.195                         | MacDonald et al. | 0.195                                                             | USEPA Reg 5 | 1.95E-01                   | MacDonald et al. |
| Pyridine                                   | 110-86-1            | --                            | --               | 0.106                                                             | USEPA Reg 5 | 1.06E-01                   | USEPA Reg 5      |
| RDX                                        | 121-82-4            | --                            | --               | --                                                                | --          | No ESV                     | No Source        |
| Silvex (2,4,5-TP)                          | 93-72-1             | --                            | --               | 0.675                                                             | USEPA Reg 5 | 6.75E-01                   | USEPA Reg 5      |
| Styrene                                    | 100-42-5            | --                            | --               | 0.254                                                             | USEPA Reg 5 | 2.54E-01                   | USEPA Reg 5      |
| 1,2,4,5-Tetrachlorobenzene                 | 95-94-3             | --                            | --               | 1.252                                                             | USEPA Reg 5 | 1.25E+00                   | USEPA Reg 5      |
| 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) | 1746-01-6           | --                            | --               | 1.20E-07                                                          | USEPA Reg 5 | 1.20E-07                   | USEPA Reg 5      |
| 1,1,2,2-Tetrachloroethane                  | 79-34-5             | --                            | --               | 0.85                                                              | USEPA Reg 5 | 8.50E-01                   | USEPA Reg 5      |
| Tetrachloroethene                          | 127-18-4            | --                            | --               | 0.99                                                              | USEPA Reg 5 | 9.90E-01                   | USEPA Reg 5      |
| 2,3,4,6-Tetrachlorophenol                  | 58-90-2             | --                            | --               | 0.129                                                             | USEPA Reg 5 | 1.29E-01                   | USEPA Reg 5      |
| Tetraethyl Dithiopyrophosphate             | 3689-24-5           | --                            | --               | 0.56                                                              | USEPA Reg 5 | 5.60E-01                   | USEPA Reg 5      |
| Tetryl                                     | 479-45-8            | --                            | --               | --                                                                | --          | No ESV                     | No Source        |

Table H-8. ESVs for Chemical Analytes in Sediment (continued)

| Analyte                           | CAS Registry Number | Sediment Screening Values     |           |                                                                   |             |                            |             |
|-----------------------------------|---------------------|-------------------------------|-----------|-------------------------------------------------------------------|-------------|----------------------------|-------------|
|                                   |                     | MacDonald et al. <sup>a</sup> |           | USEPA Region 5 ESLs (2003) <sup>b</sup><br>(update of 1998 EDQLs) |             | Preferred ESV <sup>c</sup> |             |
|                                   |                     | Number (mg/kg)                | Reference | Number (mg/kg)                                                    | Reference   | Number (mg/kg)             | Reference   |
| Toluene                           | 108-88-3            | --                            | --        | 1.22                                                              | USEPA Reg 5 | 1.22E+00                   | USEPA Reg 5 |
| Toxaphene                         | 8001-35-2           | --                            | --        | 0.000077                                                          | USEPA Reg 5 | 7.70E-05                   | USEPA Reg 5 |
| 1,2,4-Trichlorobenzene            | 120-82-1            | --                            | --        | 5.062                                                             | USEPA Reg 5 | 5.06E+00                   | USEPA Reg 5 |
| 1,1,1-Trichloroethane             | 71-55-6             | --                            | --        | 0.213                                                             | USEPA Reg 5 | 2.13E-01                   | USEPA Reg 5 |
| 1,1,2-Trichloroethane             | 79-00-5             | --                            | --        | 0.518                                                             | USEPA Reg 5 | 5.18E-01                   | USEPA Reg 5 |
| Trichloroethene                   | 79-01-6             | --                            | --        | 0.112                                                             | USEPA Reg 5 | 1.12E-01                   | USEPA Reg 5 |
| 2,4,5-Trichlorophenol             | 95-95-4             | --                            | --        | --                                                                | --          | No ESV                     | No Source   |
| 2,4,6-Trichlorophenol             | 88-06-2             | --                            | --        | 0.208                                                             | USEPA Reg 5 | 2.08E-01                   | USEPA Reg 5 |
| 2,4,5-Trichlorophenoxyacetic Acid | 93-76-5             | --                            | --        | 58.7                                                              | USEPA Reg 5 | 5.87E+01                   | USEPA Reg 5 |
| O,O,O-Triethyl Phosphorothioate   | 126-68-1            | --                            | --        | 0.189                                                             | USEPA Reg 5 | 1.89E-01                   | USEPA Reg 5 |
| 1,3,5-Trinitrobenzene             | 99-35-4             | --                            | --        | --                                                                | --          | No ESV                     | No Source   |
| 2,4,6-Trinitrotoluene             | 118-96-7            | --                            | --        | --                                                                | --          | No ESV                     | No Source   |
| Vinyl Acetate                     | 108-05-4            | --                            | --        | 0.013                                                             | USEPA Reg 5 | 1.30E-02                   | USEPA Reg 5 |
| Vinyl Chloride                    | 75-01-4             | --                            | --        | 0.202                                                             | USEPA Reg 5 | 2.02E-01                   | USEPA Reg 5 |
| Xylenes (total)                   | 1330-20-7           | --                            | --        | 0.433                                                             | USEPA Reg 5 | 4.33E-01                   | USEPA Reg 5 |

<sup>a</sup>D.D. MacDonald, C.G. Ingersoll, T.A. Berger. *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*. Archives of Environmental Contamination and Toxicology 39, 20–31 (2000).

<sup>b</sup>ESLs, USEPA Region 5, 2003: <http://www.epa.gov/reg5rcra/ca/edql.htm>

<sup>c</sup>The preferred sediment screening value is MacDonald et al. (2000) followed by USEPA Region 5 ESLs.

MacDonald et al = Consensus-based threshold effect concentrations.

BHC = Hexachlorocyclohexane.

CAS = Chemical Abstract Service.

DDD = Dichlorodiphenyldichloroethane.

DDE = Dichlorodiphenyldichloroethylene.

DDT = Dichlorodiphenyltrichloroethane.

EDQL = Ecological data quality level.

ESL = Ecological screening level.

Reg = Region.

ESV = Ecological screening value.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

mg/kg = Milligrams per kilogram.

PAH = Polycyclic aromatic hydrocarbon.

PCB = Polychlorinated biphenyl.

PCDD = Pentachlorodibenzodioxin.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine .

USEPA = U.S. Environmental Protection Agency.

-- = No value.

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Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water

| Analyte                   | CAS Registry Number | Surface Water Screening Values                   |           |                                                     |            |                |                             |                                                                   |             |                                            |                             |
|---------------------------|---------------------|--------------------------------------------------|-----------|-----------------------------------------------------|------------|----------------|-----------------------------|-------------------------------------------------------------------|-------------|--------------------------------------------|-----------------------------|
|                           |                     | Ohio EPA Administrative Code (µg/L) <sup>a</sup> |           | Updated Values for Suter and Tsao 1996 <sup>b</sup> |            |                |                             | USEPA Region 5 ESLs (2003) <sup>c</sup><br>(update of 1998 EDQLs) |             | Preferred Surface Water Value <sup>d</sup> |                             |
|                           |                     |                                                  |           | NAWQC 2009 Update                                   |            | Tier II Values |                             |                                                                   |             |                                            |                             |
|                           |                     |                                                  |           |                                                     |            |                |                             |                                                                   |             |                                            |                             |
| OMZM                      | OMZA                | Number (µg/L)                                    | Reference | Number (µg/L)                                       | Reference  | Number (µg/L)  | Reference                   | Number (µg/L)                                                     | Reference   |                                            |                             |
| Inorganic Chemicals       |                     |                                                  |           |                                                     |            |                |                             |                                                                   |             |                                            |                             |
| Aluminum                  | 7429-90-5           | --                                               | --        | 87                                                  | NAWQC 2009 | 100            | Tier II (GLI database)      | --                                                                | --          | 8.70E+01                                   | NAWQC 2009                  |
| Ammonia                   | 7664-41-7           | 500                                              | 100       | --                                                  | --         | --             | --                          | --                                                                | --          | 1.00E+02                                   | Ohio Administrative Code    |
| Antimony                  | 7440-36-0           | 900                                              | 190       | --                                                  | --         | 30             | Tier II (Suter & Tsao 1996) | 80                                                                | USEPA Reg 5 | 1.90E+02                                   | Ohio Administrative Code    |
| Arsenic III (Diss)        | 7440-38-2           | 340                                              | 150       | 150                                                 | NAWQC 2009 | --             | --                          | --                                                                | --          | 1.50E+02                                   | Ohio Administrative Code    |
| Arsenic                   | 7440-38-2           | 340                                              | 150       | --                                                  | --         | --             | --                          | 148                                                               | USEPA Reg 5 | 1.50E+02                                   | Ohio Administrative Code    |
| Arsenic V (Diss)          | 7440-38-2           | --                                               | --        | --                                                  | --         | 3.1            | Tier II (Suter & Tsao 1996) | --                                                                | --          | 3.10E+00                                   | Tier II (Suter & Tsao 1996) |
| Barium                    | 7440-39-3           | 2,000                                            | 220       | --                                                  | --         | 4.0            | Tier II (Suter & Tsao 1996) | 220                                                               | USEPA Reg 5 | 2.20E+02                                   | Ohio Administrative Code    |
| Beryllium                 | 7440-41-7           | 93                                               | 11        | --                                                  | --         | 0.66           | Tier II (Suter & Tsao 1996) | 3.6                                                               | USEPA Reg 5 | 1.10E+01                                   | Ohio Administrative Code    |
| Boron                     | 7440-42-8           | 33,000                                           | 3,900     | --                                                  | --         | 1.6            | Tier II (Suter & Tsao 1996) | --                                                                | --          | 3.90E+03                                   | Ohio Administrative Code    |
| Cadmium                   | 7440-43-9           | 4.5                                              | 2.5       | --                                                  | --         | 0.2            | Tier II (Suter & Tsao 1996) | 0.15                                                              | USEPA Reg 5 | 2.50E+00                                   | Ohio Administrative Code    |
| Cadmium (Diss)            | 7440-43-9           | 4.3                                              | 2.2       | 0.25                                                | NAWQC 2009 | --             | --                          | --                                                                | --          | 2.20E+00                                   | Ohio Administrative Code    |
| Calcium                   | 7440-70-2           | --                                               | --        | --                                                  | --         | --             | --                          | --                                                                | --          | No ESV                                     | No Source                   |
| Chlorine (total residual) | 7782-50-5           | 19                                               | 11        | 11                                                  | NAWQC 2009 | 5              | Tier II (GLI database)      | --                                                                | --          | 1.10E+01                                   | Ohio Administrative Code    |
| Chromium III (Diss)       | 7440-47-3           | 570                                              | 74        | 74                                                  | NAWQC 2009 | 210            | Tier II (Suter & Tsao 1996) | 42                                                                | USEPA Reg 5 | 7.40E+01                                   | Ohio Administrative Code    |
| Chromium                  | 7440-47-3           | 1,800                                            | 86        | --                                                  | --         | --             | --                          | 42                                                                | USEPA Reg 5 | 8.60E+01                                   | Ohio Administrative Code    |
| Chromium VI (Diss)        | 7440-47-3           | 16                                               | 11        | 11                                                  | NAWQC 2009 | 11             | Tier II (Suter & Tsao 1996) | --                                                                | --          | 1.10E+01                                   | Ohio Administrative Code    |
| Cobalt                    | 7440-48-4           | 220                                              | 24        | --                                                  | --         | 23             | Tier II (Suter & Tsao 1996) | 24                                                                | USEPA Reg 5 | 2.40E+01                                   | Ohio Administrative Code    |
| Copper (Diss)             | 7440-50-8           | 13                                               | 9         | 1.45                                                | NAWQC 2009 | --             | --                          | --                                                                | --          | 9.00E+00                                   | Ohio Administrative Code    |
| Copper                    | 7440-50-8           | 14                                               | 9.3       | --                                                  | --         | --             | --                          | 1.58                                                              | USEPA Reg 5 | 9.30E+00                                   | Ohio Administrative Code    |
| Cyanide                   | 57-12-5             | 22                                               | 5.2       | 5.2                                                 | NAWQC 2009 | --             | --                          | 5.2                                                               | USEPA Reg 5 | 5.20E+00                                   | Ohio Administrative Code    |
| Iron                      | 7439-89-6           | --                                               | --        | 1,000                                               | NAWQC 2009 | 300            | Tier II (GLI database)      | --                                                                | --          | 1.00E+03                                   | NAWQC 2009                  |
| Lead (Diss)               | 7439-92-1           | 97                                               | 5.1       | 2.5                                                 | NAWQC 2009 | --             | --                          | --                                                                | --          | 5.10E+00                                   | Ohio Administrative Code    |
| Lead                      | 7439-92-1           | 120                                              | 6.4       | --                                                  | --         | --             | --                          | 1.17                                                              | USEPA Reg 5 | 6.40E+00                                   | Ohio Administrative Code    |
| Lithium                   | 7439-93-2           | --                                               | --        | --                                                  | --         | 14             | Tier II (Suter & Tsao 1996) | --                                                                | --          | 1.40E+01                                   | Tier II (Suter & Tsao 1996) |
| Magnesium                 | 7439-95-4           | --                                               | --        | --                                                  | --         | --             | --                          | --                                                                | --          | No ESV                                     | No Source                   |
| Manganese                 | 7439-96-5           | --                                               | --        | --                                                  | --         | 120            | Tier II (Suter & Tsao 1996) | --                                                                | --          | 1.20E+02                                   | Tier II (Suter & Tsao 1996) |
| Mercury                   | 7439-97-6           | 1.7                                              | 0.91      | --                                                  | --         | 1.3            | Tier II (Suter & Tsao 1996) | 0.0013                                                            | --          | 9.10E-01                                   | Ohio Administrative Code    |
| Mercury (Diss)            | 7439-97-6           | 1.4                                              | 0.77      | 0.77                                                | NAWQC 2009 | --             | --                          | --                                                                | --          | 7.70E-01                                   | Ohio Administrative Code    |
| Mercury, methyl           | 22967-92-6          | --                                               | --        | --                                                  | --         | 0.0028         | Tier II (Suter & Tsao 1996) | 2.46E-03                                                          | --          | 2.80E-03                                   | Tier II (Suter & Tsao 1996) |
| Molybdenum                | 7439-98-7           | 190,000                                          | 20,000    | --                                                  | --         | 370            | Tier II (Suter & Tsao 1996) | --                                                                | --          | 2.00E+04                                   | Ohio Administrative Code    |
| Nickel (Diss)             | 7440-02-0           | 470                                              | 52        | 52                                                  | NAWQC 2009 | --             | --                          | --                                                                | --          | 5.20E+01                                   | Ohio Administrative Code    |
| Nickel (TR)               | 7440-02-1           | 470                                              | 52        | --                                                  | --         | --             | --                          | 28.9                                                              | USEPA Reg 5 | 5.20E+01                                   | Ohio Administrative Code    |
| Potassium                 | 7440-09-7           | --                                               | --        | --                                                  | --         | --             | --                          | --                                                                | --          | No ESV                                     | No Source                   |
| Selenium (Diss)           | 7782-49-2           | --                                               | 4.6       | 4.6                                                 | NAWQC 2009 | --             | --                          | --                                                                | --          | 4.60E+00                                   | Ohio Administrative Code    |
| Selenium                  | 7782-49-2           | --                                               | 5         | 5                                                   | NAWQC 2009 | --             | --                          | 5                                                                 | USEPA Reg 5 | 5.00E+00                                   | Ohio Administrative Code    |
| Silver (Diss)             | 7440-22-4           | 1.4                                              | --        | --                                                  | --         | 0.12           | Tier II (Suter & Tsao 1996) | --                                                                | --          | 1.40E+00                                   | Ohio Administrative Code    |
| Silver                    | 7440-22-4           | 1.6                                              | 1.3       | --                                                  | --         | 0.36           | Tier II (Suter & Tsao 1996) | 0.12                                                              | USEPA Reg 5 | 1.30E+00                                   | Ohio Administrative Code    |
| Sodium                    | 7440-23-5           | --                                               | --        | --                                                  | --         | --             | --                          | --                                                                | --          | No ESV                                     | No Source                   |
| Strontium                 | 7440-24-6           | 40,000                                           | 21,000    | --                                                  | --         | 1,500          | Tier II (Suter & Tsao 1996) | --                                                                | --          | 2.10E+04                                   | Ohio Administrative Code    |
| Thallium                  | 7440-28-0           | 79                                               | 17        | --                                                  | --         | 12             | Tier II (Suter & Tsao 1996) | 10                                                                | USEPA Reg 5 | 1.70E+01                                   | Ohio Administrative Code    |
| Tin                       | 7440-31-5           | 1,600                                            | 180       | --                                                  | --         | 73             | Tier II (Suter & Tsao 1996) | 180                                                               | USEPA Reg 5 | 1.80E+02                                   | Ohio Administrative Code    |
| Uranium                   | 7440-61-1           | --                                               | --        | --                                                  | --         | 2.6            | Tier II (Suter & Tsao 1996) | --                                                                | --          | 2.60E+00                                   | Tier II (Suter & Tsao 1996) |
| Vanadium                  | 7440-62-2           | 150                                              | 44        | --                                                  | --         | 20             | Tier II (Suter & Tsao 1996) | 12                                                                | USEPA Reg 5 | 4.40E+01                                   | Ohio Administrative Code    |
| Zinc (Diss)               | 7440-66-6           | 120                                              | 120       | 120                                                 | NAWQC 2009 | --             | --                          | --                                                                | --          | 1.20E+02                                   | Ohio Administrative Code    |

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

| Analyte                       | CAS Registry Number | Surface Water Screening Values                   |           |                                                     |            |                |                             |                                                                   |             |                                            |                             |
|-------------------------------|---------------------|--------------------------------------------------|-----------|-----------------------------------------------------|------------|----------------|-----------------------------|-------------------------------------------------------------------|-------------|--------------------------------------------|-----------------------------|
|                               |                     | Ohio EPA Administrative Code (µg/L) <sup>a</sup> |           | Updated Values for Suter and Tsao 1996 <sup>b</sup> |            |                |                             | USEPA Region 5 ESLs (2003) <sup>c</sup><br>(update of 1998 EDQLs) |             | Preferred Surface Water Value <sup>d</sup> |                             |
|                               |                     |                                                  |           | NAWQC 2009 Update                                   |            | Tier II Values |                             |                                                                   |             |                                            |                             |
|                               |                     |                                                  |           |                                                     |            |                |                             |                                                                   |             |                                            |                             |
| OMZM                          | OMZA                | Number (µg/L)                                    | Reference | Number (µg/L)                                       | Reference  | Number (µg/L)  | Reference                   | Number (µg/L)                                                     | Reference   |                                            |                             |
| Inorganic Chemicals           |                     |                                                  |           |                                                     |            |                |                             |                                                                   |             |                                            |                             |
| Zinc (TR)                     | 7440-66-6           | 120                                              | 120       | --                                                  | --         | --             | --                          | 65.7                                                              | USEPA Reg 5 | 1.20E+02                                   | Ohio Administrative Code    |
| Zirconium                     | 7440-67-7           | --                                               | --        | --                                                  | --         | 17             | Tier II (Suter & Tsao 1996) | --                                                                | --          | 1.70E+01                                   | Tier II (Suter & Tsao 1996) |
| Anions                        |                     |                                                  |           |                                                     |            |                |                             |                                                                   |             |                                            |                             |
| Chloride                      | 16887-00-6          | --                                               | --        | 230,000                                             | NAWQC 2009 | --             | --                          | --                                                                | --          | 2.30E+05                                   | NAWQC 2009                  |
| Fluoride                      | 16984-48-8          | --                                               | --        | --                                                  | --         | 3400           | Tier II (GLI database)      | --                                                                | --          | 3.40E+03                                   | Tier II (GLI database)      |
| Hydrogen Sulfide/Sulfide      | 7783-06-4           | --                                               | --        | 2                                                   | NAWQC 2009 | 2              | Tier II (GLI database)      | --                                                                | --          | 2.00E+00                                   | NAWQC 2009                  |
| Nitrate                       | 14797-55-8          | --                                               | --        | --                                                  | --         | --             | --                          | --                                                                | --          | No ESV                                     | No Source                   |
| Nitrite                       | 14797-65-0          | --                                               | --        | --                                                  | --         | 20             | Tier II (GLI database)      | --                                                                | --          | 2.00E+01                                   | Tier II (GLI database)      |
| Sulfite                       | 14265-45-3          | --                                               | --        | --                                                  | --         | 200            | Tier II (GLI database)      | --                                                                | --          | 2.00E+02                                   | Tier II (GLI database)      |
| Organic Compounds             |                     |                                                  |           |                                                     |            |                |                             |                                                                   |             |                                            |                             |
| Acenaphthene                  | 83-32-9             | 19                                               | 15        | --                                                  | --         | 5.3            | Tier II (GLI database)      | 38                                                                | USEPA Reg 5 | 1.50E+01                                   | Ohio Administrative Code    |
| Acenaphthylene                | 208-96-8            | 120                                              | 13        | --                                                  | --         | --             | --                          | 4,840                                                             | USEPA Reg 5 | 1.30E+01                                   | Ohio Administrative Code    |
| Acetaldehyde                  | 75-07-0             | --                                               | --        | --                                                  | --         | 130            | Tier II (GLI database)      | --                                                                | --          | 1.30E+02                                   | Tier II (GLI database)      |
| Acetone                       | 67-64-1             | --                                               | --        | --                                                  | --         | 1500           | Tier II (Suter & Tsao 1996) | 1,700                                                             | USEPA Reg 5 | 1.50E+03                                   | Tier II (Suter & Tsao 1996) |
| Acetonitrile                  | 75-05-8             | 100,000                                          | 12,000    | --                                                  | --         | 12,000         | Tier II (GLI database)      | 12,000                                                            | USEPA Reg 5 | 1.20E+04                                   | Ohio Administrative Code    |
| Acetylaminofluorene[2-]       | 53-96-3             | --                                               | --        | --                                                  | --         | --             | --                          | 535                                                               | USEPA Reg 5 | 5.35E+02                                   | USEPA Reg 5                 |
| Acrolein                      | 107-02-8            | --                                               | --        | 3                                                   | NAWQC 2009 | 0.19           | Tier II (GLI database)      | 0.19                                                              | USEPA Reg 5 | 3.00E+00                                   | NAWQC 2009                  |
| Acrylonitrile                 | 107-13-1            | 650                                              | 78        | --                                                  | --         | 78             | Tier II (GLI database)      | 66                                                                | USEPA Reg 5 | 7.80E+01                                   | Ohio Administrative Code    |
| Alachlor                      | 15972-60-8          | --                                               | --        | --                                                  | --         | 21             | Tier II (GLI database)      | --                                                                | --          | 2.10E+01                                   | Tier II (GLI database)      |
| Aldrin                        | 309-00-2            | --                                               | --        | --                                                  | --         | 0.035          | Tier II (GLI database)      | 0.017                                                             | USEPA Reg 5 | 3.50E-02                                   | Tier II (GLI database)      |
| 2-Amino-4,6-dinitrotoluene    | 35572-78-2          | 160                                              | 18        | --                                                  | --         | 18             | Tier II (GLI database)      | --                                                                | --          | 1.80E+01                                   | Ohio Administrative Code    |
| 4-Amino-2,6-dinitrotoluene    | 19406-51-0          | 98                                               | 11        | --                                                  | --         | 11             | Tier II (GLI database)      | --                                                                | --          | 1.10E+01                                   | Ohio Administrative Code    |
| Aniline                       | 62-53-3             | 30                                               | 4.1       | --                                                  | --         | 4.1            | Tier II (GLI database)      | 4.1                                                               | USEPA Reg 5 | 4.10E+00                                   | Ohio Administrative Code    |
| Anthracene                    | 120-12-7            | 0.18                                             | 0.02      | --                                                  | --         | 0.73           | Tier II (Suter & Tsao 1996) | 0.035                                                             | USEPA Reg 5 | 2.00E-02                                   | Ohio Administrative Code    |
| Aramite                       | 140-57-8            | --                                               | --        | --                                                  | --         | --             | --                          | 3.09                                                              | USEPA Reg 5 | 3.09E+00                                   | USEPA Reg 5                 |
| Azobenzene[p-(dimethylamino)] | 60-11-7             | --                                               | --        | --                                                  | --         | --             | --                          | 1.65                                                              | USEPA Reg 5 | 1.65E+00                                   | USEPA Reg 5                 |
| Benzene                       | 71-43-2             | 700                                              | 160       | --                                                  | --         | 130            | Tier II (Suter & Tsao 1996) | 114                                                               | USEPA Reg 5 | 1.60E+02                                   | Ohio Administrative Code    |
| Benzenemethanol               | 100-51-6            | --                                               | --        | --                                                  | --         | 8.6            | Tier II (Suter & Tsao 1996) | 8.6                                                               | USEPA Reg 5 | 8.60E+00                                   | Tier II (Suter & Tsao 1996) |
| Benzydine                     | 92-87-5             | --                                               | --        | --                                                  | --         | 3.9            | Tier II (Suter & Tsao 1996) | --                                                                | --          | 3.90E+00                                   | Tier II (Suter & Tsao 1996) |
| Benz(a)anthracene             | 56-55-3             | 42                                               | 4.7       | --                                                  | --         | 0.027          | Tier II (Suter & Tsao 1996) | 0.025                                                             | USEPA Reg 5 | 4.70E+00                                   | Ohio Administrative Code    |
| Benzo(a)pyrene                | 50-32-8             | 0.54                                             | 0.06      | --                                                  | --         | 0.014          | Tier II (Suter & Tsao 1996) | 0.014                                                             | USEPA Reg 5 | 6.00E-02                                   | Ohio Administrative Code    |
| Benzo(b)fluoranthene          | 205-99-2            | 23                                               | 2.6       | --                                                  | --         | 2.6            | Tier II (GLI database)      | 9.07                                                              | USEPA Reg 5 | 2.60E+00                                   | Ohio Administrative Code    |
| Benzo(ghi)perylene            | 191-24-2            | --                                               | --        | --                                                  | --         | --             | --                          | 7.64                                                              | USEPA Reg 5 | 7.64E+00                                   | USEPA Reg 5                 |
| Benzo(k)fluoranthene          | 207-08-9            | --                                               | --        | --                                                  | --         | --             | --                          | --                                                                | --          | No ESV                                     | No Source                   |
| Benzoic acid                  | 65-85-0             | --                                               | --        | --                                                  | --         | 42             | Tier II (Suter & Tsao 1996) | --                                                                | --          | 4.20E+01                                   | Tier II (Suter & Tsao 1996) |
| BHC, alpha                    | 319-84-6            | --                                               | --        | --                                                  | --         | --             | --                          | 12.4                                                              | USEPA Reg 5 | 1.24E+01                                   | USEPA Reg 5                 |
| BHC, beta                     | 319-85-7            | --                                               | --        | --                                                  | --         | --             | --                          | 0.495                                                             | USEPA Reg 5 | 4.95E-01                                   | USEPA Reg 5                 |
| BHC, delta                    | 319-86-8            | --                                               | --        | --                                                  | --         | --             | --                          | 667                                                               | USEPA Reg 5 | 6.67E+02                                   | USEPA Reg 5                 |
| BHC, gamma (Lindane)          | 58-89-9             | 0.95                                             | 0.057     | --                                                  | --         | 0.057          | Tier II (GLI database)      | 0.026                                                             | USEPA Reg 5 | 5.70E-02                                   | Ohio Administrative Code    |
| Biphenyl                      | 92-52-4             | 26                                               | 6.5       | --                                                  | --         | 6.5            | Tier II (GLI database)      | --                                                                | --          | 6.50E+00                                   | Ohio Administrative Code    |
| bis(2-Chloroethyl) ether      | 111-44-4            | --                                               | --        | --                                                  | --         | --             | --                          | 19,000                                                            | USEPA Reg 5 | 1.90E+04                                   | USEPA Reg 5                 |
| bis(2-Ethylhexyl)phthalate    | 117-81-7            | 1,100                                            | 8.4       | --                                                  | --         | 3.0            | Tier II (Suter & Tsao 1996) | 0.3                                                               | USEPA Reg 5 | 8.40E+00                                   | Ohio Administrative Code    |
| Bromodichloromethane          | 74-97-5             | 3,100                                            | 340       | --                                                  | --         | --             | --                          | --                                                                | --          | 3.40E+02                                   | Ohio Administrative Code    |
| Bromomethane (methyl bromide) | 74-83-9             | 38                                               | 16        | --                                                  | --         | 16             | Tier II (GLI database)      | 16                                                                | USEPA Reg 5 | 1.60E+01                                   | Ohio Administrative Code    |
| 4-bromophenyl-phenylether     | 101-55-3            | --                                               | --        | --                                                  | --         | --             | --                          | 1.5                                                               | USEPA Reg 5 | 1.50E+00                                   | USEPA Reg 5                 |

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

| Analyte                           | CAS Registry Number | Surface Water Screening Values                   |          |                                                     |            |                |                        |                                                                   |             |                                            |                          |
|-----------------------------------|---------------------|--------------------------------------------------|----------|-----------------------------------------------------|------------|----------------|------------------------|-------------------------------------------------------------------|-------------|--------------------------------------------|--------------------------|
|                                   |                     | Ohio EPA Administrative Code (µg/L) <sup>a</sup> |          | Updated Values for Suter and Tsao 1996 <sup>b</sup> |            |                |                        | USEPA Region 5 ESLs (2003) <sup>c</sup><br>(update of 1998 EDQLs) |             | Preferred Surface Water Value <sup>d</sup> |                          |
|                                   |                     |                                                  |          | NAWQC 2009 Update                                   |            | Tier II Values |                        |                                                                   |             |                                            |                          |
|                                   |                     |                                                  |          | OMZM                                                | OMZA       | Number (µg/L)  | Reference              | Number (µg/L)                                                     | Reference   | Number (µg/L)                              | Reference                |
| 2-Butanone (methyl ethyl ketone)  | 78-93-3             | 200,000                                          | 22,000   | --                                                  | --         | 22,000         | Tier II (GLI database) | 2,200                                                             | USEPA Reg 5 | 2.20E+04                                   | Ohio Administrative Code |
| Butyl benzyl phthalate            | 85-68-7             | 130                                              | 23       | --                                                  | --         | 23             | Tier II (GLI database) | 23                                                                | USEPA Reg 5 | 2.30E+01                                   | Ohio Administrative Code |
| Carbofuran                        | 1563-66-2           | --                                               | --       | --                                                  | --         | 1              | Tier II (GLI database) | --                                                                | --          | 1.00E+00                                   | Tier II (GLI database)   |
| Carbon disulfide                  | 75-15-0             | 130                                              | 15       | --                                                  | --         | 15             | Tier II (GLI database) | 15                                                                | USEPA Reg 5 | 1.50E+01                                   | Ohio Administrative Code |
| Carbon tetrachloride              | 56-23-5             | 2,200                                            | 240      | --                                                  | --         | 240            | Tier II (GLI database) | 240                                                               | USEPA Reg 5 | 2.40E+02                                   | Ohio Administrative Code |
| Chlordane                         | 57-74-9             | --                                               | --       | 0.0000043                                           | NAWQC 2009 | --             | --                     | 0.0000043                                                         | USEPA Reg 5 | 4.30E-06                                   | NAWQC 2009               |
| gamma-Chlordane                   | 5103-74-2           | --                                               | --       | --                                                  | --         | --             | --                     | --                                                                | --          | No ESV                                     | No Source                |
| 4-Chloroaniline                   | 106-47-8            | --                                               | --       | --                                                  | --         | --             | --                     | 232                                                               | USEPA Reg 5 | 2.32E+02                                   | USEPA Reg 5              |
| Chlorobenzene                     | 108-90-7            | 420                                              | 47       | --                                                  | --         | 47             | Tier II (GLI database) | 47                                                                | USEPA Reg 5 | 4.70E+01                                   | Ohio Administrative Code |
| Chlorobenzilate                   | 510-15-6            | --                                               | --       | --                                                  | --         | --             | --                     | 7.16                                                              | USEPA Reg 5 | 7.16E+00                                   | USEPA Reg 5              |
| Chloroform                        | 67-66-3             | 1,300                                            | 140      | --                                                  | --         | 140            | Tier II (GLI database) | 140                                                               | USEPA Reg 5 | 1.40E+02                                   | Ohio Administrative Code |
| Chloromethane                     | 74-87-3             | --                                               | --       | --                                                  | --         | --             | --                     | --                                                                | --          | No ESV                                     | No Source                |
| 2-Chloronaphthalene               | 91-58-7             | --                                               | --       | --                                                  | --         | --             | --                     | 0.396                                                             | USEPA Reg 5 | 3.96E-01                                   | USEPA Reg 5              |
| 2-Chlorophenol                    | 95-57-8             | 290                                              | 32       | --                                                  | --         | 32             | Tier II (GLI database) | 24                                                                | USEPA Reg 5 | 3.20E+01                                   | Ohio Administrative Code |
| Chloropyrifos                     | 2921-88-2           | --                                               | --       | 0.041                                               | NAWQC 2009 | --             | --                     | --                                                                | --          | 4.10E-02                                   | NAWQC 2009               |
| 4-chloro-3-methylphenol           | 59-50-7             | --                                               | --       | --                                                  | --         | --             | --                     | 34.8                                                              | USEPA Reg 5 | 3.48E+01                                   | USEPA Reg 5              |
| Chrysene                          | 218-01-9            | 42                                               | 4.7      | --                                                  | --         | --             | --                     | --                                                                | --          | 4.70E+00                                   | Ohio Administrative Code |
| Cyanazine                         | 21725-46-2          | --                                               | --       | --                                                  | --         | 270            | Tier II (GLI database) | --                                                                | --          | 2.70E+02                                   | Tier II (GLI database)   |
| 2,4-D                             | 94-75-7             | --                                               | --       | --                                                  | --         | 240            | Tier II (GLI database) | 220                                                               | USEPA Reg 5 | 2.40E+02                                   | Tier II (GLI database)   |
| 4,4'-DDD                          | 72-54-8             | --                                               | --       | --                                                  | --         | --             | --                     | --                                                                | --          | No ESV                                     | No Source                |
| 4,4'-DDE                          | 72-55-9             | --                                               | --       | --                                                  | --         | --             | --                     | 4.51E-09                                                          | USEPA Reg 5 | 4.51E-09                                   | USEPA Reg 5              |
| 4,4'-DDT                          | 50-29-3             | 1.10E-05                                         | 1.10E-05 | 0.001                                               | NAWQC 2009 | --             | --                     | 1.10E-05                                                          | USEPA Reg 5 | 1.10E-05                                   | Ohio Administrative Code |
| Demeton                           | 8065-48-3           | --                                               | --       | 0.1                                                 | NAWQC 2009 | 0.1            | Tier II (GLI database) | --                                                                | --          | 1.00E-01                                   | NAWQC 2009               |
| Diazinon                          | 333-41-5            | --                                               | --       | 0.17                                                | NAWQC 2009 | 0.08           | Tier II (GLI database) | --                                                                | --          | 1.70E-01                                   | NAWQC 2009               |
| Dibenzofuran                      | 132-64-9            | 36                                               | 4        | --                                                  | --         | 4              | Tier II (GLI database) | 4                                                                 | USEPA Reg 5 | 4.00E+00                                   | Ohio Administrative Code |
| Dibromochloromethane              | 124-48-1            | 2,900                                            | 320      | --                                                  | --         | --             | --                     | --                                                                | --          | 3.20E+02                                   | Ohio Administrative Code |
| 2,2-Dibromo-3-nitrilopropionamide | 10222-01-2          | --                                               | --       | --                                                  | --         | 20             | Tier II (GLI database) | --                                                                | --          | 2.00E+01                                   | Tier II (GLI database)   |
| 1,2-Dichlorobenzene               | 95-50-1             | 130                                              | 23       | --                                                  | --         | 23             | Tier II (GLI database) | 14                                                                | USEPA Reg 5 | 2.30E+01                                   | Ohio Administrative Code |
| 1,3-Dichlorobenzene               | 541-73-1            | 79                                               | 22       | --                                                  | --         | 22             | Tier II (GLI database) | 38                                                                | USEPA Reg 5 | 2.20E+01                                   | Ohio Administrative Code |
| 1,4-Dichlorobenzene               | 106-46-7            | 57                                               | 9.4      | --                                                  | --         | 9.4            | Tier II (GLI database) | 9.4                                                               | USEPA Reg 5 | 9.40E+00                                   | Ohio Administrative Code |
| Dichlorobenzene                   | 25321-22-6          | --                                               | --       | --                                                  | --         | 5              | Tier II (GLI database) | --                                                                | --          | 5.00E+00                                   | Tier II (GLI database)   |
| 3,3'-Dichlorobenzidine            | 91-94-1             | --                                               | --       | --                                                  | --         | --             | --                     | 4.5                                                               | USEPA Reg 5 | 4.50E+00                                   | USEPA Reg 5              |
| 1,1-Dichloroethane                | 75-34-3             | 3,700                                            | 410      | --                                                  | --         | 740            | Tier II (GLI database) | 47                                                                | USEPA Reg 5 | 4.10E+02                                   | Ohio Administrative Code |
| 1,2-Dichloroethane                | 107-06-2            | 9,600                                            | 2,000    | --                                                  | --         | 2,000          | Tier II (GLI database) | 910                                                               | USEPA Reg 5 | 2.00E+03                                   | Ohio Administrative Code |
| 1,1-Dichloroethene                | 75-35-4             | 1,900                                            | 210      | --                                                  | --         | 210            | Tier II (GLI database) | 65                                                                | USEPA Reg 5 | 2.10E+02                                   | Ohio Administrative Code |
| 1,2-Dichloroethene                | 540-59-0            | 8,800                                            | 970      | --                                                  | --         | 970            | Tier II (GLI database) | 970                                                               | USEPA Reg 5 | 9.70E+02                                   | Ohio Administrative Code |
| 2,4-Dichlorophenol                | 120-83-2            | 110                                              | 11       | --                                                  | --         | 11             | Tier II (GLI database) | 11                                                                | USEPA Reg 5 | 1.10E+01                                   | Ohio Administrative Code |
| 1,2-Dichloropropane               | 78-87-5             | 3,300                                            | 520      | --                                                  | --         | 520            | Tier II (GLI database) | 360                                                               | USEPA Reg 5 | 5.20E+02                                   | Ohio Administrative Code |
| 1,3-Dichloropropene               | 542-75-6            | 15                                               | 1.7      | --                                                  | --         | 1.7            | Tier II (GLI database) | --                                                                | --          | 1.70E+00                                   | Ohio Administrative Code |
| Dieldrin                          | 60-57-1             | 0.24                                             | 0.056    | 0.056                                               | NAWQC 2009 | --             | --                     | 7.10E-05                                                          | USEPA Reg 5 | 5.60E-02                                   | Ohio Administrative Code |
| Diethylphthalate                  | 84-66-2             | 980                                              | 220      | --                                                  | --         | 220            | Tier II (GLI database) | 110                                                               | USEPA Reg 5 | 2.20E+02                                   | Ohio Administrative Code |
| 7,12'-Dimethylbenz(a)anthracene   | 57-97-6             | --                                               | --       | --                                                  | --         | --             | --                     | 0.548                                                             | USEPA Reg 5 | 5.48E-01                                   | USEPA Reg 5              |
| 2,4-Dimethylphenol                | 105-67-9            | 140                                              | 15       | --                                                  | --         | 15             | Tier II (GLI database) | 100                                                               | USEPA Reg 5 | 1.50E+01                                   | Ohio Administrative Code |
| Dimethylphthalate                 | 131-11-3            | 3,200                                            | 1,100    | --                                                  | --         | 1100           | Tier II (GLI database) | --                                                                | --          | 1.10E+03                                   | Ohio Administrative Code |
| Di-n-butyl phthalate              | 84-74-2             | --                                               | --       | --                                                  | --         | 19             | Tier II (GLI database) | 9.7                                                               | USEPA Reg 5 | 1.90E+01                                   | Tier II (GLI database)   |

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

| Analyte                     | CAS Registry Number | Surface Water Screening Values                   |         |                                                     |                           |                |                        |                                                                   |             |                                            |                          |
|-----------------------------|---------------------|--------------------------------------------------|---------|-----------------------------------------------------|---------------------------|----------------|------------------------|-------------------------------------------------------------------|-------------|--------------------------------------------|--------------------------|
|                             |                     | Ohio EPA Administrative Code (µg/L) <sup>a</sup> |         | Updated Values for Suter and Tsao 1996 <sup>b</sup> |                           |                |                        | USEPA Region 5 ESLs (2003) <sup>c</sup><br>(update of 1998 EDQLs) |             | Preferred Surface Water Value <sup>d</sup> |                          |
|                             |                     |                                                  |         | NAWQC 2009 Update                                   |                           | Tier II Values |                        |                                                                   |             |                                            |                          |
|                             |                     |                                                  |         | OMZM                                                | OMZA                      | Number (µg/L)  | Reference              | Number (µg/L)                                                     | Reference   | Number (µg/L)                              | Reference                |
| Di-n-octylphthalate         | 117-84-0            | --                                               | --      | --                                                  | --                        | --             | --                     | 30                                                                | USEPA Reg 5 | 3.00E+01                                   | USEPA Reg 5              |
| 3,5-Dinitroaniline          | 618-87-1            | 210                                              | 70      | --                                                  | --                        | 70             | Tier II (GLI database) | --                                                                | --          | 7.00E+01                                   | Ohio Administrative Code |
| 1,3-Dinitrobenzene          | 99-65-0             | 100                                              | 22      | --                                                  | --                        | 22             | Tier II (GLI database) | 22                                                                | --          | 2.20E+01                                   | Ohio Administrative Code |
| 2,4-Dinitrophenol           | 51-28-5             | --                                               | --      | --                                                  | --                        | --             | --                     | 19                                                                | USEPA Reg 5 | 1.90E+01                                   | USEPA Reg 5              |
| 2,3-Dinitrotoluene          | 602-01-7            | 21                                               | 2.3     | --                                                  | --                        | 2.3            | Tier II (GLI database) | --                                                                | --          | 2.30E+00                                   | Ohio Administrative Code |
| 2,4-Dinitrotoluene          | 121-14-2            | 390                                              | 44      | --                                                  | --                        | 44             | Tier II (GLI database) | 44                                                                | USEPA Reg 5 | 4.40E+01                                   | Ohio Administrative Code |
| 2,5-Dinitrotoluene          | 619-15-8            | 50                                               | 5.6     | --                                                  | --                        | 5.6            | Tier II (GLI database) | --                                                                | --          | 5.60E+00                                   | Ohio Administrative Code |
| 2,6-Dinitrotoluene          | 606-20-2            | 730                                              | 81      | --                                                  | --                        | 81             | Tier II (GLI database) | 81                                                                | USEPA Reg 5 | 8.10E+01                                   | Ohio Administrative Code |
| 3,5-Dinitrotoluene          | 618-85-9            | 860                                              | 95      | --                                                  | --                        | 95             | Tier II (GLI database) | --                                                                | --          | 9.50E+01                                   | Ohio Administrative Code |
| 4,6-Dinitro-2-methylphenol  | 534-52-1            | --                                               | --      | --                                                  | --                        | --             | --                     | 23                                                                | USEPA Reg 5 | 2.30E+01                                   | USEPA Reg 5              |
| Dinoseb                     | 88-85-7             | --                                               | --      | --                                                  | --                        | --             | --                     | 0.48                                                              | USEPA Reg 5 | 4.80E-01                                   | USEPA Reg 5              |
| 1,4-Dioxane                 | 123-91-1            | --                                               | --      | --                                                  | --                        | --             | --                     | 22,000                                                            | USEPA Reg 5 | 2.20E+04                                   | USEPA Reg 5              |
| Diphenylamine               | 122-39-4            | --                                               | --      | --                                                  | --                        | --             | --                     | 412                                                               | USEPA Reg 5 | 4.12E+02                                   | USEPA Reg 5              |
| 1,2-Diphenylhydrazine       | 122-66-7            | --                                               | --      | --                                                  | --                        | 1.1            | Tier II (GLI database) | --                                                                | --          | 1.10E+00                                   | Tier II (GLI database)   |
| Disulfoton                  | 298-04-4            | --                                               | --      | --                                                  | --                        | --             | --                     | 0.0402                                                            | USEPA Reg 5 | 4.02E-02                                   | USEPA Reg 5              |
| Endosulfan                  | 115-29-7            | --                                               | --      | --                                                  | --                        | 0.009          | Tier II (GLI database) | --                                                                | --          | 9.00E-03                                   | Tier II (GLI database)   |
| Endosulfan I (alpha)        | 959-98-8            | --                                               | --      | 0.056                                               | NAWQC 2009                | --             | --                     | 0.056                                                             | USEPA Reg 5 | 5.60E-02                                   | NAWQC 2009               |
| Endosulfan II (beta)        | 33213-65-9          | --                                               | --      | 0.056                                               | NAWQC 2009                | --             | --                     | 0.056                                                             | USEPA Reg 5 | 5.60E-02                                   | NAWQC 2009               |
| Endosulfan sulfate          | 1031-07-8           | --                                               | --      | --                                                  | --                        | --             | --                     | 2.22                                                              | USEPA Reg 5 | 2.22E+00                                   | USEPA Reg 5              |
| Endrin                      | 72-20-8             | 0.086                                            | 0.036   | 0.036                                               | NAWQC 2009                | --             | --                     | 0.036                                                             | USEPA Reg 5 | 3.60E-02                                   | Ohio Administrative Code |
| Endrin aldehyde             | 7421-93-4           | --                                               | --      | --                                                  | --                        | --             | --                     | 0.15                                                              | USEPA Reg 5 | 1.50E-01                                   | USEPA Reg 5              |
| Ethylbenzene                | 100-41-4            | 550                                              | 61      | --                                                  | --                        | 61             | Tier II (GLI database) | 14                                                                | USEPA Reg 5 | 6.10E+01                                   | Ohio Administrative Code |
| Ethylene glycol             | 107-21-1            | 1,300,000                                        | 140,000 | --                                                  | --                        | 140000         | Tier II (GLI database) | --                                                                | --          | 1.40E+05                                   | Ohio Administrative Code |
| Fluoranthene                | 206-44-0            | 3.7                                              | 0.80    | 6.16                                                | NAWQC (Suter & Tsao 1996) | 0.8            | Tier II (GLI database) | 1.9                                                               | USEPA Reg 5 | 8.00E-01                                   | Ohio Administrative Code |
| Fluorene                    | 86-73-7             | 110                                              | 19      | --                                                  | --                        | 19             | Tier II (GLI database) | 19                                                                | USEPA Reg 5 | 1.90E+01                                   | Ohio Administrative Code |
| Formaldehyde                | 50-00-0             | --                                               | --      | --                                                  | --                        | 74             | Tier II (GLI database) | --                                                                | --          | 7.40E+01                                   | Tier II (GLI database)   |
| Guthion                     | 86-50-0             | --                                               | --      | 0.01                                                | NAWQC 2009                | 0.005          | Tier II (GLI database) | --                                                                | --          | 1.00E-02                                   | NAWQC 2009               |
| Heptachlor                  | 76-44-8             | --                                               | --      | 0.0038                                              | NAWQC 2009                | --             | --                     | 3.80E-03                                                          | USEPA Reg 5 | 3.80E-03                                   | NAWQC 2009               |
| Heptachlor epoxide          | 1024-57-3           | --                                               | --      | 0.0038                                              | NAWQC 2009                | --             | --                     | 3.80E-03                                                          | USEPA Reg 5 | 3.80E-03                                   | NAWQC 2009               |
| Hexachlorobenzene           | 118-74-1            | --                                               | --      | --                                                  | --                        | --             | --                     | 3.00E-04                                                          | USEPA Reg 5 | 3.00E-04                                   | USEPA Reg 5              |
| Hexachlorobutadiene         | 87-68-3             | --                                               | --      | --                                                  | --                        | 1              | Tier II (GLI database) | 0.053                                                             | USEPA Reg 5 | 1.00E+00                                   | Tier II (GLI database)   |
| Hexachlorocyclopentadiene   | 77-47-4             | --                                               | --      | --                                                  | --                        | 0.45           | Tier II (GLI database) | 77                                                                | USEPA Reg 5 | 4.50E-01                                   | Tier II (GLI database)   |
| Hexachloroethane            | 67-72-1             | --                                               | --      | --                                                  | --                        | --             | --                     | 8                                                                 | USEPA Reg 5 | 8.00E+00                                   | USEPA Reg 5              |
| Hexachlorophene             | 70-30-4             | --                                               | --      | --                                                  | --                        | --             | --                     | 0.228                                                             | USEPA Reg 5 | 2.28E-01                                   | USEPA Reg 5              |
| 2-Hexanone                  | 591-78-6            | --                                               | --      | --                                                  | --                        | --             | --                     | 99                                                                | USEPA Reg 5 | 9.90E+01                                   | USEPA Reg 5              |
| HMX                         | 2691-41-0           | 1,200                                            | 220     | --                                                  | --                        | 220            | Tier II (GLI database) | --                                                                | --          | 2.20E+02                                   | Ohio Administrative Code |
| Hydroquinone                | 123-31-9            | --                                               | --      | --                                                  | --                        | 2.2            | Tier II (GLI database) | --                                                                | --          | 2.20E+00                                   | Tier II (GLI database)   |
| Indeno(1,2,3-cd)pyrene      | 193-39-5            | --                                               | --      | --                                                  | --                        | --             | --                     | 4.31                                                              | USEPA Reg 5 | 4.31E+00                                   | USEPA Reg 5              |
| Isodecyl diphenyl phosphate | 29761-21-5          | --                                               | --      | --                                                  | --                        | 1.73           | Tier II (GLI database) | --                                                                | --          | 1.73E+00                                   | Tier II (GLI database)   |
| Isodrin                     | 465-73-6            | --                                               | --      | --                                                  | --                        | --             | --                     | 0.0309                                                            | USEPA Reg 5 | 3.09E-02                                   | USEPA Reg 5              |
| Isophorone                  | 78-59-1             | 7,500                                            | 920     | --                                                  | --                        | 920            | Tier II (GLI database) | 920                                                               | USEPA Reg 5 | 9.20E+02                                   | Ohio Administrative Code |
| Isopropylbenzene            | 98-82-8             | 43                                               | 4.8     | --                                                  | --                        | 4.8            | Tier II (GLI database) | --                                                                | --          | 4.80E+00                                   | Ohio Administrative Code |
| 4-Isopropyltoluene          | 99-87-6             | 150                                              | 16      | --                                                  | --                        | 16             | Tier II (GLI database) | --                                                                | --          | 1.60E+01                                   | Ohio Administrative Code |
| Kepone                      | 143-50-0            | --                                               | --      | --                                                  | --                        | --             | --                     | 0.132                                                             | USEPA Reg 5 | 1.32E-01                                   | USEPA Reg 5              |
| Malathion                   | 121-75-5            | --                                               | --      | 0.1                                                 | NAWQC 2009                | 0.1            | Tier II (GLI database) | --                                                                | --          | 1.00E-01                                   | NAWQC 2009               |

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

| Analyte                                         | CAS Registry Number | Surface Water Screening Values                   |          |                                                     |            |                |                             |                                                                   |             |                                            |                          |
|-------------------------------------------------|---------------------|--------------------------------------------------|----------|-----------------------------------------------------|------------|----------------|-----------------------------|-------------------------------------------------------------------|-------------|--------------------------------------------|--------------------------|
|                                                 |                     | Ohio EPA Administrative Code (µg/L) <sup>a</sup> |          | Updated Values for Suter and Tsao 1996 <sup>b</sup> |            |                |                             | USEPA Region 5 ESLs (2003) <sup>c</sup><br>(update of 1998 EDQLs) |             | Preferred Surface Water Value <sup>d</sup> |                          |
|                                                 |                     |                                                  |          | NAWQC 2009 Update                                   |            | Tier II Values |                             |                                                                   |             |                                            |                          |
|                                                 |                     |                                                  |          | OMZM                                                | OMZA       | Number (µg/L)  | Reference                   | Number (µg/L)                                                     | Reference   | Number (µg/L)                              | Reference                |
| MBAS (foaming agents, aesthetic criteria)       | --                  | 500                                              | --       | --                                                  | --         | --             | --                          | --                                                                | --          | 5.00E+02                                   | Ohio Administrative Code |
| Methanol                                        | 67-56-1             | --                                               | --       | --                                                  | --         | 330            | Tier II (GLI database)      | --                                                                | --          | 3.30E+02                                   | Tier II (GLI database)   |
| Methoxychlor                                    | 72-43-5             | --                                               | --       | 0.03                                                | NAWQC 2009 | 0.03           | Tier II (GLI database)      | 0.019                                                             | USEPA Reg 5 | 3.00E-02                                   | NAWQC 2009               |
| Methyl methacrylate                             | 80-62-6             | --                                               | --       | --                                                  | --         | --             | --                          | 2,800                                                             | USEPA Reg 5 | 2.80E+03                                   | USEPA Reg 5              |
| 4-Methyl-2-pentanone                            | 108-10-1            | --                                               | --       | --                                                  | --         | --             | --                          | 170                                                               | USEPA Reg 5 | 1.70E+02                                   | USEPA Reg 5              |
| Methyl tert-butyl ether                         | 1634-04-4           | 6,500                                            | 730      | 51,000                                              | NAWQC 2009 | 730            | Tier II (GLI database)      | --                                                                | --          | 7.30E+02                                   | Ohio Administrative Code |
| Methylamine                                     | 74-89-5             | --                                               | --       | --                                                  | --         | 860            | Tier II (GLI database)      | --                                                                | --          | 8.60E+02                                   | Tier II (GLI database)   |
| 3-Methylcholanthrene                            | 56-49-5             | --                                               | --       | --                                                  | --         | --             | --                          | 0.0891                                                            | USEPA Reg 5 | 8.91E-02                                   | USEPA Reg 5              |
| Methylene chloride (dichloromethane)            | 75-09-2             | 11,000                                           | 1,900    | --                                                  | --         | 2,200          | Tier II (Suter & Tsao 1996) | 940                                                               | USEPA Reg 5 | 1.90E+03                                   | Ohio Administrative Code |
| Methylene dithiocyanate                         | 6317-18-6           | --                                               | --       | --                                                  | --         | 1              | Tier II (GLI database)      | --                                                                | --          | 1.00E+00                                   | Tier II (GLI database)   |
| 2-Methylnaphthalene                             | 91-57-6             | --                                               | --       | --                                                  | --         | 4.7            | Tier II (GLI database)      | 330                                                               | USEPA Reg 5 | 4.70E+00                                   | Tier II (GLI database)   |
| 2-Methylphenol                                  | 95-48-7             | 600                                              | 67       | --                                                  | --         | 67             | Tier II (GLI database)      | 67                                                                | USEPA Reg 5 | 6.70E+01                                   | Ohio Administrative Code |
| 3-Methylphenol                                  | 108-39-4            | 560                                              | 62       | --                                                  | --         | 62             | Tier II (GLI database)      | 62                                                                | USEPA Reg 5 | 6.20E+01                                   | Ohio Administrative Code |
| 4-Methylphenol                                  | 106-44-5            | 480                                              | 53       | --                                                  | --         | 53             | Tier II (GLI database)      | 25                                                                | USEPA Reg 5 | 5.30E+01                                   | Ohio Administrative Code |
| Mirex                                           | 2385-85-5           | --                                               | --       | 0.001                                               | NAWQC 2009 | 0.001          | Tier II (GLI database)      | --                                                                | --          | 1.00E-03                                   | NAWQC 2009               |
| Naphthalene                                     | 91-20-3             | 170                                              | 21       | --                                                  | --         | 21             | Tier II (GLI database)      | 13                                                                | USEPA Reg 5 | 2.10E+01                                   | Ohio Administrative Code |
| Nitrilotriacetic acid                           | 139-13-9            | --                                               | --       | --                                                  | --         | 5000           | Tier II (GLI database)      | --                                                                | --          | 5.00E+03                                   | Tier II (GLI database)   |
| Nitrobenzene                                    | 99-95-3             | 2,000                                            | 380      | --                                                  | --         | 380            | Tier II (GLI database)      | 220                                                               | USEPA Reg 5 | 3.80E+02                                   | Ohio Administrative Code |
| Nitrocellulose                                  | 9004-70-0           | --                                               | --       | --                                                  | --         | --             | --                          | --                                                                | --          | No ESV                                     | No Source                |
| Nitroglycerin                                   | 55-63-0             | 160                                              | 18       | --                                                  | --         | 18             | Tier II (GLI database)      | --                                                                | --          | 1.80E+01                                   | Ohio Administrative Code |
| 2-Nitrophenol                                   | 88-75-5             | 650                                              | 73       | --                                                  | --         | 73             | Tier II (GLI database)      | --                                                                | --          | 7.30E+01                                   | Ohio Administrative Code |
| 4-Nitrophenol                                   | 100-02-7            | --                                               | --       | --                                                  | --         | 58             | Tier II (GLI database)      | 60                                                                | USEPA Reg 5 | 5.80E+01                                   | Tier II (GLI database)   |
| N-Nitrosodiethylamine                           | 55-18-5             | --                                               | --       | --                                                  | --         | --             | --                          | 768                                                               | USEPA Reg 5 | 7.68E+02                                   | USEPA Reg 5              |
| N-Nitrosodiphenylamine                          | 86-30-6             | --                                               | --       | --                                                  | --         | 25             | Tier II (GLI database)      | --                                                                | --          | 2.50E+01                                   | Tier II (GLI database)   |
| 2-Nitrotoluene                                  | 88-72-2             | 640                                              | 71       | --                                                  | --         | 71             | Tier II (GLI database)      | --                                                                | --          | 7.10E+01                                   | Ohio Administrative Code |
| 3-Nitrotoluene                                  | 99-08-1             | 380                                              | 42       | --                                                  | --         | 42             | Tier II (GLI database)      | --                                                                | --          | 4.20E+01                                   | Ohio Administrative Code |
| 4-Nitrotoluene                                  | 99-99-0             | 410                                              | 46       | --                                                  | --         | 46             | Tier II (GLI database)      | --                                                                | --          | 4.60E+01                                   | Ohio Administrative Code |
| Nonylphenol                                     | 84852-15-3          | --                                               | --       | 28                                                  | NAWQC 2009 | --             | --                          | --                                                                | --          | 2.80E+01                                   | NAWQC 2009               |
| Oil and grease (aesthetic criteria)             | --                  | 10,000                                           | --       | --                                                  | --         | --             | --                          | --                                                                | --          | 1.00E+04                                   | Ohio Administrative Code |
| Parathion                                       | 56-38-2             | 0.065                                            | 0.013    | 0.013                                               | NAWQC 2009 | --             | --                          | 0.013                                                             | USEPA Reg 5 | 1.30E-02                                   | Ohio Administrative Code |
| PCDDs                                           | PCDD-S              | --                                               | --       | --                                                  | --         | --             | --                          | 2.78E-07                                                          | USEPA Reg 5 | 2.78E-07                                   | USEPA Reg 5              |
| Pentachlorobenzene                              | 608-93-5            | --                                               | --       | --                                                  | --         | 3.1            | Tier II (GLI database)      | 0.019                                                             | USEPA Reg 5 | 3.10E+00                                   | Tier II (GLI database)   |
| Pentachloroethane                               | 76-01-7             | --                                               | --       | --                                                  | --         | --             | --                          | 56.4                                                              | USEPA Reg 5 | 5.64E+01                                   | USEPA Reg 5              |
| PCP                                             | 87-86-5             | 5.3                                              | 4        | 15                                                  | NAWQC 2009 | --             | --                          | 4                                                                 | USEPA Reg 5 | 4.00E+00                                   | Ohio Administrative Code |
| Perchlorate                                     | 14797-73-0          | 20,000                                           | 10,000   | --                                                  | --         | --             | --                          | --                                                                | --          | 1.00E+04                                   | Ohio Administrative Code |
| Phenanthrene                                    | 85-01-8             | 31                                               | 2.3      | --                                                  | --         | 2.3            | Tier II (GLI database)      | 3.6                                                               | USEPA Reg 5 | 2.30E+00                                   | Ohio Administrative Code |
| Phenol                                          | 108-95-2            | 4,700                                            | 400      | --                                                  | --         | 400            | Tier II (GLI database)      | 180                                                               | USEPA Reg 5 | 4.00E+02                                   | Ohio Administrative Code |
| Phenol (cold water and salmon spawning habitat) | 108-95-2            | 4,600                                            | 160      | --                                                  | --         | --             | --                          | --                                                                | --          | 1.60E+02                                   | Ohio Administrative Code |
| Phorate                                         | 298-02-2            | --                                               | --       | --                                                  | --         | --             | --                          | 3.62                                                              | USEPA Reg 5 | 3.62E+00                                   | USEPA Reg 5              |
| PCBs                                            | 1336-36-3           | 1.20E-04                                         | 1.20E-04 | 0.014                                               | NAWQC 2009 | --             | --                          | 1.20E-04                                                          | USEPA Reg 5 | 1.20E-04                                   | Ohio Administrative Code |
| Propylene glycol                                | 57-55-6             | 640,000                                          | 71,000   | --                                                  | --         | 71000          | Tier II (GLI database)      | --                                                                | --          | 7.10E+04                                   | Ohio Administrative Code |
| Pyrene                                          | 129-00-0            | 42                                               | 4.6      | --                                                  | --         | 4.6            | Tier II (GLI database)      | 0.3                                                               | USEPA Reg 5 | 4.60E+00                                   | Ohio Administrative Code |
| Pyridine                                        | 110-86-1            | --                                               | --       | --                                                  | --         | --             | --                          | 2,380                                                             | USEPA Reg 5 | 2.38E+03                                   | USEPA Reg 5              |

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

| Analyte                           | CAS Registry Number | Surface Water Screening Values                   |        |                                                     |            |                |                        |                                                                   |             |                                            |                          |
|-----------------------------------|---------------------|--------------------------------------------------|--------|-----------------------------------------------------|------------|----------------|------------------------|-------------------------------------------------------------------|-------------|--------------------------------------------|--------------------------|
|                                   |                     | Ohio EPA Administrative Code (µg/L) <sup>a</sup> |        | Updated Values for Suter and Tsao 1996 <sup>b</sup> |            |                |                        | USEPA Region 5 ESLs (2003) <sup>c</sup><br>(update of 1998 EDQLs) |             | Preferred Surface Water Value <sup>d</sup> |                          |
|                                   |                     |                                                  |        | NAWQC 2009 Update                                   |            | Tier II Values |                        |                                                                   |             |                                            |                          |
|                                   |                     |                                                  |        | OMZM                                                | OMZA       | Number (µg/L)  | Reference              | Number (µg/L)                                                     | Reference   | Number (µg/L)                              | Reference                |
| RDX                               | 121-82-4            | 520                                              | 79     | --                                                  | --         | 79             | Tier II (GLI database) | --                                                                | --          | 7.90E+01                                   | Ohio Administrative Code |
| SAS-310                           | --                  | 5                                                | 0.61   | --                                                  | --         | 0.61           | Tier II (GLI database) | --                                                                | --          | 6.10E-01                                   | Ohio Administrative Code |
| Silvex (2,4,5-TP)                 | 93-72-1             | --                                               | --     | --                                                  | --         | --             | --                     | 30                                                                | USEPA Reg 5 | 3.00E+01                                   | USEPA Reg 5              |
| Simazine                          | 122-34-9            | --                                               | --     | --                                                  | --         | 9              | Tier II (GLI database) | --                                                                | --          | 9.00E+00                                   | Tier II (GLI database)   |
| Styrene                           | 100-42-5            | 290                                              | 32     | --                                                  | --         | 32             | Tier II (GLI database) | 32                                                                | USEPA Reg 5 | 3.20E+01                                   | Ohio Administrative Code |
| 1,2,4,5-Tetrachlorobenzene        | 95-94-3             | --                                               | --     | --                                                  | --         | 8.3            | Tier II (GLI database) | 3                                                                 | USEPA Reg 5 | 8.30E+00                                   | Tier II (GLI database)   |
| 2,3,7,8-TCDD                      | 1746-01-6           | --                                               | --     | --                                                  | --         | --             | --                     | 3.00E-09                                                          | USEPA Reg 5 | 3.00E-09                                   | USEPA Reg 5              |
| 1,1,1,2-Tetrachloroethane         | 630-20-6            | 770                                              | 85     | --                                                  | --         | 85             | Tier II (GLI database) | --                                                                | --          | 8.50E+01                                   | Ohio Administrative Code |
| 1,1,2,2-Tetrachloroethane         | 79-34-5             | 910                                              | 260    | --                                                  | --         | 260            | Tier II (GLI database) | 380                                                               | USEPA Reg 5 | 2.60E+02                                   | Ohio Administrative Code |
| Tetrachloroethene                 | 127-18-4            | 430                                              | 53     | --                                                  | --         | 53             | Tier II (GLI database) | 45                                                                | USEPA Reg 5 | 5.30E+01                                   | Ohio Administrative Code |
| 2,3,4,6-Tetrachlorophenol         | 58-90-2             | --                                               | --     | --                                                  | --         | --             | --                     | 1.2                                                               | USEPA Reg 5 | 1.20E+00                                   | USEPA Reg 5              |
| Tetraethyl dithiopyrophosphate    | 3689-24-5           | --                                               | --     | --                                                  | --         | --             | --                     | 13.9                                                              | USEPA Reg 5 | 1.39E+01                                   | USEPA Reg 5              |
| Tetrahydrofuran                   | 109-99-9            | 74,000                                           | 11,000 | --                                                  | --         | 11,000         | Tier II (GLI database) | --                                                                | --          | 1.10E+04                                   | Ohio Administrative Code |
| Tetryl                            | 479-45-8            | --                                               | --     | --                                                  | --         | --             | --                     | --                                                                | --          | No ESV                                     | No Source                |
| Toluene                           | 108-88-3            | 560                                              | 62     | --                                                  | --         | 62             | Tier II (GLI database) | 253                                                               | USEPA Reg 5 | 6.20E+01                                   | Ohio Administrative Code |
| Toxaphene                         | 8001-35-2           | --                                               | --     | 0.0002                                              | NAWQC 2009 | 0.005          | Tier II (GLI database) | 1.40E-04                                                          | USEPA Reg 5 | 2.00E-04                                   | NAWQC 2009               |
| Tribromomethane (bromoform)       | 75-25-2             | 1,100                                            | 230    | --                                                  | --         | 230            | Tier II (GLI database) | 230                                                               | USEPA Reg 5 | 2.30E+02                                   | Ohio Administrative Code |
| 2,4,6-Tribromophenol              | 118-79-6            | 50                                               | 5.6    | --                                                  | --         | 5.6            | Tier II (GLI database) | --                                                                | --          | 5.60E+00                                   | Ohio Administrative Code |
| Tributyltin                       | 688-73-3            | --                                               | --     | 0.072                                               | NAWQC 2009 | --             | --                     | --                                                                | --          | 7.20E-02                                   | NAWQC 2009               |
| Trichlorobenzene                  | 12002-48-1          | --                                               | --     | --                                                  | --         | 5              | Tier II (GLI database) | --                                                                | --          | 5.00E+00                                   | Tier II (GLI database)   |
| 1,2,4-Trichlorobenzene            | 120-82-1            | --                                               | --     | --                                                  | --         | --             | --                     | 30                                                                | USEPA Reg 5 | 3.00E+01                                   | USEPA Reg 5              |
| 1,1,1-Trichloroethane             | 71-55-6             | 690                                              | 76     | --                                                  | --         | 76             | Tier II (GLI database) | 76                                                                | USEPA Reg 5 | 7.60E+01                                   | Ohio Administrative Code |
| 1,1,2-Trichloroethane             | 79-00-5             | 3,300                                            | 740    | --                                                  | --         | 740            | Tier II (GLI database) | 500                                                               | USEPA Reg 5 | 7.40E+02                                   | Ohio Administrative Code |
| Trichloroethylene                 | 79-01-6             | 2,000                                            | 220    | --                                                  | --         | 220            | Tier II (GLI database) | 47                                                                | USEPA Reg 5 | 2.20E+02                                   | Ohio Administrative Code |
| 2,4,5-Trichlorophenol             | 95-95-4             | --                                               | --     | --                                                  | --         | 1.9            | Tier II (GLI database) | --                                                                | --          | 1.90E+00                                   | Tier II (GLI database)   |
| 2,4,6-Trichlorophenol             | 88-06-2             | 39                                               | 4.9    | --                                                  | --         | 4.9            | Tier II (GLI database) | 4.9                                                               | USEPA Reg 5 | 4.90E+00                                   | Ohio Administrative Code |
| 2,4,5-Trichlorophenoxyacetic acid | 93-76-5             | --                                               | --     | --                                                  | --         | --             | --                     | 686                                                               | USEPA Reg 5 | 6.86E+02                                   | USEPA Reg 5              |
| O,O,O-Triethyl phosphorothioate   | 126-68-1            | --                                               | --     | --                                                  | --         | --             | --                     | 58.2                                                              | USEPA Reg 5 | 5.82E+01                                   | USEPA Reg 5              |
| Trimethylbenzene                  | 25551-13-7          | --                                               | --     | --                                                  | --         | 15             | Tier II (GLI database) | --                                                                | --          | 1.50E+01                                   | Tier II (GLI database)   |
| 1,2,4-Trimethylbenzene            | 95-63-6             | 140                                              | 15     | --                                                  | --         | 15             | Tier II (GLI database) | --                                                                | --          | 1.50E+01                                   | Ohio Administrative Code |
| 1,3,5-Trimethylbenzene            | 108-67-8            | 230                                              | 26     | --                                                  | --         | 26             | Tier II (GLI database) | --                                                                | --          | 2.60E+01                                   | Ohio Administrative Code |
| 1,3,5-Trinitrobenzene             | 99-35-4             | 27                                               | 11     | --                                                  | --         | 11             | Tier II (GLI database) | --                                                                | --          | 1.10E+01                                   | Ohio Administrative Code |
| 2,4,6-Trinitrotoluene             | 118-96-7            | 120                                              | 13     | --                                                  | --         | 13             | Tier II (GLI database) | --                                                                | --          | 1.30E+01                                   | Ohio Administrative Code |
| Triphenyl phosphate               | 115-86-6            | --                                               | --     | --                                                  | --         | 4              | Tier II (GLI database) | --                                                                | --          | 4.00E+00                                   | Tier II (GLI database)   |

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water

| Analyte         | CAS Registry Number | Surface Water Screening Values                   |        |                                                     |      |                |                        |                                                                   |             |                                            |                          |
|-----------------|---------------------|--------------------------------------------------|--------|-----------------------------------------------------|------|----------------|------------------------|-------------------------------------------------------------------|-------------|--------------------------------------------|--------------------------|
|                 |                     | Ohio EPA Administrative Code (µg/L) <sup>a</sup> |        | Updated Values for Suter and Tsao 1996 <sup>b</sup> |      |                |                        | USEPA Region 5 ESLs (2003) <sup>c</sup><br>(update of 1998 EDQLs) |             | Preferred Surface Water Value <sup>d</sup> |                          |
|                 |                     |                                                  |        | NAWQC 2009 Update                                   |      | Tier II Values |                        |                                                                   |             |                                            |                          |
|                 |                     |                                                  |        | OMZM                                                | OMZA | Number (µg/L)  | Reference              | Number (µg/L)                                                     | Reference   |                                            |                          |
| Urea            | 57-13-6             | 150,000                                          | 17,000 | --                                                  | --   | 17,000         | Tier II (GLI database) | --                                                                | --          | 1.70E+04                                   | Ohio Administrative Code |
| Vinyl acetate   | 108-05-4            | --                                               | --     | --                                                  | --   | --             | --                     | 248                                                               | USEPA Reg 5 | 2.48E+02                                   | USEPA Reg 5              |
| Vinyl chloride  | 75-01-4             | 8,400                                            | 930    | --                                                  | --   | 930            | Tier II (GLI database) | 930                                                               | USEPA Reg 5 | 9.30E+02                                   | Ohio Administrative Code |
| Xylenes (total) | 1330-20-7           | 240                                              | 27     | --                                                  | --   | 27             | Tier II (GLI database) | 27                                                                | USEPA Reg 5 | 2.70E+01                                   | Ohio Administrative Code |

<sup>a</sup>Ohio EPA, Division of Surface Water 1999. Ohio Administrative Code, Chapters 3745-1, 3745-2, May 11 (Ohio River Basin). Where Ohio River Basin is unavailable, Lake Erie is used [acenaphthylene; benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; bromodichloromethane; chrysene; dibromochloromethane; and 1,1-dichloroethane]. Lake Erie Wildlife OMZA (Table 33-2) used for PCBs and 4,4'-DDT. PCP is pH dependent; 6.5 used as default pH. Ammonia is both pH and temperature dependent; default value is the lowest available for each criterion. The following metals are hardness dependent: beryllium, cadmium, chromium, copper, lead, nickel, and silver; 100 mg/L CaCO<sub>3</sub> used as default hardness.

<sup>b</sup>Suter, G.W. and C.L. Tsao, *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision*, ES/ER/TM-96/R2, Lockheed Martin Energy Systems, Oak Ridge National Laboratory. See notes below for NAWQC and GLI.

<sup>c</sup>USEPA 2003. ESLs. Formerly EDQLs. <http://www.epa.gov/reg5rcra/ca/edql.htm>.

<sup>d</sup>The preferred surface water value is the hierarchy of Chapters 3745-1 and 3745-2 of the Ohio Administrative Code for the Ohio River Basin (Ohio EPA 1999), Suter and Tsao 1996 (NAWQC followed by Tier II), and EDQLs from Reg 5 (USEPA 2003). For comparisons of maximum detected concentrations to ESVs, the OMZM is the preferred value. For comparisons of average concentrations to ESVs, the OMZA is the preferred value. In the absence of either OMZM values or OMZA values, the next available value from the hierarchy [Suter and Tsao 1996 (NAWQC) followed by Tier II] and then EDQLs from Reg 5 (USEPA 2003) was used in the comparison.

BHC = Hexachlorocyclohexane.

CAS = Chemical Abstract Service.

DDD = Dichlorodiphenyldichloroethane.

DDE = Dichlorodiphenyldichloroethylene.

DDT = Dichlorodiphenyltrichloroethane.

Diss = Dissolved.

EDQL = Ecological data quality level.

ESL = Ecological screening level.

ESV = Ecological screening value.

GLI = Great Lakes Initiative Clearinghouse database, contains Tier II secondary chronic values; <http://epa.gov/gliclear/>. Values used as supplement to original Suter and Tsao values because of scholarship and methodology shown in Suter and Tsao.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

µg/L = Micrograms per liter.

MBAS = Methylene Blue Active Substance

NAWQC = National Ambient Water Quality Criteria, originally found in Suter and Tsao 1996 and updated in 2009 as National Recommended Water Quality Criteria; values are freshwater chronic. <http://epa.gov/waterscience/criteria/wqctable/>.

NAWQC 2009 value for copper can be found here: <http://www.epa.gov/waterscience/criteria/copper/2007/criteria-full.pdf>.

NAWQC 2009 value for methyl tert-butyl ether can be found here: <http://www.epa.gov/waterscience/criteria/mtbe/#findings>.

Ohio EPA = Ohio Environmental Protection Agency.

Ohio EPA Tier II values used where available; otherwise, lowest or most recent value, as appropriate.

OMZA = Outside mixing zone average.

OMZM = Outside mixing zone maximum.

PCB = Polychlorinated biphenyl.

PCDD = Pentachlorodibenzodioxin

PCP = Pentachlorophenol.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

Reg = Region.

TCDD = Tetrachlorodibenzo-p-dioxin.

USEPA = U.S. Environmental Protection Agency.

-- = No value.

Table H-10. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at the Load Line 12 Active Area Channel

| Analyte (mg/kg)                        | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification                | ESV      | ESV Source <sup>c</sup> | COPEC? (yes/no) | COPEC Justification        | Ratio of Max to ESV |
|----------------------------------------|------------|----------------|----------------|----------------|----------------|----------------------------------|----------|-------------------------------------|---------------|----------------------------------|----------|-------------------------|-----------------|----------------------------|---------------------|
| <i>Inorganic Chemicals</i>             |            |                |                |                |                |                                  |          |                                     |               |                                  |          |                         |                 |                            |                     |
| Aluminum                               | 7429-90-5  | 6/ 6           | 9,520          | 23,600         | 14,400         | 13,900                           | 29000    | No                                  | No            | Below SRV                        | No ESV   | No Source               | No              | Below SRV                  | No ESV              |
| Antimony                               | 7440-36-0  | 4/ 5           | 0.15           | 2.8            | 0.8            | 0                                | 1.3      | No                                  | Yes           | Exceeds SRV                      | No ESV   | No Source               | Yes             | Exceeds background and SRV | No ESV              |
| Arsenic                                | 7440-38-2  | 6/ 6           | 6.8            | 26             | 13.9           | 19.5                             | 25       | No                                  | Yes           | Exceeds SRV                      | 9.79     | MacDonald et al.        | Yes             | Exceeds ESV                | 2.66                |
| Barium                                 | 7440-39-3  | 6/ 6           | 58.1           | 157            | 98.2           | 123                              | 190      | No                                  | No            | Below SRV                        | No ESV   | No Source               | No              | Below SRV                  | No ESV              |
| Beryllium                              | 7440-41-7  | 6/ 6           | 0.63           | 1.5            | 0.862          | 0.38                             | 0.8      | No                                  | Yes           | Exceeds SRV                      | No ESV   | No Source               | Yes             | Exceeds background and SRV | No ESV              |
| Cadmium                                | 7440-43-9  | 6/ 6           | 0.21           | 1.8            | 0.71           | 0                                | 0.79     | No                                  | Yes           | Exceeds SRV                      | 0.99     | MacDonald et al.        | Yes             | Exceeds ESV                | 1.82                |
| Calcium                                | 7440-70-2  | 6/ 6           | 2,120          | 20,400         | 8,150          | 5,510                            | 21000    | No                                  | No            | Essential nutrient               | No ESV   | No Source               | No              | Essential nutrient         | No ESV              |
| Chromium                               | 7440-47-3  | 6/ 6           | 16.4           | 74.6           | 35.2           | 18.1                             | 29       | No                                  | Yes           | Exceeds SRV                      | 43.4     | MacDonald et al.        | Yes             | Exceeds ESV                | 1.72                |
| Cobalt                                 | 7440-48-4  | 6/ 6           | 6.7            | 30.5           | 14             | 9.1                              | 12       | No                                  | Yes           | Exceeds SRV                      | 50       | USEPA Reg 5             | No              | Below ESV                  | 0.61                |
| Copper                                 | 7440-50-8  | 6/ 6           | 17             | 85.4           | 41.8           | 27.6                             | 32       | No                                  | Yes           | Exceeds SRV                      | 31.6     | MacDonald et al.        | Yes             | Exceeds ESV                | 2.70                |
| Cyanide                                | 57-12-5    | 1/ 1           | 2.8            | 2.8            | 2.8            | 0                                | --       | No                                  | Yes           | Exceeds background               | 0.0001   | USEPA Reg 5             | Yes             | Exceeds ESV                | 28,000              |
| Iron                                   | 7439-89-6  | 6/ 6           | 18,200         | 54,900         | 28,700         | 28,200                           | 41000    | No                                  | No            | Essential nutrient               | No ESV   | No Source               | No              | Essential nutrient         | No ESV              |
| Lead                                   | 7439-92-1  | 6/ 6           | 16.4           | 76.1           | 36.1           | 27.4                             | 47       | No                                  | Yes           | Exceeds SRV                      | 35.8     | MacDonald et al.        | Yes             | Exceeds ESV                | 2.13                |
| Magnesium                              | 7439-95-4  | 6/ 6           | 2,020          | 7,870          | 3,780          | 2,760                            | 7100     | No                                  | No            | Essential nutrient               | No ESV   | No Source               | No              | Essential nutrient         | No ESV              |
| Manganese                              | 7439-96-5  | 6/ 6           | 162            | 1220           | 552            | 1,950                            | 1500     | No                                  | No            | Below background                 | No ESV   | No Source               | No              | Below background           | No ESV              |
| Mercury                                | 7439-97-6  | 4/ 6           | 0.062          | 0.37           | 0.113          | 0.059                            | 0.12     | Yes                                 | Yes           | Exceeds background, PBT compound | 0.18     | MacDonald et al.        | Yes             | Exceeds ESV, PBT Compound  | 2.06                |
| Nickel                                 | 7440-02-0  | 6/ 6           | 18.2           | 62.1           | 30.1           | 17.7                             | 33       | No                                  | Yes           | Exceeds SRV                      | 22.7     | MacDonald et al.        | Yes             | Exceeds ESV                | 2.74                |
| Potassium                              | 7440-09-7  | 6/ 6           | 979            | 2,390          | 1,460          | 1,950                            | 6800     | No                                  | No            | Essential nutrient               | No ESV   | No Source               | No              | Essential nutrient         | No ESV              |
| Selenium                               | 7782-49-2  | 6/ 6           | 0.94           | 3              | 1.86           | 1.7                              | 1.7      | No                                  | Yes           | Exceeds background               | No ESV   | No Source               | Yes             | Exceeds background and SRV | No ESV              |
| Silver                                 | 7440-22-4  | 5/ 6           | 0.078          | 397            | 78.5           | 0                                | 0.43     | No                                  | Yes           | Exceeds SRV                      | 0.5      | USEPA Reg 5             | Yes             | Exceeds ESV                | 794                 |
| Sodium                                 | 7440-23-5  | 5/ 6           | 82             | 1,290          | 393            | 112                              | --       | No                                  | No            | Essential nutrient               | No ESV   | No Source               | No              | Essential nutrient         | No ESV              |
| Thallium                               | 7440-28-0  | 6/ 6           | 0.17           | 0.72           | 0.335          | 0.89                             | 4.7      | No                                  | No            | Below background                 | No ESV   | No Source               | No              | Below background           | No ESV              |
| Vanadium                               | 7440-62-2  | 6/ 6           | 15.4           | 39.4           | 22.9           | 26.1                             | 40       | No                                  | No            | Below SRV                        | No ESV   | No Source               | No              | Below SRV                  | No ESV              |
| Zinc                                   | 7440-66-6  | 6/ 6           | 93.7           | 452            | 231            | 532                              | 160      | No                                  | No            | Below background                 | 121      | MacDonald et al.        | No              | Below background           | 3.74                |
| <i>Explosives</i>                      |            |                |                |                |                |                                  |          |                                     |               |                                  |          |                         |                 |                            |                     |
| 2,4,6-Trinitrotoluene                  | 118-96-7   | 3/ 6           | 0.035          | 0.18           | 0.123          | 0                                | --       | No                                  | Yes           | Detected organic                 | No ESV   | No Source               | Yes             | Detected organic           | No ESV              |
| HMX                                    | 2691-41-0  | 3/ 6           | 0.019          | 0.11           | 0.116          | 0                                | --       | No                                  | Yes           | Detected organic                 | No ESV   | No Source               | Yes             | Detected organic           | No ESV              |
| <i>Semi-volatile Organic Compounds</i> |            |                |                |                |                |                                  |          |                                     |               |                                  |          |                         |                 |                            |                     |
| 1,2,4-Trichlorobenzene                 | 120-82-1   | 1/ 6           | 0.064          | 0.064          | 0.409          | 0                                | --       | No                                  | Yes           | Detected organic                 | 5.062    | USEPA Reg 5             | No              | Below ESV                  | 0.01                |
| 1,2-Dichlorobenzene                    | 95-50-1    | 1/ 6           | 0.092          | 0.092          | 0.414          | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.294    | USEPA Reg 5             | No              | Below ESV                  | 0.31                |
| 2-Methylnaphthalene                    | 91-57-6    | 2/ 6           | 0.041          | 0.054          | 0.353          | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.0202   | USEPA Reg 5             | Yes             | Exceeds ESV                | 2.67                |
| Acenaphthene                           | 83-32-9    | 1/ 6           | 0.03           | 0.03           | 0.0961         | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.00671  | USEPA Reg 5             | Yes             | Exceeds ESV                | 4.47                |
| Acenaphthylene                         | 208-96-8   | 1/ 6           | 0.061          | 0.061          | 0.101          | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.00587  | USEPA Reg 5             | Yes             | Exceeds ESV                | 10.39               |
| Anthracene                             | 120-12-7   | 1/ 6           | 0.078          | 0.078          | 0.104          | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.0572   | MacDonald et al.        | Yes             | Exceeds ESV                | 1.36                |
| Benz(a)anthracene                      | 56-55-3    | 5/ 6           | 0.017          | 0.35           | 0.105          | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.108    | MacDonald et al.        | Yes             | Exceeds ESV                | 3.24                |
| Benzo(a)pyrene                         | 50-32-8    | 5/ 6           | 0.02           | 0.41           | 0.12           | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.15     | MacDonald et al.        | Yes             | Exceeds ESV                | 2.73                |
| Benzo(b)fluoranthene                   | 205-99-2   | 6/ 6           | 0.031          | 0.68           | 0.171          | 0                                | --       | No                                  | Yes           | Detected organic                 | 10.4     | USEPA Reg 5             | No              | Below ESV                  | 0.07                |
| Benzo(ghi)perylene                     | 191-24-2   | 5/ 6           | 0.018          | 0.34           | 0.102          | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.17     | USEPA Reg 5             | Yes             | Exceeds ESV                | 2                   |
| Benzo(k)fluoranthene                   | 207-08-9   | 5/ 6           | 0.015          | 0.28           | 0.0907         | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.24     | USEPA Reg 5             | Yes             | Exceeds ESV                | 1.17                |
| Bis(2-ethylhexyl)phthalate             | 117-81-7   | 4/ 6           | 0.028          | 0.22           | 0.187          | 0                                | --       | No                                  | Yes           | Detected organic                 | 1.82E-01 | USEPA Reg 5             | Yes             | Exceeds ESV                | 1.21                |
| Chrysene                               | 218-01-9   | 5/ 6           | 0.024          | 0.46           | 0.134          | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.166    | MacDonald et al.        | Yes             | Exceeds ESV                | 2.77                |
| Dibenz(a,h)anthracene                  | 53-70-3    | 1/ 6           | 0.085          | 0.085          | 0.105          | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.033    | MacDonald et al.        | Yes             | Exceeds ESV                | 2.58                |
| Dibenzofuran                           | 132-64-9   | 1/ 6           | 0.012          | 0.012          | 0.4            | 0                                | --       | No                                  | Yes           | Detected organic                 | 4.49E-01 | USEPA Reg 5             | No              | Below ESV                  | 0.03                |
| Fluoranthene                           | 206-44-0   | 6/ 6           | 0.037          | 0.68           | 0.175          | 0                                | --       | No                                  | Yes           | Detected organic                 | 0.423    | MacDonald et al.        | Yes             | Exceeds ESV                | 1.61                |

Table H-10. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at the Load Line 12 Active Area Channel (continued)

| Analyte (mg/kg)                   | CAS Number        | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification                     | ESV           | ESV Source <sup>c</sup> | COPEC? (yes/no) | COPEC Justification              | Ratio of Max to ESV |
|-----------------------------------|-------------------|----------------|----------------|----------------|----------------|----------------------------------|----------|-------------------------------------|---------------|---------------------------------------|---------------|-------------------------|-----------------|----------------------------------|---------------------|
| Fluorene                          | 86-73-7           | 1/ 6           | 0.024          | 0.024          | 0.0951         | 0                                | --       | No                                  | Yes           | Detected organic                      | 0.0774        | MacDonald et al.        | No              | Below ESV                        | 0.31                |
| <b>Indeno(1,2,3-cd)pyrene</b>     | <b>193-39-5</b>   | <b>5/ 6</b>    | <b>0.015</b>   | <b>0.31</b>    | <b>0.0952</b>  | <b>0</b>                         | --       | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>               | <b>0.2</b>    | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>               | <b>1.55</b>         |
| Naphthalene                       | 91-20-3           | 2/ 6           | 0.03           | 0.033          | 0.0957         | 0                                | --       | No                                  | Yes           | Detected organic                      | 0.176         | MacDonald et al.        | No              | Below ESV                        | 0.19                |
| <b>Phenanthrene</b>               | <b>85-01-8</b>    | <b>4/ 6</b>    | <b>0.015</b>   | <b>0.23</b>    | <b>0.102</b>   | <b>0</b>                         | --       | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>               | <b>0.204</b>  | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>               | <b>1.13</b>         |
| <b>Pyrene</b>                     | <b>129-00-0</b>   | <b>6/ 6</b>    | <b>0.028</b>   | <b>0.54</b>    | <b>0.146</b>   | <b>0</b>                         | --       | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>               | <b>0.195</b>  | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>               | <b>2.77</b>         |
| <i>PCBs</i>                       |                   |                |                |                |                |                                  |          |                                     |               |                                       |               |                         |                 |                                  |                     |
| <b>PCB-1254<sup>d</sup></b>       | <b>11097-69-1</b> | <b>2/ 6</b>    | <b>0.027</b>   | <b>0.15</b>    | <b>0.0653</b>  | <b>0</b>                         | --       | <b>Yes</b>                          | <b>Yes</b>    | <b>Detected organic, PBT Compound</b> | <b>0.0598</b> | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV, PBT Compound</b> | <b>2.51</b>         |
| <i>Volatile Organic Compounds</i> |                   |                |                |                |                |                                  |          |                                     |               |                                       |               |                         |                 |                                  |                     |
| Methylene Chloride                | 75-09-2           | 1/ 1           | 0.0024         | 0.0024         | 0.0024         | 0                                | --       | No                                  | Yes           | Detected organic                      | 0.159         | USEPA Reg 5             | No              | Below ESV                        | 0.02                |

<sup>a</sup>Background criteria for sediment from final facility-wide background values for Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

<sup>b</sup>PBT compounds are defined by Ohio Environmental Protection Agency (Ohio EPA) 2008 as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; PCBs; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); dioxin; PCDF (furans); 1,2,3,4-tetrachlorobenzene; 1,2,4,5-tetrachlorobenzene; toxaphene; and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.

<sup>c</sup>ESV: See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*, Arch. Environ. Contam. Toxicol. Volume 39, Issue 1. January 2000, followed by USEPA Region 5 ESLs.

<sup>d</sup>No ESV is available for individual PCBs; PCB-1254 ESV is for PCBs (total).

CAS = Chemical Abstract Service

COPEC = Chemical of potential ecological concern.

ESV = Ecological screening value.

Max = Maximum concentration.

mg/kg = Milligrams per kilogram.

PBT = Persistent, bioaccumulative, and toxic.

PCB = Polychlorinated biphenyl.

Reg = Region.

SRC = Site-related Contaminant.

SRV = Sediment Reference Value.

USEPA = U.S. Environmental Protection Agency.

**Bold** = Chemical is a COPEC.

--= SRV not available.

Table H-11. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at the Load Line 12 Former Settling Pond

| Analyte (mg/kg)                        | CAS Number        | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV    | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification         | ESV           | ESV Source <sup>c</sup> | COPEC? (yes/no) | COPEC Justification               | Ratio of Max to ESV |
|----------------------------------------|-------------------|----------------|----------------|----------------|----------------|----------------------------------|-------------|-------------------------------------|---------------|---------------------------|---------------|-------------------------|-----------------|-----------------------------------|---------------------|
| <i>Inorganic Chemicals</i>             |                   |                |                |                |                |                                  |             |                                     |               |                           |               |                         |                 |                                   |                     |
| Aluminum                               | 7429-90-5         | 1/ 1           | 17,200         | 17,200         | 17,200         | 13,900                           | 29000       | No                                  | No            | Below SRV                 | No ESV        | No Source               | No              | Below SRV                         | No ESV              |
| Antimony                               | 7440-36-0         | 1/ 1           | 0.21           | 0.21           | 0.21           | 0                                | 1.3         | No                                  | No            | Below SRV                 | No ESV        | No Source               | No              | Below SRV                         | No ESV              |
| Arsenic                                | 7440-38-2         | 1/ 1           | 10.1           | 10.1           | 10.1           | 19.5                             | 25          | No                                  | No            | Below background          | 9.79          | MacDonald et al.        | No              | Below background                  | 1.03                |
| Barium                                 | 7440-39-3         | 1/ 1           | 104            | 104            | 104            | 123                              | 190         | No                                  | No            | Below background          | No ESV        | No Source               | No              | Below background                  | No ESV              |
| <b>Beryllium</b>                       | <b>7440-41-7</b>  | <b>1/ 1</b>    | <b>0.97</b>    | <b>0.97</b>    | <b>0.97</b>    | <b>0.38</b>                      | <b>0.8</b>  | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>        | <b>No ESV</b> | <b>No Source</b>        | <b>Yes</b>      | <b>Exceeds background and SRV</b> | <b>No ESV</b>       |
| Cadmium                                | 7440-43-9         | 1/ 1           | 0.31           | 0.31           | 0.31           | 0                                | 0.79        | No                                  | No            | Below SRV                 | 0.99          | MacDonald et al.        | No              | Below SRV                         | 0.31                |
| Calcium                                | 7440-70-2         | 1/ 1           | 3,990          | 3,990          | 3,990          | 5,510                            | 21000       | No                                  | No            | Essential nutrient        | No ESV        | No Source               | No              | Essential nutrient                | No ESV              |
| Chromium                               | 7440-47-3         | 1/ 1           | 22.7           | 22.7           | 22.7           | 18.1                             | 29          | No                                  | No            | Below SRV                 | 43.4          | MacDonald et al.        | No              | Below SRV                         | 0.52                |
| Cobalt                                 | 7440-48-4         | 1/ 1           | 15.1           | 15.1           | 15.1           | 9.1                              | 12          | No                                  | Yes           | Exceeds SRV               | 50            | USEPA Reg 5             | No              | Below ESV                         | 0.30                |
| Copper                                 | 7440-50-8         | 1/ 1           | 28.7           | 28.7           | 28.7           | 27.6                             | 32          | No                                  | No            | Below SRV                 | 31.6          | MacDonald et al.        | No              | Below SRV                         | 0.91                |
| Iron                                   | 7439-89-6         | 1/ 1           | 30,600         | 30,600         | 30,600         | 28,200                           | 41000       | No                                  | No            | Essential nutrient        | No ESV        | No Source               | No              | Essential nutrient                | No ESV              |
| Lead                                   | 7439-92-1         | 1/ 1           | 18.9           | 18.9           | 18.9           | 27.4                             | 47          | No                                  | No            | Below background          | 35.8          | MacDonald et al.        | No              | Below background                  | 0.53                |
| Magnesium                              | 7439-95-4         | 1/ 1           | 3,720          | 3,720          | 3,720          | 2,760                            | 7100        | No                                  | No            | Essential nutrient        | No ESV        | No Source               | No              | Essential nutrient                | No ESV              |
| Manganese                              | 7439-96-5         | 1/ 1           | 302            | 302            | 302            | 1,950                            | 1500        | No                                  | No            | Below background          | No ESV        | No Source               | No              | Below background                  | No ESV              |
| <b>Mercury</b>                         | <b>7439-97-6</b>  | <b>1/ 1</b>    | <b>0.065</b>   | <b>0.065</b>   | <b>0.065</b>   | <b>0.059</b>                     | <b>0.12</b> | <b>Yes</b>                          | <b>Yes</b>    | <b>PBT Compound</b>       | <b>0.18</b>   | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>PBT Compound</b>               | <b>0.36</b>         |
| Nickel                                 | 7440-02-0         | 1/ 1           | 29.9           | 29.9           | 29.9           | 17.7                             | 33          | No                                  | No            | Below SRV                 | 22.7          | MacDonald et al.        | No              | Below SRV                         | 1.32                |
| Potassium                              | 7440-09-7         | 1/ 1           | 1,260          | 1,260          | 1,260          | 1,950                            | 6800        | No                                  | No            | Essential nutrient        | No ESV        | No Source               | No              | Essential nutrient                | No ESV              |
| <b>Selenium</b>                        | <b>7782-49-2</b>  | <b>1/ 1</b>    | <b>2.1</b>     | <b>2.1</b>     | <b>2.1</b>     | <b>1.7</b>                       | <b>1.7</b>  | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>No ESV</b> | <b>No Source</b>        | <b>Yes</b>      | <b>Exceeds background and SRV</b> | <b>No ESV</b>       |
| Silver                                 | 7440-22-4         | 1/ 1           | 0.12           | 0.12           | 0.12           | 0                                | 0.43        | No                                  | No            | Below SRV                 | 0.5           | USEPA Reg 5             | No              | Below SRV                         | 0.24                |
| Sodium                                 | 7440-23-5         | 1/ 1           | 196            | 196            | 196            | 112                              | --          | No                                  | No            | Essential nutrient        | No ESV        | No Source               | No              | Essential nutrient                | No ESV              |
| Thallium                               | 7440-28-0         | 1/ 1           | 0.27           | 0.27           | 0.27           | 0.89                             | 4.7         | No                                  | No            | Below background          | No ESV        | No Source               | No              | Below background                  | No ESV              |
| Vanadium                               | 7440-62-2         | 1/ 1           | 29.3           | 29.3           | 29.3           | 26.1                             | 40          | No                                  | No            | Below SRV                 | No ESV        | No Source               | No              | Below SRV                         | No ESV              |
| Zinc                                   | 7440-66-6         | 1/ 1           | 104            | 104            | 104            | 532                              | 160         | No                                  | No            | Below background          | 121           | MacDonald et al.        | No              | Below background                  | 0.86                |
| <i>Semi-volatile Organic Compounds</i> |                   |                |                |                |                |                                  |             |                                     |               |                           |               |                         |                 |                                   |                     |
| <b>2-Methylnaphthalene</b>             | <b>91-57-6</b>    | <b>1/ 1</b>    | <b>0.7</b>     | <b>0.7</b>     | <b>0.7</b>     | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>   | <b>0.0202</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>34.65</b>        |
| <b>3+4-Methylphenol<sup>d</sup></b>    | <b>15831-10-4</b> | <b>1/ 1</b>    | <b>0.073</b>   | <b>0.073</b>   | <b>0.073</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>   | <b>0.0202</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>3.61</b>         |
| Benz(a)anthracene                      | 56-55-3           | 1/ 1           | 0.026          | 0.026          | 0.026          | 0                                | --          | No                                  | Yes           | Detected organic          | 0.108         | MacDonald et al.        | No              | Below ESV                         | 0.24                |
| Benzo(a)pyrene                         | 50-32-8           | 1/ 1           | 0.021          | 0.021          | 0.021          | 0                                | --          | No                                  | Yes           | Detected organic          | 0.15          | MacDonald et al.        | No              | Below ESV                         | 0.14                |
| Benzo(b)fluoranthene                   | 205-99-2          | 1/ 1           | 0.03           | 0.03           | 0.03           | 0                                | --          | No                                  | Yes           | Detected organic          | 10.4          | USEPA Reg 5             | No              | Below ESV                         | 0.003               |
| Bis(2-ethylhexyl)phthalate             | 117-81-7          | 1/ 1           | 0.063          | 0.063          | 0.063          | 0                                | --          | No                                  | Yes           | Detected organic          | 0.182         | USEPA Reg 5             | No              | Below ESV                         | 0.35                |
| Chrysene                               | 218-01-9          | 1/ 1           | 0.03           | 0.03           | 0.03           | 0                                | --          | No                                  | Yes           | Detected organic          | 0.166         | MacDonald et al.        | No              | Below ESV                         | 0.18                |
| Dibenzofuran                           | 132-64-9          | 1/ 1           | 0.13           | 0.13           | 0.13           | 0                                | --          | No                                  | Yes           | Detected organic          | 0.449         | USEPA Reg 5             | No              | Below ESV                         | 0.29                |
| Fluoranthene                           | 206-44-0          | 1/ 1           | 0.036          | 0.036          | 0.036          | 0                                | --          | No                                  | Yes           | Detected organic          | 0.423         | MacDonald et al.        | No              | Below ESV                         | 0.09                |
| <b>Naphthalene</b>                     | <b>91-20-3</b>    | <b>1/ 1</b>    | <b>0.4</b>     | <b>0.4</b>     | <b>0.4</b>     | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>   | <b>0.176</b>  | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>2.27</b>         |

Table H-11. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at the Load Line 12 Former Settling Pond (continued)

| Analyte (mg/kg) | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification | ESV   | ESV Source <sup>c</sup> | COPEC? (yes/no) | COPEC Justification | Ratio of Max to ESV |
|-----------------|------------|----------------|----------------|----------------|----------------|----------------------------------|----------|-------------------------------------|---------------|-------------------|-------|-------------------------|-----------------|---------------------|---------------------|
| Phenanthrene    | 85-01-8    | 1/ 1           | 0.14           | 0.14           | 0.14           | 0                                | --       | No                                  | Yes           | Detected organic  | 0.204 | MacDonald et al.        | No              | Below ESV           | 0.69                |
| Pyrene          | 129-00-0   | 1/ 1           | 0.035          | 0.035          | 0.035          | 0                                | --       | No                                  | Yes           | Detected organic  | 0.195 | MacDonald et al.        | No              | Below ESV           | 0.18                |

<sup>a</sup> Background criteria for sediment from final facility-wide background values for Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

<sup>b</sup> PBT compounds are defined by Ohio Environmental Protection Agency (Ohio EPA) 2008 as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); dioxin; PCDF (furans); 1,2,3,4-tetrachlorobenzene; 1,2,4,5-tetrachlorobenzene; toxaphene; and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.

<sup>c</sup> ESV: See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*, Arch. Environ. Contam. Toxicol. Volume 39, Issue 1. January 2000, followed by USEPA Region 5 ecological screening levels.

<sup>d</sup> 4-Methylphenol used as a surrogate for the 3+4-methylphenol ESV.

CAS = Chemical Abstract Service.

COPEC = Chemical of potential ecological concern.

ESV = Ecological screening value.

Max = Maximum concentration.

mg/kg = Milligrams per kilogram.

PBT = Persistent, bioaccumulative, and toxic.

Reg = Region.

SRC = Site-related contaminant.

SRV = Sediment reference value.

USEPA = U.S. Environmental Protection Agency.

**Bold** = Chemical is a COPEC.

--= SRV not available.

Table H-12. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at Load Line 12 North of the Active Area

| Analyte (mg/kg)                        | CAS Number        | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV    | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification               | ESV            | ESV Source <sup>c</sup> | COPEC? (yes/no) | COPEC Justification               | Ratio of Max to ESV |
|----------------------------------------|-------------------|----------------|----------------|----------------|----------------|----------------------------------|-------------|-------------------------------------|---------------|---------------------------------|----------------|-------------------------|-----------------|-----------------------------------|---------------------|
| <i>Inorganic Chemicals</i>             |                   |                |                |                |                |                                  |             |                                     |               |                                 |                |                         |                 |                                   |                     |
| Aluminum                               | 7429-90-5         | 8/ 8           | 7,570          | 19,300         | 12,800         | 13,900                           | 29000       | No                                  | No            | Below SRV                       | No ESV         | No Source               | No              | Below SRV                         | No ESV              |
| Antimony                               | 7440-36-0         | 3/ 8           | 0.1            | 0.93           | 0.688          | 0                                | 1.3         | No                                  | No            | Below SRV                       | No ESV         | No Source               | No              | Below SRV                         | No ESV              |
| Arsenic                                | 7440-38-2         | 8/ 8           | 3.8            | 12.6           | 7.43           | 19.5                             | 25          | No                                  | No            | Below background                | 9.79           | MacDonald et al.        | No              | Below background                  | 1.29                |
| Barium                                 | 7440-39-3         | 8/ 8           | 46.1           | 129            | 82.1           | 123                              | 190         | No                                  | No            | Below SRV                       | No ESV         | No Source               | No              | Below SRV                         | No ESV              |
| <b>Beryllium</b>                       | <b>7440-41-7</b>  | <b>5/ 8</b>    | <b>0.58</b>    | <b>1</b>       | <b>0.607</b>   | <b>0.38</b>                      | <b>0.8</b>  | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>              | <b>No ESV</b>  | <b>No Source</b>        | <b>Yes</b>      | <b>Exceeds background and SRV</b> | <b>No ESV</b>       |
| <b>Cadmium</b>                         | <b>7440-43-9</b>  | <b>7/ 8</b>    | <b>0.21</b>    | <b>1.3</b>     | <b>0.64</b>    | <b>0</b>                         | <b>0.79</b> | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>              | <b>0.99</b>    | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.31</b>         |
| Calcium                                | 7440-70-2         | 8/ 8           | 1,160          | 4,850          | 2,480          | 5,510                            | 21000       | No                                  | No            | Essential nutrient              | No ESV         | No Source               | No              | Essential nutrient                | No ESV              |
| Chromium                               | 7440-47-3         | 8/ 8           | 10.9           | 26.2           | 17.9           | 18.1                             | 29          | No                                  | No            | Below SRV                       | 43.4           | MacDonald et al.        | No              | Below SRV                         | 0.60                |
| <b>Chromium, hexavalent</b>            | <b>18540-29-9</b> | <b>1/ 4</b>    | <b>1.6</b>     | <b>1.6</b>     | <b>0.95</b>    | <b>--</b>                        | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>       | <b>No ESV</b>  | <b>No Source</b>        | <b>Yes</b>      | <b>Exceeds background</b>         | <b>No ESV</b>       |
| Cobalt                                 | 7440-48-4         | 8/ 8           | 7.9            | 18.6           | 13.2           | 9.1                              | 12          | No                                  | Yes           | Exceeds SRV                     | 50             | USEPA Reg 5             | No              | Below ESV                         | 0.37                |
| <b>Copper</b>                          | <b>7440-50-8</b>  | <b>8/ 8</b>    | <b>12.8</b>    | <b>42.1</b>    | <b>20.5</b>    | <b>27.6</b>                      | <b>32</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>              | <b>31.6</b>    | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.33</b>         |
| Iron                                   | 7439-89-6         | 8/ 8           | 12,200         | 23,900         | 18,700         | 28,200                           | 41000       | No                                  | No            | Essential nutrient              | No ESV         | No Source               | No              | Essential nutrient                | No ESV              |
| Lead                                   | 7439-92-1         | 8/ 8           | 14.2           | 37.9           | 21.2           | 27.4                             | 47          | No                                  | No            | Below SRV                       | 35.8           | MacDonald et al.        | No              | Below SRV                         | 1.06                |
| Magnesium                              | 7439-95-4         | 8/ 8           | 1,300          | 2,280          | 1,840          | 2,760                            | 7100        | No                                  | No            | Essential nutrient              | No ESV         | No Source               | No              | Essential nutrient                | No ESV              |
| Manganese                              | 7439-96-5         | 8/ 8           | 177            | 469            | 299            | 1,950                            | 1500        | No                                  | No            | Below background                | No ESV         | No Source               | No              | Below background                  | No ESV              |
| <b>Mercury</b>                         | <b>7439-97-6</b>  | <b>8/ 8</b>    | <b>0.032</b>   | <b>0.17</b>    | <b>0.0811</b>  | <b>0.059</b>                     | <b>0.12</b> | <b>Yes</b>                          | <b>Yes</b>    | <b>Exceeds SRV PBT Compound</b> | <b>0.18</b>    | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>PBT Compound</b>               | <b>0.94</b>         |
| Nickel                                 | 7440-02-0         | 8/ 8           | 11.9           | 24.1           | 16.9           | 17.7                             | 33          | No                                  | No            | Below SRV                       | 22.7           | MacDonald et al.        | No              | Below SRV                         | 1.06                |
| Potassium                              | 7440-09-7         | 8/ 8           | 586            | 1,830          | 1,290          | 1,950                            | 6800        | No                                  | No            | Essential nutrient              | No ESV         | No Source               | No              | Essential nutrient                | No ESV              |
| Selenium                               | 7782-49-2         | 4/ 8           | 1              | 1.3            | 0.752          | 1.7                              | 1.7         | No                                  | No            | Below background                | No ESV         | No Source               | No              | Below background                  | No ESV              |
| <b>Silver</b>                          | <b>7440-22-4</b>  | <b>6/ 8</b>    | <b>0.096</b>   | <b>41.6</b>    | <b>8.99</b>    | <b>0</b>                         | <b>0.43</b> | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>              | <b>0.5</b>     | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>83.2</b>         |
| Sodium                                 | 7440-23-5         | 7/ 8           | 69.8           | 177            | 133            | 112                              | --          | No                                  | No            | Essential nutrient              | No ESV         | No Source               | No              | Essential nutrient                | No ESV              |
| Thallium                               | 7440-28-0         | 6/ 8           | 0.13           | 0.66           | 0.399          | 0.89                             | 4.7         | No                                  | No            | Below background                | No ESV         | No Source               | No              | Below background                  | No ESV              |
| Vanadium                               | 7440-62-2         | 8/ 8           | 10.6           | 32.1           | 22.4           | 26.1                             | 40          | No                                  | No            | Below SRV                       | No ESV         | No Source               | No              | Below SRV                         | No ESV              |
| Zinc                                   | 7440-66-6         | 8/ 8           | 55.7           | 344            | 148            | 532                              | 160         | No                                  | No            | Below background                | 121            | MacDonald et al.        | No              | Below background                  | 2.84                |
| <i>Explosives</i>                      |                   |                |                |                |                |                                  |             |                                     |               |                                 |                |                         |                 |                                   |                     |
| <b>1,3-Dinitrobenzene</b>              | <b>99-65-0</b>    | <b>1/ 8</b>    | <b>0.059</b>   | <b>0.059</b>   | <b>0.102</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.00861</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>6.85</b>         |
| <b>2,4,6-Trinitrotoluene</b>           | <b>118-96-7</b>   | <b>1/ 8</b>    | <b>0.11</b>    | <b>0.11</b>    | <b>0.109</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>No ESV</b>  | <b>No Source</b>        | <b>Yes</b>      | <b>Detected organic</b>           | <b>No ESV</b>       |
| <i>Semi-volatile Organic Compounds</i> |                   |                |                |                |                |                                  |             |                                     |               |                                 |                |                         |                 |                                   |                     |
| <b>2-Methylnaphthalene</b>             | <b>91-57-6</b>    | <b>2/ 7</b>    | <b>0.01</b>    | <b>0.057</b>   | <b>0.2</b>     | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.0202</b>  | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>2.82</b>         |
| <b>Acenaphthene</b>                    | <b>83-32-9</b>    | <b>1/ 7</b>    | <b>0.022</b>   | <b>0.022</b>   | <b>0.198</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.00671</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>3.28</b>         |
| <b>Acenaphthylene</b>                  | <b>208-96-8</b>   | <b>1/ 7</b>    | <b>0.035</b>   | <b>0.035</b>   | <b>0.2</b>     | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.00587</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>5.96</b>         |
| Anthracene                             | 120-12-7          | 1/ 7           | 0.052          | 0.052          | 0.203          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.0572         | MacDonald et al.        | No              | Below ESV                         | 0.91                |
| <b>Benz(a)anthracene</b>               | <b>56-55-3</b>    | <b>2/ 7</b>    | <b>0.044</b>   | <b>0.22</b>    | <b>0.228</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.108</b>   | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>2.04</b>         |
| <b>Benzo(a)pyrene</b>                  | <b>50-32-8</b>    | <b>2/ 7</b>    | <b>0.06</b>    | <b>0.24</b>    | <b>0.233</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.15</b>    | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.60</b>         |
| Benzo(b)fluoranthene                   | 205-99-2          | 4/ 7           | 0.082          | 0.35           | 0.2            | 0                                | --          | No                                  | Yes           | Detected organic                | 10.4           | USEPA Reg 5             | No              | Below ESV                         | 0.03                |
| Benzo(ghi)perylene                     | 191-24-2          | 2/ 7           | 0.057          | 0.17           | 0.222          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.17           | USEPA Reg 5             | No              | Max=ESV                           | 1.00                |
| Benzo(k)fluoranthene                   | 207-08-9          | 2/ 7           | 0.042          | 0.15           | 0.217          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.24           | USEPA Reg 5             | No              | Below ESV                         | 0.63                |
| <b>Bis(2-ethylhexyl)phthalate</b>      | <b>117-81-7</b>   | <b>2/ 7</b>    | <b>0.043</b>   | <b>0.23</b>    | <b>0.232</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.182</b>   | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.26</b>         |
| Butyl benzyl phthalate                 | 85-68-7           | 1/ 7           | 0.023          | 0.023          | 0.243          | 0                                | --          | No                                  | Yes           | Detected organic                | 1.97           | USEPA Reg 5             | No              | Below ESV                         | 0.01                |
| <b>Chrysene</b>                        | <b>218-01-9</b>   | <b>2/ 7</b>    | <b>0.063</b>   | <b>0.25</b>    | <b>0.235</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.166</b>   | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.51</b>         |
| <b>Dibenz(a,h)anthracene</b>           | <b>53-70-3</b>    | <b>2/ 7</b>    | <b>0.012</b>   | <b>0.042</b>   | <b>0.198</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.033</b>   | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.27</b>         |
| Dibenzofuran                           | 132-64-9          | 1/ 7           | 0.046          | 0.046          | 0.231          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.449          | USEPA Reg 5             | No              | Below ESV                         | 0.10                |
| Fluoranthene                           | 206-44-0          | 4/ 7           | 0.071          | 0.38           | 0.199          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.423          | MacDonald et al.        | No              | Below ESV                         | 0.90                |
| Fluorene                               | 86-73-7           | 1/ 7           | 0.017          | 0.017          | 0.198          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.0774         | MacDonald et al.        | No              | Below ESV                         | 0.22                |
| Indeno(1,2,3-cd)pyrene                 | 193-39-5          | 2/ 7           | 0.049          | 0.15           | 0.218          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.2            | USEPA Reg 5             | No              | Below ESV                         | 0.75                |
| Naphthalene                            | 91-20-3           | 1/ 7           | 0.044          | 0.044          | 0.201          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.176          | MacDonald et al.        | No              | Below ESV                         | 0.25                |
| Phenanthrene                           | 85-01-8           | 2/ 7           | 0.03           | 0.16           | 0.217          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.204          | MacDonald et al.        | No              | Below ESV                         | 0.78                |
| <b>Pyrene</b>                          | <b>129-00-0</b>   | <b>2/ 7</b>    | <b>0.068</b>   | <b>0.3</b>     | <b>0.243</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.195</b>   | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.54</b>         |

Table H-12. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at Load Line 12 North of the Active Area (continued)

| Analyte (mg/kg)            | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification | ESV    | ESV Source <sup>c</sup> | COPEC? (yes/no) | COPEC Justification | Ratio of Max to ESV |
|----------------------------|------------|----------------|----------------|----------------|----------------|----------------------------------|----------|-------------------------------------|---------------|-------------------|--------|-------------------------|-----------------|---------------------|---------------------|
| Volatile Organic Compounds |            |                |                |                |                |                                  |          |                                     |               |                   |        |                         |                 |                     |                     |
| 2-Butanone                 | 78-93-3    | 2/ 6           | 0.0096         | 0.017          | 0.0107         | 0                                | --       | No                                  | Yes           | Detected organic  | 0.0424 | USEPA Reg 5             | No              | Below ESV           | 0.40                |
| Acetone                    | 67-64-1    | 1/ 6           | 0.064          | 0.064          | 0.0207         | 0                                | --       | No                                  | Yes           | Detected organic  | 0.0099 | USEPA Reg 5             | Yes             | Exceeds ESV         | 6.46                |
| Methylene Chloride         | 75-09-2    | 2/ 6           | 0.0032         | 0.0032         | 0.00326        | 0                                | --       | No                                  | Yes           | Detected organic  | 0.159  | USEPA Reg 5             | No              | Below ESV           | 0.02                |
| Toluene                    | 108-88-3   | 1/ 6           | 0.0026         | 0.0026         | 0.00366        | 0                                | --       | No                                  | Yes           | Detected organic  | 1.22   | USEPA Reg 5             | No              | Below ESV           | 0.002               |

<sup>a</sup>Background criteria for sediment from final facility-wide background values for Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

<sup>b</sup>PBT compounds are defined by Ohio Environmental Protection Agency 2008 as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); dioxin; PCDF (furans); 1,2,3,4-tetrachlorobenzene; 1,2,4,5-tetrachlorobenzene; toxaphene; and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.

<sup>c</sup>ESV: See sediment ESV table. Hierarchy of values according to Ohio Environmental Protection Agency Risk Assessment Guidance is MacDonald et al. *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*, Arch. Environ. Contam. Toxicol. Volume 39, Issue 1. January 2000, followed by USEPA Region 5 ecological screening levels.

CAS = Chemical Abstract Service.

COPEC = Chemical of potential ecological concern.

ESV = Ecological screening value.

Max = Maximum concentration.

mg/kg = Milligrams per kilogram.

PBT = Persistent, bioaccumulative, and toxic.

Reg = Region.

SRC = Site-related contaminant.

SRV = Sediment reference value.

USEPA = U.S. Environmental Protection Agency.

**Bold** = Chemical is a COPEC.

--= SRV not available

Table H-13. SRC and Integrated COPEC Screening with Maximum to OMZM Ratio for Surface Water at Load Line 12

| Analyte (mg/L)                         | CAS Number        | Freq of Detect | Minimum Detect  | Maximum Detect  | Average Result   | Background Criteria <sup>a</sup> | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification                       | ESV           | ESV Source <sup>c</sup>                     | COPEC? (yes/no) | COPEC Justification                       | Ratio of Max to ESV |
|----------------------------------------|-------------------|----------------|-----------------|-----------------|------------------|----------------------------------|-------------------------------------|---------------|-----------------------------------------|---------------|---------------------------------------------|-----------------|-------------------------------------------|---------------------|
| <i>Inorganic Chemicals</i>             |                   |                |                 |                 |                  |                                  |                                     |               |                                         |               |                                             |                 |                                           |                     |
| <b>Aluminum</b>                        | <b>7429-90-5</b>  | <b>13/ 14</b>  | <b>0.079</b>    | <b>21.3</b>     | <b>3.08</b>      | <b>3.37</b>                      | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.087</b>  | <b>NAWQC 2009</b>                           | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>244.83</b>       |
| Antimony                               | 7440-36-0         | 5/ 14          | 0.0004          | 0.00094         | 0.00182          | 0                                | No                                  | Yes           | Exceeds background                      | 0.9           | Ohio Administrative Code                    | No              | Below ESV                                 | 0.001               |
| Arsenic                                | 7440-38-2         | 8/ 14          | 0.00046         | 0.0147          | 0.0037           | 0.0032                           | No                                  | Yes           | Exceeds background                      | 0.34          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.04                |
| Barium                                 | 7440-39-3         | 14/ 14         | 0.0193          | 0.187           | 0.0591           | 0.0475                           | No                                  | Yes           | Exceeds background                      | 2             | Ohio Administrative Code                    | No              | Below ESV                                 | 0.09                |
| Beryllium                              | 7440-41-7         | 4/ 14          | 0.000035        | 0.0012          | 0.00113          | 0                                | No                                  | Yes           | Exceeds background                      | 0.093         | Ohio Administrative Code <sup>d</sup>       | No              | Below ESV                                 | 0.01                |
| Cadmium                                | 7440-43-9         | 6/ 14          | 0.000038        | 0.0017          | 0.00132          | 0                                | No                                  | Yes           | Exceeds background                      | 0.0045        | Ohio Administrative Code <sup>d</sup>       | No              | Below ESV                                 | 0.38                |
| Calcium                                | 7440-70-2         | 14/ 14         | 23              | 184             | 56.4             | 41.4                             | No                                  | No            | Essential nutrient                      | No ESV        | No Source                                   | No              | Essential nutrient                        | No ESV              |
| Chromium                               | 7440-47-3         | 10/ 14         | 0.0006          | 0.0231          | 0.00518          | 0                                | No                                  | Yes           | Exceeds background                      | 1.8           | Ohio Administrative Code <sup>d</sup>       | No              | Below ESV                                 | 0.01                |
| Cobalt                                 | 7440-48-4         | 11/ 14         | 0.00019         | 0.0159          | 0.00832          | 0                                | No                                  | Yes           | Exceeds background                      | 0.22          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.07                |
| <b>Copper</b>                          | <b>7440-50-8</b>  | <b>9/ 14</b>   | <b>0.0014</b>   | <b>0.0249</b>   | <b>0.0103</b>    | <b>0.0079</b>                    | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.014</b>  | <b>Ohio Administrative Code<sup>d</sup></b> | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>1.78</b>         |
| Iron                                   | 7439-89-6         | 14/ 14         | 0.5             | 45.5            | 7.09             | 2.56                             | No                                  | No            | Essential nutrient                      | 1             | NAWQC 2009                                  | No              | Essential nutrient                        | 45.5                |
| Lead                                   | 7439-92-1         | 9/ 14          | 0.0003          | 0.0365          | 0.0062           | 0                                | No                                  | Yes           | Exceeds background                      | 0.12          | Ohio Administrative Code <sup>d</sup>       | No              | Below ESV                                 | 0.30                |
| Magnesium                              | 7439-95-4         | 14/ 14         | 2.81            | 49.5            | 9.51             | 10.8                             | No                                  | No            | Essential nutrient                      | No ESV        | No Source                                   | No              | Essential nutrient                        | No ESV              |
| <b>Manganese</b>                       | <b>7439-96-5</b>  | <b>14/ 14</b>  | <b>0.029</b>    | <b>3.6</b>      | <b>0.679</b>     | <b>0.391</b>                     | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.12</b>   | <b>Tier II (Suter &amp; Tsao 1996)</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>30</b>           |
| Nickel                                 | 7440-02-0         | 12/ 14         | 0.0017          | 0.0244          | 0.00878          | 0                                | No                                  | Yes           | Exceeds background                      | 0.47          | Ohio Administrative Code <sup>d</sup>       | No              | Below ESV                                 | 0.05                |
| Potassium                              | 7440-09-7         | 14/ 14         | 1.25            | 6.2             | 3.3              | 3.17                             | No                                  | No            | Essential nutrient                      | No ESV        | No Source                                   | No              | Essential nutrient                        | No ESV              |
| <b>Selenium</b>                        | <b>7782-49-2</b>  | <b>9/ 14</b>   | <b>0.00029</b>  | <b>0.0064</b>   | <b>0.00184</b>   | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.005</b>  | <b>NAWQC 2009</b>                           | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>1.28</b>         |
| <b>Silver</b>                          | <b>7440-22-4</b>  | <b>1/ 14</b>   | <b>0.092</b>    | <b>0.092</b>    | <b>0.00909</b>   | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.0016</b> | <b>Ohio Administrative Code<sup>d</sup></b> | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>57.5</b>         |
| Sodium                                 | 7440-23-5         | 14/ 14         | 0.94            | 25              | 5.22             | 21.3                             | No                                  | No            | Essential nutrient                      | No ESV        | No Source                                   | No              | Essential nutrient                        | No ESV              |
| Vanadium                               | 7440-62-2         | 11/ 14         | 0.00075         | 0.0367          | 0.0109           | 0                                | No                                  | Yes           | Exceeds background                      | 0.15          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.24                |
| <b>Zinc</b>                            | <b>7440-66-6</b>  | <b>11/ 14</b>  | <b>0.0102</b>   | <b>0.346</b>    | <b>0.0765</b>    | <b>0.042</b>                     | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.12</b>   | <b>Ohio Administrative Code</b>             | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>2.88</b>         |
| <b>Nitrate</b>                         | <b>14797-55-8</b> | <b>7/ 14</b>   | <b>0.033</b>    | <b>21.1</b>     | <b>1.61</b>      | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>No ESV</b> | <b>No Source</b>                            | <b>Yes</b>      | <b>Detected and no screening criteria</b> | <b>No ESV</b>       |
| <i>Explosives</i>                      |                   |                |                 |                 |                  |                                  |                                     |               |                                         |               |                                             |                 |                                           |                     |
| 1,3,5-Trinitrobenzene                  | 99-35-4           | 1/ 14          | 0.009           | 0.009           | 0.000708         | 0                                | No                                  | Yes           | Exceeds background                      | 0.027         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.33                |
| 2,4,6-Trinitrotoluene                  | 118-96-7          | 1/ 14          | 0.011           | 0.011           | 0.000866         | 0                                | No                                  | Yes           | Exceeds background                      | 0.12          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.09                |
| 4-Amino-2,6-Dinitrotoluene             | 19406-51-0        | 2/ 14          | 0.000054        | 0.00021         | 0.000102         | 0                                | No                                  | Yes           | Exceeds background                      | 0.098         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.002               |
| HMX                                    | 2691-41-0         | 1/ 14          | 0.0019          | 0.0019          | 0.00027          | 0                                | No                                  | Yes           | Exceeds background                      | 1.2           | Ohio Administrative Code                    | No              | Below ESV                                 | 0.002               |
| <b>Nitrocellulose</b>                  | <b>9004-70-0</b>  | <b>1/ 9</b>    | <b>0.15</b>     | <b>0.15</b>     | <b>0.572</b>     | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>No ESV</b> | <b>No Source</b>                            | <b>Yes</b>      | <b>Detected and no screening criteria</b> | <b>No ESV</b>       |
| <b>PETN</b>                            | <b>78-11-5</b>    | <b>1/ 8</b>    | <b>0.001</b>    | <b>0.001</b>    | <b>0.000576</b>  | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>No ESV</b> | <b>No Source</b>                            | <b>Yes</b>      | <b>Detected and no screening criteria</b> | <b>No ESV</b>       |
| RDX                                    | 121-82-4          | 3/ 14          | 0.00051         | 0.0066          | 0.000684         | 0                                | No                                  | Yes           | Exceeds background                      | 0.52          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.01                |
| <b>Tetryl</b>                          | <b>479-45-8</b>   | <b>1/ 14</b>   | <b>0.0087</b>   | <b>0.0087</b>   | <b>0.000702</b>  | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>No ESV</b> | <b>No Source</b>                            | <b>Yes</b>      | <b>Detected and no screening criteria</b> | <b>No ESV</b>       |
| <i>Semi-volatile Organic Compounds</i> |                   |                |                 |                 |                  |                                  |                                     |               |                                         |               |                                             |                 |                                           |                     |
| Benz(a)anthracene                      | 56-55-3           | 1/ 14          | 0.00024         | 0.00024         | 0.0052           | 0                                | No                                  | Yes           | Exceeds background                      | 0.042         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.01                |
| Benzo(a)pyrene                         | 50-32-8           | 1/ 14          | 0.00022         | 0.00022         | 0.00519          | 0                                | No                                  | Yes           | Exceeds background                      | 0.00054       | Ohio Administrative Code                    | No              | Below ESV                                 | 0.41                |
| Benzo(b)fluoranthene                   | 205-99-2          | 1/ 14          | 0.00032         | 0.00032         | 0.0052           | 0                                | No                                  | Yes           | Exceeds background                      | 0.023         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.01                |
| Bis(2-ethylhexyl)phthalate             | 117-81-7          | 3/ 14          | 0.0011          | 0.096           | 0.011            | 0                                | No                                  | Yes           | Exceeds background                      | 1.1           | Ohio Administrative Code                    | No              | Below ESV                                 | 0.09                |
| Chrysene                               | 218-01-9          | 1/ 14          | 0.00022         | 0.00022         | 0.00519          | 0                                | No                                  | Yes           | Exceeds background                      | 0.042         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.01                |
| Fluoranthene                           | 206-44-0          | 2/ 14          | 0.00033         | 0.00046         | 0.00488          | 0                                | No                                  | Yes           | Exceeds background                      | 0.0037        | Ohio Administrative Code                    | No              | Below ESV                                 | 0.12                |
| Pyrene                                 | 129-00-0          | 2/ 14          | 0.0003          | 0.00033         | 0.00487          | 0                                | No                                  | Yes           | Exceeds background                      | 0.042         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.01                |
| <i>Pesticides/PCBs</i>                 |                   |                |                 |                 |                  |                                  |                                     |               |                                         |               |                                             |                 |                                           |                     |
| <b>delta-BHC</b>                       | <b>319-86-8</b>   | <b>2/ 14</b>   | <b>0.000014</b> | <b>0.000067</b> | <b>0.0000272</b> | <b>0</b>                         | <b>Yes</b>                          | <b>Yes</b>    | <b>Exceeds background, PBT Compound</b> | <b>0.667</b>  | <b>USEPA Reg 5</b>                          | <b>Yes</b>      | <b>PBT Compound</b>                       | <b>1.00E-04</b>     |

Table H-13. SRC and Integrated COPEC Screening with Maximum to OMZM Ratio for Surface Water at Load Line 12 (continued)

| Analyte (mg/L)             | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification  | ESV  | ESV Source <sup>c</sup>  | COPEC? (yes/no) | COPEC Justification | Ratio of Max to ESV |
|----------------------------|------------|----------------|----------------|----------------|----------------|----------------------------------|-------------------------------------|---------------|--------------------|------|--------------------------|-----------------|---------------------|---------------------|
| Volatile Organic Compounds |            |                |                |                |                |                                  |                                     |               |                    |      |                          |                 |                     |                     |
| Carbon Disulfide           | 75-15-0    | 1/ 14          | 0.00053        | 0.00053        | 0.00136        | 0                                | No                                  | Yes           | Exceeds background | 0.13 | Ohio Administrative Code | No              | Below ESV           | 0.004               |
| Methylene Chloride         | 75-09-2    | 2/ 14          | 0.0018         | 0.0031         | 0.00135        | 0                                | No                                  | Yes           | Exceeds background | 11   | Ohio Administrative Code | No              | Below ESV           | 2.82E-04            |

<sup>a</sup>Background criteria for sediment from final facility-wide background values for Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

<sup>b</sup>PBT compounds are defined by Ohio Environmental Protection Agency 2008 as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); dioxin; PCDF (furans); 1,2,3,4-tetrachlorobenzene; 1,2,4,5-tetrachlorobenzene; toxaphene; and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.

<sup>c</sup>ESV: See sediment ESV table. Hierarchy of values according to Ohio Environmental Protection Agency Risk Assessment Guidance is MacDonald et al. *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*, Arch. Environ. Contam. Toxicol. Volume 39, Issue 1. January 2000, followed by USEPA Region 5 ecological screening levels.

<sup>d</sup>Value is hardness dependent.

BHC = Hexachlorocyclohexane.

CAS = Chemical Abstract Service.

COPEC = Chemical of potential ecological concern.

ESV = Ecological screening value.

Max = Maximum concentration.

mg/L = Milligrams per liter.

NAWQC = National Ambient Water Quality Criteria.

OMZM = Outside mixing zone maximum.

PBT = Persistent, bioaccumulative, and toxic.

PCB = Polychlorinated biphenyl.

PETN = Pentaerythritol tetranitrate.

SRC = Site-related contaminant.

USEPA = U.S. Environmental Protection Agency.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine

**Bold** = Chemical is a COPEC.

Table H-14. SRC and Integrated COPEC Screening with Maximum to OMZA Ratio for Surface Water at Load Line 12

| Analyte (mg/L)                         | CAS Number        | Freq of Detect | Minimum Detect  | Maximum Detect  | Average Result   | Background Criteria <sup>a</sup> | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification                       | ESV            | ESV Source <sup>c</sup>                     | COPEC? (yes/no) | COPEC Justification                       | Ratio of Max to ESV |
|----------------------------------------|-------------------|----------------|-----------------|-----------------|------------------|----------------------------------|-------------------------------------|---------------|-----------------------------------------|----------------|---------------------------------------------|-----------------|-------------------------------------------|---------------------|
| <i>Inorganic Chemicals</i>             |                   |                |                 |                 |                  |                                  |                                     |               |                                         |                |                                             |                 |                                           |                     |
| <b>Aluminum</b>                        | <b>7429-90-5</b>  | <b>13/ 14</b>  | <b>0.079</b>    | <b>21.3</b>     | <b>3.08</b>      | <b>3.37</b>                      | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.087</b>   | <b>NAWQC 2009</b>                           | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>244.83</b>       |
| Antimony                               | 7440-36-0         | 5/ 14          | 0.0004          | 0.00094         | 0.00182          | 0                                | No                                  | Yes           | Exceeds background                      | 0.19           | Ohio Administrative Code                    | No              | Below ESV                                 | 0.005               |
| Arsenic                                | 7440-38-2         | 8/ 14          | 0.00046         | 0.0147          | 0.0037           | 0.0032                           | No                                  | Yes           | Exceeds background                      | 0.15           | Ohio Administrative Code                    | No              | Below ESV                                 | 0.10                |
| Barium                                 | 7440-39-3         | 14/ 14         | 0.0193          | 0.187           | 0.0591           | 0.0475                           | No                                  | Yes           | Exceeds background                      | 0.22           | Ohio Administrative Code                    | No              | Below ESV                                 | 0.85                |
| Beryllium                              | 7440-41-7         | 4/ 14          | 0.000035        | 0.0012          | 0.00113          | 0                                | No                                  | Yes           | Exceeds background                      | 0.011          | Ohio Administrative Code <sup>d</sup>       | No              | Below ESV                                 | 0.11                |
| Cadmium                                | 7440-43-9         | 6/ 14          | 0.000038        | 0.0017          | 0.00132          | 0                                | No                                  | Yes           | Exceeds background                      | 0.0025         | Ohio Administrative Code <sup>d</sup>       | No              | Below ESV                                 | 0.68                |
| Calcium                                | 7440-70-2         | 14/ 14         | 23              | 184             | 56.4             | 41.4                             | No                                  | No            | Essential nutrient                      | No ESV         | No Source                                   | No              | Essential nutrient                        | No ESV              |
| Chromium                               | 7440-47-3         | 10/ 14         | 0.0006          | 0.0231          | 0.00518          | 0                                | No                                  | Yes           | Exceeds background                      | 0.086          | Ohio Administrative Code <sup>d</sup>       | No              | Below ESV                                 | 0.27                |
| Cobalt                                 | 7440-48-4         | 11/ 14         | 0.00019         | 0.0159          | 0.00832          | 0                                | No                                  | Yes           | Exceeds background                      | 0.024          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.66                |
| <b>Copper</b>                          | <b>7440-50-8</b>  | <b>9/ 14</b>   | <b>0.0014</b>   | <b>0.0249</b>   | <b>0.0103</b>    | <b>0.0079</b>                    | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.0093</b>  | <b>Ohio Administrative Code<sup>d</sup></b> | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>2.68</b>         |
| Iron                                   | 7439-89-6         | 14/ 14         | 0.5             | 45.5            | 7.09             | 2.56                             | No                                  | No            | Essential nutrient                      | 1              | NAWQC 2009                                  | No              | Essential nutrient                        | 45.5                |
| <b>Lead</b>                            | <b>7439-92-1</b>  | <b>9/ 14</b>   | <b>0.0003</b>   | <b>0.0365</b>   | <b>0.0062</b>    | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.0064</b>  | <b>Ohio Administrative Code<sup>d</sup></b> | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>5.70</b>         |
| Magnesium                              | 7439-95-4         | 14/ 14         | 2.81            | 49.5            | 9.51             | 10.8                             | No                                  | No            | Essential nutrient                      | No ESV         | No Source                                   | No              | Essential nutrient                        | No ESV              |
| <b>Manganese</b>                       | <b>7439-96-5</b>  | <b>14/ 14</b>  | <b>0.029</b>    | <b>3.6</b>      | <b>0.679</b>     | <b>0.391</b>                     | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.12</b>    | <b>Tier II (Suter &amp; Tsao 1996)</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>30</b>           |
| Nickel                                 | 7440-02-0         | 12/ 14         | 0.0017          | 0.0244          | 0.00878          | 0                                | No                                  | Yes           | Exceeds background                      | 0.052          | Ohio Administrative Code <sup>d</sup>       | No              | Below ESV                                 | 0.47                |
| Potassium                              | 7440-09-7         | 14/ 14         | 1.25            | 6.2             | 3.3              | 3.17                             | No                                  | No            | Essential nutrient                      | No ESV         | No Source                                   | No              | Essential nutrient                        | No ESV              |
| <b>Selenium</b>                        | <b>7782-49-2</b>  | <b>9/ 14</b>   | <b>0.00029</b>  | <b>0.0064</b>   | <b>0.00184</b>   | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.005</b>   | <b>Ohio Administrative Code</b>             | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>1.28</b>         |
| <b>Silver</b>                          | <b>7440-22-4</b>  | <b>1/ 14</b>   | <b>0.092</b>    | <b>0.092</b>    | <b>0.00909</b>   | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.0013</b>  | <b>Ohio Administrative Code<sup>d</sup></b> | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>70.77</b>        |
| Sodium                                 | 7440-23-5         | 14/ 14         | 0.94            | 25              | 5.22             | 21.3                             | No                                  | No            | Essential nutrient                      | No ESV         | No Source                                   | No              | Essential nutrient                        | No ESV              |
| Vanadium                               | 7440-62-2         | 11/ 14         | 0.00075         | 0.0367          | 0.0109           | 0                                | No                                  | Yes           | Exceeds background                      | 0.044          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.83                |
| <b>Zinc</b>                            | <b>7440-66-6</b>  | <b>11/ 14</b>  | <b>0.0102</b>   | <b>0.346</b>    | <b>0.0765</b>    | <b>0.042</b>                     | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.12</b>    | <b>Ohio Administrative Code</b>             | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>2.88</b>         |
| <b>Nitrate</b>                         | <b>14797-55-8</b> | <b>7/ 14</b>   | <b>0.033</b>    | <b>21.1</b>     | <b>1.61</b>      | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>No ESV</b>  | <b>No Source</b>                            | <b>Yes</b>      | <b>Detected and no screening criteria</b> | <b>No ESV</b>       |
| <i>Explosives</i>                      |                   |                |                 |                 |                  |                                  |                                     |               |                                         |                |                                             |                 |                                           |                     |
| 1,3,5-Trinitrobenzene                  | 99-35-4           | 1/ 14          | 0.009           | 0.009           | 0.000708         | 0                                | No                                  | Yes           | Exceeds background                      | 0.011          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.82                |
| 2,4,6-Trinitrotoluene                  | 118-96-7          | 1/ 14          | 0.011           | 0.011           | 0.000866         | 0                                | No                                  | Yes           | Exceeds background                      | 0.013          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.85                |
| 4-Amino-2,6-Dinitrotoluene             | 19406-51-0        | 2/ 14          | 0.000054        | 0.00021         | 0.000102         | 0                                | No                                  | Yes           | Exceeds background                      | 0.011          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.019               |
| HMX                                    | 2691-41-0         | 1/ 14          | 0.0019          | 0.0019          | 0.00027          | 0                                | No                                  | Yes           | Exceeds background                      | 0.22           | Ohio Administrative Code                    | No              | Below ESV                                 | 0.009               |
| <b>Nitrocellulose</b>                  | <b>9004-70-0</b>  | <b>1/ 9</b>    | <b>0.15</b>     | <b>0.15</b>     | <b>0.572</b>     | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>No ESV</b>  | <b>No Source</b>                            | <b>Yes</b>      | <b>Detected and no screening criteria</b> | <b>No ESV</b>       |
| <b>PETN</b>                            | <b>78-11-5</b>    | <b>1/ 8</b>    | <b>0.001</b>    | <b>0.001</b>    | <b>0.000576</b>  | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>No ESV</b>  | <b>No Source</b>                            | <b>Yes</b>      | <b>Detected and no screening criteria</b> | <b>No ESV</b>       |
| RDX                                    | 121-82-4          | 3/ 14          | 0.00051         | 0.0066          | 0.000684         | 0                                | No                                  | Yes           | Exceeds background                      | 0.079          | Ohio Administrative Code                    | No              | Below ESV                                 | 0.08                |
| <b>Tetryl</b>                          | <b>479-45-8</b>   | <b>1/ 14</b>   | <b>0.0087</b>   | <b>0.0087</b>   | <b>0.000702</b>  | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>No ESV</b>  | <b>No Source</b>                            | <b>Yes</b>      | <b>Detected and no screening criteria</b> | <b>No ESV</b>       |
| <i>Semi-volatile Organic Compounds</i> |                   |                |                 |                 |                  |                                  |                                     |               |                                         |                |                                             |                 |                                           |                     |
| Benz(a)anthracene                      | 56-55-3           | 1/ 14          | 0.00024         | 0.00024         | 0.0052           | 0                                | No                                  | Yes           | Exceeds background                      | 0.0047         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.05                |
| <b>Benzo(a)pyrene</b>                  | <b>50-32-8</b>    | <b>1/ 14</b>   | <b>0.00022</b>  | <b>0.00022</b>  | <b>0.00519</b>   | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.00006</b> | <b>Ohio Administrative Code</b>             | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>3.67</b>         |
| Benzo(b)fluoranthene                   | 205-99-2          | 1/ 14          | 0.00032         | 0.00032         | 0.0052           | 0                                | No                                  | Yes           | Exceeds background                      | 0.0026         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.12                |
| <b>Bis(2-ethylhexyl)phthalate</b>      | <b>117-81-7</b>   | <b>3/ 14</b>   | <b>0.0011</b>   | <b>0.096</b>    | <b>0.011</b>     | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.0084</b>  | <b>Ohio Administrative Code</b>             | <b>Yes</b>      | <b>Exceeds ESV</b>                        | <b>11.43</b>        |
| Chrysene                               | 218-01-9          | 1/ 14          | 0.00022         | 0.00022         | 0.00519          | 0                                | No                                  | Yes           | Exceeds background                      | 0.0047         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.05                |
| Fluoranthene                           | 206-44-0          | 2/ 14          | 0.00033         | 0.00046         | 0.00488          | 0                                | No                                  | Yes           | Exceeds background                      | 0.0008         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.58                |
| Pyrene                                 | 129-00-0          | 2/ 14          | 0.0003          | 0.00033         | 0.00487          | 0                                | No                                  | Yes           | Exceeds background                      | 0.0046         | Ohio Administrative Code                    | No              | Below ESV                                 | 0.07                |
| <i>Pesticides/PCBs</i>                 |                   |                |                 |                 |                  |                                  |                                     |               |                                         |                |                                             |                 |                                           |                     |
| <b>delta-BHC</b>                       | <b>319-86-8</b>   | <b>2/ 14</b>   | <b>0.000014</b> | <b>0.000067</b> | <b>0.0000272</b> | <b>0</b>                         | <b>Yes</b>                          | <b>Yes</b>    | <b>Exceeds background, PBT Compound</b> | <b>0.667</b>   | <b>USEPA Reg 5</b>                          | <b>Yes</b>      | <b>PBT Compound</b>                       | <b>1.00E-04</b>     |

Table H-14. SRC and Integrated COPEC Screening with Maximum to OMZA Ratio for Surface Water at Load Line 12 (continued)

| Analyte (mg/L)             | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification  | ESV   | ESV Source <sup>c</sup>  | COPEC? (yes/no) | COPEC Justification | Ratio of Max to ESV |
|----------------------------|------------|----------------|----------------|----------------|----------------|----------------------------------|-------------------------------------|---------------|--------------------|-------|--------------------------|-----------------|---------------------|---------------------|
| Volatile Organic Compounds |            |                |                |                |                |                                  |                                     |               |                    |       |                          |                 |                     |                     |
| Carbon Disulfide           | 75-15-0    | 1/ 14          | 0.00053        | 0.00053        | 0.00136        | 0                                | No                                  | Yes           | Exceeds background | 0.015 | Ohio Administrative Code | No              | Below ESV           | 0.035               |
| Methylene Chloride         | 75-09-2    | 2/ 14          | 0.0018         | 0.0031         | 0.00135        | 0                                | No                                  | Yes           | Exceeds background | 1.9   | Ohio Administrative Code | No              | Below ESV           | 0.002               |

<sup>a</sup>Background criteria for sediment from final facility-wide background values for Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

<sup>b</sup>PBT compounds are defined by Ohio Environmental Protection Agency 2008 as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); dioxin; PCDF (furans); 1,2,3,4-tetrachlorobenzene; 1,2,4,5-tetrachlorobenzene; toxaphene; and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.

<sup>c</sup>ESV: See sediment ESV table. Hierarchy of values according to Ohio Environmental Protection Agency Risk Assessment Guidance is MacDonald et al. *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*, Arch. Environ. Contam. Toxicol. Volume 39, Issue 1. January 2000, followed by USEPA Region 5 ecological screening levels.

<sup>d</sup>Value is hardness dependent.

BHC = Hexachlorocyclohexane.

CAS = Chemical Abstract Service.

COPEC = Chemical of potential ecological concern.

ESV = Ecological screening value.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

Max = Maximum concentration.

mg/L = Milligrams per liter.

NAWQC = National Ambient Water Quality Criteria.

OMZA = Outside mixing zone average.

PBT = Persistent, bioaccumulative, and toxic.

PCB = Polychlorinated biphenyl.

PETN = Pentaerythritol tetranitrate.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

SRC = Site-related contaminant.

USEPA = U.S. Environmental Protection Agency.

**Bold** = Chemical is a COPEC.

Table H-15. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at the Load Line 12 Active Area Channel

| Analyte (mg/kg)                        | CAS Number       | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV    | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification                       | ESV            | ESV Source <sup>c</sup> | COPEC? <sup>d</sup> (yes/no) | COPEC Justification               | Ratio of Avg to ESV <sup>d</sup> |
|----------------------------------------|------------------|----------------|----------------|----------------|----------------|----------------------------------|-------------|-------------------------------------|---------------|-----------------------------------------|----------------|-------------------------|------------------------------|-----------------------------------|----------------------------------|
| <i>Inorganic Chemicals</i>             |                  |                |                |                |                |                                  |             |                                     |               |                                         |                |                         |                              |                                   |                                  |
| Aluminum                               | 7429-90-5        | 6/ 6           | 9,520          | 23,600         | 14,400         | 13,900                           | 29000       | No                                  | No            | Below SRV                               | No ESV         | No Source               | No                           | Below SRV                         | No ESV                           |
| Antimony                               | 7440-36-0        | 4/ 5           | 0.15           | 2.8            | 0.8            | 0                                | 1.3         | No                                  | Yes           | Exceeds SRV                             | No ESV         | No Source               | No                           | Below SRV                         | No ESV                           |
| Arsenic                                | 7440-38-2        | 6/ 6           | 6.8            | 26             | 13.9           | 19.5                             | 25          | No                                  | Yes           | Exceeds SRV                             | 9.79           | MacDonald et al.        | No                           | Below background                  | 1.42                             |
| Barium                                 | 7440-39-3        | 6/ 6           | 58.1           | 157            | 98.2           | 123                              | 190         | No                                  | No            | Below SRV                               | No ESV         | No Source               | No                           | Below SRV                         | No ESV                           |
| <b>Beryllium</b>                       | <b>7440-41-7</b> | <b>6/ 6</b>    | <b>0.63</b>    | <b>1.5</b>     | <b>0.862</b>   | <b>0.38</b>                      | <b>0.8</b>  | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>                      | <b>No ESV</b>  | <b>No Source</b>        | <b>Yes</b>                   | <b>Exceeds background and SRV</b> | <b>No ESV</b>                    |
| Cadmium                                | 7440-43-9        | 6/ 6           | 0.21           | 1.8            | 0.71           | 0                                | 0.79        | No                                  | Yes           | Exceeds SRV                             | 0.99           | MacDonald et al.        | No                           | Below ESV                         | 0.72                             |
| Calcium                                | 7440-70-2        | 6/ 6           | 2,120          | 20,400         | 8,150          | 5,510                            | 21000       | No                                  | No            | Essential nutrient                      | No ESV         | No Source               | No                           | Essential nutrient                | No ESV                           |
| Chromium                               | 7440-47-3        | 6/ 6           | 16.4           | 74.6           | 35.2           | 18.1                             | 29          | No                                  | Yes           | Exceeds SRV                             | 43.4           | MacDonald et al.        | No                           | Below ESV                         | 0.81                             |
| Cobalt                                 | 7440-48-4        | 6/ 6           | 6.7            | 30.5           | 14             | 9.1                              | 12          | No                                  | Yes           | Exceeds SRV                             | 50             | USEPA Reg 5             | No                           | Below ESV                         | 0.28                             |
| <b>Copper</b>                          | <b>7440-50-8</b> | <b>6/ 6</b>    | <b>17</b>      | <b>85.4</b>    | <b>41.8</b>    | <b>27.6</b>                      | <b>32</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>                      | <b>31.6</b>    | <b>MacDonald et al.</b> | <b>Yes</b>                   | <b>Exceeds ESV</b>                | <b>1.32</b>                      |
| <b>Cyanide</b>                         | <b>57-12-5</b>   | <b>1/ 1</b>    | <b>2.8</b>     | <b>2.8</b>     | <b>2.8</b>     | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>0.0001</b>  | <b>USEPA Reg 5</b>      | <b>Yes</b>                   | <b>Exceeds ESV</b>                | <b>28,000</b>                    |
| Iron                                   | 7439-89-6        | 6/ 6           | 18,200         | 54,900         | 28,700         | 28,200                           | 41000       | No                                  | No            | Essential nutrient                      | No ESV         | No Source               | No                           | Essential nutrient                | No ESV                           |
| Lead                                   | 7439-92-1        | 6/ 6           | 16.4           | 76.1           | 36.1           | 27.4                             | 47          | No                                  | Yes           | Exceeds SRV                             | 35.8           | MacDonald et al.        | No                           | Below SRV                         | 1.01                             |
| Magnesium                              | 7439-95-4        | 6/ 6           | 2,020          | 7,870          | 3,780          | 2,760                            | 7100        | No                                  | No            | Essential nutrient                      | No ESV         | No Source               | No                           | Essential nutrient                | No ESV                           |
| Manganese                              | 7439-96-5        | 6/ 6           | 162            | 1220           | 552            | 1,950                            | 1500        | No                                  | No            | Below background                        | No ESV         | No Source               | No                           | Below background                  | No ESV                           |
| <b>Mercury</b>                         | <b>7439-97-6</b> | <b>4/ 6</b>    | <b>0.062</b>   | <b>0.37</b>    | <b>0.113</b>   | <b>0.059</b>                     | <b>0.12</b> | <b>Yes</b>                          | <b>Yes</b>    | <b>Exceeds background, PBT Compound</b> | <b>0.18</b>    | <b>MacDonald et al.</b> | <b>Yes</b>                   | <b>PBT Compound</b>               | <b>0.63</b>                      |
| Nickel                                 | 7440-02-0        | 6/ 6           | 18.2           | 62.1           | 30.1           | 17.7                             | 33          | No                                  | Yes           | Exceeds SRV                             | 22.7           | MacDonald et al.        | No                           | Below SRV                         | 1.33                             |
| Potassium                              | 7440-09-7        | 6/ 6           | 979            | 2,390          | 1,460          | 1,950                            | 6800        | No                                  | No            | Essential nutrient                      | No ESV         | No Source               | No                           | Essential nutrient                | No ESV                           |
| <b>Selenium</b>                        | <b>7782-49-2</b> | <b>6/ 6</b>    | <b>0.94</b>    | <b>3</b>       | <b>1.86</b>    | <b>1.7</b>                       | <b>1.7</b>  | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>               | <b>No ESV</b>  | <b>No Source</b>        | <b>Yes</b>                   | <b>Exceeds background and SRV</b> | <b>No ESV</b>                    |
| <b>Silver</b>                          | <b>7440-22-4</b> | <b>5/ 6</b>    | <b>0.078</b>   | <b>397</b>     | <b>78.5</b>    | <b>0</b>                         | <b>0.43</b> | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>                      | <b>0.5</b>     | <b>USEPA Reg 5</b>      | <b>Yes</b>                   | <b>Exceeds ESV</b>                | <b>157</b>                       |
| Sodium                                 | 7440-23-5        | 5/ 6           | 82             | 1,290          | 393            | 112                              | --          | No                                  | No            | Essential nutrient                      | No ESV         | No Source               | No                           | Essential nutrient                | No ESV                           |
| Thallium                               | 7440-28-0        | 6/ 6           | 0.17           | 0.72           | 0.335          | 0.89                             | 4.7         | No                                  | No            | Below background                        | No ESV         | No Source               | No                           | Below background                  | No ESV                           |
| Vanadium                               | 7440-62-2        | 6/ 6           | 15.4           | 39.4           | 22.9           | 26.1                             | 40          | No                                  | No            | Below background                        | No ESV         | No Source               | No                           | Below background                  | No ESV                           |
| Zinc                                   | 7440-66-6        | 6/ 6           | 93.7           | 452            | 231            | 532                              | 160         | No                                  | No            | Below background                        | 121            | MacDonald et al.        | No                           | Below background                  | 1.91                             |
| <i>Explosives</i>                      |                  |                |                |                |                |                                  |             |                                     |               |                                         |                |                         |                              |                                   |                                  |
| <b>2,4,6-Trinitrotoluene</b>           | <b>118-96-7</b>  | <b>3/ 6</b>    | <b>0.035</b>   | <b>0.18</b>    | <b>0.123</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>                 | <b>No ESV</b>  | <b>No Source</b>        | <b>Yes</b>                   | <b>Detected organic</b>           | <b>No ESV</b>                    |
| <b>HMX</b>                             | <b>2691-41-0</b> | <b>3/ 6</b>    | <b>0.019</b>   | <b>0.11</b>    | <b>0.116</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>                 | <b>No ESV</b>  | <b>No Source</b>        | <b>Yes</b>                   | <b>Detected organic</b>           | <b>No ESV</b>                    |
| <i>Semi-volatile Organic Compounds</i> |                  |                |                |                |                |                                  |             |                                     |               |                                         |                |                         |                              |                                   |                                  |
| 1,2,4-Trichlorobenzene                 | 120-82-1         | 1/ 6           | 0.064          | 0.064          | 0.409          | 0                                | --          | No                                  | Yes           | Detected organic                        | 5.062          | USEPA Reg 5             | No                           | Below ESV                         | 0.01                             |
| 1,2-Dichlorobenzene                    | 95-50-1          | 1/ 6           | 0.092          | 0.092          | 0.414          | 0                                | --          | No                                  | Yes           | Detected organic                        | 0.294          | USEPA Reg 5             | No                           | Below ESV                         | 0.31                             |
| <b>2-Methylnaphthalene</b>             | <b>91-57-6</b>   | <b>2/ 6</b>    | <b>0.041</b>   | <b>0.054</b>   | <b>0.353</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>                 | <b>0.0202</b>  | <b>USEPA Reg 5</b>      | <b>Yes</b>                   | <b>Exceeds ESV</b>                | <b>2.67</b>                      |
| <b>Acenaphthene</b>                    | <b>83-32-9</b>   | <b>1/ 6</b>    | <b>0.03</b>    | <b>0.03</b>    | <b>0.0961</b>  | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>                 | <b>0.00671</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>                   | <b>Exceeds ESV</b>                | <b>4.47</b>                      |
| <b>Acenaphthylene</b>                  | <b>208-96-8</b>  | <b>1/ 6</b>    | <b>0.061</b>   | <b>0.061</b>   | <b>0.101</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>                 | <b>0.00587</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>                   | <b>Exceeds ESV</b>                | <b>10.39</b>                     |
| <b>Anthracene</b>                      | <b>120-12-7</b>  | <b>1/ 6</b>    | <b>0.078</b>   | <b>0.078</b>   | <b>0.104</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>                 | <b>0.0572</b>  | <b>MacDonald et al.</b> | <b>Yes</b>                   | <b>Exceeds ESV</b>                | <b>1.36</b>                      |
| Benz(a)anthracene                      | 56-55-3          | 5/ 6           | 0.017          | 0.35           | 0.105          | 0                                | --          | No                                  | Yes           | Detected organic                        | 0.108          | MacDonald et al.        | No                           | Below ESV                         | 0.97                             |
| Benzo(a)pyrene                         | 50-32-8          | 5/ 6           | 0.02           | 0.41           | 0.12           | 0                                | --          | No                                  | Yes           | Detected organic                        | 0.15           | MacDonald et al.        | No                           | Below ESV                         | 0.80                             |
| Benzo(b)fluoranthene                   | 205-99-2         | 6/ 6           | 0.031          | 0.68           | 0.171          | 0                                | --          | No                                  | Yes           | Detected organic                        | 10.4           | USEPA Reg 5             | No                           | Below ESV                         | 0.02                             |
| Benzo(ghi)perylene                     | 191-24-2         | 5/ 6           | 0.018          | 0.34           | 0.102          | 0                                | --          | No                                  | Yes           | Detected organic                        | 0.17           | USEPA Reg 5             | No                           | Below ESV                         | 0.60                             |
| Benzo(k)fluoranthene                   | 207-08-9         | 5/ 6           | 0.015          | 0.28           | 0.0907         | 0                                | --          | No                                  | Yes           | Detected organic                        | 0.24           | USEPA Reg 5             | No                           | Below ESV                         | 0.38                             |
| <b>Bis(2-ethylhexyl)phthalate</b>      | <b>117-81-7</b>  | <b>4/ 6</b>    | <b>0.028</b>   | <b>0.22</b>    | <b>0.187</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>                 | <b>0.182</b>   | <b>USEPA Reg 5</b>      | <b>Yes</b>                   | <b>Exceeds ESV</b>                | <b>1.03</b>                      |
| Chrysene                               | 218-01-9         | 5/ 6           | 0.024          | 0.46           | 0.134          | 0                                | --          | No                                  | Yes           | Detected organic                        | 0.166          | MacDonald et al.        | No                           | Below ESV                         | 0.81                             |
| <b>Dibenz(a,h)anthracene</b>           | <b>53-70-3</b>   | <b>1/ 6</b>    | <b>0.085</b>   | <b>0.085</b>   | <b>0.105</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>                 | <b>0.033</b>   | <b>MacDonald et al.</b> | <b>Yes</b>                   | <b>Exceeds ESV</b>                | <b>2.58</b>                      |
| Dibenzofuran                           | 132-64-9         | 1/ 6           | 0.012          | 0.012          | 0.4            | 0                                | --          | No                                  | Yes           | Detected organic                        | 4.49E-01       | USEPA Reg 5             | No                           | Below ESV                         | 0.03                             |
| Fluoranthene                           | 206-44-0         | 6/ 6           | 0.037          | 0.68           | 0.175          | 0                                | --          | No                                  | Yes           | Detected organic                        | 0.423          | MacDonald et al.        | No                           | Below ESV                         | 0.41                             |
| Fluorene                               | 86-73-7          | 1/ 6           | 0.024          | 0.024          | 0.0951         | 0                                | --          | No                                  | Yes           | Detected organic                        | 0.0774         | MacDonald et al.        | No                           | Below ESV                         | 0.31                             |
| Indeno(1,2,3-cd)pyrene                 | 193-39-5         | 5/ 6           | 0.015          | 0.31           | 0.0952         | 0                                | --          | No                                  | Yes           | Detected organic                        | 0.2            | USEPA Reg 5             | No                           | Below ESV                         | 0.48                             |
| Naphthalene                            | 91-20-3          | 2/ 6           | 0.03           | 0.033          | 0.0957         | 0                                | --          | No                                  | Yes           | Detected organic                        | 0.176          | MacDonald et al.        | No                           | Below ESV                         | 0.19                             |

Table H-15. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at the Load Line 12 Active Area Channel (continued)

| Analyte (mg/kg)            | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification              | ESV    | ESV Source <sup>c</sup> | COPEC? <sup>d</sup> (yes/no) | COPEC Justification       | Ratio of Avg to ESV <sup>d</sup> |
|----------------------------|------------|----------------|----------------|----------------|----------------|----------------------------------|----------|-------------------------------------|---------------|--------------------------------|--------|-------------------------|------------------------------|---------------------------|----------------------------------|
| Phenanthrene               | 85-01-8    | 4/ 6           | 0.015          | 0.23           | 0.102          | 0                                | --       | No                                  | Yes           | Detected organic               | 0.204  | MacDonald et al.        | No                           | Below ESV                 | 0.50                             |
| Pyrene                     | 129-00-0   | 6/ 6           | 0.028          | 0.54           | 0.146          | 0                                | --       | No                                  | Yes           | Detected organic               | 0.195  | MacDonald et al.        | No                           | Below ESV                 | 0.75                             |
| Pesticides/PCBs            |            |                |                |                |                |                                  |          |                                     |               |                                |        |                         |                              |                           |                                  |
| PCB-1254 <sup>e</sup>      | 11097-69-1 | 2/ 6           | 0.027          | 0.15           | 0.0653         | 0                                | --       | Yes                                 | Yes           | Detected organic, PBT Compound | 0.0598 | MacDonald et al.        | Yes                          | Exceeds ESV, PBT Compound | 1.09                             |
| Volatile Organic Compounds |            |                |                |                |                |                                  |          |                                     |               |                                |        |                         |                              |                           |                                  |
| Methylene Chloride         | 75-09-2    | 1/ 1           | 0.0024         | 0.0024         | 0.0024         | 0                                | --       | No                                  | Yes           | Detected organic               | 0.159  | USEPA Reg 5             | No                           | Below ESV                 | 0.02                             |

<sup>a</sup>Background criteria for sediment from final facility-wide background values for Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

<sup>b</sup>PBT compounds are defined by Ohio Environmental Protection Agency 2008 as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); dioxin; PCDF (furans); 1,2,3,4-tetrachlorobenzene; 1,2,4,5-tetrachlorobenzene; toxaphene; and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.

<sup>c</sup>ESV: See sediment ESV table. Hierarchy of values according to Ohio Environmental Protection Agency Risk Assessment Guidance is MacDonald et al. *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*, Arch. Environ. Contam. Toxicol. Volume 39, Issue 1. January 2000, followed by USEPA Region 5 ecological screening levels.

<sup>d</sup>For average tables, SRCs are still determined by maximum detect, but COPECs and ratios are determined by average result. When avg > max, COPECs are determined by the maximum detect.

<sup>e</sup>No ESV is available for individual PCBs; PCB-1254 ESV is for PCBs (total).

Avg = Average.

CAS = Chemical Abstract Service.

COPEC = Chemical of potential ecological concern.

ESV = Ecological screening value.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

mg/kg = Milligrams per kilogram.

PBT = Persistent, bioaccumulative, and toxic.

PCB = Polychlorinated biphenyl.

Reg = Region.

SRC = Site-related contaminant.

SRV = Sediment reference value.

USEPA = U.S. Environmental Protection Agency.

**Bold** = Chemical is a COPEC.

---= SRV not available.

Table H-16. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at the Load Line 12 Former Settling Pond

| Analyte (mg/kg)                        | CAS Number        | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV    | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification         | ESV           | ESV Source <sup>c</sup> | COPEC? (yes/no) | COPEC Justification               | Ratio of Avg to ESV |
|----------------------------------------|-------------------|----------------|----------------|----------------|----------------|----------------------------------|-------------|-------------------------------------|---------------|---------------------------|---------------|-------------------------|-----------------|-----------------------------------|---------------------|
| <i>Inorganic Chemicals</i>             |                   |                |                |                |                |                                  |             |                                     |               |                           |               |                         |                 |                                   |                     |
| Aluminum                               | 7429-90-5         | 1/ 1           | 17,200         | 17,200         | 17,200         | 13,900                           | 29000       | No                                  | No            | Below SRV                 | No ESV        | No Source               | No              | Below SRV                         | No ESV              |
| Antimony                               | 7440-36-0         | 1/ 1           | 0.21           | 0.21           | 0.21           | 0                                | 1.3         | No                                  | No            | Below SRV                 | No ESV        | No Source               | No              | Below SRV                         | No ESV              |
| Arsenic                                | 7440-38-2         | 1/ 1           | 10.1           | 10.1           | 10.1           | 19.5                             | 25          | No                                  | No            | Below background          | 9.79          | MacDonald et al.        | No              | Below background                  | 1.03                |
| Barium                                 | 7440-39-3         | 1/ 1           | 104            | 104            | 104            | 123                              | 190         | No                                  | No            | Below background          | No ESV        | No Source               | No              | Below background                  | No ESV              |
| <b>Beryllium</b>                       | <b>7440-41-7</b>  | <b>1/ 1</b>    | <b>0.97</b>    | <b>0.97</b>    | <b>0.97</b>    | <b>0.38</b>                      | <b>0.8</b>  | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>        | <b>No ESV</b> | <b>No Source</b>        | <b>Yes</b>      | <b>Exceeds background and SRV</b> | <b>No ESV</b>       |
| Cadmium                                | 7440-43-9         | 1/ 1           | 0.31           | 0.31           | 0.31           | 0                                | 0.79        | No                                  | No            | Below SRV                 | 0.99          | MacDonald et al.        | No              | Below SRV                         | 0.31                |
| Calcium                                | 7440-70-2         | 1/ 1           | 3,990          | 3,990          | 3,990          | 5,510                            | 21000       | No                                  | No            | Essential nutrient        | No ESV        | No Source               | No              | Essential nutrient                | No ESV              |
| Chromium                               | 7440-47-3         | 1/ 1           | 22.7           | 22.7           | 22.7           | 18.1                             | 29          | No                                  | No            | Below SRV                 | 43.4          | MacDonald et al.        | No              | Below SRV                         | 0.52                |
| Cobalt                                 | 7440-48-4         | 1/ 1           | 15.1           | 15.1           | 15.1           | 9.1                              | 12          | No                                  | Yes           | Exceeds SRV               | 50            | USEPA Reg 5             | No              | Below ESV                         | 0.30                |
| Copper                                 | 7440-50-8         | 1/ 1           | 28.7           | 28.7           | 28.7           | 27.6                             | 32          | No                                  | No            | Below SRV                 | 31.6          | MacDonald et al.        | No              | Below SRV                         | 0.91                |
| Iron                                   | 7439-89-6         | 1/ 1           | 30,600         | 30,600         | 30,600         | 28,200                           | 41000       | No                                  | No            | Essential nutrient        | No ESV        | No Source               | No              | Essential nutrient                | No ESV              |
| Lead                                   | 7439-92-1         | 1/ 1           | 18.9           | 18.9           | 18.9           | 27.4                             | 47          | No                                  | No            | Below background          | 35.8          | MacDonald et al.        | No              | Below background                  | 0.53                |
| Magnesium                              | 7439-95-4         | 1/ 1           | 3,720          | 3,720          | 3,720          | 2,760                            | 7100        | No                                  | No            | Essential nutrient        | No ESV        | No Source               | No              | Essential nutrient                | No ESV              |
| Manganese                              | 7439-96-5         | 1/ 1           | 302            | 302            | 302            | 1,950                            | 1500        | No                                  | No            | Below background          | No ESV        | No Source               | No              | Below background                  | No ESV              |
| <b>Mercury</b>                         | <b>7439-97-6</b>  | <b>1/ 1</b>    | <b>0.065</b>   | <b>0.065</b>   | <b>0.065</b>   | <b>0.059</b>                     | <b>0.12</b> | <b>Yes</b>                          | <b>Yes</b>    | <b>PBT Compound</b>       | <b>0.18</b>   | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>PBT Compound</b>               | <b>0.36</b>         |
| Nickel                                 | 7440-02-0         | 1/ 1           | 29.9           | 29.9           | 29.9           | 17.7                             | 33          | No                                  | No            | Below SRV                 | 22.7          | MacDonald et al.        | No              | Below SRV                         | 1.32                |
| Potassium                              | 7440-09-7         | 1/ 1           | 1,260          | 1,260          | 1,260          | 1,950                            | 6800        | No                                  | No            | Essential nutrient        | No ESV        | No Source               | No              | Essential nutrient                | No ESV              |
| <b>Selenium</b>                        | <b>7782-49-2</b>  | <b>1/ 1</b>    | <b>2.1</b>     | <b>2.1</b>     | <b>2.1</b>     | <b>1.7</b>                       | <b>1.7</b>  | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>No ESV</b> | <b>No Source</b>        | <b>Yes</b>      | <b>Exceeds background and SRV</b> | <b>No ESV</b>       |
| Silver                                 | 7440-22-4         | 1/ 1           | 0.12           | 0.12           | 0.12           | 0                                | 0.43        | No                                  | No            | Below SRV                 | 0.5           | USEPA Reg 5             | No              | Below SRV                         | 0.24                |
| Sodium                                 | 7440-23-5         | 1/ 1           | 196            | 196            | 196            | 112                              | --          | No                                  | No            | Essential nutrient        | No ESV        | No Source               | No              | Essential nutrient                | No ESV              |
| Thallium                               | 7440-28-0         | 1/ 1           | 0.27           | 0.27           | 0.27           | 0.89                             | 4.7         | No                                  | No            | Below background          | No ESV        | No Source               | No              | Below background                  | No ESV              |
| Vanadium                               | 7440-62-2         | 1/ 1           | 29.3           | 29.3           | 29.3           | 26.1                             | 40          | No                                  | No            | Below SRV                 | No ESV        | No Source               | No              | Below SRV                         | No ESV              |
| Zinc                                   | 7440-66-6         | 1/ 1           | 104            | 104            | 104            | 532                              | 160         | No                                  | No            | Below background          | 121           | MacDonald et al.        | No              | Below background                  | 0.86                |
| <i>Semi-volatile Organic Compounds</i> |                   |                |                |                |                |                                  |             |                                     |               |                           |               |                         |                 |                                   |                     |
| <b>2-Methylnaphthalene</b>             | <b>91-57-6</b>    | <b>1/ 1</b>    | <b>0.7</b>     | <b>0.7</b>     | <b>0.7</b>     | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>   | <b>0.0202</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>34.65</b>        |
| <b>3+4-Methylphenol<sup>d</sup></b>    | <b>15831-10-4</b> | <b>1/ 1</b>    | <b>0.073</b>   | <b>0.073</b>   | <b>0.073</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>   | <b>0.0202</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>3.61</b>         |
| Benz(a)anthracene                      | 56-55-3           | 1/ 1           | 0.026          | 0.026          | 0.026          | 0                                | --          | No                                  | Yes           | Detected organic          | 0.108         | MacDonald et al.        | No              | Below ESV                         | 0.24                |
| Benzo(a)pyrene                         | 50-32-8           | 1/ 1           | 0.021          | 0.021          | 0.021          | 0                                | --          | No                                  | Yes           | Detected organic          | 0.15          | MacDonald et al.        | No              | Below ESV                         | 0.14                |
| Benzo(b)fluoranthene                   | 205-99-2          | 1/ 1           | 0.03           | 0.03           | 0.03           | 0                                | --          | No                                  | Yes           | Detected organic          | 10.4          | USEPA Reg 5             | No              | Below ESV                         | 0.003               |
| Bis(2-ethylhexyl)phthalate             | 117-81-7          | 1/ 1           | 0.063          | 0.063          | 0.063          | 0                                | --          | No                                  | Yes           | Detected organic          | 0.182         | USEPA Reg 5             | No              | Below ESV                         | 0.35                |
| Chrysene                               | 218-01-9          | 1/ 1           | 0.03           | 0.03           | 0.03           | 0                                | --          | No                                  | Yes           | Detected organic          | 0.166         | MacDonald et al.        | No              | Below ESV                         | 0.18                |
| Dibenzofuran                           | 132-64-9          | 1/ 1           | 0.13           | 0.13           | 0.13           | 0                                | --          | No                                  | Yes           | Detected organic          | 0.449         | USEPA Reg 5             | No              | Below ESV                         | 0.29                |
| Fluoranthene                           | 206-44-0          | 1/ 1           | 0.036          | 0.036          | 0.036          | 0                                | --          | No                                  | Yes           | Detected organic          | 0.423         | MacDonald et al.        | No              | Below ESV                         | 0.09                |

Table H-16. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at the Load Line 12 Former Settling Pond (continued)

| Analyte (mg/kg) | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification | ESV   | ESV Source <sup>c</sup> | COPEC? (yes/no) | COPEC Justification | Ratio of Avg to ESV |
|-----------------|------------|----------------|----------------|----------------|----------------|----------------------------------|----------|-------------------------------------|---------------|-------------------|-------|-------------------------|-----------------|---------------------|---------------------|
| Naphthalene     | 91-20-3    | 1/ 1           | 0.4            | 0.4            | 0.4            | 0                                | --       | No                                  | Yes           | Detected organic  | 0.176 | MacDonald et al.        | Yes             | Exceeds ESV         | 2.27                |
| Phenanthrene    | 85-01-8    | 1/ 1           | 0.14           | 0.14           | 0.14           | 0                                | --       | No                                  | Yes           | Detected organic  | 0.204 | MacDonald et al.        | No              | Below ESV           | 0.69                |
| Pyrene          | 129-00-0   | 1/ 1           | 0.035          | 0.035          | 0.035          | 0                                | --       | No                                  | Yes           | Detected organic  | 0.195 | MacDonald et al.        | No              | Below ESV           | 0.18                |

<sup>a</sup>Background criteria for sediment from final facility-wide background values for Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

<sup>b</sup>PBT compounds are defined by Ohio Environmental Protection Agency 2008 as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); dioxin; PCDF (furans); 1,2,3,4-tetrachlorobenzene; 1,2,4,5-tetrachlorobenzene; toxaphene; and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.

<sup>c</sup>ESV: See sediment ESV table. Hierarchy of values according to Ohio Environmental Protection Agency Risk Assessment Guidance is MacDonald et al. *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*, Arch. Environ. Contam. Toxicol. Volume 39, Issue 1. January 2000, followed by USEPA Region 5 ecological screening levels.

<sup>d</sup>4-Methylphenol used as a surrogate for the 3+4-methylphenol ESV.

Avg = Average.

CAS = Chemical Abstract Service.

COPEC = Chemical of potential ecological concern.

ESV = Ecological screening value.

mg/kg = Milligrams per kilogram.

PBT = Persistent, bioaccumulative, and toxic.

Reg = Region.

SRC = Site-related contaminant.

SRV = Sediment reference value.

USEPA = U.S. Environmental Protection Agency.

**Bold** = Chemical is a COPEC.

--= SRV not available.

Table H-17. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at Load Line 12 North of Active Area

| Analyte (mg/kg)                        | CAS Number        | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV    | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification               | ESV            | ESV Source <sup>c</sup> | COPEC? (yes/no) | COPEC Justification               | Ratio of Avg to ESV |
|----------------------------------------|-------------------|----------------|----------------|----------------|----------------|----------------------------------|-------------|-------------------------------------|---------------|---------------------------------|----------------|-------------------------|-----------------|-----------------------------------|---------------------|
| <i>Inorganic Chemicals</i>             |                   |                |                |                |                |                                  |             |                                     |               |                                 |                |                         |                 |                                   |                     |
| Aluminum                               | 7429-90-5         | 8/ 8           | 7,570          | 19,300         | 12,800         | 13,900                           | 29000       | No                                  | No            | Below SRV                       | No ESV         | No Source               | No              | Below SRV                         | No ESV              |
| Antimony                               | 7440-36-0         | 3/ 8           | 0.1            | 0.93           | 0.688          | 0                                | 1.3         | No                                  | No            | Below SRV                       | No ESV         | No Source               | No              | Below SRV                         | No ESV              |
| Arsenic                                | 7440-38-2         | 8/ 8           | 3.8            | 12.6           | 7.43           | 19.5                             | 25          | No                                  | No            | Below background                | 9.79           | MacDonald et al.        | No              | Below background                  | 0.76                |
| Barium                                 | 7440-39-3         | 8/ 8           | 46.1           | 129            | 82.1           | 123                              | 190         | No                                  | No            | Below SRV                       | No ESV         | No Source               | No              | Below SRV                         | No ESV              |
| <b>Beryllium</b>                       | <b>7440-41-7</b>  | <b>5/ 8</b>    | <b>0.58</b>    | <b>1</b>       | <b>0.607</b>   | <b>0.38</b>                      | <b>0.8</b>  | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>              | <b>No ESV</b>  | <b>No Source</b>        | <b>Yes</b>      | <b>Exceeds background and SRV</b> | <b>No ESV</b>       |
| <b>Cadmium</b>                         | <b>7440-43-9</b>  | <b>7/ 8</b>    | <b>0.21</b>    | <b>1.3</b>     | <b>0.64</b>    | <b>0</b>                         | <b>0.79</b> | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>              | <b>0.99</b>    | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>0.65</b>         |
| Calcium                                | 7440-70-2         | 8/ 8           | 1,160          | 4,850          | 2,480          | 5,510                            | 21000       | No                                  | No            | Essential nutrient              | No ESV         | No Source               | No              | Essential nutrient                | No ESV              |
| Chromium                               | 7440-47-3         | 8/ 8           | 10.9           | 26.2           | 17.9           | 18.1                             | 29          | No                                  | No            | Below SRV                       | 43.4           | MacDonald et al.        | No              | Below SRV                         | 0.41                |
| <b>Chromium, hexavalent</b>            | <b>18540-29-9</b> | <b>1/ 4</b>    | <b>1.6</b>     | <b>1.6</b>     | <b>0.95</b>    | <b>--</b>                        | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b>       | <b>No ESV</b>  | <b>No Source</b>        | <b>Yes</b>      | <b>Exceeds background</b>         | <b>No ESV</b>       |
| Cobalt                                 | 7440-48-4         | 8/ 8           | 7.9            | 18.6           | 13.2           | 9.1                              | 12          | No                                  | Yes           | Exceeds SRV                     | 50             | USEPA Reg 5             | No              | Below ESV                         | 0.26                |
| <b>Copper</b>                          | <b>7440-50-8</b>  | <b>8/ 8</b>    | <b>12.8</b>    | <b>42.1</b>    | <b>20.5</b>    | <b>27.6</b>                      | <b>32</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>              | <b>31.6</b>    | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>0.65</b>         |
| Iron                                   | 7439-89-6         | 8/ 8           | 12,200         | 23,900         | 18,700         | 28,200                           | 41000       | No                                  | No            | Essential nutrient              | No ESV         | No Source               | No              | Essential nutrient                | No ESV              |
| Lead                                   | 7439-92-1         | 8/ 8           | 14.2           | 37.9           | 21.2           | 27.4                             | 47          | No                                  | No            | Below SRV                       | 35.8           | MacDonald et al.        | No              | Below SRV                         | 0.59                |
| Magnesium                              | 7439-95-4         | 8/ 8           | 1,300          | 2,280          | 1,840          | 2,760                            | 7100        | No                                  | No            | Essential nutrient              | No ESV         | No Source               | No              | Essential nutrient                | No ESV              |
| Manganese                              | 7439-96-5         | 8/ 8           | 177            | 469            | 299            | 1,950                            | 1500        | No                                  | No            | Below background                | No ESV         | No Source               | No              | Below background                  | No ESV              |
| <b>Mercury</b>                         | <b>7439-97-6</b>  | <b>8/ 8</b>    | <b>0.032</b>   | <b>0.17</b>    | <b>0.0811</b>  | <b>0.059</b>                     | <b>0.12</b> | <b>Yes</b>                          | <b>Yes</b>    | <b>Exceeds SRV PBT Compound</b> | <b>0.18</b>    | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>PBT Compound</b>               | <b>0.45</b>         |
| Nickel                                 | 7440-02-0         | 8/ 8           | 11.9           | 24.1           | 16.9           | 17.7                             | 33          | No                                  | No            | Below SRV                       | 22.7           | MacDonald et al.        | No              | Below SRV                         | 0.74                |
| Potassium                              | 7440-09-7         | 8/ 8           | 586            | 1,830          | 1,290          | 1,950                            | 6800        | No                                  | No            | Essential nutrient              | No ESV         | No Source               | No              | Essential nutrient                | No ESV              |
| Selenium                               | 7782-49-2         | 4/ 8           | 1              | 1.3            | 0.752          | 1.7                              | 1.7         | No                                  | No            | Below background                | No ESV         | No Source               | No              | Below background                  | No ESV              |
| <b>Silver</b>                          | <b>7440-22-4</b>  | <b>6/ 8</b>    | <b>0.096</b>   | <b>41.6</b>    | <b>8.99</b>    | <b>0</b>                         | <b>0.43</b> | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds SRV</b>              | <b>0.5</b>     | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>17.98</b>        |
| Sodium                                 | 7440-23-5         | 7/ 8           | 69.8           | 177            | 133            | 112                              | --          | No                                  | No            | Essential nutrient              | No ESV         | No Source               | No              | Essential nutrient                | No ESV              |
| Thallium                               | 7440-28-0         | 6/ 8           | 0.13           | 0.66           | 0.399          | 0.89                             | 4.7         | No                                  | No            | Below background                | No ESV         | No Source               | No              | Below background                  | No ESV              |
| Vanadium                               | 7440-62-2         | 8/ 8           | 10.6           | 32.1           | 22.4           | 26.1                             | 40          | No                                  | No            | Below SRV                       | No ESV         | No Source               | No              | Below SRV                         | No ESV              |
| Zinc                                   | 7440-66-6         | 8/ 8           | 55.7           | 344            | 148            | 532                              | 160         | No                                  | No            | Below background                | 121            | MacDonald et al.        | No              | Below background                  | 1.22                |
| <i>Explosives</i>                      |                   |                |                |                |                |                                  |             |                                     |               |                                 |                |                         |                 |                                   |                     |
| <b>1,3-Dinitrobenzene</b>              | <b>99-65-0</b>    | <b>1/ 8</b>    | <b>0.059</b>   | <b>0.059</b>   | <b>0.102</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.00861</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>11.85</b>        |
| <b>2,4,6-Trinitrotoluene</b>           | <b>118-96-7</b>   | <b>1/ 8</b>    | <b>0.11</b>    | <b>0.11</b>    | <b>0.109</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>No ESV</b>  | <b>No Source</b>        | <b>Yes</b>      | <b>Detected organic</b>           | <b>No ESV</b>       |
| <i>Semi-volatile Organic Compounds</i> |                   |                |                |                |                |                                  |             |                                     |               |                                 |                |                         |                 |                                   |                     |
| <b>2-Methylnaphthalene</b>             | <b>91-57-6</b>    | <b>2/ 7</b>    | <b>0.01</b>    | <b>0.057</b>   | <b>0.2</b>     | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.0202</b>  | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>9.9</b>          |
| <b>Acenaphthene</b>                    | <b>83-32-9</b>    | <b>1/ 7</b>    | <b>0.022</b>   | <b>0.022</b>   | <b>0.198</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.00671</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>29.51</b>        |
| <b>Acenaphthylene</b>                  | <b>208-96-8</b>   | <b>1/ 7</b>    | <b>0.035</b>   | <b>0.035</b>   | <b>0.2</b>     | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.00587</b> | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>34.07</b>        |
| Anthracene                             | 120-12-7          | 1/ 7           | 0.052          | 0.052          | 0.203          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.0572         | MacDonald et al.        | No              | Below ESV                         | 3.55                |
| <b>Benz(a)anthracene</b>               | <b>56-55-3</b>    | <b>2/ 7</b>    | <b>0.044</b>   | <b>0.22</b>    | <b>0.228</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.108</b>   | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>2.11</b>         |
| <b>Benzo(a)pyrene</b>                  | <b>50-32-8</b>    | <b>2/ 7</b>    | <b>0.06</b>    | <b>0.24</b>    | <b>0.233</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.15</b>    | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.55</b>         |
| Benzo(b)fluoranthene                   | 205-99-2          | 4/ 7           | 0.082          | 0.35           | 0.2            | 0                                | --          | No                                  | Yes           | Detected organic                | 10.4           | USEPA Reg 5             | No              | Below ESV                         | 0.02                |
| Benzo(ghi)perylene                     | 191-24-2          | 2/ 7           | 0.057          | 0.17           | 0.222          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.17           | USEPA Reg 5             | No              | Max=ESV                           | 1.31                |
| Benzo(k)fluoranthene                   | 207-08-9          | 2/ 7           | 0.042          | 0.15           | 0.217          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.24           | USEPA Reg 5             | No              | Below ESV                         | 0.9                 |
| <b>Bis(2-ethylhexyl)phthalate</b>      | <b>117-81-7</b>   | <b>2/ 7</b>    | <b>0.043</b>   | <b>0.23</b>    | <b>0.232</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.182</b>   | <b>USEPA Reg 5</b>      | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.27</b>         |
| Butyl benzyl phthalate                 | 85-68-7           | 1/ 7           | 0.023          | 0.023          | 0.243          | 0                                | --          | No                                  | Yes           | Detected organic                | 1.97           | USEPA Reg 5             | No              | Below ESV                         | 0.12                |
| <b>Chrysene</b>                        | <b>218-01-9</b>   | <b>2/ 7</b>    | <b>0.063</b>   | <b>0.25</b>    | <b>0.235</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.166</b>   | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.42</b>         |
| <b>Dibenz(a,h)anthracene</b>           | <b>53-70-3</b>    | <b>2/ 7</b>    | <b>0.012</b>   | <b>0.042</b>   | <b>0.198</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.033</b>   | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>6</b>            |
| Dibenzofuran                           | 132-64-9          | 1/ 7           | 0.046          | 0.046          | 0.231          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.449          | USEPA Reg 5             | No              | Below ESV                         | 0.51                |
| Fluoranthene                           | 206-44-0          | 4/ 7           | 0.071          | 0.38           | 0.199          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.423          | MacDonald et al.        | No              | Below ESV                         | 0.47                |
| Fluorene                               | 86-73-7           | 1/ 7           | 0.017          | 0.017          | 0.198          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.0774         | MacDonald et al.        | No              | Below ESV                         | 2.56                |
| Indeno(1,2,3-cd)pyrene                 | 193-39-5          | 2/ 7           | 0.049          | 0.15           | 0.218          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.2            | USEPA Reg 5             | No              | Below ESV                         | 1.09                |
| Naphthalene                            | 91-20-3           | 1/ 7           | 0.044          | 0.044          | 0.201          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.176          | MacDonald et al.        | No              | Below ESV                         | 1.14                |
| Phenanthrene                           | 85-01-8           | 2/ 7           | 0.03           | 0.16           | 0.217          | 0                                | --          | No                                  | Yes           | Detected organic                | 0.204          | MacDonald et al.        | No              | Below ESV                         | 1.06                |
| <b>Pyrene</b>                          | <b>129-00-0</b>   | <b>2/ 7</b>    | <b>0.068</b>   | <b>0.3</b>     | <b>0.243</b>   | <b>0</b>                         | <b>--</b>   | <b>No</b>                           | <b>Yes</b>    | <b>Detected organic</b>         | <b>0.195</b>   | <b>MacDonald et al.</b> | <b>Yes</b>      | <b>Exceeds ESV</b>                | <b>1.25</b>         |

Table H-17. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at Load Line 12 North of Active Area (continued)

| Analyte (mg/kg)            | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | Ohio SRV | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification | ESV    | ESV Source <sup>c</sup> | COPEC? (yes/no) | COPEC Justification | Ratio of Avg to ESV |
|----------------------------|------------|----------------|----------------|----------------|----------------|----------------------------------|----------|-------------------------------------|---------------|-------------------|--------|-------------------------|-----------------|---------------------|---------------------|
| Volatile Organic Compounds |            |                |                |                |                |                                  |          |                                     |               |                   |        |                         |                 |                     |                     |
| 2-Butanone                 | 78-93-3    | 2/ 6           | 0.0096         | 0.017          | 0.0107         | 0                                | --       | No                                  | Yes           | Detected organic  | 0.0424 | USEPA Reg 5             | No              | Below ESV           | 0.25                |
| Acetone                    | 67-64-1    | 1/ 6           | 0.064          | 0.064          | 0.0207         | 0                                | --       | No                                  | Yes           | Detected organic  | 0.0099 | USEPA Reg 5             | Yes             | Exceeds ESV         | 2.09                |
| Methylene Chloride         | 75-09-2    | 2/ 6           | 0.0032         | 0.0032         | 0.00326        | 0                                | --       | No                                  | Yes           | Detected organic  | 0.159  | USEPA Reg 5             | No              | Below ESV           | 0.02                |
| Toluene                    | 108-88-3   | 1/ 6           | 0.0026         | 0.0026         | 0.00366        | 0                                | --       | No                                  | Yes           | Detected organic  | 1.22   | USEPA Reg 5             | No              | Below ESV           | 0.003               |

<sup>a</sup>Background criteria for sediment from final facility-wide background values for Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

<sup>b</sup>PBT compounds are defined by Ohio Environmental Protection Agency 2008 as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); dioxin; PCDF (furans); 1,2,3,4-tetrachlorobenzene; 1,2,4,5-tetrachlorobenzene; toxaphene; and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.

<sup>c</sup>ESV: See sediment ESV table. Hierarchy of values according to Ohio Environmental Protection Agency Risk Assessment Guidance is MacDonald et al. *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*, Arch. Environ. Contam. Toxicol. Volume 39, Issue 1. January 2000, followed by USEPA Region 5 ecological screening levels.

Avg = Average.  
BHC = Hexachlorocyclohexane.  
CAS = Chemical Abstract Service.  
COPEC = Chemical of potential ecological concern.  
ESV = Ecological screening value.  
mg/kg = Milligrams per kilogram.  
PBT = Persistent, bioaccumulative, and toxic.  
Reg = Region.  
SRC = Site-related contaminant.  
SRV = Sediment reference value.  
USEPA = U.S. Environmental Protection Agency.  
**Bold** = Chemical is a COPEC.  
--= SRV not available.

Table H-18. SRC and Integrated COPEC Screening with Average to OMZA Ratio for Surface Water at Load Line 12

| Analyte (mg/L)                         | CAS Number        | Freq of Detect | Minimum Detect | Maximum Detect | Average Result  | Background Criteria <sup>a</sup> | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification         | ESV            | ESV Source <sup>c</sup>                     | COPEC? <sup>e</sup> (yes/no) | COPEC Justification                       | Ratio of Avg to ESV <sup>e</sup> |
|----------------------------------------|-------------------|----------------|----------------|----------------|-----------------|----------------------------------|-------------------------------------|---------------|---------------------------|----------------|---------------------------------------------|------------------------------|-------------------------------------------|----------------------------------|
| <i>Inorganic Chemicals</i>             |                   |                |                |                |                 |                                  |                                     |               |                           |                |                                             |                              |                                           |                                  |
| Aluminum                               | 7429-90-5         | 13/ 14         | 0.079          | 21.3           | 3.08            | 3.37                             | No                                  | Yes           | Exceeds background        | 0.087          | NAWQC 2009                                  | No                           | Below background                          | 35.40                            |
| Antimony                               | 7440-36-0         | 5/ 14          | 0.0004         | 0.00094        | 0.00182         | 0                                | No                                  | Yes           | Exceeds background        | 0.19           | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.005                            |
| Arsenic                                | 7440-38-2         | 8/ 14          | 0.00046        | 0.0147         | 0.0037          | 0.0032                           | No                                  | Yes           | Exceeds background        | 0.15           | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.02                             |
| Barium                                 | 7440-39-3         | 14/ 14         | 0.0193         | 0.187          | 0.0591          | 0.0475                           | No                                  | Yes           | Exceeds background        | 0.22           | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.27                             |
| Beryllium                              | 7440-41-7         | 4/ 14          | 0.000035       | 0.0012         | 0.00113         | 0                                | No                                  | Yes           | Exceeds background        | 0.011          | Ohio Administrative Code <sup>d</sup>       | No                           | Below ESV                                 | 0.10                             |
| Cadmium                                | 7440-43-9         | 6/ 14          | 0.000038       | 0.0017         | 0.00132         | 0                                | No                                  | Yes           | Exceeds background        | 0.0025         | Ohio Administrative Code <sup>d</sup>       | No                           | Below ESV                                 | 0.53                             |
| Calcium                                | 7440-70-2         | 14/ 14         | 23             | 184            | 56.4            | 41.4                             | No                                  | No            | Essential nutrient        | No ESV         | No Source                                   | No                           | Essential nutrient                        | No ESV                           |
| Chromium                               | 7440-47-3         | 10/ 14         | 0.0006         | 0.0231         | 0.00518         | 0                                | No                                  | Yes           | Exceeds background        | 0.086          | Ohio Administrative Code <sup>d</sup>       | No                           | Below ESV                                 | 0.06                             |
| Cobalt                                 | 7440-48-4         | 11/ 14         | 0.00019        | 0.0159         | 0.00832         | 0                                | No                                  | Yes           | Exceeds background        | 0.024          | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.35                             |
| <b>Copper</b>                          | <b>7440-50-8</b>  | <b>9/ 14</b>   | <b>0.0014</b>  | <b>0.0249</b>  | <b>0.0103</b>   | <b>0.0079</b>                    | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>0.0093</b>  | <b>Ohio Administrative Code<sup>d</sup></b> | <b>Yes</b>                   | <b>Exceeds ESV</b>                        | <b>1.11</b>                      |
| Iron                                   | 7439-89-6         | 14/ 14         | 0.5            | 45.5           | 7.09            | 2.56                             | No                                  | No            | Essential nutrient        | 1              | NAWQC 2009                                  | No                           | Essential nutrient                        | 7.09                             |
| Lead                                   | 7439-92-1         | 9/ 14          | 0.0003         | 0.0365         | 0.0062          | 0                                | No                                  | Yes           | Exceeds background        | 0.0064         | Ohio Administrative Code <sup>d</sup>       | No                           | Below ESV                                 | 0.97                             |
| Magnesium                              | 7439-95-4         | 14/ 14         | 2.81           | 49.5           | 9.51            | 10.8                             | No                                  | No            | Essential nutrient        | No ESV         | No Source                                   | No                           | Essential nutrient                        | No ESV                           |
| <b>Manganese</b>                       | <b>7439-96-5</b>  | <b>14/ 14</b>  | <b>0.029</b>   | <b>3.6</b>     | <b>0.679</b>    | <b>0.391</b>                     | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>0.12</b>    | <b>Tier II (Suter &amp; Tsao 1996)</b>      | <b>Yes</b>                   | <b>Exceeds ESV</b>                        | <b>5.66</b>                      |
| Nickel                                 | 7440-02-0         | 12/ 14         | 0.0017         | 0.0244         | 0.00878         | 0                                | No                                  | Yes           | Exceeds background        | 0.052          | Ohio Administrative Code <sup>d</sup>       | No                           | Below ESV                                 | 0.17                             |
| Potassium                              | 9/7/7440          | 14/ 14         | 1.25           | 6.2            | 3.3             | 3.17                             | No                                  | No            | Essential nutrient        | No ESV         | No Source                                   | No                           | Essential nutrient                        | No ESV                           |
| Selenium                               | 7782-49-2         | 9/ 14          | 0.00029        | 0.0064         | 0.00184         | 0                                | No                                  | Yes           | Exceeds background        | 0.005          | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.37                             |
| <b>Silver</b>                          | <b>7440-22-4</b>  | <b>1/ 14</b>   | <b>0.092</b>   | <b>0.092</b>   | <b>0.00909</b>  | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>0.0013</b>  | <b>Ohio Administrative Code<sup>d</sup></b> | <b>Yes</b>                   | <b>Exceeds ESV</b>                        | <b>6.99</b>                      |
| Sodium                                 | 7440-23-5         | 14/ 14         | 0.94           | 25             | 5.22            | 21.3                             | No                                  | No            | Essential nutrient        | No ESV         | No Source                                   | No                           | Essential nutrient                        | No ESV                           |
| Vanadium                               | 7440-62-2         | 11/ 14         | 0.00075        | 0.0367         | 0.0109          | 0                                | No                                  | Yes           | Exceeds background        | 0.044          | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.25                             |
| Zinc                                   | 7440-66-6         | 11/ 14         | 0.0102         | 0.346          | 0.0765          | 0.042                            | No                                  | Yes           | Exceeds background        | 0.12           | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.64                             |
| <b>Nitrate</b>                         | <b>14797-55-8</b> | <b>7/ 14</b>   | <b>0.033</b>   | <b>21.1</b>    | <b>1.61</b>     | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>No ESV</b>  | <b>No Source</b>                            | <b>Yes</b>                   | <b>Detected and no screening criteria</b> | <b>No ESV</b>                    |
| <i>Explosives</i>                      |                   |                |                |                |                 |                                  |                                     |               |                           |                |                                             |                              |                                           |                                  |
| 1,3,5-Trinitrobenzene                  | 99-35-4           | 1/ 14          | 0.009          | 0.009          | 0.000708        | 0                                | No                                  | Yes           | Exceeds background        | 0.011          | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.06                             |
| 2,4,6-Trinitrotoluene                  | 118-96-7          | 1/ 14          | 0.011          | 0.011          | 0.000866        | 0                                | No                                  | Yes           | Exceeds background        | 0.013          | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.07                             |
| 4-Amino-2,6-Dinitrotoluene             | 19406-51-0        | 2/ 14          | 0.000054       | 0.00021        | 0.000102        | 0                                | No                                  | Yes           | Exceeds background        | 0.011          | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.01                             |
| HMX                                    | 2691-41-0         | 1/ 14          | 0.0019         | 0.0019         | 0.00027         | 0                                | No                                  | Yes           | Exceeds background        | 0.22           | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.001                            |
| <b>Nitrocellulose</b>                  | <b>9004-70-0</b>  | <b>1/ 9</b>    | <b>0.15</b>    | <b>0.15</b>    | <b>0.572</b>    | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>No ESV</b>  | <b>No Source</b>                            | <b>Yes</b>                   | <b>Detected and no screening criteria</b> | <b>No ESV</b>                    |
| <b>PETN</b>                            | <b>78-11-5</b>    | <b>1/ 8</b>    | <b>0.001</b>   | <b>0.001</b>   | <b>0.000576</b> | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>No ESV</b>  | <b>No Source</b>                            | <b>Yes</b>                   | <b>Detected and no screening criteria</b> | <b>No ESV</b>                    |
| RDX                                    | 121-82-4          | 3/ 14          | 0.00051        | 0.0066         | 0.000684        | 0                                | No                                  | Yes           | Exceeds background        | 0.079          | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.01                             |
| <b>Tetryl</b>                          | <b>479-45-8</b>   | <b>1/ 14</b>   | <b>0.0087</b>  | <b>0.0087</b>  | <b>0.000702</b> | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>No ESV</b>  | <b>No Source</b>                            | <b>Yes</b>                   | <b>Detected and no screening criteria</b> | <b>No ESV</b>                    |
| <i>Semi-volatile Organic Compounds</i> |                   |                |                |                |                 |                                  |                                     |               |                           |                |                                             |                              |                                           |                                  |
| Benz(a)anthracene                      | 56-55-3           | 1/ 14          | 0.00024        | 0.00024        | 0.0052          | 0                                | No                                  | Yes           | Exceeds background        | 0.0047         | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.05                             |
| <b>Benzo(a)pyrene</b>                  | <b>50-32-8</b>    | <b>1/ 14</b>   | <b>0.00022</b> | <b>0.00022</b> | <b>0.00519</b>  | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>0.00006</b> | <b>Ohio Administrative Code</b>             | <b>Yes</b>                   | <b>Exceeds ESV</b>                        | <b>3.67</b>                      |
| Benzo(b)fluoranthene                   | 205-99-2          | 1/ 14          | 0.00032        | 0.00032        | 0.0052          | 0                                | No                                  | Yes           | Exceeds background        | 0.0026         | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.12                             |
| <b>Bis(2-ethylhexyl)phthalate</b>      | <b>117-81-7</b>   | <b>3/ 14</b>   | <b>0.0011</b>  | <b>0.096</b>   | <b>0.011</b>    | <b>0</b>                         | <b>No</b>                           | <b>Yes</b>    | <b>Exceeds background</b> | <b>0.0084</b>  | <b>Ohio Administrative Code</b>             | <b>Yes</b>                   | <b>Exceeds ESV</b>                        | <b>1.31</b>                      |
| Chrysene                               | 218-01-9          | 1/ 14          | 0.00022        | 0.00022        | 0.00519         | 0                                | No                                  | Yes           | Exceeds background        | 0.0047         | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.05                             |
| Fluoranthene                           | 206-44-0          | 2/ 14          | 0.00033        | 0.00046        | 0.00488         | 0                                | No                                  | Yes           | Exceeds background        | 0.0008         | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.58                             |
| Pyrene                                 | 129-00-0          | 2/ 14          | 0.0003         | 0.00033        | 0.00487         | 0                                | No                                  | Yes           | Exceeds background        | 0.0046         | Ohio Administrative Code                    | No                           | Below ESV                                 | 0.07                             |

Table H-18. SRC and Integrated COPEC Screening with Average to OMZA Ratio for Surface Water at Load Line 12 (continued)

| Analyte (mg/L)             | CAS Number | Freq of Detect | Minimum Detect | Maximum Detect | Average Result | Background Criteria <sup>a</sup> | PBT <sup>b</sup> Compound? (yes/no) | SRC? (yes/no) | SRC Justification                | ESV   | ESV Source <sup>c</sup>  | COPEC? <sup>e</sup> (yes/no) | COPEC Justification | Ratio of Avg to ESV <sup>e</sup> |
|----------------------------|------------|----------------|----------------|----------------|----------------|----------------------------------|-------------------------------------|---------------|----------------------------------|-------|--------------------------|------------------------------|---------------------|----------------------------------|
| Pesticides/PCBs            |            |                |                |                |                |                                  |                                     |               |                                  |       |                          |                              |                     |                                  |
| delta-BHC                  | 319-86-8   | 2/ 14          | 1.40E-05       | 6.70E-05       | 2.72E-05       | 0                                | Yes                                 | Yes           | Exceeds background, PBT Compound | 0.667 | USEPA Reg 5              | Yes                          | PBT Compound        | 4.08E-05                         |
| Volatile Organic Compounds |            |                |                |                |                |                                  |                                     |               |                                  |       |                          |                              |                     |                                  |
| Carbon Disulfide           | 75-15-0    | 1/ 14          | 0.00053        | 0.00053        | 0.00136        | 0                                | No                                  | Yes           | Exceeds background               | 0.015 | Ohio Administrative Code | No                           | Below ESV           | 0.04                             |
| Methylene Chloride         | 75-09-2    | 2/ 14          | 0.0018         | 0.0031         | 0.00135        | 0                                | No                                  | Yes           | Exceeds background               | 1.9   | Ohio Administrative Code | No                           | Below ESV           | 0.001                            |

<sup>a</sup>Background criteria for sediment from final facility-wide background values for Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

<sup>b</sup>PBT compounds are defined by Ohio Environmental Protection Agency 2008 as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); dioxin; PCDF (furans); 1,2,3,4-tetrachlorobenzene; 1,2,4,5-tetrachlorobenzene; toxaphene; and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.

<sup>c</sup>ESV: See sediment ESV table. Hierarchy of values according to Ohio Environmental Protection Agency Risk Assessment Guidance is MacDonald et al. *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*, Arch. Environ. Contam. Toxicol. Volume 39, Issue 1. January 2000, followed by USEPA Region 5 ecological screening levels.

<sup>d</sup>Value is hardness dependent.

<sup>e</sup>For average tables, SRCs are still determined by maximum detect, but COPECs and Ratios are determined by Average Result. When avg > max, COPECs are determined by the maximum detect.

Avg = Average.

CAS = Chemical Abstract Service.

COPEC = Chemical of potential ecological concern.

ESV = Ecological screening value.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

mg/L = Milligrams per liter.

NAWQC = National Ambient Water Quality Criteria.

PBT = Persistent, bioaccumulative, and toxic.

PCB = Polychlorinated biphenyl.

PETN = Pentaerythritol tetranitrate.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

SRC = Site-related Contaminant.

USEPA = U.S. Environmental Protection Agency.

**Bold** = Chemical is a COPEC.

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