The following subsections present the outcomes of offshore investigative activities completed in each study area by summarizing the laboratory analytical results and characterizing their impacts on the environmental media in which they were detected.

11.1.1 Torch Lake Backwater Area

Offshore sediment samples were collected, but surface water samples were not collected from the Torch Lake Backwater Area during the SI.

The following subsections present a summary of the analytical results derived from offshore sampling activities in the Torch Lake Backwater Area.

11.1.1.1 Sediment Sampling Results

Sediment sampling activities were completed on 29 May 2015. A total of 12 sediment samples were collected from five sampling locations.

Sediment sampling locations included five surficial sediment samples, generally ranging from 0 to 6 inches (in.) in depth. The investigation also included the collection of seven deeper sediment samples ranging from 1 foot (ft) to 3.75 ft in depth. All samples were analyzed for PCBs. A subset of samples were also analyzed for semi-volatile organic compounds (SVOCs), cyanide, and inorganic constituents. Total PCBs were not detected in any of the samples collected from the Torch Lake Backwater Area.

Tabulated summaries and graphical depictions of the sediment analytical results from the Torch Lake Backwater Area are presented in **Section 5**.

11.1.1.2 Surface Water Sampling Results

No surface water samples were collected from the Torch Lake Backwater Area during implementation of the SI. Historically, one surface water sample, SW-02 was collected in 2011. The surface water analytical results for the sample contained two inorganic contaminants of concern (COCs) above or at concentrations that exceeded applicable regulatory criteria. PCBs were not detected in the sample collected from the Torch Lake Backwater Area. Tabulated

summaries and graphical depictions of the surface water analytical results from the Torch Lake Backwater Area are presented in **Section 5**.

11.1.2 Lake Linden Sands Area

Offshore sediment samples were collected, but surface water samples were not collected from the Lake Linden Sands Area during the SI. The following subsections present a summary of the analytical results derived from offshore sampling activities in the Lake Linden Sands Area.

11.1.2.1 Sediment Sampling Results

Sediment sampling activities were completed during three mobilizations. The first round of investigative work was completed on 15 June 2014, the second followed between 11 and 12 August 2014, and the third was on 29 May 2015. Between the three mobilizations, a total of 15 sediment samples and two duplicate sediment samples were collected from six sampling locations. Sediment sampling locations included six surficial sediment samples, generally ranging from 0 to 6 in. in depth. The investigation also included the collection of nine deeper sediment samples ranging from 1 ft to 5 ft in depth. All samples were analyzed for PCBs and a subset to the samples were analyzed for SVOCs and inorganic constituents. Total PCBs were not detected in any of the samples collected from the Lake Linden Sands Area. Tabulated summaries and graphical depictions of the sediment analytical results from the Lake Linden Sands Area are presented in **Section 6**.

11.1.3 Lake Linden Recreation Area

Offshore sediment and surface water samples were collected from the Lake Linden Recreation Area during the SI. The following subsections present a summary of the analytical results derived from offshore sampling activities in the Lake Linden Recreation Area.

11.1.3.1 Sediment Sampling Results

Offshore investigation activities were completed in the Lake Linden Recreation Area during four mobilizations. The first round of investigative work was completed between 15 and 16 June 2014, the second followed over a period of several days between 9 and 12 July 2014, the third between 27 and 28 May 2015, and the fourth on 12 July 2015. Between the four mobilizations, a total of

62 sediment samples and six duplicate sediment samples were collected from 24 sampling locations.

Sediment sampling locations included 24 surficial sediment samples, ranging from 0 to 6 in. in depth. The investigation also included the collection of 38 deeper sediment samples ranging from 1 ft to 5 ft in depth. All samples were analyzed for PCBs. A subset of sediment samples were also selected for inorganic, SVOC, and cyanide analysis.

The sediment analytical results for each of the samples contained multiple inorganic COCs at or above concentrations that exceeded applicable regulatory criteria. Total PCBs were detected in nine surficial sediment samples and six deep sediment samples collected from the Lake Linden Recreation Area that exceeded applicable regulatory criteria. Cyanide was not detected in any of the samples collected from the Lake Linden Recreation Area. Tabulated summaries and graphical depictions of the sediment analytical results from the Lake Linden Recreation Area are presented in **Section 7**.

11.1.3.2 Surface Water Sampling Results

Surface water sampling activities were also completed between 27 and 28 May 2015. A total of four surface water samples, ranging from 7.7 to 12.5 ft in depth, were collected from four sampling locations. All samples were analyzed for PCBs. Total PCBs and were not detected in any of the surface water samples collected from the Lake Linden Recreation Area during the SI.

Tabulated summaries and graphical depictions of the surface water analytical results from the Lake Linden Recreation Area are presented in **Section 7**.

11.1.4 Lake Linden Processing Area

Offshore sediment samples were collected, but surface water samples were not collected from the Lake Linden Processing Area during the SI. In addition, no historical surface water sampling results were included in the assessment of the Lake Linden Processing Area. The following subsections present a summary of the analytical results derived from offshore sampling activities in the Lake Linden Processing Area.

11.1.4.1 Sediment Sampling Results

Offshore investigation activities were completed in the Lake Linden Processing Area during three mobilizations. Investigative work was completed over a period of several days between 9 and 15 July 2014, 28 May and 2 June 2015, and on 23 August 2015. A total of 21 sediment samples and two duplicate sediment samples were collected from nine sampling locations. Sediment sampling locations included nine surficial sediment samples, ranging from 0 to 6 in. in depth. The investigation also included the collection of 12 deeper sediment samples ranging from 1ft to 4.75 ft in depth. All samples were analyzed for PCBs. Two sediment samples collected from location CHLL-SD-53 and two samples from CHLL-SD-83 were also analyzed for SVOCs, cyanide, and inorganic constituents.

The sediment analytical results for the Lake Linden Processing Area contained multiple inorganic COCs and cyanide at concentrations that exceeded applicable regulatory criteria. Total PCBs and SVOCs were not detected in any of the samples collected from the Lake Linden Processing Area. Tabulated summaries and graphical depictions of the surface water analytical results from the Lake Linden Processing Area are presented in **Section 8**.

11.1.5 Hubbell Processing Area

The findings derived from side-scan sonar conducted along the shoreline in the Hubbell Processing Area, as well as historical documentation, identified a high concentration of potential targets along the lake bottom. Visual inspection of these anomalies using underwater surveillance confirmed that abandoned drums, metal debris, circuit board waste, and similar materials were deposited on the lake bottom. Sampling locations defined in the SAP were modified to ensure that offshore samples were collected in the vicinity of the submerged disposal areas. Offshore sediment and surface water samples were collected from the Hubbell Processing Area during the SI. The following subsections present a summary of the analytical results derived from offshore sampling activities in the Hubbell Processing Area.

11.1.5.1 Sediment Sampling Results

Offshore investigation activities were completed in the Hubbell Processing Area during five mobilizations. The first round of investigative work was completed on 14 June 2014, the second

followed over a period of several days between 8 and 15 July 2014, the third on 1 June 2015, the fourth between 8 and 11 July 2015, and the fifth on 20 August 2015. Between the five mobilizations, a total of 69 sediment samples and nine duplicate sediment samples were collected from 26 sampling locations. Sediment sampling locations included 26 surficial sediment samples, ranging from 0 to 6 in. in depth. The investigation also included the collection of 43 deeper sediment samples ranging from 1 ft to 5 ft in depth. All samples were analyzed for PCBs. A subset of sediment samples were selected for inorganic, volatile organic compound (VOC), SVOC, and cyanide analyses.

The analytical results for sediment samples collected during the SI indicated multiple inorganic COCs at concentrations that exceeded applicable regulatory criteria. Total PCBs were detected in 10 surficial sediment samples collected from the Hubbell Processing Area that exceeded applicable regulatory criteria. Tabulated summaries and graphical depictions of the sediment analytical results from the Hubbell Processing Area are presented in **Section 9**.

11.1.5.2 Surface Water Sampling Results

Surface water sampling activities were also completed on 1 June 2015, between 8 and 9 July 2015, and on 20 August 2015. A total of six surface water samples plus one duplicate sample, ranging from 4 to 76 ft in depth, were collected from six sampling locations. All samples were analyzed for PCBs, and a subset of the samples were analyzed for VOCs, SVOCs, and inorganics.

Total PCBs and inorganics were detected in surface water sample CHLL-SW12 which was collected near a partially submerged drum at the shoreline adjacent to the smelter property. Tabulated summaries and graphical depictions of the surface water analytical results from the Hubbell Processing Area are presented in **Section 9**.

11.1.6 Hubbell Slag Dump and Beach Area

Due to a lack of historical sediment analytical results, as part of this Project, the offshore investigative work was generally completed in uniformly spaced locations along the entire length of the shoreline in the Hubbell Slag Dump and Beach Area. The following subsections present a summary of the analytical results derived from the offshore sampling activities.

11.1.6.1 Sediment Sampling Results

Offshore investigation activities were completed in the Hubbell Slag Dump and Beach Area during four mobilizations. The first round of investigative work was completed on 14 June 2014, the second followed over a period of two days between 8 and 9 July 2014, the third was on 2 June 2015, and the fourth on 8 July 2015. Between the four mobilizations, a total of 17 sediment samples and two duplicate sediment samples were collected from eight sampling locations.

Sediment sampling locations included eight surficial sediment samples, generally ranging from 0 to 6 in. in depth. The investigation also included the collection of nine deeper sediment samples ranging from 1ft to 4.5 ft in depth. All samples were analyzed for PCBs. One sample (CHLL-SD66) was also analyzed for other COCs including cyanide, inorganic COCs, and SVOCs.

The sediment analytical results for the Hubbell Slag Dump and Beach Area contained multiple inorganic COCs that exceeded applicable regulatory criteria. Total PCBs, cyanide, and SVOCs were not detected in any of the samples collected from the Hubbell Slag Dump and Beach Area during the SI. Tabulated summaries and graphical depictions of the sediment analytical results from the Hubbell Slag Dump and Beach Area are presented in **Section 10**.

11.1.6.2 Surface Water Sampling Results

Surface water sampling activities were also completed on 2 June 2015 and 8 July 2015. A total of two surface water samples, ranging from 5.25 to 7.6 ft in depth, were collected from two sampling locations. Both samples were analyzed for PCBs. Total PCBs were not detected in either surface water sample. Tabulated summaries and graphical depictions of the surface water analytical results from the Hubbell Slag Dump and Beach Area are presented in **Section 10**.

11.2 NATURE AND EXTENT OF CONTAMINATION

Utilizing the established regulatory criteria presented in **Section 4**, the laboratory analytical results summarized in the preceding section for the CHLL Operations Area were reviewed and compared to the following criteria as applicable for the sampled environmental media:

- Michigan Department of Environmental Quality (MDEQ) – Rule 57 Water Quality Values;
- U.S. Environmental Protection Agency (EPA) Ecological Screening Levels (ESLs); and,

- Sediment Quality Guidelines, Threshold Effect Concentrations (TECs) and Probable Effect Concentrations (PECs), MacDonald, et al, 2000.

11.2.1 Comprehensive Exposure Assessment

The comparison was completed to determine which ecological and human exposure pathways, risks, and conditions are relevant in Torch Lake. Although not inclusive of relevant pathways where criteria were not exceeded, the following exposure pathways were determined to be relevant in Torch Lake as it pertains to the offshore investigative activities completed during the SI:

- Risks due to hazardous substances in surface water and sediments.

11.2.1.1 Torch Lake Backwater Area - Exposure Pathway Assessment

Sediment analytical results from the Torch Lake Backwater Area included COC concentrations that were at or above concentrations that pose potential risks to sediment dwelling species, and consequently the food chain. The following table provides a summary of the sample locations located in the Torch Lake Backwater Area. The table lists only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

Sediment Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Consensus Based Sediment Quality Guidelines	
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)
Inorganics	6	101	23	**6**	**6**	**6**
Cyanide	6	3	3	**3**	0	0
VOCs	0	0	0	0	0	0
SVOCs	6	9	5	**1**	**1**	0
Total PCBs	13	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				Cadmium, Copper, Lead, Mercury, Nickel, Silver, Zinc, Cyanide, Benzo(a)Anthracene, Benzo(a)Pyrene, Chrysene, Phenanthrene, Pyrene		

The surface water analytical results from the Torch Lake Backwater Area included COC concentrations that were at or above concentrations that pose potential risks to sediment dwelling species, and consequently the food chain. The following table provides a summary of the sample

locations located in the Torch Lake Backwater Area. The table lists only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

Surface Water Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Surface Water - Rule 57		
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Human Non-Cancer Value	Human Cancer Value	Wildlife Value
Inorganics	1	12	2	**1**	0	0	0
Cyanide	1	0	0	0	0	0	0
VOCs	1	0	0	0	0	0	0
SVOCs	1	0	0	0	0	0	0
Total PCBs	1	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				Copper, Lead			

11.2.1.2 Lake Linden Sands - Exposure Pathway Assessment

The sediment analytical results from the Torch Lake Backwater Area included COC concentrations that were at or above concentrations that pose potential risks to sediment dwelling species. The following table provides a summary of the sample locations located in the Lake Linden Sands Area. The table lists only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

Sediment Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Consensus Based Sediment Quality Guidelines	
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)
Inorganics	2	32	4	**2**	**2**	**2**
Cyanide	2	0	0	0	0	0
VOCs	0	0	0	0	0	0
SVOCs	3	1	1	**1**	**1**	**1**
Total PCBs	18	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				Copper, Silver, Phenanthrene		

11.2.1.3 Lake Linden Recreation Area - Exposure Pathway Assessment

Sediment analytical results from the Lake Linden Recreation Area included COC concentrations that were at or above concentrations that pose potential risks to sediment dwelling species, and consequently the food chain. The following table provides a summary of the sample locations located in the Lake Linden Recreation Area. The table lists only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

Sediment Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Consensus Based Sediment Quality Guidelines	
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)
Inorganics	103	741	252	**103**	**103**	**93**
Cyanide	18	0	0	0	0	0
VOCs	2	0	0	0	0	0
SVOCs	22	6	5	**3**	**2**	0
Total PCBs	154	25	24	**24**	**24**	**10**
DRO/ORO	4	4	0	0	0	0
Corrosivity-pH	2	2	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Silver, Zinc, Bis(2-EthylHexyl)Phthalate, Pyrene, Total PCBs		

The surface water analytical results from the Lake Linden Recreation Area included COC concentrations that were at or above concentrations that pose potential risks to sediment dwelling species, and consequently the food chain. The following table provides a summary of the sample locations located in the Lake Linden Recreation Area. The table lists only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

Surface Water Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Surface Water - Rule 57		
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Human Non-Cancer Value	Human Cancer Value	Wildlife Value
Inorganics	4	49	16	**4**	**2**	**1**	0
Cyanide	4	1	1	**1**	0	0	0
VOCs	4	1	0	0	0	0	0
SVOCs	4	1	1	**1**	0	0	0
Total PCBs	8	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				Antimony, Arsenic, Barium, Cadmium, Copper, Cyanide, Lead, Silver, Vanadium, Zinc, Bis(2-EthylHexyl)Phthalate, Total PCBs			

11.2.1.4 Lake Linden Processing Area - Exposure Pathway Assessment

Sediment analytical results from the Lake Linden Processing Area included COC concentrations that were at or above concentrations that pose potential risks to sediment dwelling species, and consequently the food chain. The following table provides a summary of the sample locations located in the Lake Linden Processing Area. The table lists only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

Sediment Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Consensus Based Sediment Quality Guidelines	
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)
Inorganics	15	161	57	**15**	**15**	**15**
Cyanide	4	1	1	**1**	0	0
VOCs	3	0	0	0	0	0
SVOCs	7	29	5	**3**	**2**	**1**
Total PCBs	39	1	1	**1**	**1**	**1**
COCs exceeding applicable regulatory criteria in one or more sample				Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Silver, Zinc, Cyanide, 2-Methylnaphthalene, Bis(2-EthlyHexyl)Phthalate, Fluoranthene, Naphthalene, Pyrene, Total PCBs		

11.2.1.5 Hubbell Processing Area - Exposure Pathway Assessment

Sediment analytical results from the Hubbell Processing Area included COC concentrations that were at or above concentrations that pose potential risks to sediment dwelling species, and consequently the food chain. The following table provides a summary of the sample locations located in the Hubbell Processing Area. The table lists only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

Sediment Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Consensus Based Sediment Quality Guidelines	
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)
Inorganics	51	556	332	**51**	**51**	**50**
Cyanide	8	2	2	**2**	0	0
VOCs	2	0	0	0	0	0
SVOCs	14	22	18	**2**	**2**	**1**
Total PCBs	132	24	23	**23**	**23**	**7**
COCs exceeding applicable regulatory criteria in one or more sample				Arsenic, Cadmium, Chromium, Cobalt, Copper, Cyanide, Lead, Mercury, Nickel, Silver, Zinc, 2-Methylnaphthalene, Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)Anthracene, Benzo(a)Pyrene, Benzo(g,h,i)Perylene, Benzo(k)Fluoranthene, Chrysene, Dibenzo(a,h)Anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)Pyrene, Naphthalene, Phenanthrene, Pyrene, Total PCBs		

The surface water analytical results from the Hubbell Processing Area included COC concentrations, including Total PCBs that were at or above concentrations that pose potential risks to sediment dwelling species, and consequently the food chain. The following table provides a summary of the sample locations located in the Hubbell Processing Area. The table lists only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

Surface Water Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Surface Water - Rule 57		
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Human Non-Cancer Value	Human Cancer Value	Wildlife Value
Inorganics	2	19	11	**1**	**1**	**1**	**1**
Cyanide	0	0	0	0	0	0	0
VOCs	3	1	0	0	0	0	0
SVOCs	4	1	1	**1**	0	0	0
Total PCBs	8	1	1	**1**	0	**1**	**1**
COCs exceeding applicable regulatory criteria in one or more sample				Antimony, Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Silver, Zinc, Bis(2-EthlyHexyl)Phthalate, Total PCBs			

11.2.1.6 Hubbell Slag Dump and Beach Area - Exposure Pathway Assessment

Sediment analytical results from the Hubbell Slag Dump and Beach Area included COC concentrations that were at or above concentrations that pose potential risks to sediment dwelling species, and consequently the food chain. The following table provides a summary of the SI sample locations located in the Hubbell Slag Dump and Beach Area. The table lists only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

Sediment Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Consensus Based Sediment Quality Guidelines	
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)
Inorganics	11	104	74	**11**	**11**	**11**
Cyanide	1	0	0	0	0	0
VOCs	0	0	0	0	0	0
SVOCs	1	0	0	0	0	0
Total PCBs	28	2	2	**2**	**2**	0
COCs exceeding applicable regulatory criteria in one or more sample				Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Mercury, Nickel, Silver, Zinc, Total PCBs		

The surface water analytical results from the Hubbell Slag Dump and beach did not contain COCs in excess of applicable criteria. The following table provides a summary of surface water samples

located in the Hubbell Slag Dump and Beach Area. The table lists only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

Surface Water Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Surface Water - Rule 57		
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Human Non-Cancer Value	Human Cancer Value	Wildlife Value
Inorganics	0	0	0	0	0	0	0
Cyanide	0	0	0	0	0	0	0
VOCs	0	0	0	0	0	0	0
SVOCs	0	0	0	0	0	0	0
Total PCBs	2	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				None.			

11.2.2 C&H Lake Linden Operations - Extent of Contamination

The comparison of analytical results to applicable regulatory criteria indicates that potential human health and ecological risks are present in sediment and surface water in the CHLL Operations Area. The following subsections describe the extent of contamination in sediment and surface water within the CHLL Operations Area.

11.2.2.1 Sediment - Extent of Contamination

Analytical results from sediment samples collected from the various study areas within the CHLL Operations Area included COCs in both surficial and deep sediment samples. These results varied between study areas likely due to the varying operational and remedial history within each area. The following provides a summary of the analytical results and their relevance to potential exposure risks for human and ecological receptors:

- Inorganic COCs – Inorganic COCs were detected at or in excess of applicable regulatory criteria in the following study areas:
  - Torch Lake Backwater Area;
  - Lake Linden Sands Area;

- Lake Linden Recreation Area;
- Lake Linden Processing Area;
- Hubbell Processing Area; and,
- Hubbell Slag Dump and Beach Area.

As indicated by the number of locations summarized above, metals are prevalent in the region and the related exceedances, although potentially detrimental to aquatic biota, remain a consistent finding in sediment samples collected from Torch Lake. Nevertheless, exceedances of inorganic COCs in sediment should be considered when evaluating the extent of contamination in the CHLL Operations Area.

- VOCs–VOCs were not detected in sediment samples collected as part of the SI.

- SVOCs– SVOCs were detected in sediment at or in excess of applicable regulatory criteria in the following study areas:

  - Torch Lake Backwater Area;
  - Lake Linden Sands Area; and,
  - Hubbell Processing Area.

  The detection of SVOCs in sediment samples are likely indicative of a nearby contaminant source, versus the ubiquitous nature of the inorganic COCs described above. SVOC contamination in sediment present risks both to benthic organisms and human health due to their close proximity to the shoreline. The potential risks associated with SVOCs in nearshore sediment may be an indication of a terrestrial source of contamination that should be considered when evaluating the extent of sediment contamination in the CHLL Operations Area. It should be noted that samples collected from the Lake Linden Sands Area were only analyzed for PCBs during the SI.

- Total PCBs – Total PCBs were detected in sediment at or above applicable regulatory criteria in the following study areas:

  - Lake Linden Recreation Area;
  - Hubbell Processing Area; and,
  - Hubbell Slag Dump and Beach Area.

  The detection of PCBs above applicable regulatory criteria present a potential exposure risk particularly as it relates to human and ecological receptors. Concentrations of Total PCBs exceeding regulatory criteria were identified in both surficial and subsurface sediment samples. The greatest concentrations of these exceedances were located in the Lake Linden Recreation Area and the Hubbell Processing Area, where significant sources of PCBs are believed to be present. In the Lake Linden Recreation Area, analytical results suggest that a PCB source is located in sediments offshore of the Lake Linden Village Park and within 300 ft of the Lake Linden Beach. In the Hubbell Processing Area observed offshore containers and wastes as well as terrestrial PCB contamination are both likely sources contributing to the elevated PCB concentrations in the study area. The presence of

Total PCBs in sediment throughout the area present risks both to benthic organisms and human health due to their proximity to the shoreline and their potential effect on the food chain.

Sediment sampling locations in the CHLL Operations Area and Torch Lake are presented on **Figure 11-3**.

11.2.2.2 Surface Water – Extent of Contamination

Analytical results from surface water samples collected from the various study areas within the CHLL Operations Area identified a multitude of contaminants. These results varied between study areas likely due to the varying operational and remedial history within each area, but possibly due to presence of potential source areas as described above. The following provides a summary of the analytical results and their relevance to potential exposure risks for human and ecological receptors:

- Inorganic COCs – Inorganic COCs were detected at or in excess of applicable regulatory criteria in the following study areas:

  - Torch Lake Backwater Area;
  - Lake Linden Sands Area;
  - Lake Linden Recreation Area; and,
  - Hubbell Processing Area.

  Similar to the previously discussed sediment sample results, metals are ubiquitous in the study area and are apparently are predominantly the result of the presence of stamp sands. Stamp sands are not defined as a hazardous substance nor are they subject to regulation under Part 201 unless the property otherwise contains hazardous substances in excess of concentrations that satisfy the cleanup criteria for unrestricted residential use. The related exceedances, although potentially detrimental to aquatic biota, remain a consistent finding in surface water samples collected from Torch Lake. Nevertheless, exceedances of inorganic COCs in surface water should be considered when evaluating the extent of contamination in the CHLL Operations Area.

- VOCs– VOCs did not exceed applicable regulatory criteria in any surface water samples. Surface water samples collected during the SI were not analyzed for VOCs.

- SVOCs– SVOCs were detected in surface water at or in excess of applicable regulatory criteria in the following study areas:

  - Lake Linden Recreation Area; and,
  - Hubbell Processing Area.

The detection of SVOCs in surface water samples are likely indicative of a nearby contaminant source. SVOC contamination in surface water present risks both to benthic organisms and human health due to their close proximity to the shoreline. The potential risks associated with SVOCs in nearshore sediment may be an indication a terrestrial source of contamination that should be considered when evaluating the extent of contamination in the CHLL Operations Area.

- Total PCBs – Total PCBs were detected in surface water at or above applicable regulatory criteria in the following study areas:

  - Hubbell Processing Area.

  The detection of PCBs above applicable regulatory criteria present a potential exposure risk particularly as it relates to human and ecological receptors. Concentrations of Total PCBs exceeding regulatory criteria were identified near a partially submerged drum along the Torch Lake shoreline, adjacent to the former smelter property in the Hubbell Processing Area. The presence of Total PCBs in surface water in the CHLL Torch Lake present risks both to benthic organisms and human health due to their proximity to the shoreline and their potential effect on the food chain.

Surface water sampling locations in the CHLL and Torch Lake are presented on **Figure 11-1**.

11.2.3 Torch Lake – Extent of Contamination

The analytical results and interpretation summarized in the preceding subsections document potential human health and ecological risks that are present in the sediment and surface water in the CHLL Operations Area. The following subsections provide a correlation of these results to sediment and surface water analytical results throughout Torch Lake.

11.2.3.1 Sediment – Extent of Contamination

A majority of the sediment samples collected in CHLL were collected from the shallow (or surface) interval of sediment, but provide a broad view of sediment quality, as it relates to PCB contamination, across Torch Lake. The Torch Lake sediment sampling locations are depicted on **Figure 11-3**.

Sediment samples collected from the CHLL Operations Area are more representative of nearshore conditions. In addition, the historical and SI sediment samples in this area provide a vertical profile of the contaminant distribution. The interpreted results clearly show two distinct groupings of Total PCB concentrations that exceed ESLs, PECs, and TECs: The first located offshore in the

Lake Linden Recreation Area and the second located offshore in the Hubbell Processing Area. These study areas are shown relative to Torch Lake on **Figure 11-3**. Sediment sampling locations that exceeded applicable regulatory criteria for Total PCBs in the Lake Linden Recreation Area are depicted on **Figure 11-4**. Sediment sampling locations that exceeded applicable regulatory criteria for Total PCBs in the Hubbell Processing Area are depicted on **Figure 11-5**.

11.2.3.2 Surface Water and Fish Tissue – Extent of Contamination

A limited number of surface water samples were collected from Torch Lake and the CHLL Operations Area. Only one of those samples contained Total PCB concentrations at or above ESLs and Rule 57 criteria in the Hubbell Processing Area. This surface water sample was collected at the time of the sampling of the co-located, deteriorated drum whose contents are also subject to disturbance from wave action. Surface water sampling locations are depicted **Figure 11-1**.

Historical SPMD analytical results also indicated the presence of PCBs in the CHLL Operations Area and Torch Lake. The general purpose of the collection method is to provide a time-weighted exposure that is representative of chemical uptake through fish respiration. SPMD sample results do not provide for a direct comparison to surface water criteria, but are an indicator of contaminants in the water column. The SPMD results provide a qualitative comparison of PCB concentrations in Torch Lake to concentrations in connecting waters to Lake Superior. SPMD sampling locations are presented on **Figure 11-2**. As reported by the Great Lakes Environmental Center in a document entitled *Final Report, PCB Study Using Semipermeable Membrane Devices in Torch Lake, Houghton County* (March 2006), analytical results from the SPMD samples confirmed the presence of PCBs in surface waters of Torch Lake. The SPMD sampling results were inconclusive in identifying a specific PCB source within Torch Lake, but noted that the concentrations of PCBs measured in the SPMD samples were consistent with analytical results previously measured. In addition, the SPMD sample results demonstrated that concentrations of PCB congeners in Torch Lake were significantly higher than the results collected from the connecting waters to Lake Superior.

The SPMD analytical results were later corroborated in a fish tissue study completed by the MDEQ Water Bureau in 2008. The study was documented in a report prepared by the MDEQ Water

Bureau entitled *PCB Concentrations in Walleye Collected from Torch Lake (Houghton County) and Lake Superior* (June 2008). The study documented that "PCB concentrations in fish collected from Torch Lake have been consistently higher than in fish found in nearby surface water bodies. A fish consumption advisory due to elevated levels of PCBs was first issued for Torch Lake fish by the Michigan Department of Community Health (MDCH) in 1998.

Fish in Torch Lake were known to contain elevated levels of PCBs, but it was previously unclear whether the cause of elevated PCB concentrations in fish was from sources within Torch Lake watershed, from air deposition or from fish exposure at other locations. It had been postulated that the elevated concentrations of PCBs in fish caught in Torch Lake may actually represent exposure to the contaminant in Lake Superior waters since PCBs are known to be elevated in several species in Lake Superior, and there are no barriers to fish movement between the two water bodies. The elevated PCB concentration in Lake Superior fish is believed to be due primarily to atmospheric deposition.

The report concluded that "higher Total PCB concentrations and different congener compositions were found in walleye collected from Torch Lake versus walleye caught in Huron Bay indicating that there is a source of PCBs in the Torch Lake watershed" (MDEQ, 2008).

The MDEQ Water Resources Division (WRD) and Michigan Department of Health and Human Services (MDHHS) continue to monitor fish contaminant levels in Torch Lake and from two Lake Superior reference sites to allow comparisons of key contaminant concentrations between sites as well as temporal trend evaluations. An update of the status of contaminant concentrations using fish samples collected in 2013 was documented in a report prepared by the MDEQ WRD entitled *Status of fish Contaminant Levels in the Torch Lake Area of Concern 2013* (January 2016). This report provides an update of the status of contaminant concentrations using fish samples collected in 2013 from Torch Lake and from two Lake Superior reference sites. The study concluded that "Overall, the evidence indicates that total PCB concentrations in Torch Lake fish remain elevated compared to other water bodies in northern Michigan, even though levels have declined since monitoring began in 1988. Mercury concentrations in Torch Lake fish have not declined since monitoring began in 1988 and may have increased over that time; however, mercury levels are

lower than in fish from other Upper Peninsula inland lakes." The report also projected anticipated continued fish consumption advisories for Total PCBs and mercury.

PCBs were manufactured as blends based on the overall percent chlorine present in the blend. Different chlorine content dictated the physical and chemical properties of the blend, each of which had different commercial/industrial applications. The commercial name for PCB blends was "Aroclor". The Aroclor number generally indicated the percent chlorine present; Aroclor 1242 contains 42% chlorine, Aroclor 1254 contains 54% chlorine, etc. The manufacture and use of the various Aroclors is well documented (Frame, 1996). Analysis of PCBs as Aroclors (EPA Method 8082) is the most common approach to measuring PCB concentration, and is the basis for most regulatory standards. PCBs can be analyzed by "homolog", the composition by percent chlorine (EPA Method 680). Results are expressed as either parts per million (ppm) or percent of total PCB by chlorine grouping, such as monochlorobiphenyl, dichlorobiphenyls, etc., on up to decachlorobiphenyl. PCBs can also be analyzed by "congener". There are 209 possible PCB compounds, or congeners. Like homolog analysis, the results of congener analysis are expressed as either ppm or percent of total PCB by each individual congener. The composition of Aroclors by congener had been studied extensively (Frame, 1996). Most Aroclors have unique, or "marker" congeners that can help identify the source Aroclor in a degraded sample.

Comparison of Aroclors in source material and environmental media is commonly used to determine contamination pathways. While higher concentration PCBs such as in source material can be readily identified by Aroclor analysis, low concentration PCBs in the environment are sometimes degraded (through evaporation or biodegradation of the lighter congeners); homolog and congener analysis can be a useful tool when trying to identify the source of PCB contamination in degraded samples, such as in sediment and tissue.

As part of the SI, a subset of known PCB containing environmental and waste samples collected during field sampling efforts were selected for PCB congener analysis. The purpose of the analysis was to compare the observed congener/homolog/Aroclor patterns in soil, sediment, residual process materials, and groundwater from the Hubbell Processing Area and Lake Linden Recreation Area with the observed congener/homolog/Aroclor patterns in Torch Lake fish tissue data and

contrasting with congener/homolog/Aroclor patterns in waters believed to be contaminated with PCBs via only air deposition to confirm or refute the hypothesis that identified upland and in-lake PCB sources are continuing to contribute to the PCBs in the fish tissue.

The SI congener analytical results are presented in **Table 11-1**. **Figure 11-2** depicts the PCB congener, SPMD, and generalized fish tissue sampling locations.

Maximum Total PCB concentrations in the Hubbell Processing Area were:

- Residual Process Materials (wire wrap/sheathing) = 860 milligrams/kilogram (mg/kg)
- Waste Piles = 72.2 mg/kg
- Surficial soils = 9.1 mg/kg
- Sediments = 3.35 mg/kg
- Groundwater = 0.73 microgram/liter (µg/l)

The samples from this area contained the full range of Aroclors, including Aroclors 1242, 1254, 1260, 1262, and 1268. Aroclors 1262 and 1268 had limited commercial use and are therefore particularly notable when identified in environmental or fish tissue samples; both are solids at room temperature, and contain the heaviest (most chlorinated) PCB congeners.

Maximum Total PCB concentrations in the Lake Linden recreational area, where sediments are the primary issue, were:

- Sediment = 8.9 mg/kg

The Lake Linden Aroclors were limited to Aroclors 1242 and 1254, both of which were commonly used in electrical equipment.

The following initial observations were made, comparing the observed congener/homolog/Aroclor patterns in soil, sediment, residual process materials and groundwater from the Hubbell Processing area and Lake Linden Recreation Area with the observed congener/homolog/Aroclor patterns in Torch Lake fish tissue data:

Aroclor 1242

- No Aroclor 1242 was detected in upland soil or waste.
- Aroclor 1242 was detected primarily in sediments in Lake Linden Recreation Area.
- No Aroclor 1242 was detected in the 1988 fish tissue (without congener data, and assuming analysis is correct).
- Little or no Aroclor 1242 seems to be present in the 2013 fish tissue based on the congener comparison with the Aroclor 1242 standard.
- Aroclor 1242 may have entered the water at some time in the past but does not appear to be entering the water and impacting fish now.

Aroclor 1254

- Aroclor 1254 was present in every PCB containing soil, sediment and groundwater sample.
- Aroclor 1254 was present in the 1988 fish tissue.
- Aroclor 1254 is probably present in the 2013 fish tissue based on congener analysis, given that the pentachlorobiphenyl homolog common to Aroclor 1254 is significant (16%). Pentachlorobiphenyl is barely present in heavier Aroclors. Pentachlorobiphenyl is present in Aroclor 1242 (in lower proportions than in Aroclor 1254), but because Aroclor 1242 is not present in the upland areas it is not likely to still be impacting fish.
- Aroclor 1254 from sediment and upland soils could therefore still be impacting fish tissue. Airborne deposition of Aroclor 1254 (presenting as pentachlorobiphenyl vapors) could be occurring and cannot be ruled out based on the available data, but the airborne contribution relative to other pathways would be extremely small given its low vapor pressure. Ambient air monitoring would be needed to confirm whether the Aroclor homologs are detectable in the local air, and even then it would be difficult to assess their relative contribution to the water column.

Aroclor 1260 and Higher

- Aroclors 1260, 1262 and 1268 were detected in upland soil and groundwater, but not in sediment.
- These three Aroclors were not detected in the 1988 Torch Lake fish tissue samples.
- One or more of these heavier Aroclors is present in the 2013 Torch Lake fish tissue based on the congener test results. A number of the heavier homologs (hexa through octa in particular) are present in the 2013 fish tissue samples and could not have come from Aroclor 1254.

- Either Aroclor 1262 and/or 1268 are present in the 26 of 33 2013 Torch Lake fish tissue samples, based on the presence of the octa homolog. Octachlorobiphenyl is also present in Aroclor 1260 but not at levels that could explain the results shown.

- Note also that octa congeners were detected in the groundwater samples, which could explain the fish exposure pathway. SPMD test results did not show Octachlorobiphenyl, but the method only measures soluble PCBs (solids are cleaned off) and Octachlorobiphenyl is a solid (non-soluble) at room temperature.

The following initial observations were made, comparing the observed congener/homolog/Aroclor patterns in Torch Lake fish tissue data with congener/homolog/Aroclor patterns from fish tissue in waters believed to be contaminated with PCBs via only air deposition.

The Torch Lake 2013 fish tissue results were then compared with fish tissue test data from other water bodies (Huron and Keweenaw bays) where there was no identified PCB source. The congener makeup in the control sample fish (particularly in the Huron Bay samples) looks most like Aroclor 1260. The homolog percentages in some cases are higher than in the commercial mixture, but probably due to loss of the lower chlorinated congeners. There is little if any evidence of Aroclors 1262 or 1268 in the control fish tissue, unlike those of the Torch Lake samples. Only 1 out of 38 samples from Huron Bay contained any Octa, a marker for the Aroclors 1262/1268.

Based on these results, it appears that the source of some of the PCBs in the Torch Lake fish tissue is different than in the control samples from other areas with no known PCB source. In summary:

- It is apparent based on the above analysis that fish in Torch Lake are being exposed to PCB contamination from the upland areas that perhaps wasn't occurring in the past. Since Aroclor 1260 and up were not in 1988 fish samples but were in 2013 samples, and are present in upland soil and groundwater, it is apparent that Arochlor 1260 and up have made their way into fish tissue after 1988.

- Because these heavier congeners are present in groundwater and may be present in the water column, it is possible that the exposure is ongoing, but the pathway is unclear.

- Because Aroclor 1242 (i.e. the lighter congeners) have a relatively short half-life in animals and the environment, it is possible that 1242 was present in some of the 1988 fish tissue but is now undetectable. If true, this would impact the relative percentage of the various homologs present, but not enough to impact the conclusions above nor does it explain the shift to the presence of the heavier congeners.

11.3 CONCLUSIONS AND RECOMMENDATIONS

The analytical results and interpretation summarized in the preceding subsections document potential human health and ecological risks that are present in the CHLL and the implications of those findings on environmental conditions throughout Torch Lake. The following subsections provide a synopsis of these findings and a recommended path forward for mitigating these risks in the CHLL Area and subsequently, Torch Lake.

11.3.1 Conclusions

Environmental impacts in the CHLL Operations Area are generally characterized by detections of organic and inorganic contaminants in soil, groundwater, sediment, and surface water; repercussions of mining era operations in the region. Although, specific sources of these contaminants may not be fully understood, historical research related to the operations, closing, and eventual abandonment/scrapping of mining company operations provided substantive evidence for assessing specific operational areas and selecting target analytes anticipated to be present in environmental media throughout the area. The findings of these investigative activities, specifically as it relates to concentrations of contaminants in sediment and surface water are summarized as follows:

Sediment

- Inorganic COCs – Inorganic COCs were detected at or in excess of applicable regulatory criteria in the following study areas:
  - Torch Lake Backwater Area;
  - Lake Linden Sands Area;
  - Lake Linden Recreation Area;
  - Lake Linden Processing Area;
  - Hubbell Processing Area; and,
  - Hubbell Slag Dump and Beach Area.
- VOCs – VOCs were not detected in sediment samples collected as part of the SI.
- SVOCs – SVOCs were detected in sediment at or in excess of applicable regulatory criteria in the following study areas:
  - Torch Lake Backwater Area;
  - Lake Linden Sands Area; and,
  - Hubbell Processing Area.

- Total PCBs – Total PCBs were detected in sediment at or above applicable regulatory criteria in the following study areas:

  - Lake Linden Recreation Area;
  - Hubbell Processing Area; and,
  - Hubbell Slag Dump and Beach Area.

Surface Water

- Inorganic COCs – Inorganic COCs were detected at or in excess of applicable regulatory criteria in the following study areas:

  - Torch Lake Backwater Area;
  - Lake Linden Sands Area;
  - Lake Linden Recreation Area; and,
  - Hubbell Processing Area.

- VOCs– VOCs did not exceed applicable regulatory criteria in any surface water samples.

- SVOCs– SVOCs were detected in surface water at or in excess of applicable regulatory criteria in the following study areas:

  - Lake Linden Recreation Area; and,
  - Hubbell Processing Area.

- Total PCBs – Total PCBs were detected in surface water at or above applicable regulatory criteria in the following study areas:

  - Hubbell Processing Area.

Sediment samples historically collected by various agencies, from Torch Lake outside of the conceptual boundaries of this Project's CHLL Operations Area did not contain detections of PCBs. Sediment samples collected from the CHLL contained multiple detections of Total PCBs that exceeded applicable regulatory criteria. Moreover, interpretation of these results clearly demonstrates that there are two distinct groupings of elevated Total PCB concentrations in sediment: The first located offshore in the Lake Linden Recreation Area and the second located offshore in the Hubbell Processing Area.

A limited number of surface water samples were collected from Torch Lake and only one of the samples contained Total PCB concentrations at or above applicable regulatory criteria in the Hubbell Processing Area. Analytical results from the SPMD samples confirmed the presence of

PCBs in surface waters of Torch Lake. The SPMD sampling results were inconclusive in identifying a specific PCB source within Torch Lake, but noted that the concentrations of PCBs measured in the SPMD samples were consistent with historical analytical results. In addition, the SPMD sample results demonstrated that relative concentrations of PCB congeners in Torch Lake were significantly higher than the results collected from the connecting waters to Lake Superior.

The SPMD analytical results were later corroborated in a fish tissue study completed by the MDEQ. The study documented that PCB concentrations in fish collected from Torch Lake were consistently higher than in fish found in nearby surface water bodies. Torch Lake was known to contain elevated levels of PCBs, but it was unclear whether the cause of elevated PCB concentrations in fish was caused by sources within Torch Lake. The report concluded that higher Total PCB concentrations and different congener compositions were found in walleye collected from Torch Lake versus walleye caught in Huron Bay indicating that there was a source of PCBs in the Torch Lake watershed.

The investigative results from the SI have identified two offshore sources of PCBs. These source areas, as confirmed by the results of the historical SPMD and fish tissue studies, are ongoing sources of PCBs that pose both ecological and potential human health risks and continued degradation of the benthos in Torch Lake.

11.3.2 Recommendations

SI and past investigative results derived from multiple sources have confirmed that ongoing sources of contamination are present in the CHLL Operations Area and Torch Lake. Of these contaminants, PCBs present a unique hazard due to their chemical properties that allow the chemical to migrate and bioaccumulate, such as in fish tissue where concentrations of the contaminant can exceed measured concentrations in environmental samples. Although measures such as beneficial use impairments (BUIs), including “Restrictions on fish and wildlife consumption” and “Degradation of benthos” are in place, there is potential for increased risk to human health due to the presence of PCBs in the food chain, in terrestrial areas, and on-going potential for upland sources of PCBs to enter Torch Lake.

For the Hubbell Processing Area where potential upland sources of PCBs not previously addressed by EPA are present, it is recommended that remedial alternatives to mitigate concerns related to human health and/or the environment be evaluated and implemented.

MDEQ should continue to provide new study data to the Remediation and Redevelopment Division Superfund Section (RRD SFS), which is responsible for monitoring EPA's remedy for the terrestrial and lake portion of the Torch Lake Superfund Site. RRD SFS should evaluate whether any remedy modifications are necessary. The EPA and RRD SFS should verify that administrative controls for areas that have been previously remediated by the EPA have been employed to ensure that the selected remedy is performing as designed and those institutional controls, where required, have been recorded and are being enforced.

SECTION 11

DETAILED FINDINGS REPORT – TORCH LAKE TABLES

TABLE 11-1
Sample Analytical Summary - PCB Congeners
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CHLL-GW23	CHLL-RPM-02		CHLL-SB90		CHLL-SD17		CHLL-SD52		CHLL-SS01		CHLL-WP01	
FieldSampleID	CHLL-GW 23 10-15'	CHLL-RPM02-101514	CHLL-RPM02-101514	CHLL-SB90-0-6"	CHLL-SB90-0-6"	CHLL-SD17-0"-6"	CHLL-SD17-0"-6"	CHLL-SD52-0"-6"	CHLL-SD52-0"-6"	CHLL-SS01-101514	CHLL-SS01-101514	CHLL-WP01-101514	CHLL-WP01-101514
Sample Date	6/11/2014	10/15/2014	10/15/2014	8/20/2014	8/20/2014	7/12/2014	7/12/2014	7/9/2014	7/9/2014	10/15/2014	10/15/2014	10/15/2014	10/15/2014
Sample Interval (bgs)	10 - 15 ft	0 - 0 ft	0 - 0 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Type	Groundwater	Residual Process Material	Residual Process Material	Soil	Soil	Sediment	Sediment	Sediment	Sediment	Soil	Soil	Waste Pile	Waste Pile
Units	ug/L	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)
Organics - PCB Congeners													
PCB 001	I	<5.0 U	--	<5.0 U	<6.4 U	<5.0 U	<10.4 U	<5.0 U	<10.7 U	<5.0 U	<6.3 U	<5.0 U	<5.5 U
PCB 003	I	<5.0 U	--	I	I	<5.0 U	<10.4 U	<5.0 U	<10.7 U	<5.0 U	<6.3 U	<5.0 U	<5.5 U
PCB 008	0.0029	I	I	I	I	I	I	I	I	I	I	I	I
PCB 011	<0.005 U	<5.0 U	--	<5.0 U	<6.4 U	<5.0 U	<10.4 U	<5.0 U	<10.7 U	<5.0 U	<6.3 U	<5.0 U	<5.5 U
PCB 016-032	--	<2.0 U	--	<2.0 U	<2.5 U	<2.0 U	<4.1 U	31.7	68.0	<2.0 U	<2.5 U	2.1	2.4
PCB 016	0.0028	--	--	--	--	--	--	--	--	--	--	--	--
PCB 017	I	<1.0 U	--	1.6	2.1	<1.0 U	<2.0 U	20.9	44.9	3.0	3.8	2.7	3.0
PCB 018	I	3.4	--	<1.0 U	<1.2 U	0.9	1.8	51.8	111.2	0.8	1.0	6.9	7.7
PCB 022	0.0055	<0.5 U	--	0.7	0.9	0.5	1.1	15.1	32.6	0.4	0.5	1.1	1.2
PCB 025	0.0046	<1.0 U	--	0.7	0.9	<1.0 U	<2.0 U	3.5	7.6	<1.0 U	<1.2 U	1.4	1.5
PCB 026	<0.001 U	<1.0 U	--	<1.0 U	<1.2 U	<1.0 U	<2.0 U	7.9	17.0	<1.0 U	<1.2 U	9.3	10.3
PCB 027	0.02	<1.0 U	--	10.5	13.6	<1.0 U	<2.0 U	3.9	8.5	<1.0 U	<1.2 U	<1.0 U	<1.1 U
PCB 028	0.0709	4.2	--	1.6	2.1	1.5	3.1	37.4	80.2	1.6	2.1	5.6	6.2
PCB 031	0.0058	11.5	--	2.8	3.7	1.3	2.8	37.2	79.9	2.8	3.6	8.6	9.5
PCB 032	<0.001 U	--	--	--	--	--	--	--	--	--	--	--	--
PCB 033	<0.001 U	<1.0 U	--	<1.0 U	<1.2 U	0.6	1.2	30.6	65.8	<1.0 U	<1.2 U	I	I
PCB 037-042	--	<2.0 U	--	2.6	3.3	<2.0 U	<4.1 U	15.7	33.8	2.1	2.7	39.7	44.1
PCB 037	<0.001 U	--	--	--	--	--	--	--	--	--	--	--	--
PCB 040	0.006	90.3	--	4.0	5.2	1.9	4.0	7.0	15.1	1.5	1.9	122.9	136.4
PCB 042	0.0053	--	--	--	--	--	--	--	--	--	--	--	--
PCB 044	0.033	38.3	--	10.1	13.1	1.7	3.5	22.6	48.5	12.7	16.1	196.3	217.8
PCB 045	<0.001 U	5.4	--	3.4	4.4	1.8	3.8	7.2	15.6	2.5	3.2	12.1	13.5
PCB 047	0.004	<1.0 U	--	<1.0 U	<1.2 U	<1.0 U	<2.0 U	5.2	11.2	<1.0 U	<1.2 U	34.8	38.7
PCB 048	0.0043	<0.5 U	--	<0.5 U	<0.6 U	0.2	0.5	7.3	15.8	<0.5 U	<0.6 U	9.4	10.5
PCB 049	0.0218	15.0	--	5.1	6.7	1.2	2.6	16.3	35.1	3.6	4.6	154.4	171.4
PCB 052	0.0729	78.3	--	12.4	16.0	2.2	4.6	26.0	55.8	9.9	12.6	722.3	801.7
PCB 056-060	--	<1.0 U	--	11.3	14.6	1.9	3.9	15.1	32.6	13.9	17.6	56.8	63.0
PCB 056	0.008	--	--	--	--	--	--	--	--	--	--	--	--
PCB 060	0.0018	--	--	--	--	--	--	--	--	--	--	--	--
PCB 063	<0.0005 U	<0.5 U	--	<0.5 U	<0.6 U	<0.5 U	<1.0 U	0.6	1.4	<0.5 U	<0.6 U	<0.5 U	<0.5 U
PCB 064	0.0122	9.5	--	3.4	4.4	0.9	2.0	14.6	31.3	2.8	3.6	66.9	74.3
PCB 066-095	--	1094.0	--	24.5	31.7	4.1	8.7	31.7	68.0	20.9	26.6	1277.4	1417.7
PCB 066	0.0747	--	--	--	--	--	--	--	--	--	--	--	--
PCB 070	0.0477	7.4	--	3.7	4.8	0.9	1.8	8.7	18.8	4.2	5.4	48.7	54.1
PCB 071	0.0055	<1.0 U	--	<1.0 U	<1.2 U	<1.0 U	<2.0 U	4.9	10.5	<1.0 U	<1.2 U	26.4	29.3
PCB 074	0.0214	28.3	--	13.5	17.4	2.4	5.1	23.7	50.8	14.5	18.4	366.6	406.8
PCB 077-110	--	713.5	--	61.8	79.9	6.8	14.1	32.0	68.6	62.5	79.2	3814.3	4233.4
PCB 077	0.028	--	--	--	--	--	--	--	--	--	--	--	--
PCB 081-087	--	303.6	--	35.0	45.2	2.2	4.6	11.7	25.2	54.1	68.6	1337.3	1484.3
PCB 081	0.0097	--	--	--	--	--	--	--	--	--	--	--	--
PCB 082	0.0132	<0.5 U	--	3.0	4.0	0.4	1.0	2.8	6.0	3.4	4.3	141.9	157.5

TABLE 11-1
Sample Analytical Summary - PCB Congeners
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CHLL-GW23	CHLL-RPM-02		CHLL-SB90		CHLL-SD17		CHLL-SD52		CHLL-SS01		CHLL-WP01	
FieldSampleID	CHLL-GW 23 10-15'	CHLL-RPM02-101514	CHLL-RPM02-101514	CHLL-SB90-0-6"	CHLL-SB90-0-6"	CHLL-SD17-0"-6"	CHLL-SD17-0"-6"	CHLL-SD52-0"-6"	CHLL-SD52-0"-6"	CHLL-SS01-101514	CHLL-SS01-101514	CHLL-WP01-101514	CHLL-WP01-101514
Sample Date	6/11/2014	10/15/2014	10/15/2014	8/20/2014	8/20/2014	7/12/2014	7/12/2014	7/9/2014	7/9/2014	10/15/2014	10/15/2014	10/15/2014	10/15/2014
Sample Interval (bgs)	10 - 15 ft	0 - 0 ft	0 - 0 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Type	Groundwater	Residual Process Material	Residual Process Material	Soil	Soil	Sediment	Sediment	Sediment	Sediment	Soil	Soil	Waste Pile	Waste Pile
Units	ug/L	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)
PCB 083	0.0099	<0.5 U	--	3.4	4.5	<0.5 U	<1.0 U	1.5	3.4	3.0	3.8	93.7	103.9
PCB 084	0.0432	19.7	--	4.9	6.3	0.7	1.6	4.7	10.2	3.7	4.8	276.0	306.3
PCB 087	0.0797	--	--	--	--	--	--	--	--	--	--	--	--
PCB 090-101	--	1789.5	--	42.3	54.7	3.2	6.6	15.4	33.1	51.8	65.7	1921.2	2132.3
PCB 090	0.0039	--	--	--	--	--	--	--	--	--	--	--	--
PCB 091	0.0234	309.9	--	49.5	64.0	I	I	2.6	5.6	47.9	60.7	181.7	201.7
PCB 092	0.0165	120.2	--	7.0	9.0	<1.0 U	<2.0 U	2.5	5.3	6.8	8.6	208.6	231.6
PCB 095	0.0747	--	--	--	--	--	--	--	--	--	--	--	--
PCB 097	0.0448	209.9	--	32.8	42.4	1.0	2.1	6.4	13.8	52.6	66.7	666.1	739.3
PCB 099	0.0708	63.7	--	22.9	29.6	1.8	3.9	8.0	17.2	21.1	26.8	841.2	933.7
PCB 100	I	<1.0 U	--	<1.0 U	<1.2 U	<1.0 U	<2.0 U	I	I	<1.0 U	<1.2 U	11.4	12.6
PCB 101	0.1527	--	--	--	--	--	--	--	--	--	--	--	--
PCB 105	0.05	<0.5 U	--	9.9	12.8	1.2	2.7	6.7	14.4	11.6	14.8	683.2	758.3
PCB 110	0.2641	--	--	--	--	--	--	--	--	--	--	--	--
PCB 114	0.0042	43.2	--	<0.5 U	<0.6 U	<0.5 U	<1.0 U	0.4	0.9	0.5	0.6	32.4	36.0
PCB 118	0.1356	110.6	--	21.0	27.2	2.9	6.0	12.8	27.6	26.7	33.8	1813.3	2012.6
PCB 123-149	--	12825.3	--	34.2	44.3	1.6	3.4	7.1	15.4	46.3	58.7	1021.9	1134.2
PCB 123	<0.0005 U	--	--	--	--	--	--	--	--	--	--	--	--
PCB 126-178	--	2983.6	--	9.5	12.3	<2.5 U	<5.2 U	<2.5 U	<5.3 U	15.4	19.5	28.9	32.1
PCB 126	<0.001 U	--	--	--	--	--	--	--	--	--	--	--	--
PCB 128	0.0471	136.9	--	6.7	8.7	0.6	1.2	2.6	5.5	8.1	10.3	444.1	492.9
PCB 130	0.0115	<0.5 U	--	1.8	2.3	<0.5 U	<1.0 U	1.1	2.4	<0.5 U	<0.6 U	109.7	121.7
PCB 132	0.0743	1263.2	--	11.7	15.2	1.0	2.0	3.8	8.1	13.1	16.6	664.5	737.6
PCB 134	0.0081	179.9	--	1.5	2.0	<0.5 U	<1.0 U	0.7	1.5	1.3	1.7	77.5	86.0
PCB 135-144	--	1825.8	--	10.6	13.7	0.8	1.6	2.5	5.4	12.8	16.2	199.0	220.9
PCB 135	<0.0005 U	--	--	--	--	--	--	--	--	--	--	--	--
PCB 136	0.0195	1412.9	--	5.1	6.6	<1.0 U	<2.0 U	1.4	3.1	5.5	7.0	140.4	155.9
PCB 136-163	--	9200.5	--	39.4	50.9	3.1	6.5	12.1	26.1	50.6	64.1	1974.9	2191.9
PCB 137	0.0102	53.8	--	34.0	44.0	1.3	2.7	5.0	10.7	73.6	93.3	89.7	99.5
PCB 138	0.08585	--	--	--	--	--	--	--	--	--	--	--	--
PCB 141	0.0246	3607.4	--	9.5	12.3	0.5	1.0	1.9	4.2	13.6	17.3	190.3	211.2
PCB 144	0.0084	--	--	--	--	--	--	--	--	--	--	--	--
PCB 146	0.0186	887.4	--	6.0	7.8	0.2	0.6	1.3	2.8	7.5	9.5	152.9	169.7
PCB 149	0.1205	--	--	--	--	--	--	--	--	--	--	--	--
PCB 151	0.0145	6953.4	--	9.8	12.7	0.3	0.7	1.6	3.4	15.9	20.1	125.5	139.3
PCB 153	0.1356	18708.7	--	46.9	60.7	2.7	5.8	9.4	20.3	72.4	91.8	1234.7	1370.4
PCB 156	0.0155	I	I	4.6	5.9	0.4	0.8	1.4	3.1	5.1	6.4	265.4	294.5
PCB 157-201	--	1391.5	--	15.0	19.4	0.7	1.6	2.8	6.0	17.5	22.2	63.5	70.5
PCB 157	0.0051	--	--	--	--	--	--	--	--	--	--	--	--
PCB 158-160	--	591.6	--	27.7	35.8	0.3	0.7	1.5	3.3	82.1	104.1	238.1	264.3
PCB 158	0.0351	--	--	--	--	--	--	--	--	--	--	--	--
PCB 160	<0.0005 U	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 11-1
Sample Analytical Summary - PCB Congeners
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CHLL-GW23	CHLL-RPM-02		CHLL-SB90		CHLL-SD17		CHLL-SD52		CHLL-SS01		CHLL-WP01	
FieldSampleID	CHLL-GW 23 10-15'	CHLL-RPM02-101514	CHLL-RPM02-101514	CHLL-SB90-0-6"	CHLL-SB90-0-6"	CHLL-SD17-0"-6"	CHLL-SD17-0"-6"	CHLL-SD52-0"-6"	CHLL-SD52-0"-6"	CHLL-SS01-101514	CHLL-SS01-101514	CHLL-WP01-101514	CHLL-WP01-101514
Sample Date	6/11/2014	10/15/2014	10/15/2014	8/20/2014	8/20/2014	7/12/2014	7/12/2014	7/9/2014	7/9/2014	10/15/2014	10/15/2014	10/15/2014	10/15/2014
Sample Interval (bgs)	10 - 15 ft	0 - 0 ft	0 - 0 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Type	Groundwater	Residual Process Material	Residual Process Material	Soil	Soil	Sediment	Sediment	Sediment	Sediment	Soil	Soil	Waste Pile	Waste Pile
Units	ug/L	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)	ug/kg (wet wt)	ug/kg (dry wt)
PCB 163	0.08585	--	--	--	--	--	--	--	--	--	--	--	--
PCB 167	0.0063	57.6	--	2.0	2.6	<0.5 U	<1.0 U	0.3	0.7	<0.5 U	<0.6 U	85.8	95.2
PCB 169	--	<0.5 U	--	I	I	<0.5 U	<1.0 U	<0.5 U	<1.0 U	<0.5 U	<0.6 U	<0.5 U	<0.5 U
PCB 170-190	--	9408.9	--	43.5	56.2	1.5	3.2	4.0	8.6	57.1	72.3	141.7	157.3
PCB 170	0.018	--	--	--	--	--	--	--	--	--	--	--	--
PCB 171	0.0048	I	I	I	I	<0.5 U	<1.0 U	0.8	1.8	20.6	26.2	33.9	37.6
PCB 172	0.0023	1273.8	--	2.8	3.7	<0.2 U	<0.5 U	0.2	0.5	6.1	7.7	28.3	31.4
PCB 174	0.0103	13006.8	--	17.4	22.5	0.3	0.6	1.2	2.7	37.2	47.2	90.8	100.8
PCB 175	0.0004	396.8	--	1.7	2.3	<0.2 U	<0.5 U	<0.2 U	<0.5 U	2.5	3.2	<0.2 U	<0.2 U
PCB 177	0.0085	6377.1	--	13.8	17.9	0.3	0.7	1.7	3.6	25.3	32.1	63.8	70.8
PCB 178	I	--	--	--	--	--	--	--	--	--	--	--	--
PCB 179	0.0039	8660.5	--	11.6	15.0	<0.2 U	<0.5 U	0.5	1.2	23.6	29.9	32.2	35.8
PCB 180	0.0373	39698.2	--	46.3	59.8	0.7	1.5	3.2	7.0	140.8	178.5	343.7	381.4
PCB 182-187	--	21298.1	--	38.9	50.2	<0.7 U	<1.5 U	2.3	5.0	71.1	90.2	122.3	135.8
PCB 182	<0.0005 U	--	--	--	--	--	--	--	--	--	--	--	--
PCB 183	0.0084	11881.8	--	18.3	23.6	0.1	0.3	1.2	2.6	33.0	41.8	74.0	82.1
PCB 185	<0.0003 U	2531.7	--	2.8	3.6	<0.2 U	<0.5 U	0.1	0.3	6.7	8.5	11.7	13.0
PCB 187	0.015	--	--	--	--	--	--	--	--	--	--	--	--
PCB 189	0.0006	133.5	--	4.1	5.3	<0.2 U	<0.5 U	<0.2 U	<0.5 U	2.1	2.7	15.1	16.8
PCB 190	0.0019	--	--	--	--	--	--	--	--	--	--	--	--
PCB 193	0.0013	1406.6	--	1.4	1.9	<0.2 U	<0.5 U	<0.2 U	<0.5 U	3.4	4.3	12.0	13.3
PCB 194	0.007	16515.5	--	28.1	36.3	0.2	0.5	1.0	2.2	72.2	91.5	67.8	75.2
PCB 195	0.0033	5353.2	--	5.9	7.6	<0.2 U	<0.5 U	I	I	13.2	16.8	20.0	22.2
PCB 196-203	--	26036.5	--	27.9	36.0	<0.5 U	<1.0 U	1.1	2.5	76.1	96.4	82.0	91.0
PCB 196	0.0028	--	--	--	--	--	--	--	--	--	--	--	--
PCB 198	0.0065	1124.6	--	I	I	<0.2 U	<0.5 U	I	I	2.6	3.3	6.0	6.7
PCB 199 (201)	0.0081	--	--	--	--	--	--	--	--	--	--	--	--
PCB 199	--	20118.1	--	31.5	40.7	0.1	0.4	1.2	2.6	98.7	125.1	70.5	78.2
PCB 200 (199)	<0.00025 U	--	--	--	--	--	--	--	--	--	--	--	--
PCB 200	--	2762.3	--	4.4	5.8	<0.2 U	<0.5 U	<0.2 U	<0.5 U	8.4	10.7	13.0	14.4
PCB 201 (200)	I	--	--	--	--	--	--	--	--	--	--	--	--
PCB 203	0.0028	--	--	--	--	--	--	--	--	--	--	--	--
PCB 205	I	644.2	--	I	I	<0.2 U	<0.5 U	<0.2 U	<0.5 U	2.0	2.5	10.2	11.4
PCB 206	0.002	12824.1	--	22.5	29.0	<0.2 U	<0.5 U	0.9	2.0	69.3	87.9	75.0	83.3
PCB 207	<0.0003 U	946.6	--	<0.2 U	<0.3 U	<0.2 U	<0.5 U	<0.2 U	<0.5 U	7.5	9.5	12.0	13.3
Total PCB Congeners	2.3273	269550.6	--	1007.6	1301.9	63.1	131.4	633.2	1359.0	1666.5	2112.2	23631.3	26227.9

PCB Congener Table Footnotes:

bgs = Below ground surface

ft = Feet

PCBs = Polychlorinated biphenyls

ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

Laboratory Footnotes:

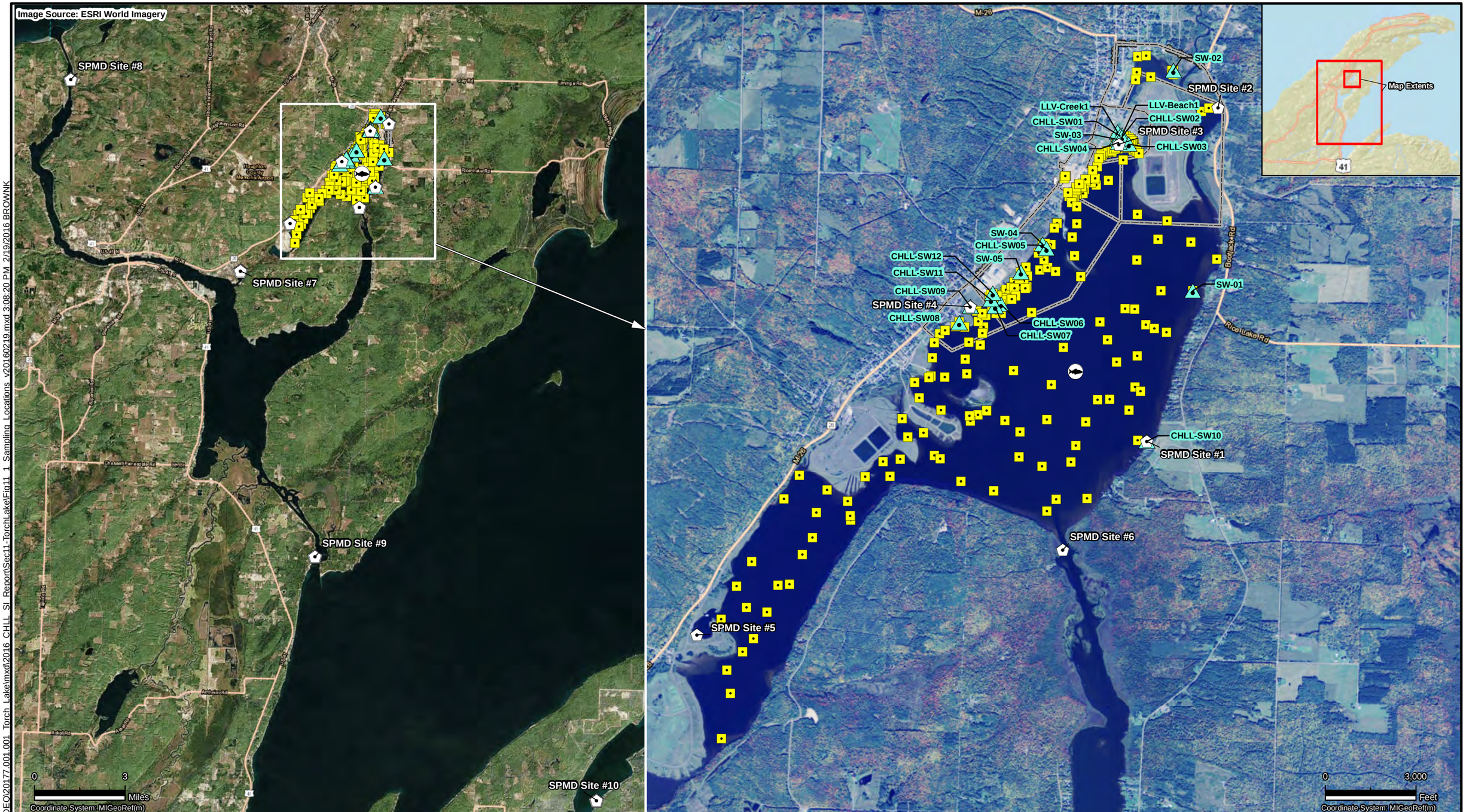
-- = Not analyzed/Not reported

I = Analytical Interference; quantification was not possible

U = Analyte analyzed for but not detected above the reported sample reporting limit.

SECTION 11

DETAILED FINDINGS REPORT – TORCH LAKE FIGURES



Sampling Location Type

- Semi-Permeable Membrane Device
- Surface Water
- Fish
- Sediment
- Conceptual Site and Geographic Area Boundaries

Notes:
Fish sample location shown is a generalization

N

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Houghton, MI 49931

Figure 11-1
Sampling Location Map
Torch Lake
Lake Linden, Houghton County, Michigan

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Sampling Location Type

- Groundwater
- Soil
- Residual Process Material
- Waste Pile
- Sediment
- Semi-Permeable Membrane Device
- Fish (Generalized Location)
- Conceptual Site and Geographic Area Boundaries

N

0 3 Miles

Coordinate System: MIGeoRef(m)

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Figure 11-2
PCB Congeners Sampling Location Map
Torch Lake
Lake Linden, Houghton County, Michigan

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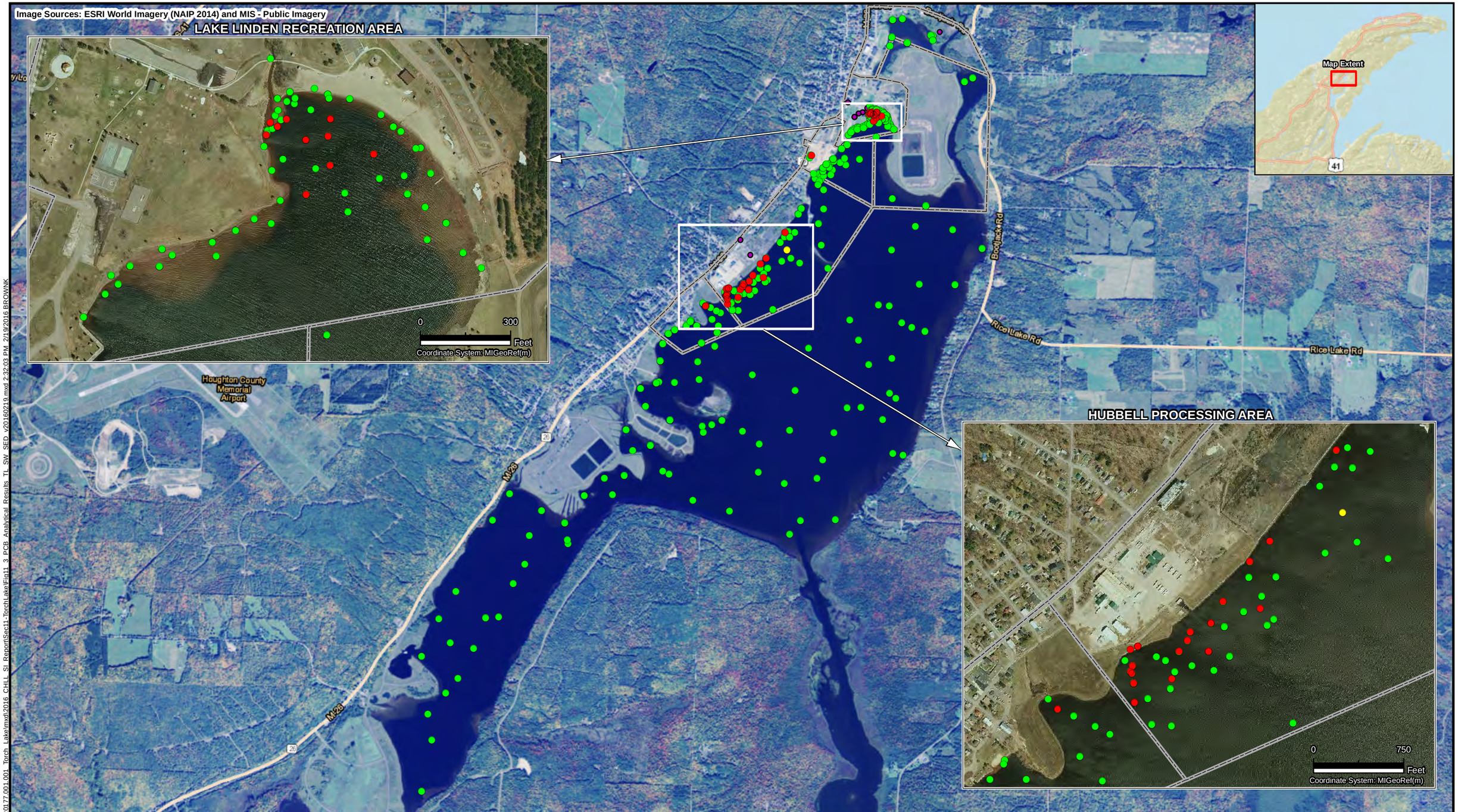

- Sampling locations with PCB detected greater than criteria
- Sampling locations with PCB detected below criteria
- Sampling locations with no PCB detections
- Conceptual Site and Geographic Area Boundaries

N

0 ½ Miles

Coordinate System: MIGeoRef(m)

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Figure 11-3

PCB Analytical Results Map
Torch Lake Sediment and Surface Water
Lake Linden, Houghton County, Michigan

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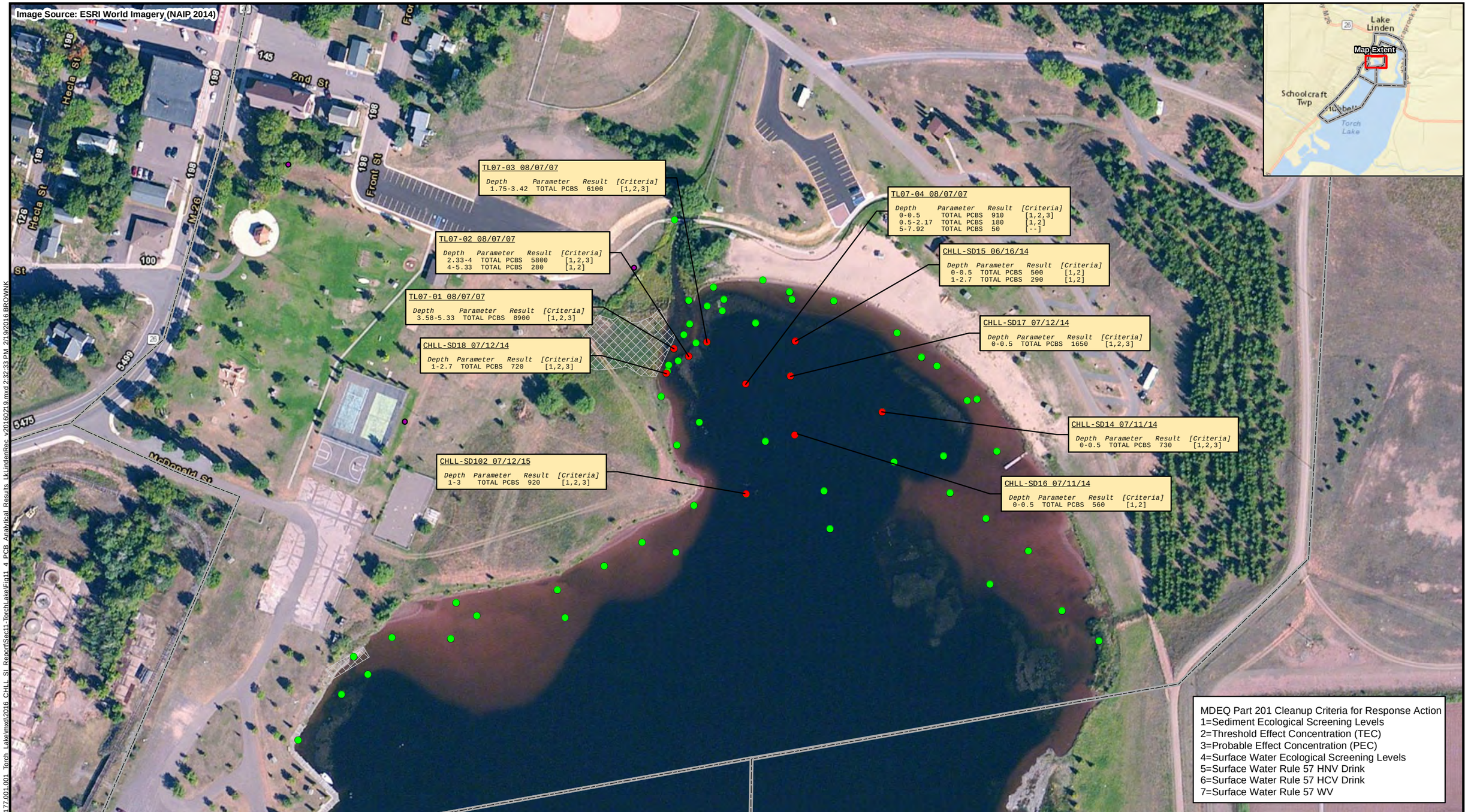

- Sampling locations with PCB detected greater than criteria
- Sampling locations with PCB detected below criteria
- Sampling locations with no PCB detections

Excavation Extent (2007)

Conceptual Site and Geographic Area Boundaries

Notes:
Sediment results = micrograms per kilogram
Surface water results = micrograms per liter
Sample depths shown in feet below surface

N

0 150 Feet

Coordinate System: MIGeoRef(m)

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Figure 11-4

PCB Analytical Results Map
Lake Linden Recreation Area Sediment and Surface Water
Lake Linden, Houghton County, Michigan

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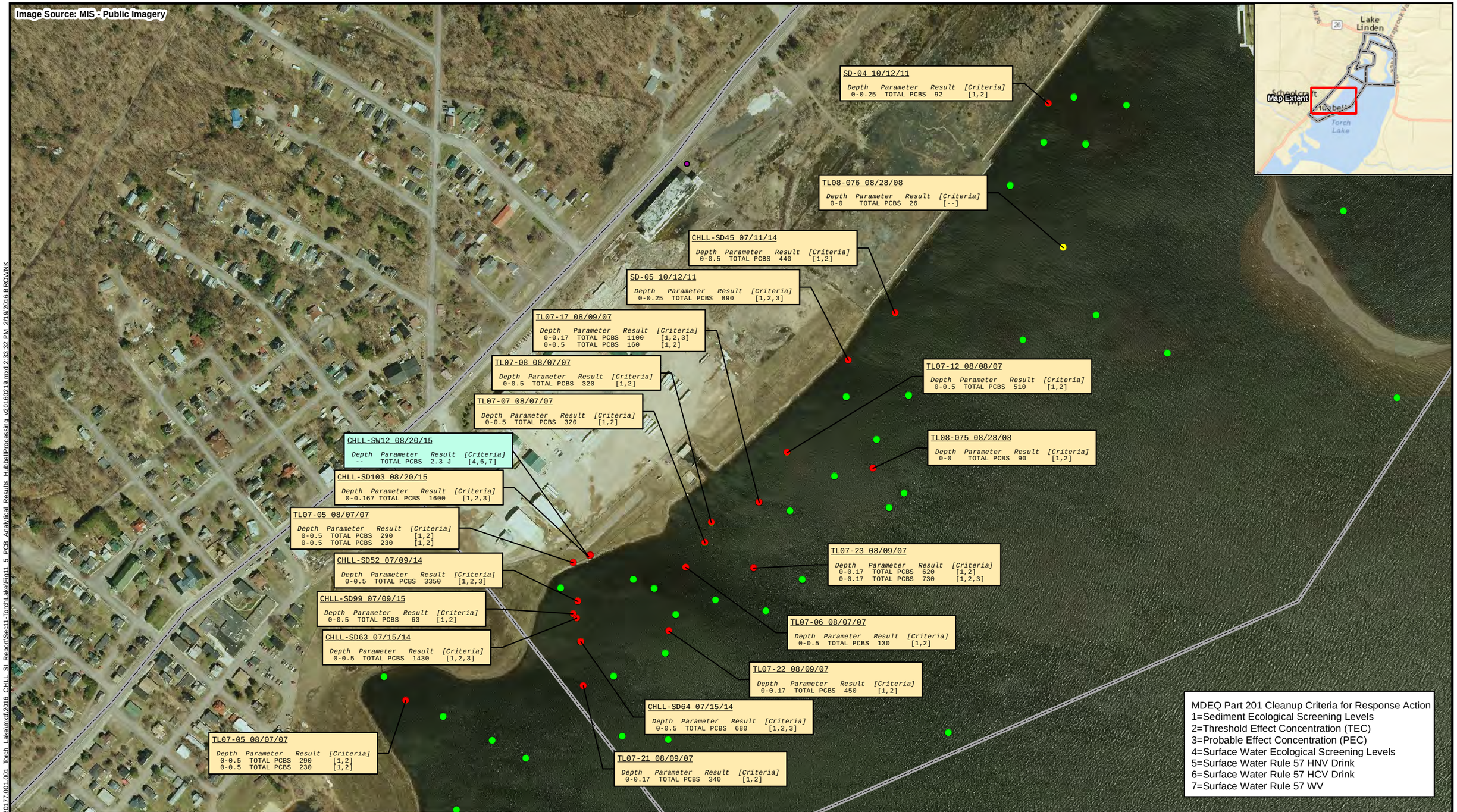

- Sampling locations with PCB detected greater than criteria
- Sampling locations with PCB detected below criteria
- Sampling locations with no PCB detections
- Conceptual Site and Geographic Area Boundaries

Notes:
Sediment results = micrograms per kilogram
Surface water results = micrograms per liter
Sample depths shown in feet below surface

N
0 325 Feet
Coordinate System: MIGeoRef(m)

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Figure 11-5
PCB Analytical Results Map
Hubbell Processing Area Sediment and Surface Water
Lake Linden, Houghton County, Michigan

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12. CONCLUSIONS AND RECOMMENDATION

The analytical results and interpretation summarized in the detailed finding reports presented in **Section 5** through **Section 11** document potential human health and ecological risks that are present in the CHLL along with the implications of these findings on environmental conditions throughout Torch Lake. The following subsections provide a synopsis of these findings and a recommended path forward for mitigating the identified risks in the CHLL and subsequently, Torch Lake.

12.1 CONCLUSIONS

Environmental impacts in the CHLL are generally characterized by detections of organic and inorganic contaminants in soil, groundwater, sediment, and surface water; repercussions of mining era operations in the region. Although, specific sources of these contaminants may not be fully understood, historical research related to the operations, closing, and eventual abandonment/scrapping of mining company operations provided substantive evidence for assessing specific operational areas and selecting target analytes anticipated to be present in environmental media throughout the area. The findings of these investigative activities in each of the study areas are presented in the following subsections.

12.1.1 Torch Lake Backwater Area

The analytical results and interpretation summarized **Section 5** document potential risks that are present in the Torch Lake Backwater Area. The findings of these investigative activities are summarized as follows:

- Soil analytical results exceeded Particulate Soil Inhalation Criteria (PSIC) and Direct Contact Criteria (DCC) in one or both of the residential and nonresidential exposure scenarios for inorganic contaminants. In addition, cyanide and semi-volatile organic compounds (SVOC) concentrations exceeded Groundwater Surface Water Interface Protection Criteria (GSIPC).
- Surface soil screening results also included measured inorganic contaminant concentrations that exceeded DCC in a residential exposure scenario.
- Sediment analytical results exceeded ESLs, TECs, and PECs for inorganic contaminants and SVOCs.
- Surface water analytical results exceeded ESLs for inorganic contaminants.

The analytical results summarized above provide sufficient analytical data and lines of evidence to conclude that the study area is a facility as defined in Section 20101(1) (s) of the NREPA. The following table provides a summary of the affected environmental media, applicable regulatory criteria and potential receptors within the Torch Lake Backwater Area.

Torch Lake Backwater Area – Media, Criteria, Potential Receptor Summary

Media	Soil			Groundwater			Air		Sediment	Surface Water		Building Materials, Asbestos, and Abandoned Containers			
Criteria / Potential Receptor	Drinking Water Protection	Groundwater Surface Water Interface	Direct Contact	Drinking Water Protection	Groundwater Surface Water Interface	Flammability and Explosivity	Volatilization	Particulate Inhalation	Ecological	Ecological	Human Health	Particulate Inhalation	Flammability and Explosivity	Environmental	Human Health
Human Residential		✓	✓					✓							
Human Nonresidential		✓						✓							
Water Column Organism									✓	✓					
Benthic Organism									✓	✓					
COCs exceeding applicable regulatory criteria in one or more sample	Cadmium, Copper, Cyanide, Lead, Mercury, Nickel, Silver, Zinc, Naphthalene, Benzo(a)anthracene, Benzo(a)pyrene, Chrysene, Phenanthrene, Pyrene														

In addition to the evaluation of analytical results collected from the study area, the following provides a summary of findings derived from the assessment of the Torch Lake Backwater Area with respect to the goals and objectives for the Project:

- In-lake and terrestrial sources of contamination are present in the form of inorganic COCs cyanide, and SVOCs in the study area. PCBs were not detected in environmental media sampled in the study area;
- No in-lake or terrestrial uncharacterized waste deposits were identified in the study area;
- Bulk disposal areas, including surficial “clinker” deposits and the historic Traprock Dump are present in the study area. The uncontrolled nature of these features makes them accessible to trespassers. Further, their proximal distance to surface water bodies, including the Trap Rock River and the Torch Lake Backwater are significant; and,

- Although, no industrial ruins or similar mining area containers, or building materials were identified, SACM (asphaltic roofing materials) and household waste were documented on the ground surface in the vicinity of the Traprock Dump.

12.1.2 Lake Linden Sands Area

The analytical results and interpretation summarized **Section 6** document potential risks that are present in the Lake Linden Sands Area. The findings of these investigative activities are summarized as follows:

- Soil analytical results did not exceed applicable regulatory criteria.
- Surface soil screening results did not exceed any applicable regulatory criteria.
- Groundwater analytical results exceeded Groundwater Surface Water Interface Criteria (GSIC) for one SVOC constituent.
- Sediment analytical results exceeded ESLs, TECs, and PECs for inorganic contaminants and SVOCs.

The analytical results summarized above provide sufficient analytical data and lines of evidence to conclude that the study area is a facility as defined in Section 20101(1) (s) of the NREPA. The following table provides a summary of the affected environmental media, applicable regulatory criteria and potential receptors within the Lake Linden Sands Area.

Lake Linden Sands Area – Media, Criteria, Potential Receptor Summary															
Media	Soil			Groundwater			Air		Sediment	Surface Water		Building Materials, Asbestos, and Abandoned Containers			
Criteria / Potential Receptor	Drinking Water Protection	Groundwater Surface Water Interface	Direct Contact	Drinking Water Protection	Groundwater Surface Water Interface	Flammability and Explosivity	Volatilization	Particulate Inhalation	Ecological	Ecological	Human Health	Particulate Inhalation	Flammability and Explosivity	Environmental	Human Health
Residential Human					✓										
Nonresidential Human					✓										
Water Column Organism															
Benthic Organism															
COCs exceeding applicable regulatory criteria in one or more sample				Copper, Silver, Phenanthrene											

In addition to the evaluation of analytical results collected from the study area, the following provides a summary of findings derived from the assessment of the Lake Linden Sands Area with respect to the goals and objectives for the Project:

- Significant in-lake and terrestrial sources of contamination are not present in the study area; however, SVOCs were detected in one groundwater sample in excess of GSIC
- PCBs were identified in a Semi-Permeable Membrane Device (SPMD) sample;
- Sediment samples did not contain detections of Total PCBs;
- No in-lake or terrestrial uncharacterized waste deposits or physical hazards were identified in the study area;
- Bulk disposal areas, including the capped stamp sand deposits are present in the study area and their proximal distance to areas of unrestricted public access are significant. Evidence of reported disposal areas was not identified through inspection and investigation methods; and,
- No industrial ruins, suspect asbestos containing material (SACM), or similar mining area containers, building materials, or wastes were identified for future investigation in the study area.

12.1.3 Lake Linden Recreation Area

The analytical results and interpretation summarized **Section 7** document potential risks that are present in the Lake Linden Recreation Area. The findings of these investigative activities are summarized as follows:

- Soil analytical results exceeded GSIPC and DCC in one or both of the residential and nonresidential exposure scenarios for inorganic and SVOCs contaminants. In addition, a limited number of samples analyzed for cyanide and SVOCs exceeded GSIPC and SVOCs exceeded DCC for the residential exposure scenario.
- Surface soil screening results also included measured inorganic contaminant concentrations that exceeded DCC and PSIC in both residential and non-residential exposure scenarios.
- Groundwater analytical results exceeded Drinking Water Criteria (DWC) for both residential and nonresidential exposure scenarios and GSIC for ammonia and organic contaminants. In several samples, ammonia exceeded DWC for both residential and nonresidential exposure scenarios. Lastly, benzene exceeded DWC and GSIC in three sampling locations at the Marina.
- Sediment analytical results exceeded ESLs, TECs, and PECs for inorganic contaminants. In addition, analytical results for Total PCBs also exceeded TECs and PECs in both surficial and deep sampling locations.
- Surface water sample analytical results exceeded applicable regulatory criteria for inorganic contaminants.

The analytical results summarized above provide sufficient analytical data and lines of evidence to conclude that the study area is a facility as defined in Section 20101(1) (s) of the NREPA. The following table provides a summary of the affected environmental media, applicable regulatory criteria, and potential receptors within the Lake Linden Recreation Area.

Lake Linden Recreation Area – Media, Criteria, Potential Receptor Summary

Media	Soil			Groundwater			Air		Sediment	Surface Water		Building Materials, Asbestos, and Abandoned Containers			
Criteria / Potential Receptor	Drinking Water Protection	Groundwater Surface Water Interface	Direct Contact	Drinking Water Protection	Groundwater Surface Water Interface	Flammability and Explosivity	Volatilization	Particulate Inhalation	Ecological	Ecological	Human Health	Particulate Inhalation	Flammability and Explosivity	Environmental	Human Health
Residential Human		✓	✓	✓	✓			✓			✓				
Nonresidential Human		✓	✓	✓	✓			✓			✓				
Water Column Organism									✓	✓					
Benthic Organism									✓	✓					
COCs exceeding applicable regulatory criteria in one or more sample				Arsenic, Barium, Cadmium, Chromium, Copper, Cyanide, Lead, Mercury, Nickel, Silver, Zinc, Total PCBs, Benzo(a)pyrene, Fluoranthene, Phenanthrene, Benzene, Ammonia, Bis(2-EthylHexyl)Phthalate, Pyrene, Antimony, Vanadium										

In addition to the evaluation of analytical results collected from the study area, the following provides a summary of findings derived from the assessment of the Lake Linden Recreation Area with respect to the goals and objectives for the Project:

- Significant in-lake and terrestrial sources of contamination are present in the form of inorganic, cyanide, and organic COCs in the study area. Concentrations of Total PCBs exceeding regulatory criteria were identified in 15 sediment samples indicating a significant in-lake source of PCB contamination in the study area;
- PCBs were identified in an SPMD sample;
- A suspected in-lake PCB-containing waste deposit was identified in sediment in the vicinity of the Lake Linden Village Park and the Lake Linden Beach. Terrestrial investigation in the vicinity of the suspected waste deposit did not indicate that PCBs were present landward of the shoreline;
- Bulk disposal areas, including capped stamp sand deposits, are present in the study area and their proximal distance to areas of unrestricted public access are significant; and,
- Industrial ruins, including foundations and building floors are present at the ground surface have been incorporated into facilities at the Lake Linden Village Park. The ruins were investigated as part of the SI and SACM and similar mining area containers, building materials, or wastes were not identified in the area.

12.1.4 Lake Linden Processing Area

The analytical results and interpretation summarized **Section 8** document potential risks that are present in the Lake Linden Processing Area. The findings of these investigative activities are summarized as follows:

- Analytical results for various building materials indicate asbestos containing material (ACM) are present in the study area. These materials are distributed across the Calumet Stamp Mill and the uncapped portion of the C&H Power Plant properties, and are subject to migration via wind and water erosion. Asbestos concentrations in seven bulk material samples contained asbestos fibers at concentrations greater than 1 percent (%). The damaged and friable nature of these materials poses a potential risk to human health as it relates to the inhalation pathway.
- Surface soil analytical results from samples collected adjacent to dilapidated drums/drum carcasses at the C&H Power Plant property contained inorganic contaminants that exceeded DCC in both of the residential and nonresidential exposure scenarios, and GISPC for cyanide.
- Soil analytical results exceeded DCC in both of the residential and nonresidential exposure scenarios for inorganic contaminants. In addition, one sample analyzed for SVOCs exceeded GSIPC and one sample analyzed for asbestos exceeded applicable criteria.
- Surface soil screening results also included measured inorganic contaminant concentrations that exceeded DCC and PSIC in both residential and non-residential exposure scenarios.
- Sediment analytical results exceeded ESLs, TECs, and PECs for inorganic contaminants and SVOCs. One analytical result for cyanide exceeded ESLs.

The analytical results summarized above provide sufficient analytical data and lines of evidence to conclude that the study area is a facility as defined in Section 20101(1) (s) of the NREPA. The following table provides a summary of the affected environmental media, applicable regulatory criteria, and potential receptors within the Lake Linden Processing Area.

Lake Linden Processing Area – Media, Criteria, Potential Receptor Summary

Media	Soil			Groundwater			Air		Sediment	Surface Water		Building Materials, Asbestos, and Abandoned Containers			
Criteria / Potential Receptor	Drinking Water Protection	Groundwater Surface Water Interface	Direct Contact	Drinking Water Protection	Groundwater Surface Water Interface	Flammability and Explosivity	Volatilization	Particulate Inhalation	Ecological	Ecological	Human Health	Particulate Inhalation	Flammability and Explosivity	Environmental	Human Health
Residential Human		✓	✓					✓							
Nonresidential Human		✓	✓					✓							
Water Column Organism									✓						
Benthic Organism									✓						
COCs exceeding applicable regulatory criteria in one or more sample	Arsenic, Cadmium, Chromium, Copper, Cyanide, Lead, Mercury, Nickel, Silver, Zinc, Asbestos, Phenanthrene														

In addition to the evaluation of analytical results collected from the study area, the following provides a summary of findings derived from the assessment of the Lake Linden Processing Area with respect to the goals and objectives for the Project:

- Significant in-lake and terrestrial sources of contamination are present in the form of inorganic, SVOCs, and cyanide COCs, and asbestos in the study area. PCBs were not detected in soil, groundwater, or sediment samples in the study area. Total PCBs exceeding applicable regulatory criteria were previously identified in the sludges and groundwater of the C&H Power Plant basement, prior to U.S. Environmental Protection Agency (EPA) and their Responsible Party (RP) undertaking remedial activities;
- No in-lake or terrestrial uncharacterized waste deposits were identified in the study area. Underwater surveillance along the shoreline documented steel, concrete, and similar rubble along the shoreline, but abandoned containers and obvious waste deposits were not visually identified;
- Bulk disposal areas, including capped mining era and asbestos containing wastes on the C&H Power Plant property, are known to be present in the study area. Benzene was detected in groundwater at concentrations exceeding applicable regulatory criteria on the adjacent Marina property that is downgradient of the Lake Linden Processing Area, suggesting that a potential source of contamination may be present in the vicinity of the sample location; and,

- Industrial ruins, including foundations and building floors associated with the Calumet Stamp Mill and reclamation complex are present at the ground surface have been incorporated into facilities at the Houghton County Historical Museum. ACM and mining area containers were identified during site reconnaissance and targeted inspection activities.

12.1.5 Hubbell Processing Area

The analytical results and interpretation summarized **Section 9** document potential risks that are present in the Hubbell Processing Area. The findings of these investigative activities are summarized as follows:

- Asbestos analytical results for various building materials including, but not limited to asphaltic roofing material, transite, and cable wrap indicted ACM are present in the study area. These materials are widely distributed across the study area and are subject to migration via wind and water erosion. Asbestos concentrations in 11 bulk material samples contained asbestos fibers at concentrations greater than 1 %. The damaged and friable nature of these materials poses a potential risk to human health as it relates to the inhalation pathway.

- Two dilapidated drums were sampled in the study area and contained inorganic contaminants that exceeded GSIPC and PSIC and DCC in both of the residential and nonresidential exposure scenarios. In addition, TCLP analytical results indicated that the sampled drum contents are characteristically hazardous for lead.

- Contents of partially buried abandoned drums protruding from the EPA cap near the Torch Lake shoreline adjacent to the smelter property contained concentrations of inorganic COCs, cyanide, and SVOCs that exceeded GSIPC, and PSIC and DCC in both of the residential and nonresidential exposure scenarios. One of the samples contained Total PCBs in excess of DCC for the residential and non-residential exposure pathways.

- Residual process materials that were sampled in the study area contained concentrations of Total PCBs that exceeded VSIC and DCC for both residential and nonresidential exposure scenarios.

- Sampled waste piles in the study area contained concentrations of inorganic contaminants that exceeded GSIPC and DCC for both residential and nonresidential exposure scenarios. Analytical results from two of the waste piles contained Total PCB concentrations that exceeded DCC for both residential and nonresidential exposure scenarios. One waste pile, contained cyanide at a concentration that exceeded GSIPC. Lastly, one waste pile also contained SVOCs that exceeded GSIPC and VOCs that exceeded DWPC for both residential and nonresidential exposure scenarios and GSIPC.

- Soil analytical results exceeded PSIC and DCC in both of the residential and nonresidential exposure scenarios for inorganic contaminants. In addition, a limited number of samples analyzed for cyanide and SVOCs exceeded GSIPC. Lastly, Total PCB concentrations in 16 samples collected from the study area exceed DCC for both residential and nonresidential exposure scenarios.

- Surface soil screening results screening results included measured inorganic contaminant concentrations that exceeded DCC and PSIC in both residential and non-residential exposure scenarios.

- Groundwater analytical results for one groundwater sample exceeded DWC for both residential and nonresidential exposure scenarios and GSIC for Total PCBs.

- Sediment analytical results exceeded ESLs, TECs, and PECs for inorganic contaminants, SVOCs, and Total PCBs. Concentrations of cyanide exceeded ESLs in one sample.

- Surface water analytical results exceeded ESLs for one SVOC constituent. Surface water analytical results exceeded the ESL and the Surface Water Rule 57 values for Total PCBs and inorganics in a sample collected near a partially submerged drum at the shoreline adjacent to the smelter property.

The analytical results summarized above provide sufficient analytical data and lines of evidence to conclude that the study area is a facility as defined in Section 20101(1) (s) of the NREPA. The following table provides a summary of the affected environmental media, applicable regulatory criteria, and potential receptors within the Hubbell Processing Area.

Hubbell Processing Area – Media, Criteria, Potential Receptor Summary

Media	Soil			Groundwater			Air		Sediment	Surface Water		Building Materials, Asbestos, and Abandoned Containers			
Criteria / Potential Receptor	Drinking Water Protection	Groundwater Surface Water Interface	Direct Contact	Drinking Water Protection	Groundwater Surface Water Interface	Flammability and Explosivity	Volatilization	Particulate Inhalation	Ecological	Ecological	Human Health	Particulate Inhalation	Flammability and Explosivity	Environmental	Human Health
Residential Human	✓	✓	✓	✓	✓		✓	✓			✓	✓		✓	✓
Nonresidential Human	✓	✓	✓	✓	✓		✓	✓			✓	✓		✓	✓
Water Column Organism									✓	✓					
Benthic Organism									✓	✓					
COCs exceeding applicable regulatory criteria in one or more sample				Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Cyanide, Iron, Lead, Mercury, Nickel, Silver, Zinc, Bis(2-EthylHexyl)Phthalate, Benzene, 1,2,4 Trimethylbenzene, Naphthalene, Total Xylenes, Fluoranthene, Hexachlorobenzene, Phenanthrene, Total PCBs, Asbestos, Benzo(a)pyrene, 2-Methylnaphthalene, Acenaphthene, Acenaphthylene, Benzo(a)anthracene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluorene, Pyrene, Indeno(1,2,3-cd)pyrene											

In addition to the evaluation of analytical results collected from the study area, the following provides a summary of findings derived from the assessment of the Hubbell Processing Area with respect to the goals and objectives for the Project:

- Significant in-lake and terrestrial sources of contamination are present in the form of inorganic COCs, cyanide, VOCs, SVOCs, PCBs, and asbestos in the study area. Reconnaissance documented that the majority of the terrestrial portions of the study area are covered by acres of uncontrolled deposits of coal, PCB-laden debris, and charred residual process materials. Further, debris and waste piles, apparently placed in the study area after mining era operations ceased contain multiple COCs that exceed applicable regulatory criteria. Offshore sampling in the vicinity of drums and waste deposits confirmed that multiple COCs are present in the surficial sediments in the nearshore environment of the study area;
- In-lake and terrestrial uncharacterized waste deposits were identified in the study area. Multiple abandoned drums in various stages of degradation are present in the study area, the contents some of which have been determined to be characteristically hazardous and/or PCB-containing. Debris and waste piles located in the study area are laden with COCs that exceed applicable regulatory criteria. Further, these waste deposits are subject to erosion and migration to Torch Lake via eroded channels on the ground surface that discharge through voids and openings in the former coal dock bulkhead. Offshore sediment sampling confirmed that COCs are present in sediment adjacent to the former smelter and coal dock operations;

- Bulk disposal areas, including the charred PCB-laden remnants of copper recovery operations cover acres of the ground surface in the study area. Similarly, the ground surface in the northern portion of the study area is covered with coal and numerous coal piles are interspersed throughout the property. Waste and debris piles containing COCs above regulatory criteria were also observed. Offshore side-scan sonar and underwater video surveillance confirmed that large deposits of drums, circuit board waste, and other materials are present in the nearshore sediment; and,

- Industrial ruins, including buildings, foundations, and building floors associated with the smelter, mineral building, and coal dock complex are present at the ground surface. In addition, a stack related to the former smelter operations was razed and the associated debris and structural components left in-place on the ground surface. The deteriorated conditions of the buildings on the property have resulted in the widespread distribution of roofing materials across the study area. The unsecured buildings and foundations also feature physical hazards, including voids and pits ranging from 6 ft to 20 ft deep. Mining era ACM, containers, and building materials were all observed in the study area.

12.1.6 Hubbell Slag Dump and Beach Area

The analytical results and interpretation summarized **Section 10** document potential human health and ecological risks that are present in the Hubbell Slag Dump and Beach Area. The findings of these investigative activities are summarized as follows:

- Soil analytical results exceeded PSIC and DCC in both residential and nonresidential exposure scenarios for inorganic contaminants, and cyanide for GSIPC.

- Surface soil screening results did not contain exceedances of applicable regulatory criteria for inorganic COCs.

- Groundwater analytical results for samples collected from the Hubbell Slag Dump and Beach Area did not contain exceedances of applicable regulatory criteria for any COCs.

- Sediment analytical results exceeded ESLs, TECs, and PECs for inorganic contaminants and Total PCBs.

The analytical results summarized above provide sufficient analytical data and lines of evidence to conclude that the study area is a facility as defined in Section 20101(1) (s) of the NREPA. The following table provides a summary of the affected environmental media, applicable regulatory criteria, and potential receptors within the Hubbell Slag Dump and Beach Area.

Hubbell Slag Dump and Beach Area – Media, Criteria, Potential Receptor Summary

Media	Soil			Groundwater			Air		Sediment	Surface Water		Building Materials, Asbestos, and Abandoned Containers			
Criteria / Potential Receptor	Drinking Water Protection	Groundwater Surface Water Interface	Direct Contact	Drinking Water Protection	Groundwater Surface Water Interface	Flammability and Explosivity	Volatilization	Particulate Inhalation	Ecological	Ecological	Human Health	Particulate Inhalation	Flammability and Explosivity	Environmental	Human Health
Residential Human		✓	✓					✓							
Nonresidential Human		✓	✓					✓							
Water Column Organism									✓						
Benthic Organism									✓						
COCs exceeding applicable regulatory criteria in one or more sample	Aluminum, Arsenic, Cadmium, Chromium, Copper, Cyanide, Iron, Lead, Manganese, Mercury, Nickel, Silver, Zinc, Total PCBs														

In addition to the evaluation of analytical results collected from the study area, the following provides a summary of findings derived from the assessment of the Hubbell Slag Dump and Beach Area with respect to the goals and objectives for the Project:

- Significant in-lake and terrestrial sources of contamination are present in the form of inorganic COCs, cyanide, and Total PCBs in the study area. In addition, physical hazards, including metal debris and ceramic-like shards were in the shallow surface water in the vicinity of the Hubbell Beach;
- PCBs were identified in an SPMD sample;
- No in-lake or terrestrial uncharacterized waste deposits were identified in the study area;
- Bulk disposal areas, including the capped slag dumps and a reported historic landfill are present in the study area and their proximal distance to areas of unrestricted public access are significant; and,
- No industrial ruins or similar mining area containers, building materials, or wastes were identified for future investigation in the area.

12.1.7 Torch Lake

The analytical results and interpretation summarized **Section 11** document the potential human health and ecological risks that are present in the CHLL and Torch Lake. The findings of these

investigative activities, specifically as it relates to concentrations of contaminants in sediment and surface water are summarized as follows:

Sediment

- Inorganic COCs – Inorganic COCs were detected at or in excess of applicable regulatory criteria in the following study areas:
  - Torch Lake Backwater Area;
  - Lake Linden Sands Area;
  - Lake Linden Recreation Area;
  - Lake Linden Processing Area;
  - Hubbell Processing Area; and,
  - Hubbell Slag Dump and Beach Area.
- VOCs – VOCs were not detected in sediment samples collected as part of the SI.
- SVOCs – SVOCs were detected in sediment at or in excess of applicable regulatory criteria in the following study areas:
  - Torch Lake Backwater Area;
  - Lake Linden Sands Area; and,
  - Hubbell Processing Area.
- Total PCBs – Total PCBs were detected in sediment at or above applicable regulatory criteria in the following study areas:
  - Lake Linden Recreation Area;
  - Hubbell Processing Area; and,
  - Hubbell Slag Dump and Beach Area.

Surface Water

- Inorganic COCs – Inorganic COCs were detected at or in excess of applicable regulatory criteria in the following study areas:
  - Torch Lake Backwater Area;
  - Lake Linden Sands Area;
  - Lake Linden Recreation Area; and,
  - Hubbell Processing Area.
- VOCs– VOCs did not exceed applicable regulatory criteria in any surface water samples.
- SVOCs– SVOCs were detected in surface water at or in excess of applicable regulatory criteria in the following study areas:
  - Lake Linden Recreation Area; and,
  - Hubbell Processing Area.

- Total PCBs – Total PCBs were detected in surface water at or above applicable regulatory criteria in the following study areas:
  - Hubbell Processing Area.

Sediment samples collected from Torch Lake outside of the conceptual boundaries of the CHLL Operations Area did not contain detections of PCBs. Sediment samples collected from the CHLL contained multiple detections of Total PCBs that exceeded applicable regulatory criteria. Moreover, interpretation of these results clearly demonstrates that there are two distinct groupings of elevated Total PCB concentrations in sediment: The first located offshore in the Lake Linden Recreation Area and the second located offshore in the Hubbell Processing Area.

A limited number of surface water samples were collected from Torch Lake and only one of the samples contained Total PCB concentrations at or above applicable regulatory criteria in the Hubbell Processing Area. Analytical results from the SPMD samples confirmed the presence of PCBs in surface waters of Torch Lake. The SPMDs are specialized sampling devices that are designed to simulate the mechanism of how fish in the lake uptake the PCBs. They are submerged in the lake for a specific amount of time and the PCBs are selectively absorbed into the sampling device. The results obtained from an SPMD are often much higher than the actual concentrations found in a water sample. These results are for a relative comparison between in-lake locations and should not be considered to be the concentrations of PCBs in the lake water itself. Analytical results from the SPMD samples confirmed the presence of PCBs in surface waters of Torch Lake. The SPMD sampling results were inconclusive in identifying a specific PCB source within Torch Lake, but noted that the concentrations of PCBs measured in the SPMD samples were consistent with historical analytical results. In addition, the SPMD sample results demonstrated that concentrations of PCB congeners in Torch Lake were significantly higher than the results collected from the connecting waters to Lake Superior.

The SPMD analytical results were later corroborated in fish tissue studies completed by the MDEQ. The study and on-going monitoring documented that PCB concentrations in fish collected from Torch Lake were consistently higher than in fish found in nearby surface water bodies. Torch Lake was known to contain elevated levels of PCBs, but it was unclear whether the cause of elevated PCB concentrations in fish was caused by sources within Torch Lake. MDEQ studies and

the SI congener analysis have concluded that higher Total PCB concentrations and different congener compositions present in multimedia samples and fish tissue collected from CHLL terrestrial areas and Torch Lake indicating that there was/is a source of PCBs in the Torch Lake watershed.

The investigative results from the SI have identified two offshore sources of PCBs. These source areas, as confirmed by the results of the historical SPMD and fish tissue studies, may be ongoing sources of PCBs that pose both ecological and potential human health risks and continued degradation of the benthos in Torch Lake.

12.2 RECOMMENDATIONS

The conclusions outlined in the preceding subsection establish that the study areas in the CHLL Operations Area are Facilities. The following subsections outline recommended path forward for managing the identified potential exposure risks in the CHLL and Torch Lake.

12.2.1 CHLL

Section 20107a of Part 201 of NREPA describes the duties of owners or operators of a Facility, regardless of their liability, including: prevent unacceptable exposures, prevent exacerbation, and take reasonable precautions against the foreseeable actions of third parties. Some exceptions may apply; in any case, owners and operators of contaminated properties should become familiar with Section 20107a and the associated Rules.

Various actions have been taken through the implementation of remedial measures, such as the placement of a soil and vegetative caps on bulk waste deposits, to address a portion of the environmental issues. The performance of a risk assessment on select properties or groups of properties, based on current and anticipated future land-use will help identify remedial goals for properties where potential human health and ecological hazards have been identified. Assessment based on current and future land-use contributes to the beneficial and safe re-use and potential redevelopment of any given property by clarifying applicability of regulatory statutes, as traditional property zoning (residential versus nonresidential) is generally undefined in the study area.

MDEQ should continue to provide new study data to the RRD Superfund Section (SFS), which is responsible for monitoring EPA's remedy for the terrestrial and lake portion of the Torch Lake Superfund Site. RRD SFS should evaluate whether any remedy modifications are necessary. The EPA and RRD SFS should verify that administrative controls for areas that have been previously remediated by the EPA have been employed to ensure that the selected remedy is performing as designed and those institutional controls, where required, have been recorded and are being enforced.

Additionally, MDEQ should continue to provide pertinent data to the Michigan Department of Health and Human Services (MDHHS) where evaluation of specific potential public health risks is warranted.

Once property-specific exposure risks have been evaluated, remedial objectives can be established with appropriate land use restrictions that minimize or eliminate potential exposure risks. These land-use restrictions, or administrative controls, should be employed to ensure that exposures are reliably restricted by a restrictive covenant, institutional control, or other mechanism allowed for under Part 201.

By copy of this report, the Project findings were provided to RRD SFS which is responsible for monitoring EPA's remedy for the Torch Lake Superfund Site. RRD SFS should evaluate whether any remedy modifications are necessary in Torch Lake or terrestrial areas previously addressed by EPA in light of the additional information provided by the Project. The EPA and RRD SFS should verify that administrative controls for areas that have been previously remediated by the EPA have been employed to ensure that the selected remedy is performing as designed and those institutional controls, where required, have been recorded and are being enforced.

In addition to the overarching recommendations presented above, the following provides additional considerations specific to individual study areas:

- **Lake Linden Recreation Area -** Benzene detected in groundwater above applicable regulatory criteria should be further delineated to assess the potential for an unknown hydrocarbon source in the vicinity of the temporary groundwater sampling locations. Additional SI activities, including soil and groundwater sampling should be conducted peripheral to the current sampling locations. Analytical results derived from the Lake Linden Recreation Area should also continue to be provided to the property owner and the

MDHHS for further evaluation to supplement the *Public Health Assessment, Evaluation of Recreational Uses at Beach Areas at Lake Linden and Along Torch Lake, Houghton County, Michigan* (MDCH, September 2014).

- **Lake Linden Processing Area -** Although EPA and RP actions have been taken through the implementation of remedial measures, such as the placement of a partial soil and vegetative cap and recording of institutional controls on the C&H Power Plant property, the remedy does not address the presence of ACM, abandoned containers, and surface soils present outside of the capped area. In addition, uncontrolled ACM and surface soils are present at the Calumet Stamp Mill property. The identified contaminants and their uncontrolled nature merit immediate response actions to control and prevent continued migration of contaminants from the terrestrial portions of the study area. Once these uncontrolled conditions have been stabilized and exposure risks have been evaluated, long-term remedial objectives can be evaluated. To ensure compliance with regulatory statutes, human health and ecological risks should minimally be qualitatively evaluated with property-specific data to determine if risks to the public health, safety, or welfare or to the environment are likely within the study area.

- **Hubbell Processing Area –** "No Action" determinations made by the EPA were based on observations and analytical results that did not include PCB analyses of surface soils and sediment. The analytical results from the SI indicate that COCs, and specifically PCBs, in waste piles, residual process materials, and surface soils located on the Mineral Building and Coal Dock properties may be subject to erosion via wind and stormwater that discharges directly to Torch Lake. Further, the analytical results from the SI conclude that the Hubbell Processing Area provides for an upland source of PCBs to Torch Lake through airborne, groundwater, surface water, and soil erosion pathways. Furthermore, partially buried abandoned drums are protruding from the EPA-installed cap near the Torch Lake shoreline adjacent to the smelter property containing multiple COCs in excess of applicable criteria. Asbestos containing building materials are also present on the Mineral Building and Coal Dock properties.

  The identified contaminants and their uncontrolled nature merit immediate response actions to control and prevent continued migration of contaminants from the terrestrial portions of the study area. Once these uncontrolled conditions have been stabilized and exposure risks have been evaluated, long-term remedial objectives can be evaluated. To ensure compliance with regulatory statutes, human health and ecological risks should minimally be qualitatively evaluated with property-specific data to determine if risks to the public health, safety, or welfare or to the environment are likely within the study area.

- **Hubbell Slag Dump and Beach Area –**Analytical results and observations of potential physical hazards derived from the Hubbell Slag Dump and Beach Area should continue to be provided to the property owner and too the MDHHS for further evaluation to supplement the *Public Health Assessment, Evaluation of Recreational Uses at Beach Areas at Lake Linden and Along Torch Lake, Houghton County, Michigan* (MDCH, September 2014).

12.2.2 Torch Lake

Identified terrestrial and in-lake contamination in the CHLL and Torch Lake may require that additional steps be taken to remove, reduce or treat the contamination to concentrations that are below applicable cleanup standards. Of these contaminants, PCBs present a unique hazard due to their chemical properties that allow the chemical to migrate and bioaccumulate, such as in fish tissue where concentrations of the contaminant can exceed measured concentrations in environmental samples. Although measures such as beneficial use impairments (BUIs), including "Restrictions on fish and wildlife consumption" and "Degradation of benthos" are in place, risks to human health are significant due to the presence of PCBs in the food chain in terrestrial areas, and on-going potential for upland sources of PCBs to enter Torch Lake.

These factors make addressing PCBs contamination a priority. For the Coal Dock and Mineral Building Properties in the Hubbell Processing Area where potential upland sources of PCBs not previously addressed by EPA are present, it is recommended that remedial alternatives to mitigate concerns related to human health and/or the environment be evaluated and implemented.

MDEQ should continue to provide new study data to the RRD SFS, which is responsible for monitoring EPA's remedy for the terrestrial and lake portion of the Torch Lake Superfund Site so they can determine if any remedy modifications are necessary in light of the additional information provided by the Project. The EPA and RRD SFS should verify that administrative controls for areas that have been previously remediated by the EPA have been employed to ensure that EPA's selected remedy is performing as designed and those institutional controls, where required, have been recorded and are being enforced.

Additionally, MDEQ will continue to provide pertinent data to MDHHS where evaluation of specific potential public health risks is warranted.

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TABLES

TABLE 3-1
Summary of Historical Operations - C&H Lake Linden Operations Geographic Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Historical Building	Study Area	Mining Era Operation	Potential Contaminant Sources	Operational Practices
Houghton County Electric Light & Power (Substation #9)	Torch Lake Backwater Area	The Houghton County Electric Light & Power building was built between 1890 and 1902 when the land was owned by the Peninsula Electric Light & Power Co. which then became the Houghton County Electric Light Co. It was then sold to the Upper Peninsula Power Co. in 1947 and again to the Village of Lake Linden in 1969 when the building was probably no longer used as a sub-station.	Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. Potential ACM used for insulation of equipment and fire retardant.	Research indicates that substation may have provided power for local trolley service, which reportedly continued in Lake Linden until 1932.
C&H Flotation Plant	Lake Linden Processing Area	The Flotation Plant was constructed to treat slimes from stamp sand reclamation operations. The floatation process utilized sodium xanthate, pine oil, and air agitation to recover copper from reclaimed stamp sands. The copper-bearing froth was skimmed and collected for further processing. The sludges/gangue remaining in the tank, having no monetary value, were discharged to the tailings piles in Torch Lake The floatation plant closed in 1953 when the Lake Linden reclamation plant had exhausted all useable tailings.	Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. Storage and disposal practices for xanthate, pine oil and other chemicals. Potential for the use of oils and lubricants for maintenance of equipment.	Chemical storage and disposal practices are not well understood. The sludges/gangue were discharged to the tailings piles in Torch Lake

TABLE 3-1
Summary of Historical Operations - C&H Lake Linden Operations Geographic Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Historical Building	Study Area	Mining Era Operation	Potential Contaminant Sources	Operational Practices
C&H Leaching Plant	Lake Linden Recreation Area	The Leaching Plant construction was started in 1914 and completed in 1915. Leaching operations began the following summer in 1916. The leaching solution is a complex chemical compound which first dissolved the copper from the sand and later is distilled in the still house and the copper precipitated as black copper oxide. In the distillation the volatile ammonium carbonate is condensed and goes back to the leaching plant solutions to dissolve more copper.	Potential for the use of oils and lubricants for maintenance of equipment. Storage and disposal practices for leaching solutions, ammonium carbonate, and other chemicals. The final disposition of scrap (post leaching) and any contents of scrapped items is unknown.	Housed sixteen, 54 foot diameter, 12 ft high leach tanks (up to approximately 205,000 gallons per tank). Six leach tanks were used for treatment of brass clad steel scrap. Leaching process took approximately 72 hours Chemical storage and disposal practices are not well understood.
Calumet Stamp Mill	Lake Linden Processing Area	The mill was constructed in the 1870s. In 1905 the entire interior of the mill was remodeled and updated. In 1919 tanks for settling slimes were added to prepare for the reprocessing of tailings. Operations at the Calumet mill ceased in 1944.	Potential for the use of oils and lubricants for maintenance of equipment. Potential for subsurface conduits and utility corridors creating preferential pathways to Torch Lake Metals-laden stamp sand discharged to Torch Lake Stamp sand waste stream was commingled with waste streams generated by other facilities including the power plant and reclamation facilities	Original stamp sand deposit was reclaimed and consolidated with Hecla Mill stamp sands at the Lake Linden Sands.

TABLE 3-1
Summary of Historical Operations - C&H Lake Linden Operations Geographic Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Historical Building	Study Area	Mining Era Operation	Potential Contaminant Sources	Operational Practices
Hecla Stamp Mill	Lake Linden Processing Area	The mill was constructed in the 1860s. An addition to the mill was completed in 1893. Another addition was completed in 1902. This addition was powered with electricity and the equipment was contracted through General Electric. In 1919 the mill was equipped with tanks for settling slimes in preparation for the reprocessing of tailings. The Hecla Mill closed in 1921 and was dismantled in 1924, with remaining equipment and structures dismantled in 1940.	Potential for the use of oils and lubricants for maintenance of equipment. Potential for subsurface conduits and utility corridors creating preferential pathways to Torch Lake Metals-laden stamp sand discharged to Torch Lake Stamp sand waste stream was commingled with waste streams generated by other facilities including the power plant and reclamation facilities	Original stamp sand deposit was reclaimed and consolidated with Calumet Mill stamp sands at the Lake Linden Sands.
Still House	Lake Linden Processing Area	There were four still units in the still house each unit consisting of one 13 section still with its preheater, reflux column, and condenser. The steam enters the bottom section and rises against and through the descending copper bearing solution. With volatile elements eliminated, the barren solution, carrying the copper oxide in suspension, flows from the bottom outlet to settling tanks and filters.	Oxide bakes out in the distilling process, coating the interior of the stills. Units were cleaned out on a 48 hour basis, reportedly requiring the use of a jack hammer. Undocumented disposal of oxide build up, but likely added to the stamp sand waste stream. Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. Potential ACM used for insulation of equipment and fire retardant.	The still house housed a turbo generator and was tied into the power plant operations using transformers on the interior of the power plant.

TABLE 3-1
Summary of Historical Operations - C&H Lake Linden Operations Geographic Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Historical Building	Study Area	Mining Era Operation	Potential Contaminant Sources	Operational Practices
C&H Power Plant	Lake Linden Processing Area	In 1902 a new steel electric power house was erected and it went into commission in 1903. The Power Plant could generate 2,000 KW in 1907. In 1917 the building was fireproofed. A new 2000 KW low pressure unit that utilized excess steam from the stamp mills was installed and operational by 1920. In 1929 obsolete electrical equipment was reportedly scrapped. The power plant closed with the company in 1968 and the building was razed in 2013.	Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. ACM used for insulation of equipment and fire retardant building materials. Potential for subsurface conduits and utility corridors creating preferential pathways to Torch Lake Documented coal and asbestos storage	Use and discharge of cooling water, condensate, and possible treatment chemicals are not well understood. Fly-ash reportedly transferred to smelter operations for copper recovery and fertilizer production
C&H Boiler House	Lake Linden Processing Area	The boiler house was built in 1896 to help power the C&H stamp mills located in Lake Linden. The boilers at the Water Works were moved to this new facility in 1897 and 4 more boilers were added in 1900. This facility quickly became obsolete and a new one was built in 1907 and completed in 1908 where it remained, situated next to the Power House. In 1920 the boiler house had massive renovations. A concrete foundation was added and the side walls were coated with concrete to prevent fire. In 1929 an addition of steel and glass was added to the main furnace building. This building closed with the company in 1968.	Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. ACM used for insulation of equipment and fire retardant building materials. Potential for subsurface conduits and utility corridors creating preferential pathways to Torch Lake Particulate distribution from coal combustion resulting in potential distribution of mercury and other impurities. Boiler “clinkers” and similar waste streams likely added to the stamp sand waste stream and discharged to Torch Lake	Disposal practices for coal ash is not well understood. Fly-ash reportedly transferred to smelter operations for copper recovery and fertilizer production Bottom-ash disposal practices are not well-understood, but were likely added to the stamp sand waste stream and discharged to Torch Lake

TABLE 3-1
Summary of Historical Operations - C&H Lake Linden Operations Geographic Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Historical Building	Study Area	Mining Era Operation	Potential Contaminant Sources	Operational Practices
C&H Mineral House	Hubbell Processing Area	The mineral house began construction in 1927 and was completed in 1929. It had a reinforced concrete foundation and compartment walls for mineral storage for the smelter, including 10 main compartments for 15,000 tons of material and a 7.5 ton overhead electric crane carrying a clam shell bucket for handling the mineral. The mineral house closed in 1968 with the company and is still standing.	Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. Potential for PCB-containing wastes, including wire/cable wrap. Byproducts of copper recovery, achieved through removal and burning of encasements and outer sheathings.	10 material bins located along the south side of the building. Nine “concentrate” bins located along the north side of the building. One bin on north side used for granulated refining slag storage. It is unclear what operations were conducted at the mineral house following the closure of the stamp mills and the closure of the company in 1968
C&H Oil House	Hubbell Processing Area	An Oil house was typically a separate structure (for safety reasons) used for centralized storage and disposal of oil and lubricating structure.	Potential storage and handling of PCB-containing oils and lubricants for maintenance of equipment. Potential storage and handling of other oils and lubricants for maintenance of equipment.	Chemical storage and disposal practices are not well understood.
C&H Coal Pulverization Plant	Hubbell Processing Area	This building pulverized the coal delivered to the C&H coal dock for use in the smelter and the Power House in Lake Linden. There is expected to be pollution in the area related to coal waste.	Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. Potential ACM used for insulation of equipment and fire retardant. Particulate distribution of coal dust resulting in potential distribution of mercury and other coal-related byproducts	Possibly housed a transformer pad on the southeast exterior of the building.

TABLE 3-1
Summary of Historical Operations - C&H Lake Linden Operations Geographic Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Historical Building	Study Area	Mining Era Operation	Potential Contaminant Sources	Operational Practices
C&H Smelting & Refining Plant	Hubbell Processing Area	The Smelting and Refining Plant was constructed in 1887 and in 1893 it covered about 30 acres, was connected to the mills by short railway, 4 stone furnace buildings – 80 x 130 ft, and had a water source from an artesian well. In 1924 the smelter was the central plant that pulverized the coal used as fuel, about 12 tons of coal per hour. In 1930 the smelter main furnace building was extended 45 ft north. In 1944 the smelter had a process for removing arsenic from soda slag by leaching the later with soda solution. Two major furnaces were rebuilt in 1957 and another two in 1965, but the smelter closed in 1968 with the company.	Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. Particulate distribution from coal combustion resulting in potential distribution of mercury and other impurities. ACM used for insulation of equipment and fire retardant building materials. Potential for subsurface conduits, flues, and utility corridors creating preferential pathways to Torch Lake. Sewage discharged to Torch Lake.	1-10 foot diameter and 1-13 foot diameter smoke stack, each 200 feet tall. Chemical storage and disposal practices are not well understood. Housed turbo generators and transformers in the southwest corner of the building. “Slag pumps”, “scrap tracks”, and slag tracks located within the plant. Slag and scrap tracks merge and appear to exit the plant to the southwest on rail “slag to dump”
C&H Smelter Electric Shop	Hubbell Processing Area	To date there is no available information on the Electric Shop at the Smelter, other than its appearance on Sanborn maps.	Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. Potential ACM used for insulation of equipment and fire retardant.	Research indicates that substation may have provided power for local trolley service, which reportedly continued in Lake Linden until 1932.
C&H Smelter Power Plant	Hubbell Processing Area	This building was actually a portion of the larger smelter building, which housed the electrical transformers and turbo generators to power the smelter facilities.	Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. Particulate distribution of mercury and other coal burning byproducts Potential for subsurface conduits and utility corridors creating preferential pathways to Torch Lake Documented coal and asbestos storage	Use and discharge of cooling water, condensate, and possible treatment chemicals are not well understood. Bottom-ash/Fly-ash reportedly transferred to smelter operations for copper recovery and fertilizer production

TABLE 3-1
Summary of Historical Operations - C&H Lake Linden Operations Geographic Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Historical Building	Study Area	Mining Era Operation	Potential Contaminant Sources	Operational Practices
C&H Electrolytic Plant	Hubbell Processing Area	The Electrolytic Plant foundation was completed in 1912 and was 155 x 270 ft. The facility closed in 1922 and did not re-open. The Electrolytic Plant purified copper through dissolving the unprocessed copper on electrodes and electroplating it. This only lasted a few years in the Keweenaw as the process did not work well on native copper.	Potential for the use of PCB-containing oils and lubricants for maintenance of equipment. Anode slimes or the solid impurities in the anodes that collected in the bottom of a cell as sludge The storage and handling practices related to electrolytic solutions including sulfuric acid and copper sulfate are unknown	Copper anodes are loaded into electrolytic cells and interspaced with copper cathodes, in a bath of copper sulfate solution. When a direct current is passed through the cell the copper is dissolved from the anode, and re-deposited on the cathode starting sheets. When the cathodes have built-up to sufficient thickness they are removed from the electrolytic cell and a new set of starting sheets is put in their place.
C&H Acid Treating Plant	Hubbell Processing Area	This building is believed to have been associated with the Electrolytic Plant and operations would have ceased in 1922.	Metal refineries using sulfide concentrates have sulfuric acid plants that convert sulfur dioxide and trioxide to sulfuric acid. Waste streams can be high in acid content and suspended solids.	Chemical storage and disposal practices are not well understood. Process may have used “blow down” methods to minimize build-up of impurities

TABLE 3-1
Summary of Historical Operations - C&H Lake Linden Operations Geographic Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Historical Building	Study Area	Mining Era Operation	Potential Contaminant Sources	Operational Practices
Jos. Ethier & Co. Lumber	Hubbell Slag Dump and Beach Area	Jos. Ethier & Co. was a lumber company in Hubbell, MI. In 1905 Joseph H. LeBlanc bought out Ethier's share and the business was renamed after LeBlanc and sons.	Possible wood treatment operations. Sawdust and similar disposal operations are not well understood.	Lumber milling and processing. Shipping and receiving of timbers and milled materials.
Hubbell Municipal Dump	Hubbell Slag Dump and Beach Area	The Hubbell Dump is believed to be the municipal dump for the Hubbell area as well as Torch Lake Township. It was located just south of the C&H Smelter, which has led researchers to believe that it was also used as a dump for smelter slag and other company waste. It was cleaned up in the 1980s and turned into a park with a beach and boat launch for the local community. Archival and Township records have yet to provide any substantial information about the area.	Potential undocumented household and industrial wastes.	Potential municipal waste disposal. Segregation and disposal practices are not well understood. Potential industrial waste disposal. Segregation and disposal practices are not well understood.

Table 3-2
Sampling and Analysis Summary
Torch Lake Backwater Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
Soil Borings																														
CHLL-SB01-0-6"	6/13/2014	CHLL-SB01-0"-6"	1406232	-88.40500145	47.19724009	0 - 0.5	Proximity to a historical generating station or electrical substation.	SAND, Medium grained, gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB01-X-Y'	6/13/2014	CHLL-SB01-6"-36"	1406232	-88.40500145	47.19724009	0.5 - 3	Proximity to a historical generating station or electrical substation.	SAND, Medium grained, brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB02-0-6"	6/13/2014	CHLL-SB02-0"-6"	1406232	-88.404736871	47.197153273	0 - 0.5	Proximity to a historical generating station or electrical substation.	SAND, Fine to Medium grained, gray	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB02-X-Y'	6/13/2014	CHLL-SB02-6"-24"	1406232	-88.404736871	47.197153273	0.5 - 2	Proximity to a historical generating station or electrical substation.	FILL, Sand and Gravel	Composite Sample	Direct Push Boring		X							X	X			X							
CHLL-SB03-0-6"	6/13/2014	CHLL-SB03-0"-6"	1406232	-88.40452586	47.19713512	0 - 0.5	Proximity to a historical generating station or electrical substation.	SAND, Medium grained, gray	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB03-X-Y'	6/13/2014	CHLL-SB03-6"-24"	1406232	-88.40452586	47.19713512	0.5 - 2	Proximity to a historical generating station or electrical substation.	FILL, Sand and Gravel	Composite Sample	Direct Push Boring		X						X	X	X			X							
--	6/13/2014	CHLL-SB03-6"-24"-DUP	1406232	-88.40452586	47.19713512	0.5 - 2	Proximity to a historical generating station or electrical substation.	FILL, Sand and Gravel	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X						X	X	X			X							
CHLL-SB04-0-6"	6/13/2014	CHLL-SB04-0"-6"	1406232	-88.40452301	47.19664463	0 - 0.5	Proximity to a historical generating station or electrical substation.	TOPSOIL, Sandy, Fine grained, gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB04-X-Y'	6/13/2014	CHLL-SB04-6"-24"	1406232	-88.40452301	47.19664463	0.5 - 2	Proximity to a historical generating station or electrical substation.	SAND, Medium grained, brown	Composite Sample	Direct Push Boring		X								X										
Field Determined	6/15/2014	CHLL-SB57-0"-6"	1406233	-88.404313050	47.197111996	0 - 0.5	East end of the 9th Street Substation	SAND, Fine grained, Gray	Grab Sample	Direct Push Boring	X								X	X			X							
Field Determined	6/15/2014	CHLL-SB57-6"-36"	1406233	-88.404313050	47.197111996	0.5 - 3	East end of the 9th Street Substation	SAND, Medium to fine grained, Brown to reddish brown	Composite Sample	Direct Push Boring		X						X		X										
Groundwater																														
CHLL-MW01-X-Y'	6/13/2014	CHLL-GW01-7'-12'	1406237	-88.404523009	47.196644626	7 - 12	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 7 ft - 12 ft	Grab Sample	Peristaltic Pump			X				X	X		X						8.20	0.750	6.40	7.09	NM
Field Determined	6/15/2014	CHLL-GW39-8'-13'	1406236	-88.404323744	47.196744648	8 - 13	East end of the 9th Street Substation	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X						7.50	0.318	1.80	6.92	NM
CHLL-GW70	05/13/15	CHLL-GW-70-40-45'	1505145	-88.40317069	47.19702691	40 - 45	Residential property east of the 9th Street Substation	Temporary Screen Interval: 40 ft - 45 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						NM	NM	NM	NM	NM
Sediment and Surface Water																														
CHLL-SD01-0-6"	5/29/2015	CHLL-SD-01-0-6"	1506039	-88.4045138	47.19636772	0 - 0.5	Proximity to a historical generating station or electrical substation.	SILT, Dark Brown to Black	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD01-1-3'	5/29/2015	CHLL-SD-01-1'-3'	1506039	-88.4045138	47.19636772	1 - 3	Proximity to a historical generating station or electrical substation.	SILT, Dark Brown to Black	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD01-3-5'	5/29/2015	CHLL-SD-01-3'-3.75'	1506039	-88.4045138	47.19636772	3 - 3.75	Proximity to a historical generating station or electrical substation.	SILT, Reddish-Brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD02-0-6"	5/29/2015	CHLL-SD-02-0-6"	1506039	-88.40338311	47.19645463	0 - 0.5	Proximity to a historical generating station or electrical substation.	SILT, Dark Brown to Black, wood debris	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD02-1-3'	5/29/2015	CHLL-SD-02-1'-1.5'	1506039	-88.40338311	47.19645463	1 - 1.5	Proximity to a historical generating station or electrical substation.	SILT, Reddish-Brown, wood debris	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD02-3-5'	--	--	--	--	--	--	Proximity to a historical generating station or electrical substation.	--	Sample Not collected - Low recovery	--					--					--										
CHLL-SD03-0-6"	5/29/2015	CHLL-SD-03-0-6"	1506039	-88.39993785	47.19519886	0 - 0.5	Proximity to reported dumping/disposal areas	SAND, Dark Brown to Black, fine to medium grained, silty	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD03-1-3'	5/29/2015	CHLL-SD-03-1'-1.5'	1506039	-88.39993785	47.19519886	1 - 1.5	Proximity to reported dumping/disposal areas	SAND, Tan, fine to medium grained	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD03-3-6'	--	--	--	--	--	--	Proximity to reported dumping/disposal areas	--	Sample Not collected - Low recovery	--					--					--										
CHLL-SD04-0-6"	5/29/2015	CHLL-SD-04-0-6"	1506039	-88.40456155	47.1949586	0 - 0.5	Proximity to reported dumping/disposal areas	SILT, Dark Brown to Black	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD04-1-3'	5/29/2015	CHLL-SD-04-1-3'	1506039	-88.40456155	47.1949586	1 - 3	Proximity to reported dumping/disposal areas	SILT, Dark Brown to Black to 2.2 ft; SILT, Reddish-Brown	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD04-3-5'	5/29/2015	CHLL-SD-04-3'-4'	1506039	-88.40456155	47.1949586	3 - 4	Proximity to reported dumping/disposal areas	SILT, Reddish-Brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD06-0-6"	5/29/2015	CHLL-SD-06-0-6"	1506039	-88.39973112	47.19480761	0 - 0.5	Proximity to reported dumping/disposal areas	SAND, Dark Brown to Black, fine to medium grained, silty	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD06-1-3'	5/29/2015	CHLL-SD-06-1'-1.25'	1506039	-88.39973112	47.19480761	1 - 1.25	Proximity to reported dumping/disposal areas	SAND, Tan, fine to medium grained, silt stringers at 0.7' and 1'	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD06-3-5'	--	--	--	--	--	--	Proximity to reported dumping/disposal areas	--	Sample Not collected - Low recovery	--					--					--										

Notes:
% = Percent
°C = Degrees Celsius
CHLL = C&H Lake Linden Operations
DRO = Diesel Range Organics
ft = Feet
GW = Groundwater
mS/cm = Millisiemens per Centimeter
MW = Monitoring Well
NM = Not Measured
ORO = Oil Range Organics
PNAs = Polynuclear Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
SB = Soil Boring
SD = Sediment
VOCs = Volatile Organic Compounds
X = Analyte selected for laboratory analysis

For the purposes of this investigation, sediments include residues and waste material associated with chemical containers and deposits on the lake bottom historically discarded in Torch Lake.

Table 3-2
Sampling and Analysis Summary
Lake Linden Sands Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
Soil Borings																														
CHLL-SB05-0-6"	6/16/2014	CHLL-SB05-0"-6"	1406234	-88.40373588	47.19327193	0 - 0.5	Proximity to reported dumping/disposal areas	CLAY, Reddish brown	Grab Sample	Direct Push Boring	X								X				X							
CHLL-SB05-X-Y'	6/16/2014	CHLL-SB05-6"-48"	1406234	-88.40373588	47.19327193	0.5 - 4	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained .5 ft- 1 ft; SAND, fine to medium, Reddish brown 1 ft- 4 ft	Composite Sample	Direct Push Boring		X						X	X	X			X							
CHLL-SB06-0-6"	6/15/2014	CHLL-SB06-0"-6"	1406233	-88.405905596	47.191853864	0 - 0.5	Proximity to reported dumping/disposal areas	SAND, Fine grained, brown	Grab Sample	Direct Push Boring	X							X	X	X			X							
CHLL-SB06-X-Y'	6/15/2014	CHLL-SB06-6"-48"	1406233	-88.405905596	47.191853864	0.5 - 4	Proximity to reported dumping/disposal areas	SAND, with GRAVEL, Medium grained, Reddish brown to brown	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB08-0-6"	6/16/2014	CHLL-SB08-0"-6"	1406234	-88.40122719	47.18950973	0 - 0.5	Proximity to reported dumping/disposal areas	SILTY CLAY, Reddish brown	Grab Sample	Direct Push Boring	X								X				X							
--	6/16/2014	CHLL-SB08-0"-6"-DUP	1406234	-88.40122719	47.18950973	0 - 0.5	Proximity to reported dumping/disposal areas	SILTY CLAY, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring	X								X				X							
CHLL-SB08-X-Y	6/16/2014	CHLL-SB08-6"-8'	1406235	-88.40122719	47.18950973	0.5 - 8	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown .5 ft - 4 ft; CONCRETE RUBBLE 4 ft - 5 ft; SAND, Fine to medium grained, Reddish brown 5 ft - 8 ft	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB08-X-Y	6/16/2014	CHLL-SB08-8'-15'	1406235	-88.40122719	47.18950973	8 - 15	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X					X													
CHLL-SB09-0-6"	6/16/2014	CHLL-SB09-0"-6"	1406234	-88.40291972	47.19120328	0 - 0.5	Proximity to reported dumping/disposal areas	SILTY SAND, Fine grained, Reddish brown	Grab Sample	Direct Push Boring	X								X				X							
CHLL-SB09-X-Y'	6/16/2014	CHLL-SB09-6"-6'	1406234	-88.40291972	47.19120328	0.5 - 6	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X						X	X	X			X							
CHLL-SB09-X-Y'	6/16/2014	CHLL-SB09-6'-12'	1406234	-88.40291972	47.19120328	6 - 12	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X						X	X	X			X							
CHLL-SB10-0-6"	6/16/2014	CHLL-SB10-0"-6"	1406234	-88.40120998	47.19244751	0 - 0.5	Proximity to reported dumping/disposal areas	SILTY CLAY, Reddish brown	Grab Sample	Direct Push Boring	X								X				X							
CHLL-SB10-X-Y'	6/16/2014	CHLL-SB10-6"-48"	1406234	-88.40120998	47.19244751	0.5 - 4	Proximity to reported dumping/disposal areas	SAND, Reddish brown	Composite Sample	Direct Push Boring		X						X	X	X			X							
CHLL-SB10-X-Y'	6/16/2014	CHLL-SB10-48"-96"	1406234	-88.40120998	47.19244751	4 - 8	Proximity to reported dumping/disposal areas	SAND, Reddish brown	Composite Sample	Direct Push Boring		X						X	X	X										
CHLL-SB11-0-6"	6/16/2014	CHLL-SB11-0"-6"	1406234	-88.40154714	47.19025126	0 - 0.5	Proximity to reported dumping/disposal areas	CLAY, Reddish brown	Grab Sample	Direct Push Boring	X								X				X							
CHLL-SB11-X-Y	6/16/2014	CHLL-SB11-6"-8'	1406234	-88.40154714	47.19025126	0.5 - 8	Proximity to reported dumping/disposal areas	CONCRETE RUBBLE .5 ft - 3 ft; SAND, Fine to medium grained, Reddish brown 3 ft - 8 ft	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
--	6/16/2014	CHLL-SB11-6"-8'-DUP	1406234	-88.40154714	47.19025126	0.5 - 8	Proximity to reported dumping/disposal areas	CONCRETE RUBBLE .5 ft - 3 ft; SAND, Fine to medium grained, Reddish brown 3 ft - 8 ft	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB11-X-Y	6/16/2014	CHLL-SB11-8'-16'	1406234	-88.40154714	47.19025126	8 - 16	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB13-0-6"	6/15/2014	CHLL-SB13-3"-9"	1406233	-88.40441981	47.19163801	0.25 - 0.75	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Grab Sample	Direct Push Boring	X							X	X	X			X							
CHLL-SB13-X-Y'	6/15/2014	CHLL-SB13-9"-96"	1406233	-88.40441981	47.19163801	0.75 - 8	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB15-0-6"	6/15/2014	CHLL-SB15-3"-9"	1406234	-88.40414357	47.19272549	0.25 - 0.75	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Grab Sample	Direct Push Boring	X							X	X	X			X							
CHLL-SB15-X-Y'	6/15/2014	CHLL-SB15-9"-5'	1406234	-88.40414357	47.19272549	0.75 - 5	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
--	6/15/2014	CHLL-SB15-9"-5'-DUP	1406234	-88.40414357	47.19272549	0.75 - 5	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB16-0-6"	6/16/2014	CHLL-SB16-0"-6"	1406234	-88.40204832	47.1918104	0 - 0.5	Proximity to reported dumping/disposal areas	SILTY SAND, Fine grained, Reddish brown	Grab Sample	Direct Push Boring	X								X				X							
CHLL-SB16-X-Y'	6/16/2014	CHLL-SB16-6"-6'	1406234 14061049	-88.40204832	47.1918104	0.5 - 6	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X						X	X	X	X		X							
CHLL-SB16-X-Y'	6/16/2014	CHLL-SB16-6'-12'	1406234	-88.40204832	47.1918104	6 - 12	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X						X	X	X			X							
Groundwater																														
CHLL-MW02-X-Y'	6/16/2014	CHLL-GW02-9'-14'	1406236	-88.40373588	47.19327193	9 - 14	Proximity to reported dumping/disposal areas	Temporary Screen Interval: 9 ft - 14 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						9.60	0.231	2.60	7.06	NM
CHLL-MW03-X-Y'	6/15/2014	CHLL-GW03-9'-14'	1406236	-88.405905596	47.191853864	9 - 14	Proximity to reported dumping/disposal areas	Temporary Screen Interval: 9 ft - 14 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						9.50	0.500	1.60	7.04	NM
CHLL-MW05-X-Y'	6/16/2014	CHLL-GW05-20'-25'	1406236	-88.40122719	47.18950973	20 - 25	Proximity to reported dumping/disposal areas	Temporary Screen Interval: 20 ft - 25 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						16.00	0.630	59.30	7.32	NM
CHLL-MW06-X-Y'	6/16/2014	CHLL-GW06-16'-21'	1406236	-88.40291972	47.19120328	16 - 21	Proximity to reported dumping/disposal areas	Temporary Screen Interval: 16 ft - 21 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						11.40	0.660	1.80	7.26	NM
CHLL-MW07-X-Y'	6/16/2014	CHLL-GW07-14'-19'	1406236	-88.40120998	47.19244751	14 - 19	Proximity to reported dumping/disposal areas	Temporary Screen Interval: 14 ft - 19 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						10.70	0.423	46.80	7.43	NM
--	6/16/2014	CHLL-GW07-14'-19'-DUP	1406236	-88.40120998	47.19244751	14 - 19	Proximity to reported dumping/disposal areas	Temporary Screen Interval: 14 ft - 19 ft	Grab Sample, QA/QC - Duplicate Sample	Peristaltic Pump			X						X											
Sediment and Surface Water																														
CHLL-SD05-0-6"	05/29/15	CHLL-SD-05-0-6"	1506039	-88.40272412	47.19453135	0 - 0.5	Proximity to reported dumping/disposal areas	SAND, Dark Brown to Black, fine grained, silty	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD05-1-3'	05/29/15	CHLL-SD-05-1-3'	1506039	-88.40272412	47.19453135	1 - 3	Proximity to reported dumping/disposal areas	SAND, Reddish-Brown, fine grained, silty	Composite Sample	Vibracore Sampler					X			X		X										
--	05/29/15	CHLL-SD-05-1-3'-DUP	1506039	-88.40272412	47.19453135	1 - 3	Proximity to reported dumping/disposal areas	SAND, Reddish-Brown, fine grained, silty	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X			X		X										
CHLL-SD05-3-5'	05/29/15	CHLL-SD-05-3'-5'	1506039	-88.40272412	47.19453135	3 - 5	Proximity to reported dumping/disposal areas	SAND, Reddish-Brown, fine grained, silty	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD07-0-6"	7/12/2014	CHLL-SD07-0"-6"	1407175	-88.39581486	47.19156789	0 - 0.5	Mouth of the Traprock River	SILT, Sandy, Dark brown to black	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD07-1-3'	7/12/2014	CHLL-SD07-1'-3'	1407175	-88.39581486	47.19156789	1 - 3	Mouth of the Traprock River	SILT, Clayey, Dark brown to black to reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD07-3-5'	--	--	--	--	--	--	Mouth of the Traprock River	--	Sample Not collected - Low recovery	--					--					--										
CHLL-SD08-0-6"	7/11/2014	CHLL-SD08-0"-6"	1407166	-88.39486955	47.19189741	0 - 0.5	Mouth of the Traprock River	SILT, Sandy, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD08-1-3'	7/11/2014	CHLL-SD08-1'-3'	1407166	-88.39486955	47.19189741	1 - 3	Mouth of the Traprock River	SILT, Sandy, Dark brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD08-3-5'	7/11/2014	CHLL-SD08-3'-4'	1407166	-88.39486955	47.19189741	3 - 4	Mouth of the Traprock River	SILT, Sandy, Dark brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD09-0-6"	6/15/2014	CHLL-SD09-0"-6"	1406230	-88.39993376	47.18153743	0 - 0.5	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD09-1-3'	6/15/2014	CHLL-SD09-1'-2.1'	1406230	-88.39993376	47.18153743	1 - 2.1	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD09-1'-2.1'-DUP	6/15/2014	CHLL-SD09-1'-2.1'-DUP	1406230	-88.39993376	47.18153743	1 - 2.1	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD09-3-5'	--	--	--	--	--	--	Proximity to reported dumping/disposal areas	--	Sample Not collected - Low recovery	Vibracore Sampler					--					--										
CHLL-SD10-0-6"	6/15/2014	CHLL-SD10-0"-6"	1406230	-88.40390005	47.18204071	0 - 0.5	Proximity to reported dumping/disposal areas	SAND, Fine grained, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD10-1-3'	6/15/2014	CHLL-SD10-1'-2'	1406230	-88.40390005	47.18204071	1 - 2	Proximity to reported dumping/disposal areas	SAND, Fine grained, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD10-3-5'	--	--	--	--	--	--	Proximity to reported dumping/disposal areas	--	Sample Not collected - Low recovery	--					--					--										
CHLL-SD72-0-6"	5/29/2015	CHLL-SD-72-0-6"	1506039	-88.4047263	47.19426599	0 - 0.5	Proximity to reported dumping/disposal areas	SILT, Sandy, Dark brown to black	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD72-1-3'	5/29/2015	CHLL-SD-72-1-3'	1506039	-88.4047263	47.19426599	1 - 3	Proximity to reported dumping/disposal areas	SAND, silty, fine grained, reddish-brown	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD72-3-5'	5/29/2015	CHLL-SD-72-3'-4.9'	1506039	-88.4047263	47.19426599	3 -- 4.9	Proximity to reported dumping/disposal areas	SAND, silty, fine grained, reddish-brown	Composite Sample	Vibracore Sampler					X					X										

Notes:
% = Percent
°C = Degrees Celsius
CHLL = C&H Lake Linden Operations
DRO = Diesel Range Organics
ft = Feet
GW = Groundwater
mS/cm = Millisiemens per Centimeter
MW = Monitoring Well
NM = Not Measured
ORO = Oil Range Organics
PNAs = Polynuclear Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
SB = Soil Boring
SD = Sediment
VOCs = Volatile Organic Compounds
X = Analyte selected for laboratory analysis

For the purposes of this investigation, sediments include residues and waste material associated with chemical containers and deposits on the lake bottom historically discarded in Torch Lake.

Table 3-2
Sampling and Analysis Summary
Lake Linden Recreation Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
Soil Borings																														
CHLL-SB07-0-6"	6/16/2014	CHLL-SB07-0"-6"	1406235	-88.40495223	47.19037126	0 - 0.5	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Grab Sample	Direct Push Boring	X								X				X							
CHLL-SB07-X-Y	6/16/2014	CHLL-SB07-6"-12'	1406235 14061049	-88.40495223	47.19037126	0.5 - 12	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X					X	X	X	X	X		X							
CHLL-SB07-X-Y	6/16/2014	CHLL-SB07-12'-23'	1406235	-88.40495223	47.19037126	12 - 23	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown, Some SILTY SAND	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB12-0-6"	6/16/2014	CHLL-SB12-0"-6"	1406235	-88.40395101	47.19045756	0 - 0.5	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Grab Sample	Direct Push Boring	X								X				X							
CHLL-SB12-X-Y	6/16/2014	CHLL-SB12-6"-12'	1406235	-88.40395101	47.19045756	0.5 - 12	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB12-X-Y	6/16/2014	CHLL-SB12-12'-24'	1406235	-88.40395101	47.19045756	12 - 24	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Reddish brown, Some SILTY SAND	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB14-0-6"	6/15/2014	CHLL-SB14-0"-6"	1406233	-88.406364639	47.191387659	0 - 0.5	Proximity to reported dumping/disposal areas	SAND, Fine to medium grained, Gray	Grab Sample	Direct Push Boring	X							X	X	X			X							
CHLL-SB14-X-Y'	6/15/2014	CHLL-SB14-6"-36"	1406233	-88.406364639	47.191387659	0.5 - 3	Proximity to reported dumping/disposal areas	FILL, Sand, gravel, and concrete	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB17-0-6"	6/14/2014	CHLL-SB17-0"-6"	1406233 240-38977	-88.40878611	47.18831652	0 - 0.5	Proximity to a historical generating station or electrical substation.	SAND, Fine to medium grained, Brown	Grab Sample	Direct Push Boring	X								X	X			X	X						
CHLL-SB17-X-Y'	6/14/2014	CHLL-SB17-3'-5'	1406233	-88.40878611	47.18831652	3 - 5	Proximity to a historical generating station or electrical substation.	SAND, Coarse to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X							X	X			X							
CHLL-SB18-0-6"	6/14/2014	CHLL-SB18-4"-12"	1406233	-88.40905548	47.18113871	0.33 - 1	Proximity to a historical generating station or electrical substation.	SAND, Coarse to medium grained, Reddish brown	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB18-X-Y'	6/14/2014	CHLL-SB18-1'-4'	1406233	-88.40905548	47.18113871	1 - 4	Proximity to a historical generating station or electrical substation.	SAND, Coarse to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X							X	X			X							
CHLL-SB19-0-6"	6/14/2014	CHLL-SB19-0"-6"	1406233 240-38977	-88.40861776	47.18790384	0 - 0.5	Proximity to a historical generating station or electrical substation.	CLAY, Brown	Grab Sample	Direct Push Boring	X									X				X						
CHLL-SB19-X-Y	6/14/2014	CHLL-SB19-1'-5'	1406233	-88.40861776	47.18790384	1 - 5	Proximity to a historical generating station or electrical substation.	SAND, Medium to fine grained, brown; GRAVEL, Gray from 4-5'	Composite Sample	Direct Push Boring		X								X										
--	6/14/2014	CHLL-SB19-1'-5'-DUP	1406233	-88.40861776	47.18790384	1 - 5	QA/QC Duplicate Sample	SAND, Medium to fine grained, brown; GRAVEL, Gray from 4-5'	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X								X										
CHLL-SB20-0-6"	6/14/2014	CHLL-SB20-6"-12"	1406233	-88.40832418	47.18812285	0.5 - 1	Proximity to a historical generating station or electrical substation.	SAND, Medium grained, Dark brown	Grab Sample	Direct Push Boring	X									X										
CHLL-SB20-X-Y	6/14/2014	CHLL-SB20-3'-6'	1406233	-88.40832418	47.18812285	3 - 6	Proximity to a historical generating station or electrical substation.	SAND, Coarse to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB21-0-6"	6/14/2014	CHLL-SB21-3"-9"	1406232 14061049	-88.40967237	47.18748048	0.25 - 0.75	Proximity to a historical generating station or electrical substation.	SAND, Fine to medium grained, Reddish brown	Grab Sample	Direct Push Boring	X									X	X									
CHLL-SB21-X-Y'	6/14/2014	CHLL-SB21-9"-48"	1406232	-88.40967237	47.18748048	0.75 - 4	Proximity to a historical generating station or electrical substation.	SAND, Coarse to fine grained, Brown to reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB22-0-6"	6/14/2014	CHLL-SB22-3"-9"	1406232 240-38977	-88.41035503	47.18672537	0.25 - 0.75	Proximity to a historical generating station or electrical substation.	SAND, Fine to medium grained, Reddish brown	Grab Sample	Direct Push Boring	X								X	X			X	X						
CHLL-SB22-X-Y'	6/14/2014	CHLL-SB22-12"-48"	1406232	-88.41035503	47.18672537	1 - 4	Proximity to a historical generating station or electrical substation.	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X							X	X			X							
CHLL-SB50-0-6"	6/14/2014	CHLL-SB50-0"-12"	1406233 240-38977	-88.407348446	47.189094562	0 - 1	Proximity to a historical removal area.	SAND, Coarse to medium grained, With gravel, Reddish Brown	Grab Sample	Direct Push Boring	X								X	X			X	X						
CHLL-SB50-X-Y'	--	--	--	--	--	--	Proximity to a historical removal area.	--	No Sample Collected - Saturated at 1 ft bgs	--		--							--	--										
Field Determined	6/14/2014	CHLL-SB55-0"-6"	1406232 240-38977	-88.410016830	47.187160142	0 - 0.5	Marina Property, East of the Historical Society	SAND, Medium to fine grained, Dark gray	Grab Sample	Direct Push Boring	X								X	X			X	X						
Field Determined	6/14/2014	CHLL-SB55-6"-48"	1406232	-88.410016830	47.187160142	0.5 - 4	Marina Property, East of the Historical Society	SAND, Coarse to fine grained, Brown to reddish brown	Composite Sample	Direct Push Boring		X							X	X			X							
Field Determined	6/14/2014	CHLL-SB56-0"-6"	240-38977	-88.410763057	47.186230411	0 - 0.5	Marina Property, East of the Historical Society, Asbestos Only	No cuttings - collected surface sample only for asbestos	Grab Sample	Direct Push Boring	X													X						
CHLL-SB109-0-6"	8/20/2014	CHLL-SB109-0-6"	1408233	-88.41039444	47.18663611	0.5 - 1	Proximity to residential direct contact criteria exceedance	TOPSOIL, Sandy Loam, Brown	Grab Sample	Hand Tools	X								X											
CHLL-SB110-0-6"	8/20/2014	CHLL-SB110-0-6"	1408233	-88.41013889	47.18711111	--	Proximity to residential direct contact criteria exceedance	TOPSOIL, Sandy Loam, Brown	Grab Sample	Hand Tools	X								X				X							
CHLL-SB111-0-6"	8/20/2014	CHLL-SB111-6-12"	1408239	-88.40759167	47.18801389	0.5 - 1	Proximity to a historical removal	CLAY, Gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB111-X-Y'	8/20/2014	CHLL-SB111-12"-3'	1408239	-88.40759167	47.18801389	1 - 3	Proximity to a historical removal	SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB112-0-6"	8/20/2014	CHLL-SB112-6-12"	1408239	-88.40713889	47.18821667	0.5 - 1	Proximity to a historical removal	CLAY, Gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB112-X-Y'	8/20/2014	CHLL-SB112-12"-3'	1408239	-88.40713889	47.18821667	1 - 3	Proximity to a historical removal	SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB113-0-6"	8/20/2014	CHLL-SB113-6-12"	1408240	-88.40771111	47.18841667	0.5 - 1	Proximity to a historical removal	CLAY, Gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB113-X-Y'	8/20/2014	CHLL-SB113-12"-3'	1408240	-88.40771111	47.18841667	1 - 3	Proximity to a historical removal	SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB114-0-6"	8/20/2014	CHLL-SB114-6"-12"	1408240	-88.40850833	47.18894167	0.5 - 1	Proximity to a historical removal	CLAY, Gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB114-X-Y'	8/20/2014	CHLL-SB114-12"-3'	1408240	-88.40850833	47.18894167	1 - 3	Proximity to a historical removal	SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB115-0-6"	8/20/2014	CHLL-SB115-6"-12"	1408240	-88.408875	47.189	0.5 - 1	Proximity to a historical removal	CLAY, Gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB115-X-Y'	8/20/2014	CHLL-SB115-12"-5'	1408240	-88.408875	47.189	1 - 5	Proximity to a historical removal	SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
--	8/20/2014	CHLL-SB115-12"-5'-DUP	1408240	-88.408875	47.189	1 - 5	Proximity to a historical removal	SAND, Medium grained, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X								X										
CHLL-SB116-0-6"	8/20/2014	CHLL-SB116-6-12"	1408239	-88.40733838	47.18884483	0.5 - 1	Proximity to a historical removal	SAND, Medium grained, Reddish brown	Grab Sample	Direct Push Boring	X									X										
CHLL-SB116-X-Y'	--	--	--	--	--	--	Proximity to a historical removal	--	No Sample Collected - Saturated at 1 ft bgs	--		--								--										
CHLL-SB117-0-6"	8/20/2014	CHLL-SB117-6"-12"	1408240	-88.40725	47.18920278	0.5 - 1	Proximity to a historical flotation and leaching operations	SAND, Medium grained, Reddish brown	Grab Sample	Direct Push Boring	X									X										
CHLL-SB117-X-Y'	8/20/2014	CHLL-SB117-12"-3'	1408240	-88.40725	47.18920278	1 - 3	Proximity to a historical flotation and leaching operations	SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB118-0-6"	8/21/2014	CHLL-SB118-6"-12"	1408239	-88.40609444	47.18949444	0.5 - 1	Proximity to a historical flotation and leaching operations	SAND, Medium grained, Reddish brown	Grab Sample	Direct Push Boring	X									X										
CHLL-SB118-X-Y'	8/21/2014	CHLL-SB118-12"-3'	1408239	-88.40609444	47.18949444	1 - 3	Proximity to a historical flotation and leaching operations	SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB119-0-6"	8/21/2014	CHLL-SB119-6"-12"	1408239	-88.40645	47.18955556	0.5 - 1	Proximity to a historical flotation and leaching operations	SAND, Medium grained, Reddish brown	Grab Sample	Direct Push Boring	X									X										
CHLL-SB119-X-Y'	8/21/2014	CHLL-SB119-12"-3'	1408239	-88.40645	47.18955556	1 - 3	Proximity to a historical flotation and leaching operations	SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB120-0-6"	8/20/2014	CHLL-SB120-0-6"	1408238	-88.40685833	47.18987222	0 - 0.5	Proximity to a historical flotation and leaching operations	SILTY SAND, brown, fine grained	Grab Sample	Direct Push Boring	X									X										
CHLL-SB120-X-Y'	8/20/2014	CHLL-SB120-6"-3'	1408240	-88.40685833	47.18987222	0.5 - 3	Proximity to a historical flotation and leaching operations	SILTY SAND, brown, fine grained to 1 ft; SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB121-0-6"	8/20/2014	CHLL-SB121-0-6"	1408238	-88.40671389	47.190275	0 - 0.5	Proximity to a historical flotation and leaching operations	SILTY SAND, Fine grained, Brown to 1.5 ft	Grab Sample	Direct Push Boring	X									X										
CHLL-SB121-X-Y'	8/20/2014	CHLL-SB121-6"-4'	1408238	-88.40671389	47.190275	0.5 - 4	Proximity to a historical flotation and leaching operations	SILTY SAND, Fine grained, Brown to 1.5 ft; SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB122-0-6"	8/20/2014	CHLL-SB122-0-6"	1408238	-88.40654722	47.190625	0 - 0.5	Proximity to a historical flotation and leaching operations	FILL, Sand and gravel, Reddish brown	Grab Sample	Direct Push Boring	X									X										
CHLL-SB122-X-Y'	8/20/2014	CHLL-SB122-6"-3'	1408238	-88.40654722	47.190625	0.5 - 3	Proximity to a historical flotation and leaching operations	FILL, Sand and gravel, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB123-0-6"	8/20/2014	CHLL-SB123-0-6"	1408239	-88.40657099	47.19139656	0 - 0.5	Proximity to semivolatile detections	FILL, Sand and gravel, Reddish brown	Grab Sample	Direct Push Boring	X							X		X										
CHLL-SB123-X-Y'	8/20/2014	CHLL-SB123-6"-4'	1408239	-88.40657099	47.19139656	0.5 - 4	Proximity to semivolatile detections	FILL, Sand and gravel, Reddish brown	Composite Sample	Direct Push Boring		X						X		X										
CHLL-SB124-0-6"	8/20/2014	CHLL-SB124-0-6"	1408238	-88.40615	47.191175	0 - 0.5	Proximity to semivolatile detections	SAND, Medium grained, Brown to 1.5 ft	Grab Sample	Direct Push Boring	X							X		X										
CHLL-SB124-X-Y'	8/20/2014	CHLL-SB124-6"-4'	1408238	-88.40615	47.191175	0.5 - 4	Proximity to semivolatile detections	SAND, Medium grained, Brown to 1.5 ft; CLAY, Reddish brown to 2 ft; SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X						X		X										
--	8/20/2014	CHLL-SB124-6"-4'-DUP	1408238	-88.40615	47.191175	0.5 - 4	Proximity to semivolatile detections	SAND, Medium grained, Brown to 1.5 ft; CLAY, Reddish brown to 2 ft; SAND, Medium grained, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X						X		X										
CHLL-SB125-0-6"	8/20/2014	CHLL-SB125-0-6"	1408238	-88.40631667	47.19090833	0 - 0.5	Proximity to semivolatile detections	SAND, Medium grained, Gray to 1 ft	Grab Sample	Direct Push Boring	X							X		X										
CHLL-SB125-X-Y'	8/20/2014	CHLL-SB125-6"-4'	1408238	-88.40631667	47.19090833	0.5 - 4	Proximity to semivolatile detections	SAND, Medium grained, Gray to 1 ft; SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X						X		X										

Table 3-2
Sampling and Analysis Summary
Lake Linden Recreation Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
Groundwater																														
CHLL-MW04-X-Y'	6/16/2014	CHLL-GW04-28'-33'	1406236	-88.40495223	47.19037126	28 - 33	Proximity to reported dumping/disposal areas	Temporary Screen Interval: 28 ft - 33 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						NM	NM	NM	NM	NM
CHLL-MW08-X-Y	6/14/2014	CHLL-GW08-12'-17'	1406237	-88.40861776	47.18790384	12 - 17	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 12 ft - 17 ft	Grab Sample	Peristaltic Pump			X						X	X						8.00	0.610	0.90	7.04	NM
CHLL-MW09-X-Y	6/14/2014	CHLL-GW09-12'-17'	1406237	-88.40832418	47.18812285	12 - 17	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 12 ft - 17 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						7.00	0.433	7.50	7.50	NM
CHLL-MW10-X-Y	6/14/2014	CHLL-GW10-12'-17'	1406237	-88.40967237	47.18748048	12 - 17	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 12 ft - 17 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						8.60	0.640	3.60	7.02	NM
CHLL-MW11-X-Y	6/14/2014	CHLL-GW11-10'-15'	1406237	-88.41035503	47.18672537	10 - 15	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						9.20	0.468	15.60	6.63	NM
CHLL-MW35-X-Y	6/14/2014	CHLL-GW35-6'-11'	1406237	-88.407348446	47.189094562	6 - 11	Proximity to a historical removal area.	Temporary Screen Interval: 6 ft - 11 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						9.70	0.392	62.30	7.33	NM
Field Determined	6/14/2014	CHLL-GW38-10-15'	1406237	-88.410016830	47.187160142	10 - 15	Marina Property, East of the Historical Society	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						12.20	0.890	95.00	7.32	NM
CHLL-MW42-X-Y'	8/20/2014	CHLL-GW42-7-12'	1408234	-88.40759167	47.18801389	7 - 12	Proximity to a historical removal	Temporary Screen Interval: 7 ft - 12 ft	Grab Sample	Peristaltic Pump			X							X			X			14.70	0.600	3.00	7.52	NM
CHLL-MW43-X-Y'	8/20/2014	CHLL-GW43-8-13'	1408234	-88.40713889	47.18821667	8 - 13	Proximity to a historical removal	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X			X			13.80	0.580	2.70	7.60	NM
CHLL-MW44-X-Y'	8/20/2014	CHLL-GW44-7-12'	1408234	-88.40771111	47.18841667	7 - 12	Proximity to a historical removal	Temporary Screen Interval: 7 ft - 12 ft	Grab Sample	Peristaltic Pump			X							X			X			15.70	0.560	2.20	7.52	NM
--	8/20/2014	CHLL-GW44-7-12'-DUP	1408234	-88.40771111	47.18841667	7 - 12	Proximity to a historical removal	Temporary Screen Interval: 7 ft - 12 ft	Grab Sample, QA/QC - Duplicate Sample	Peristaltic Pump			X							X			X							
CHLL-MW45-X-Y'	8/20/2014	CHLL-GW45-9-14'	1408234	-88.40850833	47.18894167	9 - 14	Proximity to a historical removal	Temporary Screen Interval: 9 ft - 14 ft	Grab Sample	Peristaltic Pump			X							X			X			16.70	0.690	42.00	8.40	NM
CHLL-MW46-X-Y'	8/20/2014	CHLL-GW46-10-15'	1408234	-88.408875	47.189	10 - 15	Proximity to a historical flotation and leaching operations	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X							X			X			18.00	0.740	59.50	8.19	NM
CHLL-MW47-X-Y'	8/20/2014	CHLL-GW47-6-11'	1408234	-88.40733838	47.18884483	6 - 11	Proximity to a historical flotation and leaching operations	Temporary Screen Interval: 6 ft - 11 ft	Grab Sample	Peristaltic Pump			X							X			X			15.20	0.570	4.50	7.37	NM
CHLL-MW48-X-Y'	8/20/2014	CHLL-GW48-8-13'	1408234	-88.40725	47.18920278	8 - 13	Proximity to a historical flotation and leaching operations	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X			X			15.60	0.425	54.10	7.09	NM
CHLL-MW49-X-Y'	8/21/2014	CHLL-GW49-8-13'	1408234	-88.40609444	47.18949444	8 - 13	Proximity to a historical flotation and leaching operations	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X			X			13.20	0.433	1.00	7.43	NM
CHLL-MW50-X-Y'	8/21/2014	CHLL-GW50-8-13'	1408234	-88.40645	47.18955556	8 - 13	Proximity to a historical flotation and leaching operations	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X			X			15.10	0.330	1.30	7.40	NM
CHLL-MW51-X-Y'	8/20/2014	CHLL-GW51-8-13'	1408234	-88.40685833	47.18987222	8 - 13	Proximity to a historical flotation and leaching operations	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X			X			11.90	0.404	2.20	7.43	NM
CHLL-MW52-X-Y'	8/20/2014	CHLL-GW52-9-14'	1408234	-88.40671389	47.190275	9 - 14	Proximity to semivolatile detections	Temporary Screen Interval: 9 ft - 14 ft	Grab Sample	Peristaltic Pump			X							X			X			13.20	0.418	3.80	7.63	NM
CHLL-MW53-X-Y'	8/20/2014	CHLL-GW53-8-13'	1408234	-88.40654722	47.190625	8 - 13	Proximity to semivolatile detections	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X			X			14.20	0.408	2.80	8.13	NM
CHLL-MW54-X-Y'	8/20/2014	CHLL-GW54-10-15'	1408234	-88.40657099	47.19139656	10 - 15	Proximity to semivolatile detections	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X					X		X			X			13.80	0.940	61.00	7.09	NM
CHLL-MW55-X-Y'	8/20/2014	CHLL-GW55-9-14'	1408234	-88.40615	47.191175	9 - 14	Proximity to a historical electrical generator/transformers.	Temporary Screen Interval: 9 ft - 14 ft	Grab Sample	Peristaltic Pump			X					X		X			X			12.00	1.420	2.30	8.10	NM
CHLL-MW56-X-Y'	8/20/2014	CHLL-GW56-9-14'	1408234	-88.40631667	47.19090833	9 - 14	Proximity to a historical electrical generator/transformers.	Temporary Screen Interval: 9 ft - 14 ft	Grab Sample	Peristaltic Pump			X					X		X			X			12.50	0.980	3.40	8.05	NM
CHLL-MW76-X-Y'	8/19/2015	CHLL-GW76-10'-15'	1508196	-88.4101091	47.18725742	10 - 15	Proximity to historical PCB detections	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X				X	X		X						NM	NM	NM	NM	NM
--	8/19/2015	CHLL-GW76-10'-15' DUP	1508196	-88.4101091	47.18725742	10 - 15	Proximity to historical PCB detections	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample, QA/QC - Duplicate Sample	Peristaltic Pump			X				X	X		X										
CHLL-MW77-X-Y'	8/19/2015	CHLL-GW77-10'-15'	1508196	-88.41000722	47.18734554	10 - 15	Proximity to historical PCB detections	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X				X	X		X						NM	NM	NM	NM	NM
CHLL-MW78-X-Y'	8/19/2015	CHLL-GW78-10'-15'	1508196	-88.41016841	47.18710907	10 - 15	Proximity to historical PCB detections	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X				X	X		X						NM	NM	NM	NM	NM
Sediment and Surface Water																														
CHLL-SD12-0-6"	6/15/2014	CHLL-SD12-0"-6"	1406230	-88.40472113	47.18784236	0 - 0.5	Proximity to reported dumping/disposal areas, proximity to the public beach	SAND, Fine to medium grained, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD12-1-3'	6/15/2014	CHLL-SD12-1'-2.5'	1406230	-88.40472113	47.18784236	1 - 2.5	Proximity to reported dumping/disposal areas, proximity to the public beach	SAND, Fine to medium grained, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD12-3-5'	--	--	--	--	--	--	Proximity to reported dumping/disposal areas, proximity to the public beach	--	Sample Not collected - Low recovery	--					--					--										
CHLL-SD13-0-6"	6/15/2014	CHLL-SD13-0"-6"	1406229 1407121	-88.40500421	47.18825094	0 - 0.5	Proximity to reported dumping/disposal areas, proximity to the public beach	SAND, Fine to medium grained, Reddish brown	Grab Sample	Vibracore Sampler					X			X	X	X			X							
CHLL-SD13-1-3'	6/15/2014	CHLL-SD13-1'-2'	1406229	-88.40500421	47.18825094	1 - 2	Proximity to reported dumping/disposal areas, proximity to the public beach	SAND, Fine to medium grained, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
--	6/15/2014	CHLL-SD13-1'-2'-DUP	1406229	-88.40500421	47.18825094	1 - 2	Proximity to reported dumping/disposal areas, proximity to the public beach	SAND, Fine to medium grained, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD13-3-5'	--	--	--	--	--	--	Proximity to reported dumping/disposal areas	--	Sample Not collected - Low recovery	--					--					--										
CHLL-SD14-0-6"	7/11/2014	CHLL-SD14-0"-6"	1407175	-88.40547174	47.18860746	0 - 0.5	Proximity to reported dumping/disposal areas, proximity to the public beach	SILT, Dark brown	Grab Sample	Vibracore Sampler					X			X	X	X			X							
CHLL-SD14-1-3'	7/11/2014	CHLL-SD14-1'-3'	1407175	-88.40547174	47.18860746	1 - 3	Proximity to reported dumping/disposal areas, proximity to the public beach	SILT, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD14-3-5'	7/11/2014	CHLL-SD14-3'-4'	1407175	-88.40547174	47.18860746	3 - 4	Proximity to reported dumping/disposal areas, proximity to the public beach	SILT, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD15-0-6"	6/16/2014	CHLL-SD15-0"-6"	1406229	-88.40606326	47.18891668	0 - 0.5	Proximity to historical PCB detections	SILT, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD15-1-3'	6/16/2014	CHLL-SD15-1'-2.7'	1406229	-88.40606326	47.18891668	1 - 2.7	Proximity to historical PCB detections	SAND, Silty, Fine grained, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD15-3-5'	--	--	--	--	--	--	Sample Not Collected	--	Sample Not collected - Low recovery	--					--					--										
CHLL-SD16-0-6"	7/11/2014	CHLL-SD16-0"-6"	1407175	-88.406047	47.18849123	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD16-1-3'	7/11/2014	CHLL-SD16-1'-3'	1407175	-88.406047	47.18849123	1 - 3	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD16-3-5'	7/11/2014	CHLL-SD16-3'-4'	1407175	-88.406047	47.18849123	3 - 4	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD16-3-5'	7/11/2014	CHLL-SD16-3'-4'-DUP	1407175	-88.406047	47.18849123	3 - 4	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD17-0-6"	7/12/2014	CHLL-SD17-0"-6"	1407166	-88.40608744	47.18875752	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown	Grab Sample	Vibracore Sampler					X					X										
--	7/12/2014	CHLL-SD17-1'-3'	1407166	-88.40608744	47.18875752	1 - 3	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample, Field Determined	Vibracore Sampler					X					X										
--	7/12/2014	CHLL-SD17-3'-5'	1407166	-88.40608744	47.18875752	3 - 5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample, Field Determined	Vibracore Sampler					X					X										
CHLL-SD18-0-6"	7/12/2014	CHLL-SD18-0"-6"	1407166	-88.40691288	47.18875298	0 - 0.5	Proximity to historical PCB detections	SAND, Silty, Fine grained, Reddish brown	Grab Sample	Vibracore Sampler					X			X	X	X			X							
--	7/12/2014	CHLL-SD18-1'-2.7'	1407166	-88.40691288	47.18875298	1 - 2.7	Proximity to historical PCB detections	SAND, Silty, Poorly sorted, Reddish brown	Composite Sample, Field Determined	Vibracore Sampler					X			X	X	X			X							
CHLL-SD19-0-6"	7/12/2014	CHLL-SD19-0"-6"	1407166	-88.4067679	47.1889803	0 - 0.5	Proximity to historical PCB detections	SAND, Poorly sorted, Brown	Grab Sample	Vibracore Sampler					X			X	X	X			X							
CHLL-SD19-1-3'	7/12/2014	CHLL-SD19-1'-2.4'	1407175	-88.4067679	47.1889803	1 - 2.4	Proximity to historical PCB detections	SAND, Poorly sorted, Few Pebbles, Brown	Composite Sample, Field Determined	Vibracore Sampler					X			X	X	X										
CHLL-SD20-0-6"	6/16/2014	CHLL-SD20-0"-6"	1406229	-88.40681175	47.18794425	0 - 0.5	Proximity to a historical generating station or electrical substation.	SAND, Fine grained, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD20-1-3'	6/16/2014	CHLL-SD20-1'-2'	1406229	-88.40681175	47.18794425	1 - 2	Proximity to a historical generating station or electrical substation.	SAND, Poorly sorted, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD20-3-5'	--	--	--	--	--	--	Proximity to a historical generating station or electrical substation.	--	Sample Not Collected, Low Recovery	--					--					--										
CHLL-SD21-0-6"	7/10/2014	CHLL-SD21-0"-6"	1407176	-88.407534538	47.187633652	0 - 0.5	Proximity to a historical generating station or electrical substation.	SAND, Poorly sorted, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD21-1-2'	--	--	--	--	--	--	Proximity to a historical generating station or electrical substation.	--	Sample Not Collected, Low Recovery	--					--					--										
CHLL-SD21-3-5'	--	--	--	--	--	--	Proximity to a historical generating station or electrical substation.	--	Sample Not Collected, Low Recovery	--					--					--										

Table 3-2
Sampling and Analysis Summary
Lake Linden Recreation Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
CHLL-SD22-0-6"	6/16/2014	CHLL-SD22-0"-6"	1406229	-88.4082893	47.18752254	0 - 0.5	Proximity to a historical generating station or electrical substation.	SAND, Poorly sorted, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
--	6/16/2014	CHLL-SD22-0"-6"-DUP	1406229	-88.4082893	47.18752254	0 - 0.5	Proximity to a historical generating station or electrical substation.	SAND, Poorly sorted, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD22-1-3'	6/16/2014	CHLL-SD22-1'-1.5'	1406229	-88.4082893	47.18752254	1 - 1.5	Proximity to a historical generating station or electrical substation.	SAND, Poorly sorted, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD22-3-5'	--	--	--	--	--	--	Proximity to a historical generating station or electrical substation.	--	Sample Not Collected, Low Recovery	--					--					--										
CHLL-SD23-0-6"	7/10/2014	CHLL-SD23-0"-6"	1407176	-88.4090053	47.18725446	0 - 0.5	Proximity to a historical generating station or electrical substation.	SAND, Silty, Fine grained, Dark brown, With wood debris	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD23-1-3'	7/10/2014	CHLL-SD23-1'-1.5'	1407175	-88.4090053	47.18725446	1 - 1.5	Proximity to a historical generating station or electrical substation.	SAND, Silty, Fine grained, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD23-3-5'	--	--	--	--	--	--	Proximity to a historical generating station or electrical substation.	--	Sample Not Collected, Low Recovery	--					--					--										
CHLL-SD73-0-6"	5/27/2015	CHLL-SD-73 0'-6"	1506001	-88.40654548	47.18909634	0 - 0.5	Proximity to historical PCB detections	SILT, Dark Brown, sandy	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD73-1-3'	5/27/2015	CHLL-SD-73 1'-3'	1506001	-88.40654548	47.18909634	1 - 3	Proximity to historical PCB detections	SAND, Reddish brown, fine grained, silty to 2.1 ft; SILT, Reddish brown	Composite Sample	Vibracore Sampler					X			X		X										
--	5/27/2015	CHLL-SD-73 1'-3' DUP	1506001	-88.40654548	47.18909634	1 - 3	Proximity to historical PCB detections	SAND, Reddish brown, fine grained, silty to 2.1 ft; SILT, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X			X		X										
CHLL-SD73-3-5'	5/27/2015	CHLL-SD-73 3'-4.9'	1506001	-88.40654548	47.18909634	3 - 4.9	Proximity to historical PCB detections	Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD74-0-6"	5/27/2015	CHLL-SD-74 0'-6"	1506001	-88.40632968	47.18899332	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD74-1-3'	5/27/2015	CHLL-SD-74 1'-3'	1506001	-88.40632968	47.18899332	1 - 3	Proximity to historical PCB detections	SILT, Reddish brown	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD74-3-5'	5/27/2015	CHLL-SD-74 3'-5'	1506001	-88.40632968	47.18899332	3 - 5	Proximity to historical PCB detections	SILT, Reddish brown to 3.9 ft; SAND, Reddish brown, fine-medium grained, silty	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD75-0-6"	5/27/2015	CHLL-SD-75 0'-6"	1506001	-88.40609369	47.18910542	0 - 0.5	Proximity to historical PCB detections	SAND, Brown, poorly sorted	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD75-1-3'	5/27/2015	CHLL-SD-75 1'-3'	1506001	-88.40609369	47.18910542	1 - 3	Proximity to historical PCB detections	SAND, Reddish brown, poorly sorted to 2 ft; SAND, Reddish brown, fine to medium grained	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD75-3-5'	5/27/2015	CHLL-SD-75 3'-5'	1506001	-88.40609369	47.18910542	3 - 5	Proximity to historical PCB detections	SAND, Reddish brown, fine to medium grained	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD76-0-6"	5/28/2015	CHLL-SD-76 0-6"	1506002	-88.40522141	47.18886121	0 - 0.5	Proximity to historical PCB detections	SAND, Reddish brown, fine to medium grained	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD76-1-3'	5/28/2015	CHLL-SD-76 1'-3'	1506002	-88.40522141	47.18886121	1 - 3	Proximity to historical PCB detections	SAND, Reddish brown, poorly sorted to 3.75 ft; SAND, Reddish brown, fine grained	Composite Sample	Vibracore Sampler					X			X		X										
--	5/28/2015	CHLL-SD-76 1'-3' DUP	1506002	-88.40522141	47.18886121	1 - 3	Proximity to historical PCB detections	SAND, Reddish brown, poorly sorted to 3.75 ft; SAND, Reddish brown, fine grained	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X			X		X										
CHLL-SD76-3-5'	5/28/2015	CHLL-SD-76 3'-5'	1506002	-88.40522141	47.18886121	3 - 5	Proximity to historical PCB detections	SAND, Reddish brown, fine to medium grained	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD77-0-6"	5/28/2015	CHLL-SD-77 0-6"	1506002	-88.40490932	47.1886722	0 - 0.5	Proximity to historical PCB detections	SAND, Reddish brown, fine to medium grained	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD77-1-3'	5/28/2015	CHLL-SD-77 1'-3'	1506002	-88.40490932	47.1886722	1 - 3	Proximity to historical PCB detections	SAND, Reddish brown, fine to medium grained	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD77-3-5'	5/28/2015	CHLL-SD-77 3'-5'	1506002	-88.40490932	47.1886722	3 - 5	Proximity to historical PCB detections	SAND, Reddish brown, fine to medium grained, Silty	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD78-0-6"	5/28/2015	CHLL-SD-78 0-6"	1506002	-88.40505358	47.18841752	0 - 0.5	Proximity to historical PCB detections	SILT, Dark Brown	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD78-1-3'	5/28/2015	CHLL-SD-78 1'-3'	1506002	-88.40505358	47.18841752	1 - 3	Proximity to historical PCB detections	SILT, Reddish brown, Clayey	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD78-3-5'	5/28/2015	CHLL-SD-78 3'-5'	1506002	-88.40505358	47.18841752	3 - 5	Proximity to historical PCB detections	SAND, Reddish brown, fine grained	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD79-0-6"	5/28/2015	CHLL-SD-79 0-6"	1506002	-88.40538279	47.1883839	0 - 0.5	Proximity to historical PCB detections	SILT, Dark Brown	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD79-1-3'	5/28/2015	CHLL-SD-79 1'-3'	1506002	-88.40538279	47.1883839	1 - 3	Proximity to historical PCB detections	SILT, Reddish brown, Clayey	Composite Sample	Vibracore Sampler					X			X		X										
--	5/28/2015	CHLL-SD-79 1'-3' DUP	1506002	-88.40538279	47.1883839	1 - 3	Proximity to historical PCB detections	SILT, Reddish brown, Clayey	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X			X		X										
CHLL-SD79-3-5'	5/28/2015	CHLL-SD-79 3'-4.75'	1506002	-88.40538279	47.1883839	3 - 4.75	Proximity to historical PCB detections	SILT, Reddish brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD80-0-6"	5/27/2015	CHLL-SD-80 0'-6"	1506001	-88.40584112	47.18824185	0 - 0.5	Proximity to historical PCB detections	SILT, Dark Brown	Grab Sample	Vibracore Sampler					X				X	X			X							
CHLL-SD80-1-3'	5/27/2015	CHLL-SD-80 1'-3'	1506001	-88.40584112	47.18824185	1 - 3	Proximity to historical PCB detections	SILT, Reddish brown, Clayey	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD80-3-5'	5/27/2015	CHLL-SD-80 3'-4.75'	1506001	-88.40584112	47.18824185	3 - 4.75	Proximity to historical PCB detections	SILT, Reddish brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD81-0-6"	5/27/2015	CHLL-SD-81 0'-6"	1506001	-88.40624104	47.18845824	0 - 0.5	Proximity to historical PCB detections	SILT, Dark Brown	Grab Sample	Vibracore Sampler					X					X			X							
CHLL-SD81-1-3'	5/27/2015	CHLL-SD-81 1'-3'	1506001	-88.40624104	47.18845824	1 - 3	Proximity to historical PCB detections	SILT, Reddish brown	Composite Sample	Vibracore Sampler					X			X		X										
CHLL-SD81-3-5'	5/27/2015	CHLL-SD-81 3'-4'	1506001	-88.40624104	47.18845824	3 - 4	Proximity to historical PCB detections	SILT, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD82-0-6"	5/28/2015	CHLL-SD-82 0"-6"	1506002 1508147	-88.40668455	47.18853551	0 - 0.5	Proximity to historical PCB detections	SILT, Dark Brown, Sandy	Grab Sample	Vibracore Sampler					X				X	X										
CHLL-SD82-1-3'	5/28/2015	CHLL-SD-82 1'-3'	1506002	-88.40668455	47.18853551	1 - 3	Proximity to historical PCB detections	SILT, Dark Brown, Sandy to 2 ft; SAND, Reddish-Brown, fine to medium grained	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD82-3-5'	5/28/2015	CHLL-SD-82 3'-4.75'	1506002	-88.40668455	47.18853551	3 - 4.75	Proximity to historical PCB detections	SAND, Reddish-Brown, fine to medium grained	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD101-0-6"	7/12/2015	CHLL-SD-101-0-6"	1507172	-88.40579419	47.18807105	0 - 0.5	Proximity to historical PCB detections	SILT WITH ORGANICS, dark brown to black, wet, soft	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD101-1-2'	7/12/2015	CHLL-SD-101-1-3'	1507172	-88.40579419	47.18807105	1 - 3	Proximity to historical PCB detections	CLAY WITH SILT, dark brown, wet, soft; SILT WITH TRACE SAND, dark brown, wet, soft to firm	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD101-3-5'	7/12/2015	CHLL-SD-101-3-4.75'	1507172	-88.40579419	47.18807105	3 - 4.75	Proximity to historical PCB detections	SILT WITH TRACE SAND, dark brown, wet, soft to firm	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD102-0-6"	7/12/2015	CHLL-SD-102-0-6"	1507172	-88.40635777	47.18821708	0 - 0.5	Proximity to historical PCB detections	SILT WITH SAND, light brown to black, wet, soft	Grab Sample	Vibracore Sampler					X				X	X					X					
CHLL-SD102-1-3'	7/12/2015	CHLL-SD-102-1-3'	1507172	-88.40635777	47.18821708	1 - 3	Proximity to historical PCB detections	SAND WITH SILT, dark brown, wet, loose to medium dense, fine to medium, angular to1.75 ft; SILT WITH SAND, dark brown, wet, firm, angular	Composite Sample	Vibracore Sampler					X					X					X					
CHLL-SD102-3-5'	7/12/2015	CHLL-SD-102-3-5'	1507172	-88.40635777	47.18821708	3 - 5	Proximity to historical PCB detections	SILT WITH SAND, dark brown, wet, firm, silt with fine angular sand	Composite Sample	Vibracore Sampler					X					X										
CHLL-SW01-X-Y'	05/27/15	CHLL-SW01- 6.7-7.7'	1506003	-88.40654548	47.18909634	6.7 - 7.7	Proximity to historical PCB detections.	--	Grab Sample	Peristaltic Pump				X						X						NM	NM	NM	NM	NM
CHLL-SW02-X-Y'	05/27/15	CHLL-SW02-12.5-13.5'	1506003	-88.40632968	47.18899332	12.5 - 13.5	Proximity to historical PCB detections	--	Grab Sample	Peristaltic Pump				X						X						NM	NM	NM	NM	NM
CHLL-SW03-X-Y'	05/28/15	CHLL-SW03-18.4-19.4'	1506003	-88.40538279	47.1883839	18.4 - 19.4	Proximity to historical PCB detections	--	Grab Sample	Peristaltic Pump				X						X						NM	NM	NM	NM	NM
CHLL-SW04-X-Y'	05/28/15	CHLL-SW04-11.5-12.5'	1506003	-88.40668455	47.18853551	11.5 - 12.5	Proximity to historical PCB detections	--	Grab Sample	Peristaltic Pump				X						X						NM	NM	NM	NM	NM

Notes:
% = Percent
°C = Degrees Celsius
CHLL = C&H Lake Linden Operations
DRO = Diesel Range Organics
ft = Feet
GW = Groundwater
mS/cm = Millisiemens per Centimeter
MW = Monitoring Well
NM = Not Measured
ORO = Oil Range Organics
PNAs = Polynuclear Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
SB = Soil Boring
SD = Sediment
VOCs = Volatile Organic Compounds
X = Analyte selected for laboratory analysis

For the purposes of this investigation, sediments include residues and waste material associated with chemical containers and deposits on the lake bottom historically discarded in Torch Lake.

Table 3-2
Sampling and Analysis Summary
Lake Linden Processing Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
Soil Borings																														
CHLL-SB23-0-6"	--	--	--	--	--	--	Proximity to a historical generating station or electrical substation.	--	Sample Not Collected - Clay Cap	--	--									--										
CHLL-SB23-X-Y	8/18/2015	CHLL - SB - 23 - 4'-4.5'	1508201	-88.41272498	47.1852047	4 - 4.5	Proximity to a historical generating station or electrical substation.	FILL, SAND, Light brown to 4 ft; CLAY, Reddish brown	Grab Sample	Direct Push Boring		X								X										
CHLL-SB23-X-Y	8/18/2015	CHLL - SB - 23 - 4.5'-13'	1508201	-88.41272498	47.1852047	4.5 - 13	Proximity to a historical generating station or electrical substation.	FILL, SAND, Light brown to 4 ft; CLAY, Reddish brown to 4.75 ft; SAND, Reddish brown, Fine to medium to 5 ft; SAND Dark gray, Medium to coarse to 11 ft; SAND, Reddish brown, Fine to medium	Composite Sample	Direct Push Boring		X								X										
CHLL-SB24-0-6"	--	--	--	--	--	--	Proximity to a historical generating station or electrical substation.	--	Sample Not Collected - Sand and Clay Cap	--	--								--	--			--							
CHLL-SB24-X-Y'	8/18/2015	CHLL - SB - 24 - 3.5'-4'	1508201	-88.41307513	47.18450463	3.5 - 4	Proximity to a historical generating station or electrical substation.	SAND, medium, dark gray	Grab Sample	Direct Push Boring		X							X	X			X							
CHLL-SB24-X-Y'	8/18/2015	CHLL - SB - 24 - 4'-15'	1508201	-88.41307513	47.18450463	4 - 15	Proximity to a historical generating station or electrical substation.	SAND, fine, light brown; SAND, medium to coarse, reddish brown to dark gray	Composite Sample	Direct Push Boring		X								X										
CHLL-SB25-0-6"	--	--	--	--	--	--	Proximity to a historical generating station or electrical substation.	--	Sample Not Collected - Sand and Clay Cap	--	--								--	--										
CHLL-SB25-X-Y'	8/18/2015	CHLL - SB - 25 - 5'-5.5'	1508201	-88.41366014	47.18442354	5 - 5.5	Proximity to a historical generating station or electrical substation.	SAND, medium to course grained, dark gray	Grab Sample	Direct Push Boring		X							X	X			X							
CHLL-SB25-X-Y'	8/18/2015	CHLL - SB - 25 - 5.5'-11'	1508202	-88.41366014	47.18442354	5.5 - 11	Proximity to a historical generating station or electrical substation.	SAND, medium to course grained, dark gray 5 ft to 10 ft; SAND fine to medium, reddish brown 10 ft to 11 ft	Composite Sample	Direct Push Boring		X								X										
--	8/18/2015	CHLL - SB - 25 - 5.5'-11' DUP	1508202	-88.41366014	47.18442354	5.5 - 11	QA/QC Duplicate Sample	SAND, medium to course grained, dark gray 5 ft to 10 ft; SAND fine to medium, reddish brown 10 ft to 11 ft	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X								X										
CHLL-SB51-0-6"	6/15/2014	CHLL-SB51-0"-6"	1406233 240-38977	-88.414387755	47.186334403	0 - 0.5	Proximity to historical assay laboratory.	TOPSOIL, Sandy, Fine grained, Gray	Grab Sample	Direct Push Boring	X							X	X	X			X	X						
CHLL-SB51-X-Y'	6/15/2014	CHLL-SB51-6"'-5'	1406233	-88.414387755	47.186334403	0.5 - 5	Proximity to historical assay laboratory.	SAND, Fine grained, Dark gray	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB142-0-6"	5/13/2015	CHLL-SB-142-0-6"	1505144 240-51104	-88.41078705	47.18776805	0 - 0.5	Proximity to historical PCB detections	TOPSOIL	Grab Sample	Direct Push Boring	X									X				X						
CHLL-SB142-X-Y'	5/13/2015	CHLL-SB-142-6"-8'	1505144	-88.41078705	47.18776805	0.5 - 8	Proximity to historical PCB detections	SAND, Fine grained to 1.5 ft, Gray; FILL, Gravel and Wood to 2.5 ft; SAND, Brown, Medium to fine grained	Composite Sample	Direct Push Boring		X					X	X		X										
CHLL-SB143-0-6"	5/13/2015	CHLL-SB-143-0-6"	1505144 240-51104	-88.410638	47.187401	0 - 0.5	Proximity to historical PCB detections	TOPSOIL	Grab Sample	Direct Push Boring	X									X				X						
CHLL-SB143-X-Y'	5/13/2015	CHLL-SB-143-6"-5'	1505144	-88.410638	47.187401	0.5 - 5	Proximity to historical PCB detections	SAND, Gray, Fine grained to 1.5 ft; SAND, Brown, Medium to fine grained	Composite Sample	Direct Push Boring		X					X	X		X										
CHLL-SB144-0-6"	5/13/2015	CHLL-SB144-0-6"	1505144 240-51104	-88.4107631	47.18720106	0 - 0.5	Proximity to historical PCB detections	SAND, Gray, Fine grained	Grab Sample	Direct Push Boring	X									X				X						
CHLL-SB144-X-Y'	5/13/2015	CHLL-SB-144-6"-5'	1505144	-88.4107631	47.18720106	0.5 - 5	Proximity to historical PCB detections	SAND, Gray, Fine grained to 1 ft; SAND, Brown, Medium to fine grained to 5 ft; SAND, Reddish brown, Medium grained	Composite Sample	Direct Push Boring		X					X	X		X										
CHLL-SB145-0-6"	5/13/2015	CHLL-SB-145-0-6"	1505144 240-51104	-88.411609	47.18663	0 - 0.5	Proximity to historical PCB detections	Surface soil	Grab Sample	Hand Tools	X									X				X						
CHLL-SB145-X-Y'	--	--	--	--	--	--	Proximity to historical PCB detections	--	Sample Not Collected - Refusal	--		--					--	--	--	--			--							
CHLL-SB159-0-6"	8/18/2015	CHLL-SB159-3"-9"	1508201 240-54660-1	-88.41209208	47.18611352	0.25 - 0.75	Proximity to historical PCB detections	CLAY CAP and FILL SAND	Grab Sample	Direct Push Boring	X						X	X	X	X			X	X						
CHLL-SB159-X-Y'	8/18/2015	CHLL - SB - 159 - 3"-12'	1508201	-88.41209208	47.18611352	0.75 - 12	Proximity to historical PCB detections	FILL, SAND, Dark gray, Medium to 3.5 ft; SAND, Reddish brown, Fine to medium to 11 ft; CLAY, Reddish brown to 11.5 ft; SAND, Reddish brown, Fine to medium	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB160-0-6"	--	--	--	--	--	--	Proximity to historical PCB detections	--	Sample Not Collected - Clay Cap	--	--						--	--	--	--			--	--						
CHLL-SB160-X-Y'	8/18/2015	CHLL-SB160-9"-15"	1508201 240-54660-1	-88.41235956	47.1857789	0.75 - 1.25	Proximity to historical PCB detections	FILL, SAND, Dark gray, Medium	Grab Sample	Direct Push Boring		X					X	X	X	X			X	X						
CHLL-SB160-X-Y'	8/18/2015	CHLL - SB160 - 15"-12'	1508201	-88.41235956	47.1857789	1.25 - 12	Proximity to historical PCB detections	FILL, SAND, Dark gray, Medium to 6 ft; CLAY, Reddish brown to 6.5 ft; SAND, Reddish brown, Fine to medium	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB161-0-6"	--	--	--	--	--	--	Proximity to historical PCB detections	--	Sample Not Collected - Sand and Clay Cap	--	--						--	--	--	--			--	--						
CHLL-SB161-X-Y'	8/18/2015	CHLL - SB161 - 3'-3.5'	1508201 240-54660-1	-88.41349427	47.18409792	3 - 3.5	Proximity to historical PCB detections	SAND, Dark gray, Medium to coarse	Grab Sample	Direct Push Boring		X					X	X	X	X			X	X						
CHLL-SB161-X-Y'	8/18/2015	CHLL - SB161 - 3.5'-9'	1508202	-88.41349427	47.18409792	3.5 - 9	Proximity to historical PCB detections	SAND, Dark gray, Medium to coarse	Composite Sample	Direct Push Boring		X						X	X	X			X							
Surface Soil																														
CHLL-SS10	7/1/2015	CHLL-SS10-0-6"	240-52869	-88.41089	47.187459	0 - 0.5	Eroded channel where apparent runoff discharges to Torch Lake	SAND AND GRAVEL, Brownish black	Grab Sample	Hand Tools	X													X						
CHLL-SS11	7/1/2015	CHLL-SS11-0-6"	240-52869	-88.411151	47.186941	0 - 0.5	Eroded channel where apparent runoff discharges to Torch Lake	SAND AND GRAVEL, Brownish black	Grab Sample	Hand Tools	X													X						
CHLL-SS12	7/1/2015	CHLL-SS12-0-6"	240-52869	-88.411221	47.186729	0 - 0.5	Eroded channel where apparent runoff discharges to Torch Lake	SAND AND GRAVEL, Brownish black	Grab Sample	Hand Tools	X													X						
CHLL-SS13	7/1/2015	CHLL-SS13-0-6"	240-52869	-88.411121	47.186749	0 - 0.5	Proximity to partially buried abandoned containers	SANDY LOAM, Black, Organics, Wet	Grab Sample	Hand Tools	X													X						
CHLL-SS16	8/19/2015	CHLL-SS16- 0"-6"	1508198	-88.41156802	47.18490741	0 - 0.5	Proximity to partially buried abandoned containers	SANDY LOAM, Black, Organics, Wet	Grab Sample	Hand Tools	X						X	X	X	X			X							
CHLL-SS17	8/19/2015	CHLL-SS17- 0"-6"	1508198	-88.41154282	47.1849048	0 - 0.5	Proximity to partially buried abandoned containers	SANDY LOAM, Black, Organics, Wet	Grab Sample	Hand Tools	X						X	X	X	X			X							
Groundwater																														
CHLL-MW12-X-Y	8/18/2015	CHLL-GW12-18'-23'	1508196	-88.41272498	47.1852047	18 - 23	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 18 ft - 23 ft	Grab Sample	Peristaltic Pump			X				X	X		X						20.1	0.71	76	6.93	NM
CHLL-MW13-X-Y	8/18/2015	CHLL-GW13-17'-22'	1508196	-88.41307513	47.18450463	17 - 22	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 17 ft - 22 ft	Grab Sample	Peristaltic Pump			X				X	X		X						16.2	0.61	39.1	6.66	NM
CHLL-MW14-X-Y	8/18/2015	CHLL-GW14-17'-22'	1508196	-88.41366014	47.18442354	17 - 22	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 17 ft - 22 ft	Grab Sample	Peristaltic Pump			X				X	X		X						22.2	1.07	NM	6.99	NM
CHLL-MW36-X-Y'	6/15/2014	CHLL-GW36-12'-17'	1406236	-88.414387755	47.186334403	12 - 17	Proximity to historical assay laboratory.	Temporary Screen Interval: 12 ft - 17 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						11.10	0.180	112.50	7.45	NM
CHLL-GW64-X-Y'	5/13/2015	CHLL-GW-64-13'-18'	1505145	-88.41078705	47.18776805	13 - 18	Proximity to historical PCB detections	Temporary Screen Interval: 13 ft - 18 ft	Grab Sample	Peristaltic Pump			X				X	X		X						7.40	0.293	94.00	7.49	NM
CHLL-GW65-X-Y'	5/13/2015	CHLL-GW-65-10'-15'	1505145	-88.410638	47.187401	10 - 15	Proximity to historical PCB detections	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X				X	X		X						8.40	0.341	87.80	7.24	NM
CHLL-GW66-X-Y'	5/13/2015	CHLL-GW-66-10'-15'	1505145	-88.4107631	47.18720106	10 - 15	Proximity to historical PCB detections	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X				X	X		X						7.60	0.304	9.00	7.20	NM
CHLL-GW71-X-Y'	8/18/2015	CHLL-GW71-17'-22'	1508196	-88.41209208	47.18611352	17 - 22	Proximity to historical PCB detections	Temporary Screen Interval: 17 ft - 22 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						NM	NM	NM	NM	NM
CHLL-GW72-X-Y'	8/18/2015	CHLL-GW72-21'-26'	1508196	-88.41235956	47.1857789	21 - 26	Proximity to historical PCB detections	Temporary Screen Interval: 21 ft - 26 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						22.50	0.473	48.80	6.46	NM
CHLL-GW73-X-Y'	8/18/2015	CHLL-GW73-13'-18'	1508196	-88.41349427	47.18409792	13 - 18	Proximity to historical PCB detections	Temporary Screen Interval: 13 ft - 18 ft	Grab Sample	Peristaltic Pump			X				X	X	X	X						17.00	0.960	58.80	6.64	NM
Sediment and Surface Water																														
CHLL-SD25-0-6"	7/11/2014	CHLL-SD25-0"-6"	1407165	-88.40944532	47.18623018	0 - 0.5	Proximity to a historical generating station or electrical substation.	SILT, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD25-1-2'	7/11/2014	CHLL-SD25-1'-3'	1407165	-88.40944532	47.18623018	1 - 3	Proximity to a historical generating station or electrical substation.	SAND, Silty, Fine grained, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD25-3-5'	7/11/2014	CHLL-SD25-3'-4'	1407166	-88.40944532	47.18623018	3 - 4	Proximity to a historical generating station or electrical substation.	SAND, Silty, Fine grained, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD26-0-6"	5/28/2015	CHLL-SD-26 0"-6"	1506002	-88.41004169	47.18588889	0 - 0.5	Proximity to a historical generating station or electrical substation.	SILT, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD26-1-3'	5/28/2015	CHLL-SD-26 1'-3'	1506002	-88.41004169	47.18588889	1 - 3	Proximity to a historical generating station or electrical substation.	SILT, Reddish brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD26-3-5'	5/28/2015	CHLL-SD-26 3'-4.75'	1506002	-88.41004169	47.18588889	3 - 4.75	Proximity to a historical generating station or electrical substation.	SILT, Reddish brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD28-0-6"	7/10/2014	CHLL-SD28-0"-6"	1407176	-88.41092995	47.18488075	0 - 0.5	Proximity to a historical generating station or electrical substation.	SILT, Clayey, Dark Brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD28-1-3'	7/10/2014	CHLL-SD28-1'-2'	1407176	-88.41092995	47.18488075	1 - 2	Proximity to a historical generating station or electrical substation.	SAND, Silty, Poorly sorted, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD28-3-5'	--	--	--	--	--	--	Sample Not Collected, Low Recovery	--	Sample not collected, Low recovery	--					--					--										
CHLL-SD29-0-6"	7/10/2014	CHLL-SD29-0"-6"	1407176	-88.411468664	47.184386639	0 - 0.5	Proximity to a historical generating station or electrical substation.	SAND, Silty, Fine grained, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD29-1-2'	7/10/2014	CHLL-SD29-1'-2.3'	1407176	-88.411468664	47.184386639	1 - 2.3	Proximity to a historical generating station or electrical substation.	SAND, Silty, Fine grained, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD29-3-5'	--	--	--	--	--	--	Sample Not Collected	--	Sample not collected, Low recovery	--					--					--										
CHLL-SD30-0-6"	7/9/2014	CHLL-SD30-0"-6"	1407176	-88.41217951	47.1840607	0 - 0.5	Proximity to a historical generating station or electrical substation.	SILT, Clayey, Dark Brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD30-1-3'	7/9/2014	CHLL-SD30-1'-3'	1407176	-88.41217951	47.1840607	1 - 3	Proximity to a historical generating station or electrical substation.	SILT, Reddish brown; SAND, Clayey, Silty, Poorly sorted	Composite Sample	Vibracore Sampler					X					X										
--	7/9/2014	CHLL-SD30-1'-3'-DUP	1407176	-88.41217951	47.1840607	1 - 3	Proximity to a historical generating station or electrical substation.	SILT, Reddish brown; SAND, Clayey, Silty, Poorly sorted	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD30-3-5'	--	--	--	--	--	--	Proximity to a historical generating station or electrical substation.	--	Sample not collected, Low recovery	Vibracore Sampler					--					--										

Table 3-2
Sampling and Analysis Summary
Lake Linden Processing Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
CHLL-SD53-0-6"	7/15/2014	CHLL-SD53-0"-6"	1407213	-88.41218146	47.18432837	0 - 0.5	Proximity to historical PCB detections	SAND, Silty, Fine grained, Dark brown	Grab Sample	Vibracore Sampler					X			X	X	X			X							
CHLL-SD53-1-2.3'	7/15/2014	CHLL-SD53-1'-2.3'	1407213	-88.41218146	47.18432837	1 - 2.3	Proximity to historical PCB detections	SAND, Silty, Fine grained, Dark brown; Gray staining between 0.5 ft and 2.3 ft	Composite Sample	Vibracore Sampler					X			X	X	X			X							
CHLL-SD83-0-6"	5/28/2015	CHLL-SD83-0"-6"	1506002	-88.41099349	47.18505717	0 - 0.5	Proximity to historical PCB detections	SILT, Dark Brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD83-1-3'	5/28/2015	CHLL-SD83-1'-3'	1506002	-88.41099349	47.18505717	1 - 3	Proximity to historical PCB detections	SILT, Reddish brown, Clayey to 2.1 ft; SILT, Reddish-Brown, sandy, few pieces of slag to 2.5 ft; SILT, Reddish brown, Clayey	Composite Sample	Vibracore Sampler					X			X	X	X			X							
--	5/28/2015	CHLL-SD83-1'-3' DUP	1506002	-88.41099349	47.18505717	1 - 3	Proximity to historical PCB detections	SILT, Reddish brown, Clayey to 2.1 ft; SILT, Reddish-Brown, sandy, few pieces of slag to 2.5 ft; SILT, Reddish brown, Clayey	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD83-3-5'	5/28/2015	CHLL-SD83-3'-4.5'	1506002	-88.41099349	47.18505717	3 - 4.5	Proximity to historical PCB detections	SAND, Light brown to rusty brown, Poorly sorted	Composite Sample	Vibracore Sampler					X			X	X	X			X							
CHLL-SD84-0-6"	6/2/2015	CHLL-SD84-0-6"	1506048	-88.4117852	47.18462343	0 - 0.5	Proximity to historical PCB detections	SILT, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD84-1-3'	6/2/2015	CHLL-SD84-1-3'	1506048	-88.4117852	47.18462343	1 - 3	Proximity to historical PCB detections	SAND, Reddish brown, fine grained, silty to 1.2 ft; SAND, Reddish brown, poorly sorted	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD84-3-5'	6/2/2015	CHLL-SD84-3-3.5'	1506048	-88.4117852	47.18462343	3 - 3.5	Proximity to historical PCB detections	SAND, Reddish brown, poorly sorted	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD96-0-6"	8/23/2015	CHLL - SD96 - 0"-3"	1508213	-88.413241	47.183833	0 - 0.25	Proximity to historical PCB detections	Surface Sediment	Grab Sample	Hand Tools					X					X										
Bulk Asbestos																														
CHLL-ASBBLK38A	6/30/2015	CHLL-ASBBLK38A-063015	240-52869	-88.411011	47.187664	--	Suspect Asbestos Containing Material	Tar-coated rope-like gasket material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK38B	6/30/2015	CHLL-ASBBLK38B-063015	240-52869	-88.411089	47.187412	--	Suspect Asbestos Containing Material	Tar-coated rope-like gasket material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK38C	6/30/2015	CHLL-ASBBLK38C-063015	240-52869	-88.411434	47.186724	--	Suspect Asbestos Containing Material	Tar-coated rope-like gasket material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK39A	6/30/2015	CHLL-ASBBLK39A-063015	240-52869	-88.411001	47.187627	--	Suspect Asbestos Containing Material	Thermal insulating material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK39B	6/30/2015	CHLL-ASBBLK39B-063015	240-52869	-88.411035	47.187573	--	Suspect Asbestos Containing Material	Thermal insulating material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK39C	6/30/2015	CHLL-ASBBLK39C-063015	240-52869	-88.411158	47.186941	--	Suspect Asbestos Containing Material	Thermal insulating material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK40A	6/30/2015	CHLL-ASBBLK40A-063015	240-52869	-88.410997	47.187634	--	Suspect Asbestos Containing Material	Black and silver colored mass of fibrous material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK41A	6/30/2015	CHLL-ASBBLK41A-063015	240-52869	-88.410779	47.187709	--	Suspect Asbestos Containing Material	Blue-gray layered transite-like material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK41B	6/30/2015	CHLL-ASBBLK41B-063015	240-52869	-88.410803	47.187611	--	Suspect Asbestos Containing Material	Blue-gray layered transite-like material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK41C	6/30/2015	CHLL-ASBBLK41C-063015	240-52869	-88.411394	47.186681	--	Suspect Asbestos Containing Material	Blue-gray layered transite-like material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK42A	6/30/2015	CHLL-ASBBLK42A-063015	240-52869	-88.410759	47.18771	--	Suspect Asbestos Containing Material	Gray paper, weathered, layered	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK42B	6/30/2015	CHLL-ASBBLK42B-063015	240-52869	-88.411475	47.186727	--	Suspect Asbestos Containing Material	Gray paper, weathered, layered	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK42C	6/30/2015	CHLL-ASBBLK42C-063015	240-52869	-88.411086	47.187115	--	Suspect Asbestos Containing Material	Gray paper, weathered, layered	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK43A	6/30/2015	CHLL-ASBBLK43A-063015	240-52869	-88.411025	47.187566	--	Suspect Asbestos Containing Material	Grayish white transite fragments	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK43B	6/30/2015	CHLL-ASBBLK43B-063015	240-52869	-88.411056	47.187461	--	Suspect Asbestos Containing Material	Grayish white transite fragments	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK43C	6/30/2015	CHLL-ASBBLK43C-063015	240-52869	-88.411227	47.186737	--	Suspect Asbestos Containing Material	Grayish white transite fragments	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK44A	6/30/2015	CHLL-ASBBLK44A-063015	240-52869	-88.410893	47.187474	--	Suspect Asbestos Containing Material	Grayish white transite fragment	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK45A	6/30/2015	CHLL-ASBBLK45A-063015	240-52869	-88.41106	47.187456	--	Suspect Asbestos Containing Material	Grayish white woven fabric	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK45B	6/30/2015	CHLL-ASBBLK45B-063015	240-52869	-88.411324	47.187117	--	Suspect Asbestos Containing Material	Grayish white woven fabric	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK46A	6/30/2015	CHLL-ASBBLK46A-063015	240-52869	-88.411066	47.187459	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK46B	6/30/2015	CHLL-ASBBLK46B-063015	240-52869	-88.41105	47.187172	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK46C	6/30/2015	CHLL-ASBBLK46C-063015	240-52869	-88.411324	47.187172	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK47A	6/30/2015	CHLL-ASBBLK47A-063015	240-52869	-88.411056	47.187439	--	Suspect Asbestos Containing Material	Grayish white tile board	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK47B	6/30/2015	CHLL-ASBBLK47B-063015	240-52869	-88.411695	47.186368	--	Suspect Asbestos Containing Material	Grayish white tile board	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK47C	6/30/2015	CHLL-ASBBLK47C-063015	240-52869	-88.411422	47.186813	--	Suspect Asbestos Containing Material	Grayish white tile board	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK48A	6/30/2015	CHLL-ASBBLK48A-063015	240-52869	-88.411117	47.18693	--	Suspect Asbestos Containing Material	Gray corrugated pipe wrap	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK48B	6/30/2015	CHLL-ASBBLK48B-063015	240-52869	-88.411173	47.186813	--	Suspect Asbestos Containing Material	Gray corrugated pipe wrap	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK49A	6/30/2015	CHLL-ASBBLK49A-063015	240-52869	-88.411169	47.186839	--	Suspect Asbestos Containing Material	Gray white woven fabric	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK50A	6/30/2015	CHLL-ASBBLK50A-063015	240-52869	-88.410391	47.187396	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK50B	6/30/2015	CHLL-ASBBLK50B-063015	240-52869	-88.410375	47.18743	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK50C	6/30/2015	CHLL-ASBBLK50C-063015	240-52869	-88.410342	47.187494	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK51A	6/30/2015	CHLL-ASBBLK51A-063015	240-52869	-88.411298	47.187206	--	Suspect Asbestos Containing Material	Dense gray mineral-like insulating board	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK51B	6/30/2015	CHLL-ASBBLK51B-063015	240-52869	-88.4113	47.186918	--	Suspect Asbestos Containing Material	Dense gray mineral-like insulating board	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK51C	6/30/2015	CHLL-ASBBLK51C-063015	240-52869	-88.411183	47.186771	--	Suspect Asbestos Containing Material	Dense gray mineral-like insulating board	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK52A	6/30/2015	CHLL-ASBBLK52A-063015	240-52869	-88.411194	47.18695	--	Suspect Asbestos Containing Material	White-colored fiber board with red or blue backing	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK52B	6/30/2015	CHLL-ASBBLK52B-063015	240-52869	-88.411245	47.186839	--	Suspect Asbestos Containing Material	White-colored fiber board with red or blue backing	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK52C	6/30/2015	CHLL-ASBBLK52C-063015	240-52869	-88.411478	47.186534	--	Suspect Asbestos Containing Material	White-colored fiber board with red or blue backing	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK52D	6/30/2015	CHLL-ASBBLK52D-063015	240-52869	-88.411435	47.186536	--	Suspect Asbestos Containing Material	White-colored fiber board with red or blue backing	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK53A	6/30/2015	CHLL-ASBBLK53A-063015	240-52869	-88.411205	47.187058	--	Suspect Asbestos Containing Material	Bright yellow fire brick fragments	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK53B	6/30/2015	CHLL-ASBBLK53B-063015	240-52869	-88.411416	47.186843	--	Suspect Asbestos Containing Material	Bright yellow fire brick fragments	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK53C	6/30/2015	CHLL-ASBBLK53C-063015	240-52869	-88.411576	47.186558	--	Suspect Asbestos Containing Material	Bright yellow fire brick fragments	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK54A	6/30/2015	CHLL-ASBBLK54A-063015	240-52869	-88.411243	47.186729	--	Suspect Asbestos Containing Material	Grayish white flooring plaster	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK55A	6/30/2015	CHLL-ASBBLK55A-063015	240-52869	-88.411745	47.18722	--	Suspect Asbestos Containing Material	Asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK56A	6/30/2015	CHLL-ASBBLK56A-063015	240-52869	-88.41175	47.187147	--	Suspect Asbestos Containing Material	White fibrous insulating material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK57A	6/30/2015	CHLL-ASBBLK57A-063015	240-52869	-88.411816	47.186863	--	Suspect Asbestos Containing Material	Yellow ceramic pavers with brown glaze	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK59A	7/1/2015	CHLL-ASBBLK59A-070115	240-52869	-88.411515	47.184951	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK60A	7/1/2015	CHLL-ASBBLK60A-070115	240-52869	-88.41154	47.184926	--	Suspect Asbestos Containing Material	Grayish white transite	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK61A	7/1/2015	CHLL-ASBBLK61A-070115	240-52869	-88.41151	47.184955	--	Suspect Asbestos Containing Material	Fibrous rope-like material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK62A	7/1/2015	CHLL-ASBBLK62A-070115	240-52869	-88.411438	47.185023	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK63A	7/1/2015	CHLL-ASBBLK63A-070115	240-52869	-88.411604	47.184957	--	Suspect Asbestos Containing Material	Grayish white transite fragment	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK64A	7/1/2015	CHLL-ASBBLK64A-070115	240-52869	-88.414123	47.184397	--	Suspect Asbestos Containing Material	White fibrous insulating material	Bulk Material Sample	Grab						X								X						

Notes:
% = Percent
°C = Degrees Celsius
CHLL = C&H Lake Linden Operations
ft = Feet
GW = Groundwater
mS/cm = Millisiemens per Centimeter
MW = Monitoring Well
NM = Not Measured
PNAs = Polynuclear Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
SB = Soil Boring
SD = Sediment
VOCs = Volatile Organic Compounds
X = Analyte selected for laboratory analysis

For the purposes of this investigation, sediments include residues and waste material associated with chemical containers and deposits on the lake bottom historically discarded in Torch Lake.

Table 3-2
Sampling and Analysis Summary
Hubbell Processing Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
Soil Borings																														
CHLL-SB26-0-6"	6/13/2014	CHLL-SB26-0"-6"	1406231	-88.4155226	47.18108261	0 - 0.5	Proximity to a historical electrical substation.	TOPSOIL, Sandy, Fine grained, Gray	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB26-X-Y'	6/13/2014	CHLL-SB26-6"-30"	1406231 14061049	-88.4155226	47.18108261	0.5 - 2.5	Proximity to a historical electrical substation.	SAND, Fine grained, Brown	Composite Sample	Direct Push Boring		X							X	X	X		X							
CHLL-SB27-0-6"	6/13/2014	CHLL-SB27-0"-6"	1406231	-88.41588189	47.18072306	0 - 0.5	Proximity to a historical electrical substation.	SAND, Medium to fine grained, Gray	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB27-X-Y	6/13/2014	CHLL-SB27-24"-30"	1406231	-88.41588189	47.18072306	2 - 2.5	Proximity to a historical electrical substation.	SAND, Medium grained, Brown	Grab Sample	Direct Push Boring		X							X	X			X							
CHLL-SB28-0-6"	6/13/2014	CHLL-SB28-0"-6"	1406232	-88.41615761	47.18128438	0 - 0.5	Proximity to a historical electrical substation.	SAND, Medium grained, Gray	Grab Sample	Direct Push Boring	X							X	X	X			X							
CHLL-SB28-X-Y'	6/13/2014	CHLL-SB28-6"-4'	1406232	-88.41615761	47.18128438	0.5 - 4	Proximity to a historical electrical substation.	SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X						X	X	X			X							
--	6/13/2014	CHLL-SB28-6"-4'-DUP	1406232	-88.41615761	47.18128438	0.5 - 4	Proximity to a historical electrical substation.	SAND, Medium grained, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X						X	X	X			X							
CHLL-SB29-0-6"	6/13/2014	CHLL-SB29-0"-6"	1406232	-88.41639531	47.18093188	0 - 0.5	Proximity to a historical electrical substation.	SAND, Fine grained, Gray	Grab Sample	Direct Push Boring	X							X	X	X			X							
CHLL-SB29-X-Y	6/13/2014	CHLL-SB29-6"-4'	1406232	-88.41639531	47.18093188	0.5 - 4	Proximity to a historical electrical substation.	SAND, Medium to fine grained, Reddish brown	Composite Sample	Direct Push Boring		X						X	X	X			X							
CHLL-SB30-0-6"	6/13/2014	CHLL-SB30-0"-6"	1406231	-88.41687162	47.17965364	0 - 0.5	Data Gap - Lack of historical data	FILL, Sand and Gravel	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB30-X-Y'	6/13/2014	CHLL-SB30-6"-12"	1406231	-88.41687162	47.17965364	0.5 - 1	Data Gap - Lack of historical data	FILL, Sand and Gravel	Grab Sample	Direct Push Boring		X							X	X			X							
CHLL-SB31-0-6"	6/11/2014	CHLL-SB31-0"-6"	1406176	-88.41810489	47.17850391	0 - 0.5	Data Gap - Lack of historical data	SAND, Coarse to medium grained, Gray	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB31-X-Y	6/11/2014	CHLL-SB31-6"-4'	1406176	-88.41810489	47.17850391	0.5 - 4	Data Gap - Lack of historical data	SAND, Medium to fine grained, Reddish brown	Composite Sample	Direct Push Boring		X							X	X			X							
CHLL-SB32-0-6"	6/11/2014	CHLL-SB32-0"-6"	1406176	-88.41929338	47.17722715	0 - 0.5	Data Gap - Lack of historical data	SAND, Coarse to medium grained, Gray	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB32-X-Y	6/11/2014	CHLL-SB32-6"-4'	1406176	-88.41929338	47.17722715	0.5 - 4	Data Gap - Lack of historical data	SAND, Coarse to fine grained, Reddish brown	Composite Sample	Direct Push Boring		X							X	X			X							
CHLL-SB33-0-6"	6/11/2014	CHLL-SB33-6"-12"	1406177 240-38974	-88.42207981	47.17684282	0.5 - 1	Proximity to a historical generating station or electrical substation.	SAND, Coarse to fine grained, Gray	Grab Sample	Direct Push Boring	X								X	X			X	X						
CHLL-SB33-X-Y'	6/11/2014	CHLL-SB33-1'-4'	1406177	-88.42207981	47.17684282	1 - 4	Proximity to a historical generating station or electrical substation.	SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB34-0-6"	6/11/2014	CHLL-SB34-6"-12"	1406177	-88.42206669	47.17641438	0.5 - 1	Proximity to a historical generating station or electrical substation.	SAND, Medium to fine grained, Gray	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB34-X-Y'	6/11/2014	CHLL-SB34-1'-4'	1406177	-88.42206669	47.17641438	1 - 4	Proximity to a historical generating station or electrical substation.	SAND, Medium to fine grained, Gray to reddish brown	Composite Sample	Direct Push Boring		X								X										
--	6/11/2014	CHLL-SB34-1'-4'-DUP	1406177	-88.42206669	47.17641438	1 - 4	Proximity to a historical generating station or electrical substation.	SAND, Medium to fine grained, Gray to reddish brown	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X								X										
CHLL-SB35-0-6"	--	--	--	-88.42254228	47.1760793	--	Proximity to a historical generating station or electrical substation.	--	Sample Not Collected - FILL, Road gravel	--	--								--	--										
CHLL-SB35-X-Y	6/11/2014	CHLL-SB35-1'-4'	1406177	-88.42254228	47.1760793	1 - 4	Proximity to a historical generating station or electrical substation.	SAND, Medium to fine grained, Gray	Composite Sample	Direct Push Boring		X							X	X			X							
CHLL-SB36-0-6"	6/11/2014	CHLL-SB36-6"-12"	1406177	-88.42268657	47.17529244	0.5 - 1	Proximity to a historical smelter operations	COAL, Coarse to fine grained, Black to 2 ft	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB36-X-Y'	6/11/2014	CHLL-SB36-1'-4'	1406177	-88.42268657	47.17529244	1 - 4	Proximity to a historical smelter operations	COAL, Coarse to fine grained, Black to 2 ft; SAND, Medium to fine grained, Dark gray	Composite Sample	Direct Push Boring		X								X										
CHLL-SB37-0-6"	6/11/2014	CHLL-SB37-6"-12"	1406177 1406761	-88.42319975	47.17494067	0.5 - 1	Proximity to a historical smelter operations	COAL, Coarse to fine grained, Black	Grab Sample	Direct Push Boring	X								X	X	X		X							
CHLL-SB37-X-Y	6/11/2014	CHLL-SB37-1'-4'	1406177	-88.42319975	47.17494067	1 - 4	Proximity to a historical smelter operations	COAL, Coarse to fine grained, Black	Composite Sample	Direct Push Boring		X								X										
CHLL-SB52-0-6"	6/11/2014	CHLL-SB52-0"-6"	1406176 240-38974	-88.42080215	47.17698723	0 - 0.5	Proximity to a historical mineral building operations	SAND, Fine grained, Gray to 1 ft	Grab Sample	Direct Push Boring	X						X	X	X	X			X	X						
CHLL-SB52-X-Y'	6/11/2014	CHLL-SB52-6"-4'	1406176	-88.42080215	47.17698723	0.5 - 4	Proximity to a historical mineral building operations	SAND, Fine grained, Gray to 1 ft; SAND, Medium to fine grained, Reddish Brown	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB58-0-6"	8/19/2014	CHLL-SB58-3"-9"	1408232	-88.423275	47.17525	0.25 - 0.75	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Some metal debris, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB59-0-6"	8/19/2014	CHLL-SB59-3"-9"	1408232	-88.42291944	47.17504444	0.25 - 0.75	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB60-0-6"	8/19/2014	CHLL-SB60-6"-12"	1408232	-88.422375	47.17480278	0.5 - 1	Grid Sampling - PCB Delineation	SAND, Coarse to fine grained, some pebbles, Brown to dark brown	Grab Sample	Hand Tools	X									X										
CHLL-SB61-0-6"	8/19/2014	CHLL-SB61-3"-9"	1408232	-88.42285	47.17552222	0.25 - 0.75	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB62-0-6"	8/19/2014	CHLL-SB62-3"-9"	1408232	-88.42247778	47.1754	0.25 - 0.75	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB63-0-6"	8/19/2014	CHLL-SB63-6"-12"	1408232	-88.42196111	47.17507778	0.5 - 1	Grid Sampling - PCB Delineation	SAND, Coarse to fine grained, some pebbles, Brown to dark brown	Grab Sample	Hand Tools	X									X										
CHLL-SB64-0-6"	8/19/2014	CHLL-SB64-3"-9"	1408232	-88.422475	47.17600833	0.25 - 0.75	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB65-0-6"	8/19/2014	CHLL-SB65-3"-9"	1408233	-88.422064063	47.175774002	0.25 - 0.75	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB66-0-6"	8/19/2014	CHLL-SB66-6"-12"	1408232	-88.42127222	47.17557222	0.5 - 1	Grid Sampling - PCB Delineation	SAND, Coarse to fine grained, Brown	Grab Sample	Hand Tools	X									X										
CHLL-SB67-0-6"	8/19/2014	CHLL-SB67-3"-9"	1408232	-88.42194444	47.17644167	0.25 - 0.75	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB68-0-6"	8/19/2014	CHLL-SB68-3"-9"	1408232	-88.42156389	47.17612778	0.25 - 0.75	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Some metal debris, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB69-0-6"	8/21/2014	CHLL-SB69-0-6"	1408233	-88.42097778	47.17580556	0 - 0.5	Grid Sampling - PCB Delineation	SAND, Coarse to fine grained, Brown	Grab Sample	Hand Tools	X									X										
CHLL-SB70-0-6"	--	--		-88.42244444	47.1769	--	Grid Sampling - PCB Delineation	--	Sample Not Collected - Refusal Concrete Slab	--	--									--										
CHLL-SB71-0-6"	8/19/2014	CHLL-SB71-6"-12"	1408233	-88.422175	47.17711667	0.5 - 1	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB72-0-6"	8/19/2014	CHLL-SB72-3"-9"	1408233	-88.42164167	47.17680556	0.25 - 0.75	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Black to dark brown	Grab Sample	Hand Tools	X									X										
CHLL-SB73-0-6"	8/19/2014	CHLL-SB73-3"-9"	1408233	-88.42110833	47.17649444	0.25 - 0.75	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Black to dark brown	Grab Sample	Hand Tools	X									X										
CHLL-SB74-0-6"	8/20/2014	CHLL-SB74-0-6"	1408232	-88.42049722	47.17615278	0 - 0.5	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Dark brown	Grab Sample, Adjusted location due to flooding	Hand Tools	X							X	X	X			X							
CHLL-SB74R-0-6"	8/21/2014	CHLL-SB74R-0-6"	1408233	-88.420654695	47.176390310	0 - 0.5	Grid Sampling - PCB Delineation	SAND and GRAVEL, Coarse to medium grained, Dark brown	Grab Sample	Hand Tools	X									X										
CHLL-SB75-0-6"	8/20/2014	CHLL-SB75-0-6"	1408232	-88.421695721	47.177495482	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
--	8/20/2014	CHLL-SB75-0-6"-DUP	1408232	-88.421695721	47.177495482	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample, QA/QC - Duplicate Sample	Hand Tools	X									X										
CHLL-SB76-0-6"	8/20/2014	CHLL-SB76-0-6"	1408232	-88.42118611	47.17717222	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB77-0-6"	8/20/2014	CHLL-SB77-0-6"	1408232	-88.42065000	47.17685833	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB78-0-6"	8/20/2014	CHLL-SB78-6-12"	1408232	-88.42001944	47.17650556	0.5 - 1	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB79-0-6"	8/20/2014	CHLL-SB79-0-6"	1408232	-88.42126389	47.17784722	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB80-0-6"	8/20/2014	CHLL-SB80-0-6"	1408232	-88.420767450	47.177561153	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X							X	X	X			X							
--	8/20/2014	CHLL-SB80-0-6"-DUP	1408232	-88.420767450	47.177561153	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample, QA/QC - Duplicate Sample	Hand Tools	X							X	X	X			X							
CHLL-SB81-0-6"	8/20/2014	CHLL-SB81-0-6"	1408232	-88.42019444	47.177225	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB82-0-6"	8/19/2014	CHLL-SB82-0-6"	1408239	-88.41960000	47.17685556	0 - 0.5	Grid Sampling - PCB Delineation	SAND, Fine to medium grained, Gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB82-X-Y'	8/19/2014	CHLL-SB82-6"-5'	1408239	-88.41960000	47.17685556	0.5 - 5	Grid Sampling - PCB Delineation	SAND, Fine to medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB83-0-6"	8/20/2014	CHLL-SB83-0-6"	1408231	-88.42080833	47.17821111	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB84-0-6"	8/20/2014	CHLL-SB84-0-6"	1408231	-88.42027222	47.1779	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
--	8/20/2014	CHLL-SB84-0-6"-DUP	1408231	-88.42027222	47.1779	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample, QA/QC - Duplicate Sample	Hand Tools	X									X										
CHLL-SB85-0-6"	8/20/2014	CHLL-SB85-0-6"	1408231	-88.41973611	47.17758889	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB86-0-6"	8/20/2014	CHLL-SB86-0-6"	1408231	-88.41933889	47.17738333	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB87-0-6"	8/20/2014	CHLL-SB87-0-6"	1408231	-88.42035000	47.17857778	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
--	8/20/2014	CHLL-SB87-0-6"-DUP	1408231	-88.42035000	47.17857778	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample, QA/QC - Duplicate Sample	Hand Tools	X									X										
CHLL-SB88-0-6"	8/20/2014	CHLL-SB88-0-6"	1408231	-88.41981389	47.17826667	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB89-0-6"	8/20/2014	CHLL-SB89-0-6"	1408231	-88.41928056	47.17795278	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB90-0-6"	8/20/2014	CHLL-SB90-0-6"	1408231	-88.41874167	47.177625	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB91-0-6"	8/20/2014	CHLL-SB91-0-6"	1408231	-88.41989167	47.17894167	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB92-0-6"	8/20/2014	CHLL-SB92-0-6"	1408231	-88.41935833	47.17863056	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB93-0-6"	8/20/2014	CHLL-SB93-0-6"	1408231	-88.41882222	47.17831944	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										

Table 3-2
Sampling and Analysis Summary
Hubbell Processing Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
CHLL-SB94-0-6"	8/19/2014	CHLL-SB94-0-6"	1408239	-88.41830278	47.17800556	0 - 0.5	Grid Sampling - PCB Delineation	GRAVEL, Black to 1 ft	Grab Sample	Direct Push Boring	X									X										
CHLL-SB94-X-Y'	8/19/2014	CHLL-SB94-6"-4'	1408239	-88.41830278	47.17800556	0.5 - 4	Grid Sampling - PCB Delineation	GRAVEL, Black to 1 ft; SAND, Coarse grained, Greenish gray to 2 ft; GRAVEL, Gray	Composite Sample	Direct Push Boring		X								X										
CHLL-SB95-0-6"	8/20/2014	CHLL-SB95-0-6"	1408231	-88.41943611	47.17930833	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB96-0-6"	8/20/2014	CHLL-SB96-0-6"	1408231	-88.41890278	47.17899444	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB97-0-6"	8/20/2014	CHLL-SB97-0-6"	1408231	-88.41836667	47.17868333	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
--	8/20/2014	CHLL-SB97-0-6"-DUP	1408231	-88.41836667	47.17868333	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample, QA/QC - Duplicate Sample	Hand Tools	X									X										
CHLL-SB98-0-6"	8/20/2014	CHLL-SB98-0-6"	1408231	-88.41781667	47.17838056	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB99-0-6"	8/20/2014	CHLL-SB99-0-6"	1408231	-88.41898056	47.17967222	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB100-0-6"	8/20/2014	CHLL-SB100-0-6"	1408233	-88.41844444	47.17936111	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB101-0-6"	8/20/2014	CHLL-SB101-0-6"	1408233	-88.41791111	47.17905	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB102-0-6"	8/20/2014	CHLL-SB102-0-6"	1408233	-88.41743333	47.17872778	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB103-0-6"	8/20/2014	CHLL-SB103-0-6"	1408233	-88.41852222	47.18003611	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB104-0-6"	8/20/2014	CHLL-SB104-0-6"	1408233	-88.41798333	47.17972778	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB105-0-6"	8/20/2014	CHLL-SB105-0-6"	1408233	-88.41744722	47.17941667	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB106-0-6"	8/20/2014	CHLL-SB106-0-6"	1408233	-88.41699167	47.17914167	0 - 0.5	Grid Sampling - PCB Delineation	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X									X										
CHLL-SB107-0-6"	8/19/2014	CHLL-SB107-0-6"	1408239	-88.4223639940	47.1775023360	0 - 0.5	Proximity to a historical electrical substation/transformers.	SAND, Medium grained, Brown	Grab Sample	Direct Push Boring	X									X										
CHLL-SB107-X-Y'	8/19/2014	CHLL-SB107-6"-3'	1408239	-88.4223639940	47.1775023360	0.5 - 3	Proximity to a historical electrical substation/transformers.	SAND, Medium grained, Brown to 3 ft; SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB108-0-6"	8/19/2014	CHLL-SB108-0-6"	1408239	-88.4223365780	47.1775611720	0 - 0.5	Proximity to a historical electrical substation/transformers.	SAND, Medium grained, Brown	Grab Sample	Direct Push Boring	X									X										
CHLL-SB108-X-Y'	8/19/2014	CHLL-SB108-6"-3'	1408239	-88.4223365780	47.1775611720	0.5 - 3	Proximity to a historical electrical substation/transformers.	SAND, Medium grained, Brown to 3 ft; SAND, Medium grained, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB126-0-6"	8/19/2014	CHLL-SB126-0-6"	1408238	-88.423081640	47.176166514	0 - 0.5	Proximity to a historical electrical generator/transformers.	ROAD GRAVEL, Sand and gravel, Gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB126-X-Y'	8/19/2014	CHLL-SB126-6"-5'	1408238	-88.423081640	47.176166514	0.5 - 5	Proximity to a historical electrical generator/transformers.	SAND, Coarse grained, With gravel, Gray	Composite Sample	Direct Push Boring		X								X										
CHLL-SB127-0-6"	8/19/2014	CHLL-SB127-0-6"	1408238	-88.423021098	47.176218814	0 - 0.5	Proximity to a historical electrical generator/transformers.	FILL, Sand and gravel, Gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB127-X-Y'	8/19/2014	CHLL-SB127-6"-5'	1408238	-88.423021098	47.176218814	0.5 - 5	Proximity to a historical electrical generator/transformers.	SAND, Coarse grained, With gravel, Gray	Composite Sample	Direct Push Boring		X								X										
CHLL-SB137-0-6"	8/20/2014	CHLL-SB137-0-6"	1408233	-88.41699167	47.17980556	0 - 0.5	Proximity to a historical electrical substation/transformers.	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X								X				X							
CHLL-SB138-0-6"	8/20/2014	CHLL-SB138-0-6"	1408233	-88.416475	47.179825	0 - 0.5	Proximity to a historical electrical substation/transformers.	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X								X				X							
CHLL-SB139-0-6"	8/20/2014	CHLL-SB139-0-6"	1408233	-88.4164	47.18068056	0 - 0.5	Proximity to a historical electrical substation/transformers.	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X								X				X							
CHLL-SB140-0-6"	8/20/2014	CHLL-SB140-0-6"	1408233	-88.41652778	47.18101944	0 - 0.5	Proximity to a historical electrical substation/transformers.	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X								X				X							
CHLL-SB141-0-6"	8/20/2014	CHLL-SB141-0-6"	1408233	-88.4169	47.18198611	0 - 0.5	Proximity to a historical electrical substation/transformers.	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X								X				X							
CHLL-SB146-0-6"	05/12/15	CHLL-SB146-0-6"	1505142	-88.41955668	47.17842005	0 - 0.5	Proximity to historical PCB detection.	SAND, Gray, Medium to fine grained	Grab Sample	Direct Push Boring	X									X										
CHLL-SB146-X-Y'	05/12/15	CHLL-SB146-6"-2.5'	1505142	-88.41955668	47.17842005	0.5 - 2.5	Proximity to historical PCB detection.	SAND, Gray, Medium to fine grained to 1 ft; SAND, Fine to medium, reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB146-X-Y'	05/12/15	CHLL-SB146-2.5'-4'	1505142	-88.41955668	47.17842005	2.5 - 4	Proximity to historical PCB detection.	SAND, Fine to medium, reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB147-0-6"	05/12/15	CHLL-SB147-0-6"	1505142	-88.41914844	47.1780916	0 - 0.5	Proximity to historical PCB detection.	SAND, Gray, Medium to coarse grained	Grab Sample	Direct Push Boring	X									X										
CHLL-SB147-X-Y'	05/12/15	CHLL-SB147-6"-2.5'	1505142	-88.41914844	47.1780916	0.5 - 2.5	Proximity to historical PCB detection.	SAND, Brown, Fine to medium grained	Composite Sample	Direct Push Boring		X								X										
CHLL-SB147-X-Y'	05/12/15	CHLL-SB147-2.5'-4'	1505142	-88.41914844	47.1780916	2.5 - 4	Proximity to historical PCB detection.	SAND, Brown, Fine to medium grained	Composite Sample	Direct Push Boring		X								X										
CHLL-SB148-0-6"	05/12/15	CHLL-SB148-0-6"	1505142	-88.42001326	47.17803217	0 - 0.5	Proximity to historical PCB detection.	SAND, Gray, Medium to coarse grained	Grab Sample	Direct Push Boring	X									X										
CHLL-SB148-X-Y'	05/12/15	CHLL-SB148-6"-2.5'	1505142	-88.42001326	47.17803217	0.5 - 2.5	Proximity to historical PCB detection.	SAND, gray, medium to coarse grained to 1 ft; SAND, Brown, Fine to medium grained	Composite Sample	Direct Push Boring		X								X										
CHLL-SB148-X-Y'	05/12/15	CHLL-SB148-2.5'-4'	1505142	-88.42001326	47.17803217	2.5 - 4	Proximity to historical PCB detection.	SAND, Brown, Fine to medium grained	Composite Sample	Direct Push Boring		X								X										
CHLL-SB149-0-6"	05/12/15	CHLL-SB149-0-6"	1505142	-88.41965851	47.17777139	0 - 0.5	Proximity to historical PCB detection.	SAND, Gray, Medium to coarse grained	Grab Sample	Direct Push Boring	X									X										
CHLL-SB149-X-Y'	05/12/15	CHLL-SB149-6"-2.5'	1505142	-88.41965851	47.17777139	0.5 - 2.5	Proximity to historical PCB detection.	SAND, gray, medium to coarse grained to 1 ft; SAND, Brown, Fine to medium grained	Composite Sample	Direct Push Boring		X								X										
--	05/12/15	CHLL-SB149-6"-2.5'-DUP	1505142	-88.41965851	47.17777139	0.5 - 2.5	Proximity to historical PCB detection.	SAND, gray, medium to coarse grained to 1 ft; SAND, Brown, Fine to medium grained	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X								X										
CHLL-SB149-X-Y'	05/12/15	CHLL-SB149-2.5'-4'	1505142	-88.41965851	47.17777139	2.5 - 4	Proximity to historical PCB detection.	SAND, Brown, Fine to medium grained	Composite Sample	Direct Push Boring		X								X										
CHLL-SB150-0-6"	05/12/15	CHLL-SB150-0-6"	1505142	-88.41993448	47.17762803	0 - 0.5	Proximity to historical PCB detection.	SAND, Gray, Fine grained	Grab Sample	Direct Push Boring	X									X										
CHLL-SB150-X-Y'	05/12/15	CHLL-SB150-6"-2.5'	1505142	-88.41993448	47.17762803	0.5 - 2.5	Proximity to historical PCB detection.	SAND, Gray, Fine grained to 1 ft; SAND, Gray, Medium to fine grained to 2 ft; SAND, Brown, Fine to medium grained	Composite Sample	Direct Push Boring		X								X										
CHLL-SB150-X-Y'	05/12/15	CHLL-SB150-2.5'-4'	1505142	-88.41993448	47.17762803	2.5 - 4	Proximity to historical PCB detection.	SAND, Brown, Fine to medium grained	Composite Sample	Direct Push Boring		X								X										
CHLL-SB151-0-6"	05/12/15	CHLL-SB151-0-6"	1505142	-88.41939757	47.17757741	0 - 0.5	Proximity to historical PCB detection.	SAND and GRAVEL, Gray, Medium to coarse	Grab Sample	Direct Push Boring	X									X										
CHLL-SB151-X-Y'	05/12/15	CHLL-SB151-6"-2.5'	1505142	-88.41939757	47.17757741	0.5 - 2.5	Proximity to historical PCB detection.	SAND and GRAVEL, Gray, Medium to coarse to 2 ft; SAND, Fine to medium, Brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB151-X-Y'	05/12/15	CHLL-SB151-2.5'-4'	1505142	-88.41939757	47.17757741	2.5 - 4	Proximity to historical PCB detection.	SAND, Fine to medium, Brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB152-0-6"	05/12/15	CHLL-SB152-0-6"	1505143	-88.41902594	47.17761272	0 - 0.5	Proximity to historical PCB detection.	SAND and GRAVEL, Gray, Medium to coarse	Grab Sample	Direct Push Boring	X									X										
CHLL-SB152-X-Y'	05/12/15	CHLL-SB152-6"-2.5'	1505143	-88.41902594	47.17761272	0.5 - 2.5	Proximity to historical PCB detection.	SAND and GRAVEL, Gray, Medium to coarse to 1 ft; FILL to 1.5 ft, SAND and GRAVEL, Gray, Medium to coarse	Composite Sample	Direct Push Boring		X								X										
CHLL-SB153-0-6"	05/12/15	CHLL-SB153-0-6"	1505143	-88.41837058	47.17761961	0 - 0.5	Proximity to historical PCB detection.	SAND and GRAVEL, Gray, Medium to coarse	Grab Sample	Direct Push Boring	X									X										
CHLL-SB153-X-Y'	05/12/15	CHLL-SB153-6"-2.5'	1505143	-88.41837058	47.17761961	0.5 - 2.5	Proximity to historical PCB detection.	SAND and GRAVEL, Gray, Medium to coarse to 1 ft; GRAVEL, Reddish brown, to 2 ft, GRAVEL, Gray to 2.5 ft; FILL, Wood debris	Composite Sample	Direct Push Boring		X								X										
CHLL-SB154-0-6"	05/12/15	CHLL-SB154-0-6"	1505143	-88.4187512	47.1773365	0 - 0.5	Proximity to historical PCB detection.	GRAVEL and WOOD, Gray	Grab Sample	Direct Push Boring	X									X										
CHLL-SB154-X-Y'	05/12/15	CHLL-SB154-6"-2.5'	1505143	-88.4187512	47.1773365	0.5 - 2.5	Proximity to historical PCB detection.	SAND, Reddish brown, Medium to coarse to 2 ft; GRAVEL, gray	Composite Sample	Direct Push Boring		X								X										
--	05/12/15	CHLL-SB154-6"-2.5'-DUP	1505143	-88.4187512	47.1773365	0.5 - 2.5	Proximity to historical PCB detection.	SAND, Reddish brown, Medium to coarse to 2 ft; GRAVEL, gray	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X								X										
CHLL-SB154-X-Y'	05/12/15	CHLL-SB154-6"-2.5'-4'	1505143	-88.4187512	47.1773365	2.5 - 4	Proximity to historical PCB detection.	GRAVEL, Gray	Composite Sample	Direct Push Boring		X								X										
CHLL-SB155-0-6"	05/12/15	CHLL-SB155-0-6"	1505143	-88.41933092	47.17724819	0 - 0.5	Proximity to historical PCB detection.	SAND, Gray, Fine to medium grained	Grab Sample	Direct Push Boring	X									X										
CHLL-SB155-X-Y'	05/12/15	CHLL-SB155-6"-2.5'	1505143	-88.41933092	47.17724819	0.5 - 2.5	Proximity to historical PCB detection.	SAND, Gray, Fine to medium grained to 1ft; SAND, Fine to medium, reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB155-X-Y'	05/12/15	CHLL-SB155-2.5'-4'	1505143	-88.41933092	47.17724819	2.5 - 4	Proximity to historical PCB detection.	SAND, Fine to medium, reddish brown	Composite Sample	Direct Push Boring		X								X										

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Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
CHLL-SB156-0-6"	05/12/15	CHLL-SB156-0-6"	1505143	-88.41938808	47.17795417	0 - 0.5	Proximity to historical PCB detection.	SAND, Gray, Coarse	Grab Sample	Direct Push Boring	X									X										
CHLL-SB156-X-Y'	05/12/15	CHLL-SB156-6"-2.5'	1505143	-88.41938808	47.17795417	0.5 - 2.5	Proximity to historical PCB detection.	SAND, Gray, Coarse to 1 ft; SAND, Medium to coarse, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB156-X-Y'	05/12/15	CHLL-SB156-2.5'-4'	1505143	-88.41938808	47.17795417	2.5 - 4	Proximity to historical PCB detection.	SAND, Medium to coarse, Reddish brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB157-0-6"	05/12/15	CHLL-SB157-0-6"	1505143	-88.41879946	47.17855145	0 - 0.5	Proximity to historical PCB detection.	SAND, Gray, Fine to medium	Grab Sample	Direct Push Boring	X									X										
CHLL-SB157-X-Y'	05/12/15	CHLL-SB157-6"-2.5'	1505143	-88.41879946	47.17855145	0.5 - 2.5	Proximity to historical PCB detection.	SAND, Brown, Fine to medium	Composite Sample	Direct Push Boring		X								X										
--	05/12/15	CHLL-SB157-6"-2.5'-DUP	1505143	-88.41879946	47.17855145	0.5 - 2.5	Proximity to historical PCB detection.	SAND, Brown, Fine to medium	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X								X										
CHLL-SB157-X-Y'	05/12/15	CHLL-SB157-2.5'-4'	1505143	-88.41879946	47.17855145	2.5 - 4	Proximity to historical PCB detection.	SAND, Brown, Fine to medium	Composite Sample	Direct Push Boring		X								X										
CHLL-SB165-0-6"	08/19/15	CHLL-SB165 0"-6"	1508198	-88.41947584	47.17701399	0 - 0.5	Proximity to historical PCB detection.	TOPSOIL	Grab Sample	Direct Push Boring	X									X										
CHLL-SB165-X-Y'	08/19/15	CHLL-SB165 6"-5'	1508198	-88.41947584	47.17701399	0.5 - 5	Proximity to historical PCB detection.	SAND, Brown, Fine to 1 ft; SAND, Reddish brown, Fine to medium	Composite Sample	Direct Push Boring		X								X										
CHLL-SB166-0-6"	08/19/15	CHLL-SB166 0"-6"	1508198	-88.4191947	47.17689267	0 - 0.5	Proximity to historical PCB detection.	TOPSOIL	Grab Sample	Direct Push Boring	X									X										
CHLL-SB166-X-Y'	08/19/15	CHLL-SB166 6"-5'	1508198	-88.4191947	47.17689267	0.5 - 5	Proximity to historical PCB detection.	SAND, Light brown, Fine to 0.75 ft; SAND, Dark gray, Fine to medium; to 1 ft; SAND, Reddish brown, Fine to medium	Composite Sample	Direct Push Boring		X								X										
--	08/19/15	CHLL-SB166 6"-5' DUP	1508198	-88.4191947	47.17689267	0.5 - 5	Proximity to historical PCB detection.	SAND, Light brown, Fine to 0.75 ft; SAND, Dark gray, Fine to medium; to 1 ft; SAND, Reddish brown, Fine to medium	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X								X										
CHLL-SB167-0-6"	08/19/15	CHLL-SB-167 0-6"	1508199	-88.42016506	47.17837491	0 - 0.5	Proximity to historical PCB detection.	SAND, Dark gray, Medium to coarse	Grab Sample	Direct Push Boring	X									X										
CHLL-SB167-X-Y'	08/19/15	CHLL-SB-167 6"-5'	1508199	-88.42016506	47.17837491	0.5 - 5	Proximity to historical PCB detection.	SAND, Dark gray, Medium to coarse to 3 ft; SAND, light brown, fine	Composite Sample	Direct Push Boring		X								X										
CHLL-SB168-0-6"	08/19/15	CHLL-SB-168 0-6"	1508199	-88.41995486	47.17855702	0 - 0.5	Proximity to historical PCB detection.	TOPSOIL	Grab Sample	Direct Push Boring	X									X										
CHLL-SB168-X-Y'	08/19/15	CHLL-SB-168 6"-2'	1508199	-88.41995486	47.17855702	0.5 - 2	Proximity to historical PCB detection.	SAND, Dark gray, Medium to coarse to 1.5 ft; SAND, Light brown, Fine to 2 ft; SAND, Reddish brown, Fine	Composite Sample	Direct Push Boring		X								X										
CHLL-SB169-0-6"	08/19/15	CHLL-SB-169 0-6"	1508199	-88.41699731	47.18092419	0 - 0.5	Proximity to historical PCB detection.	TOPSOIL	Grab Sample	Direct Push Boring	X									X										
CHLL-SB169-X-Y'	08/19/15	CHLL-SB-169 6"-3'	1508199	-88.41699731	47.18092419	0.5 - 3	Proximity to historical PCB detection.	SAND, Dark brown, Fine to medium to 1 ft; SAND, Reddish brown, Fine to medium	Composite Sample	Direct Push Boring		X								X										
CHLL-SB170-0-6"	08/19/15	CHLL-SB-170 0-6"	1508199	-88.41732785	47.18029982	0 - 0.5	Proximity to historical PCB detection.	COAL	Grab Sample	Direct Push Boring	X									X										
CHLL-SB170-X-Y'	08/19/15	CHLL-SB-170 6"-12"	1508199	-88.41732785	47.18029982	0.5 - 1	Proximity to historical PCB detection.	SAND, Dark brown, Medium to 1 ft; SAND, Brown, Medium	Composite Sample	Direct Push Boring		X								X										
CHLL-SB171-0-6"	08/19/15	CHLL-SB-171 0-6"	1508199	-88.41763371	47.1799679	0 - 0.5	Proximity to historical PCB detection.	TOPSOIL	Grab Sample	Direct Push Boring	X									X										
CHLL-SB171-X-Y'	08/19/15	CHLL-SB-171 6"-12"	1508199	-88.41763371	47.1799679	0.5 - 1	Proximity to historical PCB detection.	SAND, Dark brown, Medium to coarse to 0.75 ft; SAND, Dark gray, Fine to 1 ft	Composite Sample	Direct Push Boring		X								X										
Surface Soil																														
CHLL-SS01	10/15/2014	CHLL-SS01-101514	1410132	-88.41891198	47.1771028	0 - 0.5	Eroded channel where apparent runoff discharges to Torch Lake	SAND AND GRAVEL, Brownish black	Grab Sample	Hand Tools	X									X										
CHLL-SS02	10/15/2014	CHLL-SS02-101514	1410132	-88.4175397	47.17831148	0 - 0.5	Eroded channel where apparent runoff discharges to Torch Lake	SAND AND GRAVEL, Brownish black	Grab Sample	Hand Tools	X									X										
CHLL-SS03	10/15/2014	CHLL-SS03-101514	1410132	-88.41733045	47.17849804	0 - 0.5	Eroded channel where apparent runoff discharges to Torch Lake	SAND AND GRAVEL, Brownish black	Grab Sample	Hand Tools	X									X										
CHLL-SS04	10/15/2014	CHLL-SS04-101514	1410132 240-43237 240-43479	-88.419298	47.178879	0 - 0.5	Proximity to partially buried abandoned containers	SANDY LOAM, Black, Organics, Wet	Grab Sample	Hand Tools	X						X		X	X			X	X						
CHLL-SS05	10/15/2014	CHLL-SS05-101514	1410132 240-43237 240-43479	-88.41927	47.178892	0 - 0.5	Proximity to partially buried abandoned containers	SANDY LOAM, Black, Organics, Wet	Grab Sample	Hand Tools	X						X		X	X			X	X						
CHLL-SS06	10/15/2014	CHLL-SS06-101514	1410132 240-43237 240-43479	-88.419265	47.178883	0 - 0.5	Proximity to partially buried abandoned containers	SANDY LOAM, Black, Organics, Wet	Grab Sample	Hand Tools	X						X		X	X			X	X						
CHLL-SS07	10/15/2014	CHLL-SS07-101514	1410132 240-43237 240-43479	-88.417407531	47.180619168	0 - 0.5	Proximity to abandoned containers	SANDY LOAM, Black, Organics	Grab Sample	Hand Tools	X						X		X	X			X	X						
CHLL-SS08	10/15/2014	CHLL-SS08-101514	240-43237	-88.41570889	47.18113515	0 - 0.5	Soil deposit in close proximity to suspect asbestos containing building materials	SANDY LOAM, With gravel, Commingled building debris	Grab Sample	Hand Tools	X													X						
CHLL-SS09	10/15/2014	CHLL-SS09-101514	240-43237	-88.41885665	47.17744907	0 - 0.5	Proximity to suspect burn areas	SAND AND GRAVEL, Black	Grab Sample	Hand Tools	X													X						
CHLL-SS14	8/20/2015	CHLL - SS14 - 0-6"	1508213	-88.42286386	47.17446054	0 - 0.5	Proximity to partially buried abandoned containers	--	Grab Sample	Hand Tools	X						X	X	X	X			X							
CHLL-SS15	8/20/2015	CHLL - SS15 - 0"-6"	1508213	-88.42311385	47.17437837	0 - 0.5	Proximity to partially buried abandoned containers	--	Grab Sample	Hand Tools	X						X	X	X	X			X							
CHLL-WP01	10/15/2014	CHLL-WP01-101514	1410132 240-43237 240-43479	-88.42027136	47.17744615	0 - 0.5	Debris pile containing burnt debris, wastes, and building materials	SAND AND GRAVEL, Black	Composite Sample	Hand Tools	X						X	X	X	X			X	X						
CHLL-WP02	10/15/2014	CHLL-WP02-101514	1410132 240-43237 240-43479	-88.42031123	47.17666176	0 - 0.5	Debris pile containing burnt debris, wastes, and building materials	SAND AND GRAVEL, Black	Composite Sample	Hand Tools	X						X	X	X	X			X	X						
CHLL-WP03	10/15/2014	CHLL-WP03-101514	1410132 240-43237 240-43479	-88.42177107	47.17745774	0 - 0.5	Debris pile containing burnt debris, wastes, and building materials	SAND AND GRAVEL, Black	Composite Sample	Hand Tools	X						X	X	X	X			X	X						
Groundwater																														
CHLL-MW15-X-Y	6/13/2014	CHLL-GW15-10'-15'	1406237	-88.4155226	47.18108261	10 - 15	Data Gap - Lack of historical data	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X					X	X	X						13.90	0.148	87.50	7.20	NM
CHLL-MW16-X-Y	6/13/2014	CHLL-GW16-8'-13'	1406237	-88.41588189	47.18072306	8 - 13	Data Gap - Lack of historical data	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X					X	X	X						12.10	0.200	89.00	7.03	NM
CHLL-MW17-X-Y	6/13/2014	CHLL-GW17-10'-15'	1406236	-88.41687162	47.17965364	10 - 15	Data Gap - Lack of historical data	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X						X	X						9.60	0.067	5.30	6.99	NM
--	6/13/2014	CHLL-GW17-10'-15'-DUP	1406237	-88.41687162	47.17965364	10 - 15	Data Gap - Lack of historical data	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample, QA/QC - Duplicate Sample	Peristaltic Pump			X						X	X										
CHLL-MW18-X-Y	6/11/2014	CHLL-GW18-10'-15'	1406174	-88.41810489	47.17850391	10 - 15	Data Gap - Lack of historical data	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X					X	X	X						9.80	0.257	2.70	5.96	NM
CHLL-MW19-X-Y	6/11/2014	CHLL-GW19-10'-15'	1406174	-88.41929338	47.17722715	10 - 15	Data Gap - Lack of historical data	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X						X	X						8.30	0.114	27.80	7.66	NM
CHLL-MW20-X-Y	6/11/2014	CHLL-GW20-10'-15'	1406174	-88.42207981	47.17684282	10 - 15	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X					X	X	X						9.60	0.600	54.80	7.53	NM
CHLL-MW21-X-Y	6/11/2014	CHLL-GW21-10'-15'	1406174	-88.42206669	47.17641438	10 - 15	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X					X	X	X						9.50	0.216	14.20	7.06	NM
CHLL-MW22-X-Y	6/11/2014	CHLL-GW22-12'-17'	1406174	-88.42254228	47.1760793	12 - 17	Proximity to a historical generating station or electrical substation.	Temporary Screen Interval: 12 ft - 17 ft	Grab Sample	Peristaltic Pump			X					X	X	X						11.20	0.970	16.90	6.95	NM
CHLL-MW23-X-Y	6/11/2014	CHLL-GW23-10'-15'	1406174	-88.42268657	47.17529244	10 - 15	Proximity to a historical smelter operations	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X					X		X						12.90	1.070	5.50	7.79	NM
CHLL-MW24-X-Y	6/11/2014	CHLL-GW24-10'-15'	1406174	-88.42319975	47.17494067	10 - 15	Proximity to a historical smelter operations	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X					X		X						10.60	0.820	2.20	7.57	NM
CHLL-MW37-X-Y	6/11/2014	CHLL-GW37-9'-14'	1406174	-88.42080215	47.17698723	9 - 14	Proximity to a historical mineral building operations	Temporary Screen Interval: 9 ft - 14 ft	Grab Sample	Peristaltic Pump			X					X	X	X						11.20	0.217	9.40	7.16	NM
CHLL-MW40-X-Y'	8/19/2014	CHLL-GW40-10-15'	1408234	-88.4196	47.17685556	10 - 15	Grid Sampling - PCB Delineation	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X							X						17.70	0.335	76.50	6.73	NM
CHLL-MW41-X-Y'	8/19/2014	CHLL-GW41-8-13'	1408234	-88.41830278	47.17800556	8 - 13	Grid Sampling - PCB Delineation	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X						10.10	0.128	7.00	7.86	NM
--	8/19/2014	CHLL-GW41-8-13'-DUP	1408234	-88.41830278	47.17800556	8 - 13	Grid Sampling - PCB Delineation	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample, QA/QC - Duplicate Sample	Peristaltic Pump			X							X										
CHLL-MW57-X-Y'	8/19/2014	CHLL-GW57-11-16'	1408234	-88.423081640	47.176166514	11 - 16	Proximity to residential direct contact criteria exceedance	Temporary Screen Interval: 11 ft - 16 ft	Grab Sample	Peristaltic Pump			X							X			X			NM	NM	NM	NM	NM
CHLL-MW58-X-Y'	8/19/2014	CHLL-GW58-11-16'	1408234	-88.423021098	47.176218814	11 - 16	Proximity to residential direct contact criteria exceedance	Temporary Screen Interval: 11 ft - 16 ft	Grab Sample	Peristaltic Pump			X							X			X			NM	NM	NM	NM	NM
CHLL-MW68-X-Y'	05/12/15	CHLL-GW68-7-12'	1505141	-88.41938808	47.17795417	7 - 12	Data Gap - Lack of historical data	Temporary Screen Interval: 7 ft - 12 ft	Grab Sample	Peristaltic Pump			X				X	X		X		X				7.26	0.232	NM	7.66	NM
CHLL-MW69-X-Y'	05/12/15	CHLL-GW69-9-14'	1505141	-88.41879946	47.17855145	9 - 14	Data Gap - Lack of historical data	Temporary Screen Interval: 9 ft - 14 ft	Grab Sample	Peristaltic Pump			X				X	X		X		X				7	0.252	NM	7.68	NM

Table 3-2
Sampling and Analysis Summary
Hubbell Processing Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
CHLL-PCI-MW-102Ar	8/19/2014	CHLL-PCI-MW-102A-4.8-14.8	1408230	-88.4225719	47.1746077	4.8 - 14.8	Existing monitoring well on the PCI property	Permanent Screen Interval: 4.8 ft - 14.8 ft	Grab Sample	Peristaltic Pump			X							X						11.30	0.399	0.90	7.74	NM
CHLL-PCI-MW-102Br	8/19/2014	CHLL-PCI-MW-102B-25-30	1408230	-88.4225473	47.1746182	25 - 30	Existing monitoring well on the PCI property	Permanent Screen Interval: 25 ft - 30 ft	Grab Sample	Peristaltic Pump			X							X						10.80	0.303	1.90	8.28	NM
CHLL-PCI-MW-103Ar	8/19/2014	CHLL-PCI-MW-103A-3-13	1408230	-88.4220637	47.1748118	3 - 13	Existing monitoring well on the PCI property	Permanent Screen Interval: 3 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X						13.80	0.352	0.90	7.96	NM
CHLL-PCI-MW-103Br	8/19/2014	CHLL-PCI-MW-103B-24-29	1408230	-88.4220889	47.1748186	24 - 29	Existing monitoring well on the PCI property	Permanent Screen Interval: 24 ft - 29 ft	Grab Sample	Peristaltic Pump			X							X						12.00	0.330	1.40	9.51	NM
CHLL-PCI-MW-103Cr	8/19/2014	CHLL-PCI-MW-103C-49-54	1408230	-88.4220447	47.174829	49 - 54	Existing monitoring well on the PCI property	Permanent Screen Interval: 49 ft - 54 ft	Grab Sample	Peristaltic Pump			X							X						12.10	0.254	1.00	8.22	NM
CHLL-PCI-MW-104A	8/19/2014	CHLL-PCI-MW-104A-4.5-14.5	1408230	-88.4216904	47.1751179	4.5 - 14.5	Existing monitoring well on the PCI property	Permanent Screen Interval: 4.5 ft - 14.5 ft	Grab Sample	Peristaltic Pump			X							X						12.60	0.710	0.90	7.91	NM
--	8/19/2014	CHLL-PCI-MW-104A-4.5-14.5-DUP	1408230	-88.4216904	47.1751179	4.5 - 14.5	Existing monitoring well on the PCI property	Permanent Screen Interval: 4.5 ft - 14.5 ft	Grab Sample, QA/QC - Duplicate Sample	Peristaltic Pump			X							X										
CHLL-PCI-MW-104Br	8/19/2014	CHLL-PCI-MW-104B-24-29	1408230	-88.4216762	47.1751082	24 - 29	Existing monitoring well on the PCI property	Permanent Screen Interval: 24 ft - 29 ft	Grab Sample	Peristaltic Pump			X							X						11.20	0.700	1.30	8.10	NM
CHLL-PCI-MW-105A	8/21/2014	CHLL-PCI-MW-105A-3.7-8.7	1408230	-88.4205841	47.1761722	3.7 - 8.7	Existing monitoring well on the PCI property	Permanent Screen Interval: 3.7 ft - 8.7 ft	Grab Sample	Peristaltic Pump			X							X						NM	NM	NM	NM	NM
CHLL-PCI-MW-105B	8/21/2014	CHLL-PCI-MW-105B-24.5-29.5	1408230	-88.4205979	47.1761712	24.5 - 29.5	Existing monitoring well on the PCI property	Permanent Screen Interval: 24.5 ft - 29.5 ft	Grab Sample	Peristaltic Pump			X							X						NM	NM	NM	NM	NM
CHLL-PCI-MW108A	6/11/2014	CHLL-PCI-MW108A	1406174	-88.42273653	47.17517985	4 - 8.4	Existing monitoring well on the PCI property	Permanent Screen Interval: 4 ft - 8.4 ft	Grab Sample	Peristaltic Pump			X							X						11.30	0.660	1.00	8.46	NM
CHLL-PCI-MW108B	6/11/2014	CHLL-PCI-MW108B	1406174	-88.42275984	47.17516294	24 - 29	Existing monitoring well on the PCI property	Permanent Screen Interval: 24 ft - 29 ft	Grab Sample	Peristaltic Pump			X							X						12.80	0.740	0.90	7.49	NM
CHLL-PCI-MW-112A	8/19/2014	CHLL-PCI-MW-112A-5.5-15.5	1408230	-88.4208004	47.1756123	5.5 - 15.5	Existing monitoring well on the PCI property	Permanent Screen Interval: 5.5 ft - 15.5 ft	Grab Sample	Peristaltic Pump			X							X						11.80	0.478	1.30	7.56	NM
CHLL-PCI-MW-112B	8/19/2014	CHLL-PCI-MW-112B-24-29	1408230	-88.4208135	47.1756277	24 - 29	Existing monitoring well on the PCI property	Permanent Screen Interval: 24 ft - 29 ft	Grab Sample	Peristaltic Pump			X							X						11.60	0.530	1.10	7.65	NM
CHLL-PCI-MW113	6/11/2014	CHLL-PCI-MW113	1406174	-88.42449147	47.17425218	5 - 15	Existing monitoring well on the PCI property	Permanent Screen Interval: 5 ft - 15 ft	Grab Sample	Peristaltic Pump			X							X						10.00	0.429	1.20	8.36	NM
CHLL-PCI-MW113-DUP	6/11/2014	CHLL-PCI-MW113-DUP	1406174	-88.42449147	47.17425218	5 - 15	Existing monitoring well on the PCI property	Permanent Screen Interval: 5 ft - 15 ft	Grab Sample, QA/QC - Duplicate Sample	Peristaltic Pump			X							X										
CHLL-PCI-MW118	6/11/2014	CHLL-PCI-MW118	1406174	-88.42410191	47.17402435	8.5 - 18.5	Existing monitoring well on the PCI property	Permanent Screen Interval: 8.5 ft - 18.5 ft	Grab Sample	Peristaltic Pump			X							X						10.50	0.093	85.50	7.08	NM
Sediment and Surface Water																														
CHLL-SD36-0-6"	7/11/2014	CHLL-SD36-0"-6"	1407165	-88.41457429	47.18099976	0 - 0.5	Proximity to a historical electrical substation.	SILT, Dark brown	Grab Sample	Vibracore Sampler					X			X		X										
CHLL-SD36-1-3'	7/11/2014	CHLL-SD36-1'-3'	1407165	-88.41457429	47.18099976	1 - 3	Proximity to a historical electrical substation.	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD36-3-5'	7/11/2014	CHLL-SD36-3'-5'	1407165	-88.41457429	47.18099976	3 - 5	Proximity to a historical electrical substation.	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD37-0-6'	7/11/2014	CHLL-SD37-0"-6"	1407165	-88.41492188	47.18054817	0 - 0.5	Proximity to a historical electrical substation.	SILT, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD37-1-3'	7/11/2014	CHLL-SD37-1'-3'	1407165	-88.41492188	47.18054817	1 - 3	Proximity to a historical electrical substation.	SILT, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
--	7/11/2014	CHLL-SD37-1'-3'-DUP	1407165	-88.41492188	47.18054817	1 - 3	Proximity to a historical electrical substation.	SILT, Reddish brown	Grab Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD37-3-5'	7/11/2014	CHLL-SD37-3'-5'	1407165	-88.41492188	47.18054817	3 - 5	Proximity to a historical electrical substation.	SILT, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD40-0-6"	7/12/2014	CHLL-SD40-0"-6"	1407175	-88.41605254	47.1791287	0 - 0.5	Data Gap - Lack of historical data	SILT, Sandy, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD40-1-3'	7/12/2014	CHLL-SD40-1'-3'	1407175	-88.41605254	47.1791287	1 - 3	Data Gap - Lack of historical data	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD40-3-5'	7/12/2014	CHLL-SD40-3'-4'	1407175	-88.41605254	47.1791287	3 - 4	Data Gap - Lack of historical data	SAND, Medium to fine grained, Tan, Wood debris at 3.7 ft	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD41-0-6"	7/12/2014	CHLL-SD41-0"-6"	1407175	-88.41646583	47.17867571	0 - 0.5	Data Gap - Lack of historical data	SILT, Coal fragment, Light brown	Grab Sample	Vibracore Sampler					X			X	X	X			X							
CHLL-SD41-1-3'	7/12/2014	CHLL-SD41-1'-3'	1407175	-88.41646583	47.17867571	1 - 3	Data Gap - Lack of historical data	SILT, Clayey, Reddish brown; SAND, Poorly sorted, Tan, pebbles at 3 ft	Composite Sample	Vibracore Sampler					X					X										
--	7/12/2014	CHLL-SD41-1'-3'-DUP	1407175	-88.41646583	47.17867571	1 - 3	Data Gap - Lack of historical data	SILT, Clayey, Reddish brown; SAND, Poorly sorted, Tan, pebbles at 3 ft	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD41-3-5'	--	--	--	--	--	--	Data Gap - Lack of historical data	--	Sample Not collected - Low recovery	--					--					--										
CHLL-SD42-0-6"	7/12/2014	CHLL-SD42-0"-6"	1407175	-88.41693405	47.17823617	0 - 0.5	Data Gap - Lack of historical data	SILT, Sandy, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD42-1-3'	7/12/2014	CHLL-SD42-1'-3'	1407175	-88.41693405	47.17823617	1 - 3	Data Gap - Lack of historical data	SAND, Medium to fine grained, Tan	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD42-3-5'	7/12/2014	CHLL-SD42-3'-3.7'	1407175	-88.41693405	47.17823617	3 - 3.7	Data Gap - Lack of historical data	SAND, Medium to fine grained, Tan	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD45-0-6"	7/11/2014	CHLL-SD45-0"-6"	1407175	-88.41854807	47.1769445	0 - 0.5	Data Gap - Lack of historical data	SILT, Sandy, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD45-1-3'	7/11/2014	CHLL-SD45-1'-3'	1407175	-88.41854807	47.1769445	1 - 3	Data Gap - Lack of historical data	SILT, Sandy, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD45-3-5'	7/11/2014	CHLL-SD45-3'-3.4'	1407165	-88.41854807	47.1769445	3 - 3.4	Data Gap - Lack of historical data	SAND, Poorly sorted, Light brown to tan	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD46-0-6"	7/8/2014	CHLL-SD46-0"-6"	1407166	-88.41831316	47.176135	0 - 0.5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD46-1-3'	7/8/2014	CHLL-SD46-1'-3'	1407166	-88.41831316	47.176135	1 - 3	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
--	7/8/2014	CHLL-SD46-1-3'-DUP	1407166	-88.41831316	47.176135	1 - 3	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD46-3-5'	7/8/2014	CHLL-SD46-3'-4.5'	1407166	-88.41831316	47.176135	3 - 4.5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD47-0-6"	7/8/2014	CHLL-SD47-0"-6"	1407166	-88.4187584	47.1756862	0 - 0.5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD47-1-3'	7/8/2014	CHLL-SD47-1'-2'	1407166	-88.4187584	47.1756862	1 - 2	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD47-3-5'	--	--	--	--	--	--	Sample Not Collected, Low Recovery	--	Sample not collected, Low recovery	--					--					--										
CHLL-SD48-0-6"	7/8/2014	CHLL-SD48-0"-6"	1407166	-88.41935229	47.17531293	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown; SILT, Clayey, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD48-1-3'	7/8/2014	CHLL-SD48-1'-3'	1407166	-88.41935229	47.17531293	1 - 3	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD48-3-5'	7/8/2014	CHLL-SD48-3'-5'	1407166	-88.41935229	47.17531293	3 - 5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD49-0-6"	7/8/2014	CHLL-SD49-0"-6"	1407166	-88.41998	47.17495733	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown; SILT, Clayey, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD49-1-3'	7/8/2014	CHLL-SD49-1'-3'	1407176	-88.41998	47.17495733	1 - 3	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD49-3-5'	7/8/2014	CHLL-SD49-3'-4.5'	1407176	-88.41998	47.17495733	3 - 4.5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
--	7/8/2014	CHLL-SD49-3'-4.5'-DUP	1407176	-88.41998	47.17495733	3 - 4.5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD50-0-6"	6/14/2014	CHLL-SD50-0"-6"	1406230	-88.42158855	47.17389502	0 - 0.5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD50-1-3'	6/14/2014	CHLL-SD50-1'-3'	1406230	-88.42158855	47.17389502	1 - 3	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD50-3-5'	6/14/2014	CHLL-SD50-3'-5'	1406230	-88.42158855	47.17389502	3 - 5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD51-0-6"	6/14/2014	CHLL-SD51-0"-6"	1406229	-88.42222241	47.17423279	0 - 0.5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD51-1-3'	6/14/2014	CHLL-SD51-1'-3'	1406229	-88.42222241	47.17423279	1 - 3	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD51-3-5'	6/14/2014	CHLL-SD51-3'-5'	1406229	-88.42222241	47.17423279	3 - 5	Proximity to historical PCB detections	SILT, Clayey, Reddish brown to dark brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD52-0-6"	7/9/2014	CHLL-SD52-0"-6"	1407176	-88.423016700	47.174000000	0 - 0.5	Proximity to historical PCB detections	SILT, Clayey, Brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD52-1-2'	7/9/2014	CHLL-SD52-1'-3'	1407176	-88.423016700	47.174000000	1 - 3	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD52-3-5'	7/9/2014	CHLL-SD52-3'-4'	1407176	-88.423016700	47.174000000	3 - 4	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD61-0-6"	7/15/2014	CHLL-SD61-0"-6"	1407213	-88.42327222	47.17412448	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown; SAND, Poorly sorted, Reddish brown, Slag fragments	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD63-0-6"	7/15/2014	CHLL-SD63-0"-6"	1407213	-88.42302683	47.17383056	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown to reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD63-1-3'	7/15/2014	CHLL-SD63-1'-3'	1407213	-88.42302683	47.17383056	1 - 3	Proximity to historical PCB detections	SILT, Clayey, Reddish brown; SAND, Silty, Poorly sorted, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD64-0-6"	7/15/2014	CHLL-SD64-0"-6"	1407213	-88.4229569	47.173603	0 - 0.5	Proximity to historical PCB detections	SILT, Sandy, Clayey, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD64-1-3'	7/15/2014	CHLL-SD64-1'-3'	1407213	-88.4229569	47.173603	1 - 3	Proximity to historical PCB detections	SILT, Sandy, Clayey, Reddish brown; SAND, Coarse to medium grained, Slag fragments	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD64-1-3'-DUP	7/15/2014	CHLL-SD64-1'-3'-DUP	1407213	-88.4229569	47.173603	1 - 3	Proximity to historical PCB detections	SILT, Sandy, Clayey, Reddish brown; SAND, Coarse to medium grained, Slag fragments	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD64-3-3.4'	7/15/2014	CHLL-SD64-3'-3.4'	1407213	-88.4229569	47.173603	3 - 3.4	Proximity to historical PCB detections	SILT, Clayey, Reddish brown	Grab Sample	Vibracore Sampler					X					X										

Table 3-2
Sampling and Analysis Summary
Hubbell Processing Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
CHLL-SD86-0-6"	6/1/2015	CHLL-SD-86-0-6"	1506040	-88.41585897	47.17866797	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD86-1-3'	6/1/2015	CHLL-SD-86-1-3'	1506040	-88.41585897	47.17866797	1 - 3	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey, ~2.8' tan to rusty brown silty fine grained sand seam less than 1" thick	Composite Sample	Vibracore Sampler					X					X										
--	6/1/2015	CHLL-SD-86-1-3' DUP	1506039	-88.41585897	47.17866797	1 - 3	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey, ~2.8' tan to rusty brown silty fine grained sand seam less than 1" thick	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD86-3-5'	6/1/2015	CHLL-SD-86-3-5'	1506039	-88.41585897	47.17866797	3 - 5	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD87-0-6"	6/1/2015	CHLL-SD-87-0-6"	1506040	-88.4185478	47.17501737	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD87-1-3'	6/1/2015	CHLL-SD-87-1-3'	1506040	-88.4185478	47.17501737	1 - 3	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
--	6/1/2015	CHLL-SD-87-1-3' DUP	1506040	-88.4185478	47.17501737	1 - 3	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD87-3-5'	6/1/2015	CHLL-SD-87-3-5'	1506040	-88.4185478	47.17501737	3 - 5	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD88-0-6"	6/1/2015	CHLL-SD-88-0-6"	1506040	-88.4197724	47.17428199	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD88-1-3'	6/1/2015	CHLL-SD-88-1-3'	1506040	-88.4197724	47.17428199	1 - 3	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD88-3-5'	6/1/2015	CHLL-SD-88-3-5'	1506040	-88.4197724	47.17428199	3 - 5	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD89-0-6"	6/1/2015	CHLL-SD-89-0-6"	1506040	-88.42028619	47.1739601	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown	Grab Sample	Vibracore Sampler					X			X	X	X										
--	6/1/2015	CHLL-SD-89-0.7'-0.9'	1506040	-88.42028619	47.1739601	0.7 - 0.9	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey. To 0.7 ft, SILT, Black	Grab Sample	Vibracore Sampler					X			X	X	X										
CHLL-SD89-1-2'	6/1/2015	CHLL-SD-89-1'-3'	1506040	-88.42028619	47.1739601	1 - 3	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD89-3-5'	6/1/2015	CHLL-SD-89-3'-5'	1506040	-88.42028619	47.1739601	3 - 5	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD90-0-6"	6/1/2015	CHLL-SD-90-0-6"	1506040	-88.42172672	47.1735117	0 - 0.5	Proximity to historical PCB detections	SILT, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD90-1-3'	6/1/2015	CHLL-SD-90-1-3'	1506040	-88.42172672	47.1735117	1 - 3	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD90-3-5'	6/1/2015	CHLL-SD-90-3'-5'	1506040	-88.42172672	47.1735117	3 - 5	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
--	6/1/2015	CHLL-SD-90-3'-5' DUP	1506040	-88.42172672	47.1735117	3 - 5	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD91-0-6"	6/1/2015	CHLL-SD-91-0-6"	1506040	-88.42246506	47.17326677	0 - 0.5	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD91-1-3'	6/1/2015	CHLL-SD-91-1'-3'	1506040	-88.42246506	47.17326677	1 - 3	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD91-3-5'	6/1/2015	CHLL-SD-91-3'-5'	1506040	-88.42246506	47.17326677	3 - 5	Proximity to historical PCB detections	SILT, Reddish-Brown, Clayey, stained dark black stringer at 3.5'	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD95-0-6"	7/11/2015	CHLL-SD-95-0-6"	1507172	-88.42231337	47.17267789	0 - 0.5	Proximity to historical PCB detections	SILT, dark brown, wet, soft, black streaking visible	Grab Sample	Vibracore Sampler					X			X	X	X			X							
CHLL-SD95-1-3'	7/11/2015	CHLL-SD-95-1-3'	1507172	-88.42231337	47.17267789	1 - 3	Proximity to historical PCB detections	CLAY, dark brown with purple hue, wet, soft, black streaking visible	Composite Sample	Vibracore Sampler					X			X	X	X			X							
--	7/11/2015	CHLL-SD-95-1-3' DUP	1507172	-88.42231337	47.17267789	1 - 3	Proximity to historical PCB detections	CLAY, dark brown with purple hue, wet, soft, black streaking visible	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X			X		X										
CHLL-SD95-3-5'	7/11/2015	CHLL-SD-95-3-5'	1507172	-88.42231337	47.17267789	3 - 5	Proximity to historical PCB detections	CLAY, dark brown with purple hue, wet, soft, black streaking visible	Composite Sample	Vibracore Sampler					X			X	X	X			X							
CHLL-SD99-0-6"	7/9/2015	CHLL - SD - 99 - 0"-6"	1507118	-88.42307551	47.17387222	0 - 0.5	Proximity to historical PCB detections	SAND, Dark brown with purple hue, wet, loose, medium to coarse, angular	Grab Sample	Vibracore Sampler					X			X	X	X										
CHLL-SD99-1-3'	7/9/2015	CHLL - SD - 99 - 1'-2.5'	1507118	-88.42307551	47.17387222	1 - 2.5	Proximity to historical PCB detections	SAND, Dark brown with purple hue, wet, loose, medium to coarse, angular to 1 ft; SILT WITH SAND, dark brown to purple-brown, wet, soft, angular to 1.5 ft; SILT WITH CLAY, dark brown to purple brown, wet, soft, black streaking.	Composite Sample	Vibracore Sampler					X			X	X	X										
CHLL-SD103-0-6"	8/20/2015	CHLL - SD - 103 - 0-2"	1508213	-88.42285265	47.17445709	0 - 0.167	Proximity to historical PCB detections	Surface Sediment	Grab Sample	Hand Tools					X		X	X	X	X			X							
CHLL-SD104-0-6"	8/20/2015	CHLL - SD - 104 - 0-2"	1508213	-88.42309758	47.17438011	0 - 0.167	Proximity to historical PCB detections	Surface Sediment	Grab Sample	Hand Tools					X		X	X	X	X			X							
CHLL-SW05-X-Y'	6/1/2015	CHLL-SW05-41.8-42.8'	1506038	-88.41585897	47.17866797	41.8 - 42.8	Proximity to historical PCB detections.	--	Grab Sample	Peristaltic Pump				X						X						NM	NM	NM	NM	NM
CHLL-SW06-X-Y'	6/1/2015	CHLL-SW06-75.6-76.6'	1506038	-88.42172672	47.1735117	75.6 - 76.6	Proximity to historical PCB detections	--	Grab Sample	Peristaltic Pump				X						X						NM	NM	NM	NM	NM
--	6/1/2015	CHLL-SW06-75.6-76.6'- DUP	1506038	-88.42172672	47.1735117	75.6 - 76.6	Proximity to historical PCB detections	--	Grab Sample, QA/QC - Duplicate Sample	Peristaltic Pump				X						X										
CHLL-SW07-X-Y'	6/1/2015	CHLL-SW07-70.2-71.2'	1506038	-88.42246506	47.17326677	70.2 - 71.2	Proximity to historical PCB detections	--	Grab Sample	Peristaltic Pump				X						X						NM	NM	NM	NM	NM
CHLL-SW10-X-Y'	7/8/2015	CHLL - SW10 -4.08-5.08'	1507116	-88.40175	47.1738722	0 - 4.08	Proximity to historical PCB detections	--	Grab Sample	Peristaltic Pump				X						X						21.9	146.7	6.71	8.28	3.9
CHLL-SW11-X-Y'	7/9/2015	CHLL - SW11 - 44.5-45.5'	1507116	-88.42307551	47.17387222	44.5 - 45.5	Proximity to historical PCB detections	--	Grab Sample	Peristaltic Pump				X				X		X						14.5	122.8	9.03	7.82	10.3
CHLL-SW12-X-Y'	8/20/2015	CHLL-SW12	1508197	-88.42286663	47.17445235	--	Proximity to historical PCB detections	--	Grab Sample	Peristaltic Pump				X			X	X	X	X						NM	NM	NM	NM	NM
Abandoned Containers																														
CHLL-DM01	8/20/2014	CHLL-DM01	1408233	-88.419426675	47.177462803	--	Waste Sample from Degraded Abandoned Drum	Weathered, Yellowish gray granular drum contents, Half-full	Grab Sample	Hand Tools						X		X	X	X			X							
CHLL-DM02	8/20/2014	CHLL-DM02	1408233	-88.419426675	47.177462803	--	Waste Sample from Degraded Abandoned Drum	Weathered, Brownish gray granular drum contents, Half-full	Grab Sample	Hand Tools						X		X	X	X			X							
CHLL-DM03	8/20/2015	CHLL-DM03	1508213	-88.42286663	47.17445235	--	Waste Sample from Degraded Abandoned Drum	--	Grab Sample	Hand Tools						X	X	X	X	X			X							
CHLL-DM04	8/20/2015	CHLL-DM04	1508213	-88.42264007	47.17453117	--	Waste Sample from Degraded Abandoned Drum	--	Grab Sample	Hand Tools						X	X	X	X	X			X							
--	10/15/2014	CHLL-DRUMWC-101514	240-43288	-88.419426675	47.177462803	--	Waste Characterization Sample from CHLL-DM01 and CHLL-DM02	Weathered, Yellow/Brown gray granular drum contents	Composite Sample	Hand Tools						X	X		X				X							
Residual Process Material																														
CHLL-RPM-01	10/15/2014	CHLL-RPM01-101514	1410133	-88.41981812	47.17795401	--	Suspect waste stream from copper reclamation practices	White with brown and black oily staining, Rope-like, Suspect wire wrap, Damaged	Grab Sample	Hand Tools						X				X										
CHLL-RPM-02	10/15/2014	CHLL-RPM02-101514	1410133	-88.41981812	47.17795401	--	Suspect waste stream from copper reclamation practices	Black, Plastic-like wrap exterior, Whitish gray fibrous mat interior, Suspect wire wrap, Damaged	Grab Sample	Hand Tools						X				X										
CHLL-RPM-03	10/15/2014	CHLL-RPM03-101514	1410133	-88.41981812	47.17795401	--	Suspect waste stream from copper reclamation practices	Black, Appears burnt, Plastic-like wrap exterior, Whitish gray fibrous mat interior, Suspect wire wrap, Damaged	Grab Sample	Hand Tools						X				X										
CHLL-RPM-04	10/15/2014	CHLL-RPM04-101514	1410132 240-43237	-88.42303534	47.17686919	--	Eroded sludge migrating near property boundary	Greenish gray, Sludge, Eroding from stack debris	Grab Sample	Hand Tools						X				X				X						

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Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
Bulk Asbestos																														
CHLL-ASBBLK01	7/31/2014	CHLL-ASBBLK01-073114	240-40204	-88.421369914	47.178119534	--	Suspect Asbestos Containing Material	Black asphaltic roofing material from the Mineral Building	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK02	7/31/2014	CHLL-ASBBLK02-073114	240-40204	-88.421040495	47.177854495	--	Suspect Asbestos Containing Material	Green asphaltic roofing material from sandstone building	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK03	7/31/2014	CHLL-ASBBLK03-073114	240-40204	-88.421071257	47.177854697	--	Suspect Asbestos Containing Material	Black corrugated asphaltic roofing material from sandstone building	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK04	7/31/2014	CHLL-ASBBLK04-073114	240-40204	-88.421874807	47.177482023	--	Suspect Asbestos Containing Material	White cementitious material (possible pipe insulation) in debris pile	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK05	7/31/2014	CHLL-ASBBLK05-073114	240-40204	-88.421922705	47.177429506	--	Suspect Asbestos Containing Material	Whitish grey, transite fragment in debris pile	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK06	7/31/2014	CHLL-ASBBLK06-073114	240-40204	-88.422518943	47.177160609	--	Suspect Asbestos Containing Material	Black, weathered roofing material, tar paper	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK07	10/14/2014	CHLL-ASBBLK07-101414	240-43237	-88.41569408	47.18111181	--	Suspect Asbestos Containing Material	Gray transite, Approximately 1/16" thick, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK08	10/14/2014	CHLL-ASBBLK08-101414	240-43237	-88.41570889	47.18113515	--	Suspect Asbestos Containing Material	Roofing material, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK09	10/14/2014	CHLL-ASBBLK09-101414	240-43237	-88.41571499	47.18120749	--	Suspect Asbestos Containing Material	Gray transite, Approximately 1/4" thick, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK10	10/14/2014	CHLL-ASBBLK10-101414	240-43237	-88.41573824	47.18117417	--	Suspect Asbestos Containing Material	Whitish gray, Cementitious plaster material, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK11	10/14/2014	CHLL-ASBBLK11-101414	240-43237	-88.41900177	47.17904308	--	Suspect Asbestos Containing Material	Whitish gray, Cementitious plaster material, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK12	10/14/2014	CHLL-ASBBLK12-101414	240-43237	-88.41900177	47.17904308	--	Suspect Asbestos Containing Material	Black asphaltic roofing material, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK13	10/14/2014	CHLL-ASBBLK13-101414	240-43237	-88.41900177	47.17904308	--	Suspect Asbestos Containing Material	Gray, Cementitious plaster, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK14	10/14/2014	CHLL-ASBBLK14-101414	240-43237	-88.418866	47.17950921	--	Suspect Asbestos Containing Material	White, Plaster, Paper backing, Coarse grained, 1/4" thick	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK15	10/14/2014	CHLL-ASBBLK15-101414	240-43237	-88.41886439	47.17947056	--	Suspect Asbestos Containing Material	White, Corrugated, Paper insulation, Canvas backing, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK16	10/14/2014	CHLL-ASBBLK16-101414	240-43237	-88.41886778	47.17947283	--	Suspect Asbestos Containing Material	Black, Asphaltic roofing material, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK17	10/14/2014	CHLL-ASBBLK17-101414	240-43237	-88.41880053	47.17944771	--	Suspect Asbestos Containing Material	Black, Brittle paper, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK18	10/14/2014	CHLL-ASBBLK18-101414	240-43237	-88.41861238	47.17957011	--	Suspect Asbestos Containing Material	Blackish brown, Canvas material, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK19	10/14/2014	CHLL-ASBBLK19-101414	240-43237	-88.41910688	47.17842797	--	Suspect Asbestos Containing Material	Whitish gray, Transite, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK20	10/14/2014	CHLL-ASBBLK20-101414	240-43237	-88.41940521	47.17786133	--	Suspect Asbestos Containing Material	Green, Asphaltic roofing material, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK21	10/14/2014	CHLL-ASBBLK21-101414	240-43237	-88.41941825	47.17785466	--	Suspect Asbestos Containing Material	Red, Asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK22	10/14/2014	CHLL-ASBBLK22-101414	240-43237	-88.41980427	47.17794881	--	Suspect Asbestos Containing Material	White with brown and black oily staining, Rope-like, Suspect wire wrap, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK23	10/14/2014	CHLL-ASBBLK23-101414	240-43237	-88.4198371	47.17796854	--	Suspect Asbestos Containing Material	Brown exterior, Orange interior, Suspect circuit board waste, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK24	10/14/2014	CHLL-ASBBLK24-101414	240-43237	-88.41892289	47.17744564	--	Suspect Asbestos Containing Material	Black, Mesh, Wire wrap, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK25	10/14/2014	CHLL-ASBBLK25-101414	240-43237	-88.42037809	47.17665596	--	Suspect Asbestos Containing Material	Tan/Brown, Corrugated paper, Found in multiple debris piles, Damaged.	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK26	10/15/2014	CHLL-ASBBLK26-101514	240-43237	-88.42036837	47.17750053	--	Suspect Asbestos Containing Material	Grayish white, Transite, Found in multiple debris piles, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK27	10/15/2014	CHLL-ASBBLK27-101514	240-43237	-88.4224757	47.17715673	--	Suspect Asbestos Containing Material	Grayish brown, Fibrous, Insulating material, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK28	10/15/2014	CHLL-ASBBLK28-101514	240-43237	-88.42248975	47.17733862	--	Suspect Asbestos Containing Material	White, Some blue-green staining, Fire brick, Labeled "A.P. Green 5 X 6 Key"	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK29	10/15/2014	CHLL-ASBBLK29-101514	240-43237	-88.42252097	47.17716082	--	Suspect Asbestos Containing Material	Orange with black specks, Fire brick, Labeled "Webster"	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK30	10/15/2014	CHLL-ASBBLK30-101514	240-43237	-88.42280324	47.17702606	--	Suspect Asbestos Containing Material	Grayish brown, Brick mortar, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK31	10/15/2014	CHLL-ASBBLK31-101514	240-43237	-88.42251409	47.17713631	--	Suspect Asbestos Containing Material	Black, Tar-like coating on concrete stack components, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK32	10/15/2014	CHLL-ASBBLK32-101514	240-43237	-88.42159722	47.17794638	--	Suspect Asbestos Containing Material	Black, Asphaltic roofing material, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK33	10/15/2014	CHLL-ASBBLK33-101514	240-43237	-88.42141172	47.17821976	--	Suspect Asbestos Containing Material	Whitish gray, Cementitious plaster material, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK34	10/15/2014	CHLL-ASBBLK34-101514	240-43237	-88.42012495	47.17677508	--	Suspect Asbestos Containing Material	Yellowish orange, Molded block material, Labeled "Duro 8759-15" Cone, rectangular, and cylinder shaped, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK35	10/15/2014	CHLL-ASBBLK35-101514	240-43237	-88.41901721	47.17903235	--	Suspect Asbestos Containing Material	Pink, Fire brick, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK36	10/15/2014	CHLL-ASBBLK36-101514	240-43237	-88.41901721	47.17903235	--	Suspect Asbestos Containing Material	Yellowish orange, Fire brick, Damaged	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK37	10/15/2014	CHLL-ASBBLK37-101514	240-43237	-88.41987379	47.177838	--	Suspect Asbestos Containing Material	Black, Plastic-like wrap exterior, Whitish gray fibrous mat interior, Suspect wire wrap, Damaged	Bulk Material Sample	Grab						X								X						

Notes:
% = Percent
°C = Degrees Celsius
ASBBLK = Bulk Asbestos
CHLL = C&H Lake Linden Operations
DM = Drum/Container
DRO = Diesel Range Organics
ft = Feet
GW = Groundwater
mS/cm = Millisiemens per Centimeter
MW = Monitoring Well
NM = Not Measured
ORO = Oil Range Organics
PNAs = Polynuclear Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
RPM = Residual Process Material
SB = Soil Boring
SD = Sediment
SS = Surface Soil
VOCs = Volatile Organic Compounds
WP = Waste Pile
X = Analyte selected for laboratory analysis

Bulk asbestos samples, denoted by ASBBLK designation, included the collection of three representative material samples designated (A, B, C)

For the purposes of this investigation, sediments include residues and waste material associated with chemical containers and deposits on the lake bottom historically discarded in Torch Lake.

Table 3-2
Sampling and Analysis Summary
Hubbell Slag Dump and Beach Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
Soil Borings																														
CHLL-SB38-0-6"	6/12/2014	CHLL-SB-38-6"-12"	1406176	-88.42744113	47.17191926	0.5 - 1	Data Gap - Lack of historical data, proximity to the public beach	SILTY SAND, Fine grained, Brown	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB38-X-Y'	6/12/2014	CHLL-SB-38-1'-4'	1406176	-88.42744113	47.17191926	1 - 4	Data Gap - Lack of historical data, proximity to the public beach	SAND, Medium grained, Brown	Composite Sample	Direct Push Boring		X					X	X		X										
CHLL-SB39-0-6"	6/12/2014	CHLL-SB-39-6"-12"	1406176	-88.42772128	47.17172162	0.5 - 1	Data Gap - Lack of historical data, proximity to the public beach	SAND, Medium to fine grained, Dark brown	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB39-X-Y'	6/12/2014	CHLL-SB-39-1'-4'	1406176	-88.42772128	47.17172162	1 - 4	Data Gap - Lack of historical data, proximity to the public beach	SAND, Medium grained, Brown	Composite Sample	Direct Push Boring		X					X	X		X										
--	6/12/2014	CHLL-SB-39-1'-4'-DUP	1406176	-88.42772128	47.17172162	1 - 4	Data Gap - Lack of historical data, proximity to the public beach	SAND, Medium grained, Brown	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X					X	X		X										
CHLL-SB40-0-6"	6/12/2014	CHLL-SB-40-6"-12"	1406176	-88.42791258	47.17197501	0.5 - 1	Data Gap - Lack of historical data	DEBRIS, Landfill waste and SAND	Grab Sample	Direct Push Boring	X								X	X										
CHLL-SB40-X-Y	6/12/2014	CHLL-SB-40-1'-4'	1406176	-88.42791258	47.17197501	1 - 4	Data Gap - Lack of historical data	SAND, Medium grained, Brown	Composite Sample	Direct Push Boring		X					X	X		X										
CHLL-SB41-0-6"	6/12/2014	CHLL-SB-41-6"-12"	1406176	-88.42820234	47.17180474	0.5 - 1	Data Gap - Lack of historical data	SAND, Medium to fine grained, Brown	Grab Sample	Direct Push Boring	X								X	X										
CHLL-SB41-X-Y'	6/12/2014	CHLL-SB-41-1'-4'	1406176	-88.42820234	47.17180474	1 - 4	Data Gap - Lack of historical data	SAND, Medium to fine grained, Brown to 2 ft; SAND, Medium grained, Brown	Composite Sample	Direct Push Boring		X					X	X		X										
CHLL-SB42-0-6"	6/12/2014	CHLL-SB-42-6"-12"	1406231	-88.42803684	47.17153702	0.5 - 1	Data Gap - Lack of historical data	SAND, coarse grained, gray	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB42-X-Y	6/12/2014	CHLL-SB-42-12"-3'	1406231	-88.42803684	47.17153702	1 - 3	Data Gap - Lack of historical data	SAND to SILTY SAND, Medium to fine grained, Brown	Composite Sample	Direct Push Boring		X								X										
CHLL-SB43-0-6"	6/12/2014	CHLL-SB-43-6"-12"	1406231	-88.42833328	47.17132782	0.5 - 1	Data Gap - Lack of historical data	SAND, Fine to medium grained, Brown	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB43-X-Y'	--	--		--	--	--	Data Gap - Lack of historical data	--	No Sample Collected - Saturated at 1 ft bgs	--		--								--										
CHLL-SB44-0-6"	6/12/2014	CHLL-SB-44-2"-12"	1406231	-88.4287112	47.17125394	0.17 - 1	Data Gap - Lack of historical data	SAND, Fine grained, Yellow	Grab Sample	Direct Push Boring	X						X	X	X	X			X							
--	6/12/2014	CHLL-SB-44-2"-12"-DUP	1406231	-88.4287112	47.17125394	0.17 - 1	Data Gap - Lack of historical data	SAND, Fine grained, Yellow	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring	X						X	X	X	X			X							
CHLL-SB44-X-Y	--	--	--	--	--	--	Data Gap - Lack of historical data	GRAVEL	No Sample Collected - Groundwater at 1 ft bgs	--																				
CHLL-SB45-0-6"	6/12/2014	CHLL-SB-45-0"-8"	1406231	-88.42910194	47.17123633	0 - 0.67	Data Gap - Lack of historical data	TOPSOIL, Sandy loam	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB45-X-Y'	--	--	--	--	--	--	Data Gap - Lack of historical data	SAND, Coarse to medium grained, With gravel, Gray	No Sample Collected - Groundwater at 1 ft bgs	--		--								--										
CHLL-SB46-0-6"	--	--	--	-88.42968156	--	--	Data Gap - Lack of historical data	--	No Sample Collected - Topsoil	--	--								--	--			--							
CHLL-SB46-X-Y	6/12/2014	CHLL-SB-46-6"-12"	1406231	-88.42968156	47.17138208	0.5 - 1	Data Gap - Lack of historical data	SAND and GRAVEL, Gray to brown	Composite Sample	Direct Push Boring		X							X	X			X							
CHLL-SB47-0-6"	6/12/2014	CHLL-SB-47-0"-6"	1406231	-88.43027812	47.1712622	0 - 0.5	Data Gap - Lack of historical data	TOPSOIL, Sandy loam	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB47-X-Y'	6/12/2014	CHLL-SB-47-6"-30"	1406231	-88.43027812	47.1712622	0.5 - 2.5	Data Gap - Lack of historical data	SILTY SAND, Fine grained, Gray	Composite Sample	Direct Push Boring		X					X	X		X										
CHLL-SB48-0-6"	6/12/2014	CHLL-SB-48-0"-6"	1406231	-88.43065318	47.17095298	0 - 0.5	Data Gap - Lack of historical data	FILL, Sand and gravel	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB48-X-Y	6/12/2014	CHLL-SB-48-6"-48"	1406231	-88.43065318	47.17095298	0.5 - 4	Data Gap - Lack of historical data	SILTY SAND, Fine grained, Brown to 3 ft; GRAVEL to 4 ft	Composite Sample	Direct Push Boring		X					X	X		X										
CHLL-SB49-0-6"	6/12/2014	CHLL-SB-49-0"-6"	1406231	-88.43091905	47.17058552	0 - 0.5	Data Gap - Lack of historical data	FILL, Sand and gravel	Grab Sample	Direct Push Boring	X								X	X			X							
CHLL-SB49-X-Y'	6/12/2014	CHLL-SB-49-1'-6'	1406231	-88.43091905	47.17058552	1 - 6	Data Gap - Lack of historical data	SAND, Coarse to medium grained, With gravel, Reddish brown to Gray	Composite Sample	Direct Push Boring		X						X		X										
--	6/12/2014	CHLL-SB-49-1'-6'-DUP	1406231	-88.43091905	47.17058552	1 - 6	Data Gap - Lack of historical data	SAND, Coarse to medium grained, With gravel, Reddish brown to Gray	Composite Sample, QA/QC - Duplicate Sample	Direct Push Boring		X						X		X										
Field Determined	6/12/2014	CHLL-SB-53-6"-12"	1406176	-88.42744071	47.17175885	0.5 - 1	Observed waste at Hubbell Beach	FILL, Debris/landfill waste	Grab Sample	Direct Push Boring	X								X	X			X							
Field Determined	6/12/2014	CHLL-SB-54-6"-18"	1406176 1406261	-88.42757284	47.171809	0.5 - 1.5	Observed waste at Hubbell Beach	FILL, Sandy, Debris/landfill waste	Grab Sample	Direct Push Boring		X							X	X	X									
CHLL-SB128-0-6"	8/19/2014	CHLL-SB128-0-6"	1408233	-88.43060556	47.17053889	0 - 0.5	Proximity to residential direct contact criteria exceedance	SAND, Medium grained, Brown	Grab Sample	Hand Tools	X								X				X							
CHLL-SB129-0-6"	8/19/2014	CHLL-SB129-0-6"	1408233	-88.43093611	47.17068889	0 - 0.5	Proximity to residential direct contact criteria exceedance	SAND, Medium grained, Brown	Grab Sample	Hand Tools	X								X				X							
CHLL-SB130-0-6"	--	--	--	-88.42748611	47.17179167	--	Proximity to residential direct contact criteria exceedance	--	No Sample Collected	--	--								--	--			--							
CHLL-SB130-X-Y'	8/19/2014	CHLL-SB130-6-12"	1408238	-88.42748611	47.17179167	0.5 - 1	Proximity to residential direct contact criteria exceedance	DEBRIS, Landfill waste .5 ft - .75 ft; SAND, Medium grained, Brown	Composite Sample	Direct Push Boring		X							X	X			X							
CHLL-SB131-0-6"	--	--	--	-88.427404250	47.171839800	--	Proximity to residential direct contact criteria exceedance	--	No sample collected	--	--								--	--			--							
CHLL-SB131-X-Y'	8/19/2014	CHLL-SB131-6-12"	1408238	-88.42740425	47.1718398	0.5 - 1	Proximity to residential direct contact criteria exceedance	SAND, Medium grained, Brown	Composite Sample	Direct Push Boring		X							X	X			X							
CHLL-SB132-0-6"	--	--	--	-88.42721111	47.17199167	--	Proximity to residential direct contact criteria exceedance	--	No sample collected	--	--								--	--			--							
CHLL-SB132-X-Y'	8/19/2014	CHLL-SB132-12-18"	1408238	-88.42721111	47.17199167	1 - 1.5	Proximity to residential direct contact criteria exceedance	DEBRIS, Landfill waste to 1.5 ft	Grab Sample	Direct Push Boring		X							X	X			X							
CHLL-SB133-0-6"	--	--	--	-88.42742222	47.1719	--	Proximity to residential direct contact criteria exceedance	--	No sample collected	--	--									--										
CHLL-SB133-X-Y'	8/19/2014	CHLL-SB133-6-12"	1408238	-88.42742222	47.1719	0.5 - 1	Proximity to residential direct contact criteria exceedance	SAND, Medium grained, Brown	Grab Sample	Direct Push Boring		X							X	X			X							
--	8/19/2014	CHLL-SB133-6-12"-DUP	1408238	-88.42742222	47.1719	0.5 - 1	Proximity to residential direct contact criteria exceedance	SAND, Medium grained, Brown	Grab Sample, QA/QC - Duplicate Sample	Direct Push Boring		X							X	X			X							
CHLL-SB134-0-6"	--	--	--	--	--	--	Proximity to residential direct contact criteria exceedance	--	No sample collected	--	--								--	--			--							
CHLL-SB134-X-Y'	8/19/2014	CHLL-SB134-18"-24"	1408238	-88.42761944	47.17178056	1.5 - 2	Proximity to residential direct contact criteria exceedance	DEBRIS, Landfill waste	Grab Sample	Direct Push Boring		X							X	X			X							
CHLL-SB135-0-6"	8/19/2014	CHLL-SB135-0-6"	1408233	-88.42893889	47.17134722	0 - 0.5	Proximity to residential direct contact criteria exceedance	TOPSOIL, Sandy loam, Organics, Brownish black	Grab Sample	Hand Tools	X								X				X							
CHLL-SB136-0-6"	8/19/2014	CHLL-SB136-0-6"	1408233	-88.42935278	47.17150833	0 - 0.5	Proximity to residential direct contact criteria exceedance	TOPSOIL, Sandy loam, Organics, Brownish black	Grab Sample	Hand Tools	X								X				X							
CHLL-SB162	8/20/2015	CHLL - SB - 162 - 6"-12"	1508213	-88.42429792	47.17404347	0.5 - 1	Proximity to historical PCB detections	FILL, Concrete to 0.75 ft; SAND, Dark gray, Medium to coarse	Grab Sample	Direct Push Boring	X						X	X	X	X			X							
CHLL-SB162	8/20/2015	CHLL - SB - 162 - 1'-12'	1508213	-88.42429792	47.17404347	1 - 12	Proximity to historical PCB detections	FILL, Concrete to 0.75 ft; SAND, Dark gray, Medium to coarse to 12 ft; SAND Reddish brown, Medium to coarse	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB163	8/20/2015	CHLL - SB - 163 - 6"-12"	1508213	-88.4241898	47.1738299	0.5 - 1	Proximity to historical PCB detections	SAND, Reddish brown, Medium to coarse grained	Grab Sample	Direct Push Boring	X						X	X	X	X			X							
CHLL-SB163	8/20/2015	CHLL - SB - 163 - 1'-12'	1508213	-88.4241898	47.1738299	1 - 12	Proximity to historical PCB detections	SAND, Reddish brown, Medium to coarse grained	Composite Sample	Direct Push Boring		X					X	X	X	X			X							
CHLL-SB164	8/20/2015	CHLL - SB - 164 - 6"-12"	1508213	-88.42395556	47.17375202	0.5 - 1	Proximity to historical PCB detections	SAND, Reddish brown, Medium to coarse grained	Grab Sample	Direct Push Boring	X						X	X	X	X			X							
CHLL-SB164	8/20/2015	CHLL - SB - 164 - 1'-9'	1508213	-88.42395556	47.17375202	1 - 9	Proximity to historical PCB detections	SAND, Reddish brown, Medium to coarse grained	Composite Sample	Direct Push Boring		X					X	X	X	X			X							

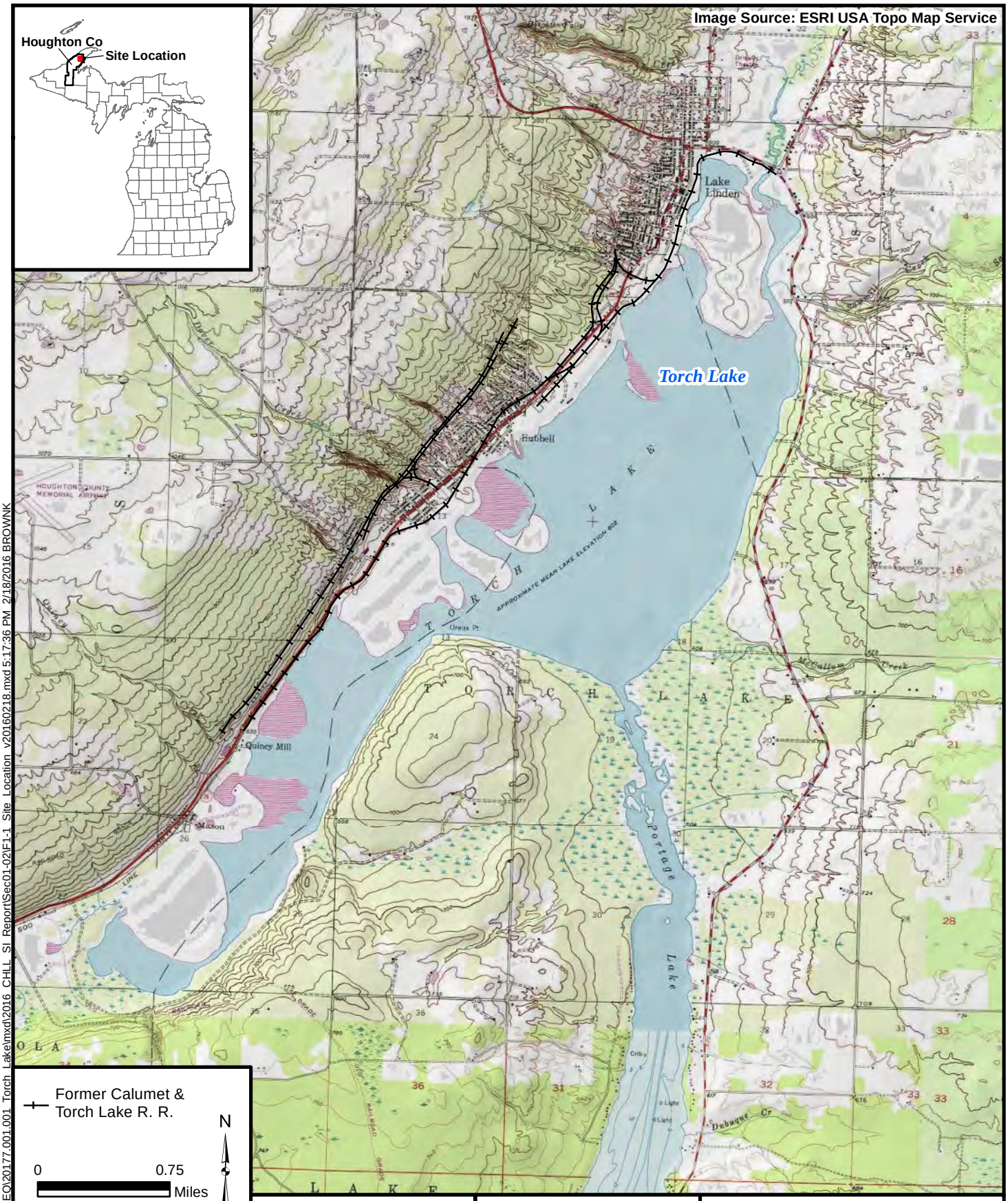
Table 3-2
Sampling and Analysis Summary
Hubbell Slag Dump and Beach Area
C&H Lake Linden Operations
Houghton County, Michigan

Proposed Sampling Location	Sample Date	Field Sample Identification	Laboratory Work Order Number	Longitude	Latitude	Sample Interval/Screen Interval (feet)	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix						Requested Laboratory Analyses									Water Quality Parameters				
											Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment	Drum, Container, or Material Sample	VOCs	PNAs	Metals	PCBs	Hexavalent Chromium	Chloride and Sulfate	Cyanide	Asbestos	DRO/ORO	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (%)	pH	Turbidity (nTu)
Groundwater																														
CHLL-PCI-MW120	6/11/2014	CHLL-PCI-MW120	1406174	-88.42498689	47.17422533	4.7 - 14.7	Existing monitoring well on the PCI property	Permanent Screen Interval: 4.7 ft - 14.7 ft	Grab Sample	Peristaltic Pump			X					X		X						12.50	0.345	9.30	7.39	NM
CHLL-MW25-X-Y	6/12/2014	CHLL-GW-25-9'-14'	1406174	-88.42744113	47.17191926	9 - 14	Data Gap - Lack of historical data	Temporary Screen Interval: 9 ft - 14 ft	Grab Sample	Peristaltic Pump			X							X						9.40	0.279	1.00	6.40	NM
CHLL-MW26-X-Y	6/12/2014	CHLL-GW-26-9'-14'	1406174	-88.42772128	47.17172162	9 - 14	Data Gap - Lack of historical data	Temporary Screen Interval: 9 ft - 14 ft	Grab Sample	Peristaltic Pump			X					X		X						7.10	0.301	2.10	6.58	NM
CHLL-MW27-X-Y	6/12/2014	CHLL-GW-27-8'-13'	1406236	-88.42803684	47.17153702	8 - 13	Data Gap - Lack of historical data	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X					X		X						9.90	0.292	49.10	6.63	NM
CHLL-MW28-X-Y	6/12/2014	CHLL-GW-28-6'-11'	1406236	-88.42832328	47.17132782	6 - 11	Data Gap - Lack of historical data	Temporary Screen Interval: 6 ft - 11 ft	Grab Sample	Peristaltic Pump			X							X						10.20	0.374	16.30	6.98	NM
CHLL-MW29-X-Y	6/12/2014	CHLL-GW-29-6'-11'	1406236	-88.4287112	47.17125394	6 - 11	Data Gap - Lack of historical data	Temporary Screen Interval: 6 ft - 11 ft	Grab Sample	Peristaltic Pump			X							X						9.40	0.426	75.20	6.72	NM
CHLL-MW30-X-Y	6/12/2014	CHLL-GW-30-4'-9'	1406236	-88.42910194	47.17123633	4 - 9	Data Gap - Lack of historical data	Temporary Screen Interval: 4 ft - 9 ft	Grab Sample	Peristaltic Pump			X							X						8.80	0.489	6.20	7.02	NM
CHLL-MW31-X-Y	6/12/2014	CHLL-GW-31-8'-13'	1406236	-88.42968156	47.17138208	8 - 13	Data Gap - Lack of historical data	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X						9.80	0.455	65.00	6.93	NM
CHLL-MW32-X-Y	6/12/2014	CHLL-GW-32-8'-13'	1406236	-88.43027812	47.1712622	8 - 13	Data Gap - Lack of historical data	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample	Peristaltic Pump			X							X						9.20	0.900	60.40	6.89	NM
--	6/12/2014	CHLL-GW-32-8'-13'-DUP	1406236	-88.43027812	47.1712622	8 - 13	Data Gap - Lack of historical data	Temporary Screen Interval: 8 ft - 13 ft	Grab Sample, QA/QC - Duplicate Sample	Peristaltic Pump			X							X										
CHLL-MW33-X-Y	6/12/2014	CHLL-GW-33-12'-17'	1406236	-88.43065318	47.17095298	12 - 17	Data Gap - Lack of historical data	Temporary Screen Interval: 12 ft - 17 ft	Grab Sample	Peristaltic Pump			X							X						NM	NM	NM	NM	NM
CHLL-MW34-X-Y	6/12/2014	CHLL-GW-34-10'-15'	1406236	-88.43091905	47.17058552	10 - 15	Data Gap - Lack of historical data	Temporary Screen Interval: 10 ft - 15 ft	Grab Sample	Peristaltic Pump			X				x	X		X						NM	NM	NM	NM	NM
CHLL-MW59-X-Y'	8/19/2014	CHLL-GW59-6'-11'	1408234	-88.42748611	47.17179167	6 - 11	Proximity to residential direct contact criteria exceedance	Temporary Screen Interval: 6 ft - 11 ft	Grab Sample	Peristaltic Pump			X							X						15.70	0.381	40.50	6.55	NM
CHLL-MW60-X-Y'	8/19/2014	CHLL-GW60-6'-11'	1408234	-88.42740425	47.1718398	6 - 11	Proximity to residential direct contact criteria exceedance	Temporary Screen Interval: 6 ft - 11 ft	Grab Sample	Peristaltic Pump			X							X						15.50	0.312	16.80	6.61	NM
CHLL-MW61-X-Y'	8/19/2014	CHLL-GW61-6'-11'	1408234	-88.42721111	47.17199167	6 - 11	Proximity to residential direct contact criteria exceedance	Temporary Screen Interval: 6 ft - 11 ft	Grab Sample	Peristaltic Pump			X							X						14.80	0.336	10.20	6.42	NM
CHLL-MW62-X-Y'	8/19/2014	CHLL-GW62-6'-11'	1408234	-88.42742222	47.1719	6 - 11	Proximity to residential direct contact criteria exceedance	Temporary Screen Interval: 6 ft - 11 ft	Grab Sample	Peristaltic Pump			X							X						16.80	0.202	22.50	6.41	NM
CHLL-MW63-X-Y'	8/19/2014	CHLL-GW63-6'-11'	1408234	-88.42761944	47.17178056	6 - 11	Proximity to residential direct contact criteria exceedance	Temporary Screen Interval: 6 ft - 11 ft	Grab Sample	Peristaltic Pump			X							X						16.20	0.317	3.40	6.52	NM
Sediment and Surface Water																														
CHLL-SD65-0-6"	6/14/2014	CHLL-SD65-0"-6"	1406229	-88.4264484	47.17134587	0 - 0.5	Data Gap - Lack of historical data	SILT, Reddish brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD65-1-3'	6/14/2014	CHLL-SD65-0.75'-1'	1406229	-88.4264484	47.17134587	0.75 - 1	Data Gap - Lack of historical data	SAND, Silty, Wood debris, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD65-3-5'	--	--	--	--	--	--	Data Gap - Lack of historical data	--	Sample Not Collected - Refusal at 1 ft	--					--					--										
CHLL-SD66-0-6"	6/14/2014	CHLL-SD66-0"-6"	1406229 1407121	-88.42718304	47.17176789	0 - 0.5	Data Gap - Lack of historical data, proximity to the public beach	SILT, Reddish brown, sandy	Grab Sample	Vibracore Sampler					X			X	X	X			X							
CHLL-SD66-1-3'	6/14/2014	CHLL-SD66-1'-1.5'	1406229	-88.42718304	47.17176789	1 - 1.5	Data Gap - Lack of historical data, proximity to the public beach	SAND, Poorly sorted, Wood debris, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD66-3-5'	--	--	--	--	--	--	Data Gap - Lack of historical data, proximity to the public beach	--	Sample Not Collected	--					--					--										
CHLL-SD67-0-6"	7/8/2014	CHLL-SD67-0"-6"	1407176	-88.427663336	47.171321919	0 - 0.5	Data Gap - Lack of historical data, proximity to the public beach	SAND, Silty, Fine grained, Some wood debris, Dark brown	Sample jar broken upon arrival at the laboratory.	--					--			--	--	--										
CHLL-SD67-1-3'	7/8/2014	CHLL-SD67-1'-3'	1407176	-88.427663336	47.171321919	1 - 3	Data Gap - Lack of historical data, proximity to the public beach	SILT, Sandy, Some wood debris, Dark brown; SAND, Poorly sorted, Dark brown to tan	Composite Sample	Vibracore Sampler					X					X										
--	7/8/2014	CHLL-SD67-1'-3'-DUP	1407176	-88.427663336	47.171321919	1 - 3	Data Gap - Lack of historical data, proximity to the public beach	SILT, Sandy, Some wood debris, Dark brown; SAND, Poorly sorted, Dark brown to tan	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SD67-3-5'	--	--	--	--	--	--	Data Gap - Lack of historical data, proximity to the public beach	--	Sample Not Collected - End of Boring at 3 ft	--					--					--										
CHLL-SD69-0-6"	7/9/2014	CHLL-SD69-0"-6"	1407176	-88.4290461	47.17095995	0 - 0.5	Data Gap - Lack of historical data	SAND, Silty, Medium to fine grained, Dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD69-1-3'	7/9/2014	CHLL-SD69-1'-2.5'	1407176	-88.4290461	47.17095995	1 - 2.5	Data Gap - Lack of historical data	SAND, Silty, With wood debris, Medium to fine grained, Dark brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD69-3-5'	--	--	--	--	--	--	Data Gap - Lack of historical data	--	Sample Not Collected, Low Recovery	--					--					--										
CHLL-SD70-0-6"	6/14/2014	CHLL-SD70-0"-6"	1406229	-88.42975295	47.17065588	0 - 0.5	Data Gap - Lack of historical data	SAND, dark brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD70-1-3'	6/14/2014	CHLL-SD70-1'-3'	1406229	-88.42975295	47.17065588	1 - 3	Data Gap - Lack of historical data	SAND, Medium to fine grained, Reddish brown; SILT, clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD70-3-5'	6/14/2014	CHLL-SD70-3'-4.5'	1406229	-88.42975295	47.17065588	3 - 4.5	Data Gap - Lack of historical data	SAND, Poorly sorted, Reddish brown; SILT, clayey, Reddish brown	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD97-0-6"	6/2/2015	CHLL-SD-97-0-6"	1506048	-88.4240372	47.1708584	0 - 0.5	Proximity to historical PCB detections.	SILT, Dark Brown	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD97-1-3'	6/2/2015	CHLL-SD-97-1-3'	1506048	-88.4240372	47.1708584	1 - 3	Proximity to historical PCB detections.	SILT, Reddish brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD97-3-5'	6/2/2015	CHLL-SD-97-3-5'	1506048	-88.4240372	47.1708584	3 - 5	Proximity to historical PCB detections.	SILT, Reddish brown, Clayey	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD98-0-6"	7/8/2015	CHLL - SD - 98 - 0"-6"	1507118	-88.4258366	47.16997797	0 - 0.5	Proximity to historical PCB detections.	SAND, Dark brown to purple-brown; loose; wet; fine sand.	Grab Sample	Vibracore Sampler					X					X										
CHLL-SD98-1-3'	7/8/2015	CHLL - SD - 98 - 1'-3.25'	1507118	-88.4258366	47.16997797	1 - 3.25	Proximity to historical PCB detections.	SAND, Dark brown to purple-brown; loose; wet; fine sand.	Composite Sample	Vibracore Sampler					X					X										
CHLL-SD98-3-5'	7/8/2015	CHLL - SD - 98 - 1'-3.25' DUP	1507118	-88.4258366	47.16997797	1 - 3.25	Proximity to historical PCB detections.	SAND, Dark brown to purple-brown; loose; wet; fine sand.	Composite Sample, QA/QC - Duplicate Sample	Vibracore Sampler					X					X										
CHLL-SW08-X-Y'	6/2/2015	CHLL-SW08-6.5-7.5'	1506049	-88.42720955	47.17167408	6.5 - 7.5	Proximity to historical PCB detections.	--	Grab Sample	Peristaltic Pump				X						X						NM	NM	NM	NM	NM
CHLL-SW09-X-Y'	7/8/2015	CHLL - SW - 09 - 4.25-5.25'	1507116	-88.42579	47.17319	4.25 - 5.25	Proximity to historical PCB detections	--	Grab Sample	Peristaltic Pump				X						X						21.8	0.3	7.19	8.41	4.3
Bulk Asbestos																														
CHLL-ASBBLK58A	7/1/2015	CHLL-ASBBLK58A-070115	240-52869	-88.426459	47.171717	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK58B	7/1/2015	CHLL-ASBBLK58B-070115	240-52869	-88.426459	47.171717	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						
CHLL-ASBBLK58C	7/1/2015	CHLL-ASBBLK58C-070115	240-52869	-88.426459	47.171717	--	Suspect Asbestos Containing Material	Black asphaltic roofing material	Bulk Material Sample	Grab						X								X						

Notes:
% = Percent
°C = Degrees Celsius
CHLL = C&H Lake Linden Operations
DRO = Diesel Range Organics
ft = Feet
GW = Groundwater
mS/cm = Millisiemens per Centimeter
MW = Monitoring Well
NM = Not Measured
ORO = Oil Range Organics
PNAs = Polynuclear Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
SB = Soil Boring
SD = Sediment
VOCs = Volatile Organic Compounds
X = Analyte selected for laboratory analysis

For the purposes of this investigation, sediments include residues and waste material associated with chemical containers and deposits on the lake bottom historically discarded in Torch Lake.

FIGURES



Source: Draft Site Inspection (SI) Report for C&H Lake Linden Operations, Lake Linden, Michigan, 49945 - March 2013. Prepared by the MDEQ-RRD Superfund Section, Pre-remedial Group, Site Evaluation Unit (Pre-remedial Group)

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Michigan Department of Environmental Quality

Prepared By:
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Figure 1-1
Site Location Map
C & H Lake Linden Operations
Lake Linden, Houghton County, Michigan

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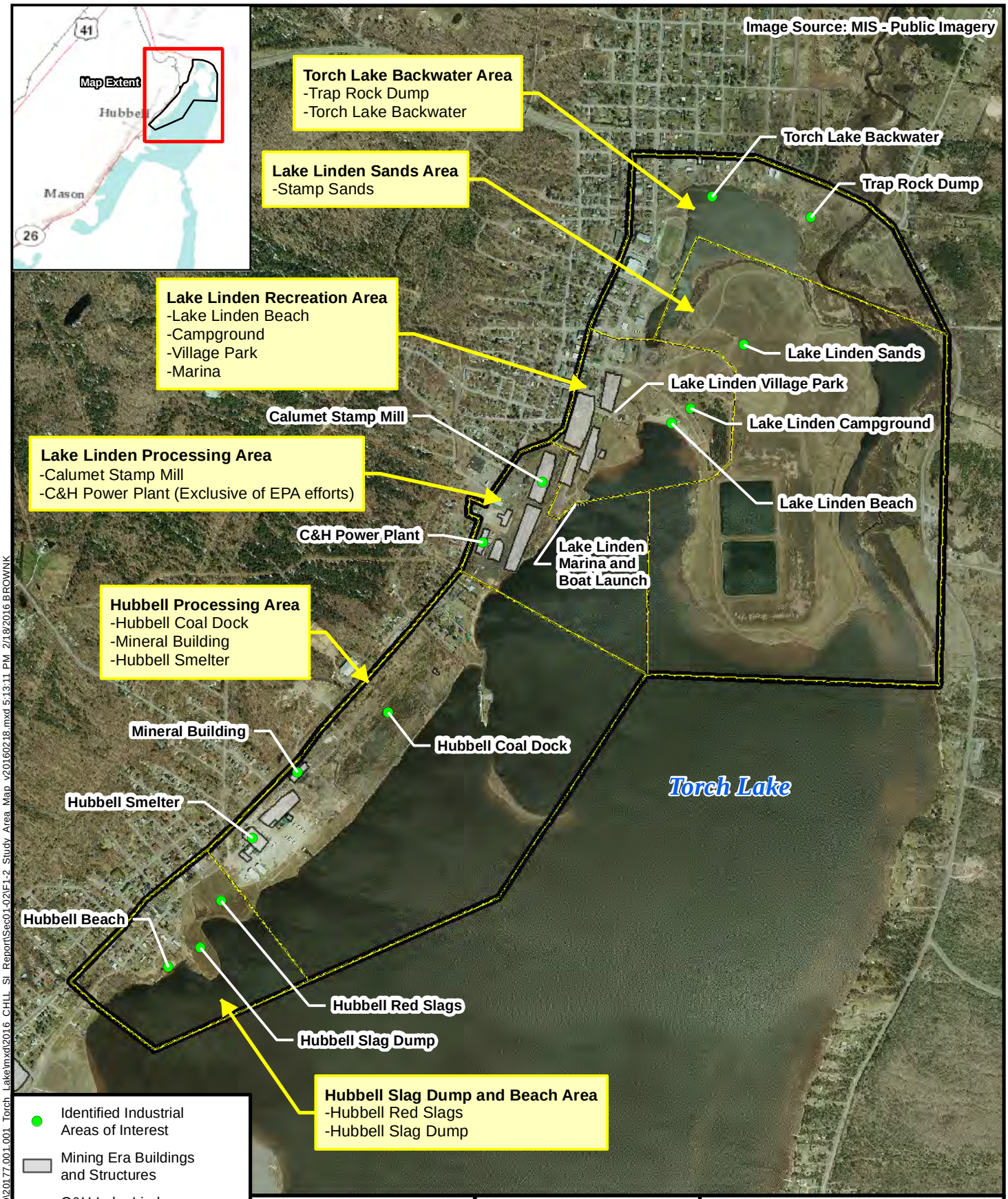

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Figure 1-2
C & H Lake Linden Operations Study Area Map
Lake Linden, Houghton County, Michigan

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Figure 2-1
Torch Lake Backwater Area
Site Location and Features Map
C & H Lake Linden Operations
Lake Linden, Houghton County, Michigan

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Figure 2-2
Lake Linden Sands Area
Site Location and Features Map
C & H Lake Linden Operations
Lake Linden, Houghton County, Michigan

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Figure 2-3
Lake Linden Recreation Area
Site Location and Features Map
C & H Lake Linden Operations
Lake Linden, Houghton County, Michigan

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Figure 2-4
Lake Linden Processing Area
Site Location and Features Map
C & H Lake Linden Operations
Lake Linden, Houghton County, Michigan

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Figure 2-5
Hubbell Processing Area
Site Location and Features Map
C & H Lake Linden Operations
Lake Linden, Houghton County, Michigan

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Limit of Capped Slag (as mapped by MDEQ)

Mining Era Buildings and Structures

Limits of Previously Documented Observed Waste Deposits or Contamination

Study Area

0 375 Feet

Coordinate System: MIGeoRef(m)

N

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Figure 2-6
Hubbell Slag Dump and Beach Area
Site Location and Features Map
C & H Lake Linden Operations
Lake Linden, Houghton County, Michigan

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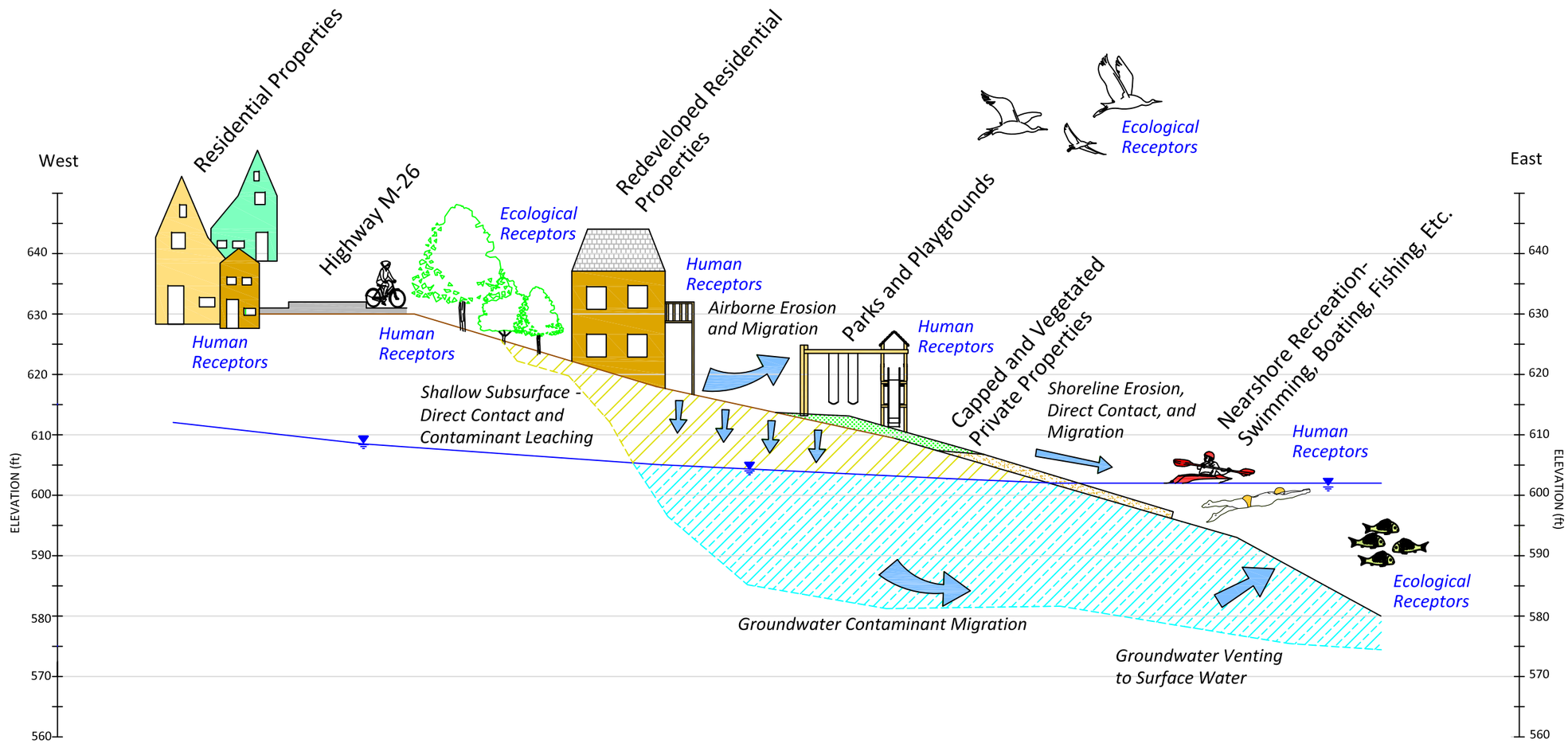
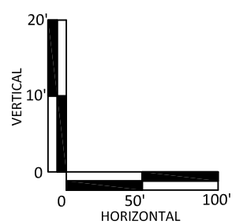


LEGEND

- Conceptual Extent of Contaminated Soil and Wastes
- Conceptual Extent of Groundwater Contamination
- Conceptual Groundwater and Surface Water Elevations



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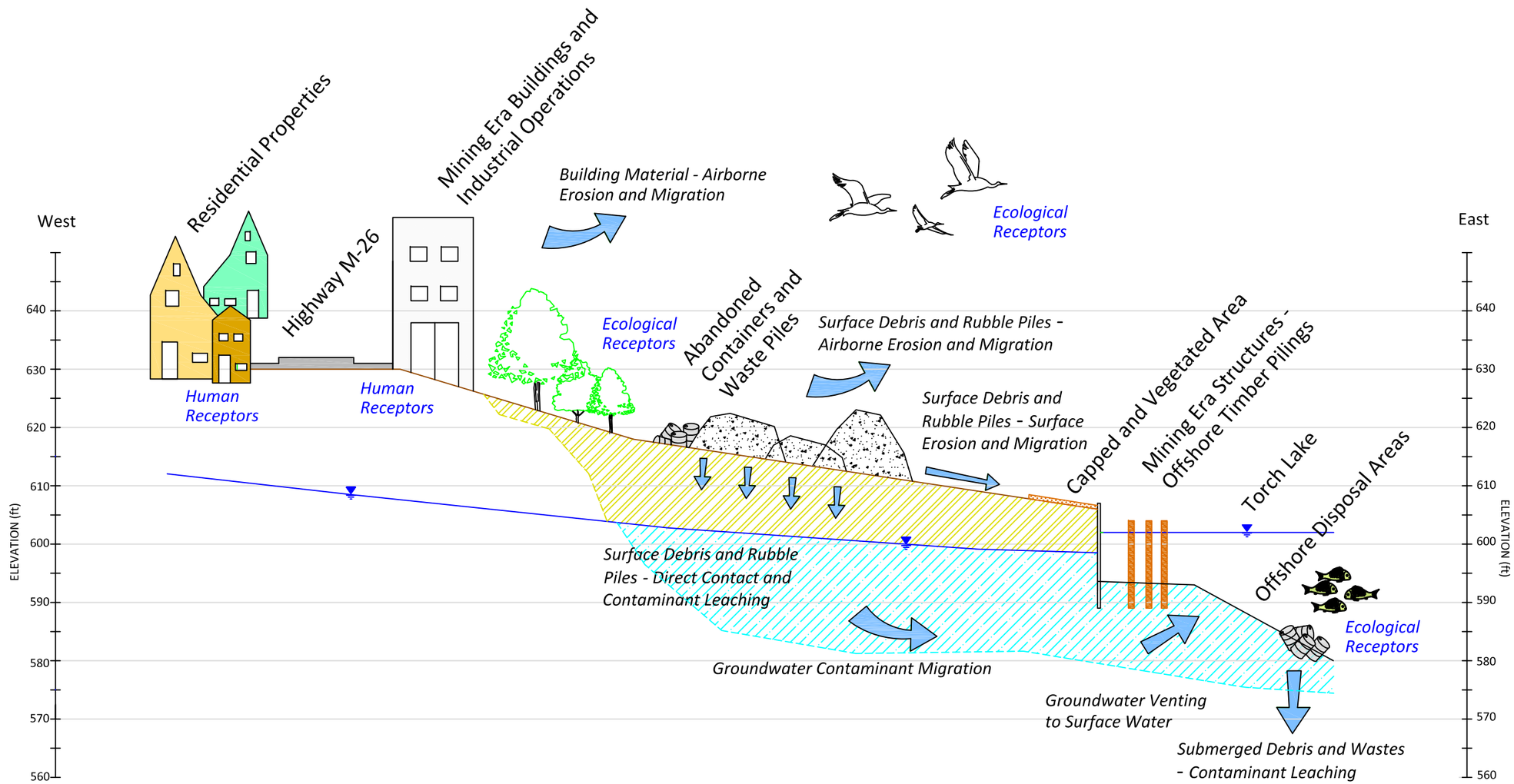
CONCEPTUAL SITE MODEL
RESIDENTIAL/RECREATIONAL LAND USE SCENARIO

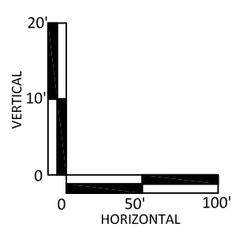
TORCH LAKE NON-SUPERFUND SITE
HOUGHTON COUNTY, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
AS NOTED	DPL	12/2014		FIGURE 4-1



LEGEND

- Conceptual Extent of Contaminated Soil and Wastes
- Conceptual Extent of Groundwater Contamination
- Conceptual Groundwater and Surface Water Elevations



K:\Torch Lake NS Site\2014 Report\Figures\Section 4\Figure 4-2_NonResCSM

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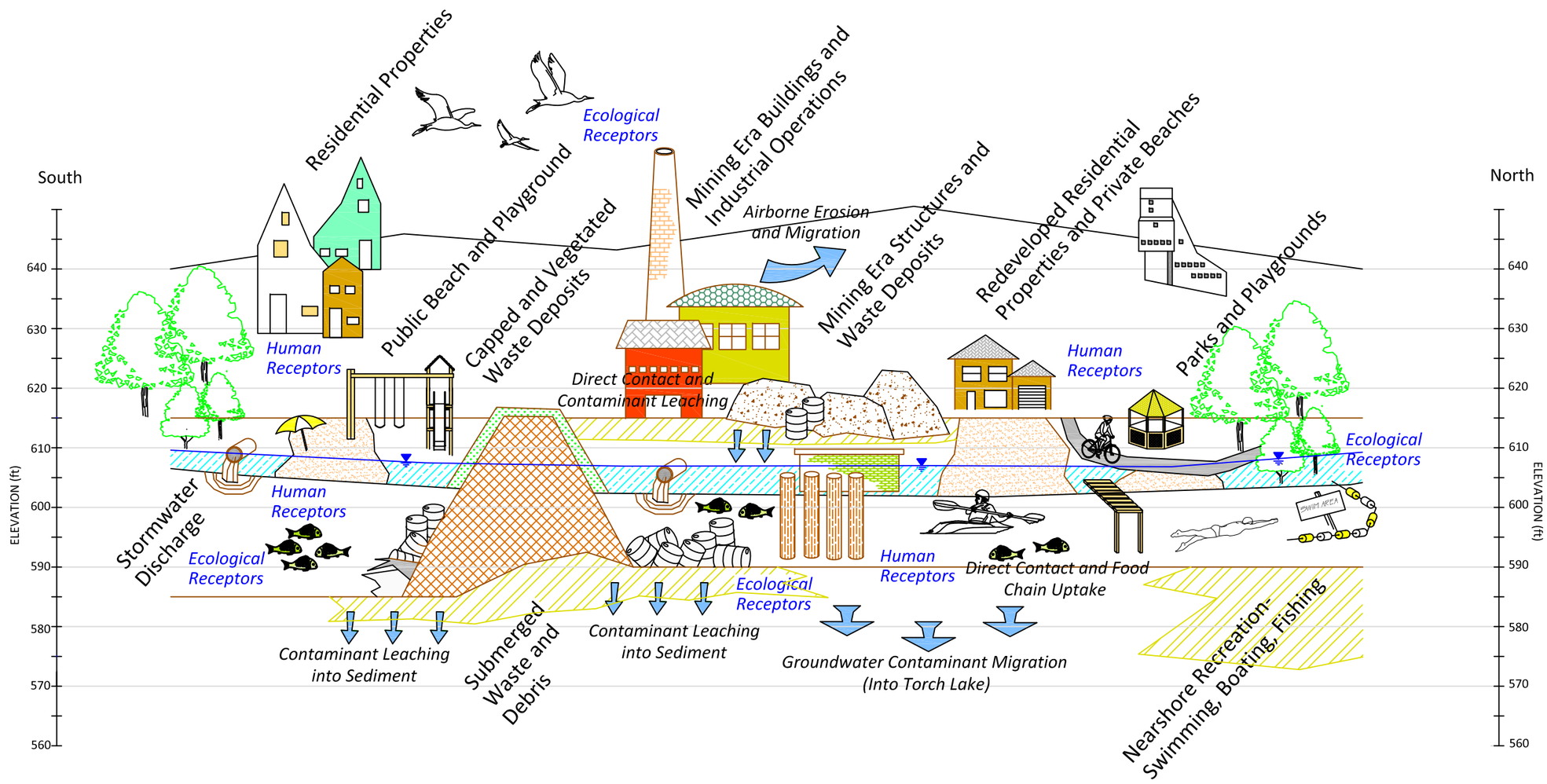
CONCEPTUAL SITE MODEL
NON-RESIDENTIAL USE SCENARIO

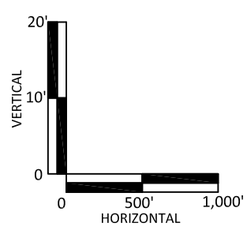
TORCH LAKE NON-SUPERFUND SITE
HOUGHTON COUNTY, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
AS NOTED	DPL	12/2014		FIGURE 4-2



LEGEND

- Conceptual Extent of Contaminated Soil and Sediment
- Conceptual Extent of Groundwater Contamination
- Conceptual Groundwater Elevation



K:\Torch Lake NS Site\2014 Report\Figures\Section 4\Figure 4-3_LongCSM

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CONCEPTUAL SITE MODEL LONGITUDINAL

TORCH LAKE NON-SUPERFUND SITE HOUGHTON COUNTY, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
AS NOTED	DPL	12/2014		FIGURE 4-3

APPENDICES

Provided on CD as separate files.

Appendix A	**Michigan Tech Historical Summary**
Appendix B	**Side Scan Sonar Imagery**
Appendix C	**Underwater Videos**
Appendix D	**Site Inspections – Reconnaissance Logs**
Appendix E	**Site Inspections – Targeted Inspection Forms**
Appendix F	**Photographic Log**
Appendix G	**Boring Logs**
Appendix H	**Sediment Core Logs**
Appendix I	**Laboratory Analytical Reports**

SECTION 7

DETAILED FINDINGS REPORT – LAKE LINDEN RECREATION AREA TABLES

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHLL-SB07			CHLL-SB12			CHLL-SB14	
Field Sample ID									CHLL-SB 07 0-6''	CHLL-SB 07 6''-12'	CHLL-SB 07 12'-23'	CHLL-SB 12 0-6''	CHLL-SB 12 6''-12'	CHLL-SB 12 12'-24'	CHLL-SB 14 0''-6''	CHLL-SB 14 6''-36''
Sample Date:									6/16/2014	6/16/2014	6/16/2014	6/16/2014	6/16/2014	6/16/2014	6/15/2014	6/15/2014
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 12 ft	12 - 23 ft	0 - 0.5 ft	0.5 - 12 ft	12 - 24 ft	0 - 0.5 ft	0.5 - 3 ft
Sample Description:									SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown, Some SILTY SAND	SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown, Some SILTY SAND	SAND, Fine to medium grained, Gray	FILL, Sand, gravel, and concrete
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**5600**	**11000**	**6400**	**7500**	**8000**	**8400**	**14000**	**9200**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**1.0**	**1.2**	**3.2**	**1.2**	**1.5**	**1.1**	**2.3**	**14**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**27**	**14**	**16**	**23**	**25**	**16**	**13**	**39**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	**0.4**	**0.8**	**0.8**	**0.9**	**0.9**	**0.8**	**0.4**	**0.5**
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	**0.2**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	**8.0**	**29**	**21**	**20**	**22**	**24**	**29**	**21**
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**2.9**	**13**	**9.3**	**10**	**10**	**11**	**18**	**9.1**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**18**	**700**	**890**	**870**	**570**	**750**	**1500**	**7600**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**8900**	**15000**	**13000**	**12000**	**14000**	**14000**	**21000**	**16000**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**2.5**	**2.0**	**2.2**	**13**	**7.5**	**2.0**	**7.6**	**110**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**220**	**320**	**230 J**	**250**	**250**	**270**	**360**	**260**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	<0.06 U	<0.06 U	<0.06 U	<0.05 U	<0.05 U	**0.2**	<0.05 U	**0.08**
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**6.2**	**39**	**25**	**27**	**28**	**32**	**29**	**22**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	**0.3**
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	<0.1 U	**1.2**	**1.6**	**2.4**	**1.5**	**2.8**	**0.7**	**3.6**
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**15**	**58**	**57**	**67**	**57**	**58**	**58**	**83**
Inorganics - Chromium, Hexavalent																
									--	ND	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	<0.11 U	<0.12 U	<0.11 U	<0.11 U	<0.11 U	<0.11 U	**0.25**	<0.11 U
Organics - PCBs (ug/kg)																
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	--	<250 U	<110 U	--	<110 U	<110 U	<110 U	<350 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	--	ND	ND	--	ND	ND	ND	ND
Organics - SVOCs																
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	<250 U	<220 U	--	<220 UJ	<230 U	<220 U	**460 J**
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<250 U	<220 U	--	<220 UJ	<230 U	<220 U	**2300 J**
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	<500 U	<450 U	--	<430 UJ	<450 U	<440 U	**2400 J**
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<500 U	<450 U	--	<430 UJ	<450 U	<440 U	**3100 J**
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	<500 U	<450 U	--	<430 UJ	<450 U	<440 U	**1300 J**
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	<500 U	<450 U	--	<430 UJ	<450 U	<440 U	**1100 J**
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	<250 U	<220 U	--	<220 UJ	<230 U	<220 U	**2600 J**
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	<500 U	<450 U	--	<430 UJ	<450 U	<440 U	<440 UJ
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	<250 U	<220 U	--	<220 UJ	<230 U	<220 U	**6800 J**
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<500 U	<450 U	--	<430 UJ	<450 U	<440 U	**1200 J**
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<250 U	<220 U	--	<220 UJ	<230 U	<220 U	**200 J**
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	<250 U	<220 U	--	<220 UJ	<230 U	<220 U	**3400 J**
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	<250 U	<220 U	--	<220 UJ	<230 U	<220 U	**5600 J**
Organics - VOCs																
									--	ND	ND	--	ND	ND	--	ND
Asbestos																
									--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHLL-SB17		CHLL-SB18		CHLL-SB19			CHLL-SB20	
Field Sample ID									CHLL-SB 17 0''-6''	CHLL-SB 17 3'-5'	CHLL-SB 18 4''-12''	CHLL-SB 18 1'-4'	CHLL-SB 19 0''-6''	CHLL-SB 19 1'-5'	CHLL-SB 19 1'-5' Dup	CHLL-SB 20 6''-12''	CHLL-SB 20 3'-6'
Sample Date:									6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014
Sample Interval (bgs):									0 - 0.5 ft	3 - 5 ft	0.33 - 1 ft	1 - 4 ft	0 - 0.5 ft	1 - 5 ft	1 - 5 ft	0.5 - 1 ft	3 - 6 ft
Sample Description:									SAND, Fine to medium grained, Brown	SAND, Coarse to medium grained, Reddish brown	SAND, Coarse to medium grained, Reddish brown	SAND, Coarse to medium grained, Reddish brown	CLAY, Brown	SAND, Medium to fine grained, brown; GRAVEL, Gray from 4-5'	Field Duplicate	SAND, Medium grained, Dark brown	SAND, Coarse to medium grained, Reddish brown
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**8000**	**6300**	**5200**	**5000**	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<0.3 U	<0.3 U	<0.3 U	<0.3 U	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**2.4**	**1.3**	**1.2**	**1.1**	--	--	--	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**21**	**45**	**14**	**9.4**	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	**0.6**	**0.8**	**0.8**	**0.8**	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	<0.2 U	<0.2 U	<0.2 U	<0.2 U	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	**17**	**19**	**13**	**13**	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**8.3**	**8.7**	**7.3**	**6.7**	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**330**	**4100**	**6300**	**4300**	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**16000**	**11000**	**9400**	**9900**	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**5.6**	**4.9**	**3.5**	**2.9**	--	--	--	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**250 J**	**260**	**190**	**180**	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	<0.06 U	<0.06 U	<0.05 U	<0.05 U	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**20**	**23**	**17**	**16**	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<0.2 U	**0.2**	<0.2 U	<0.2 U	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**0.7**	**1.8**	**3.1**	**3.4**	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**46**	**55**	**53**	**52**	--	--	--	--	--
Inorganics - Chromium, Hexavalent																	
									--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																	
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	<0.12 U	<0.11 U	<0.11 U	<0.11 U	--	--	--	--	--
Organics - PCBs (ug/kg)																	
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<120 U	<110 U	<110 U	<110 U	<230 U	<340 U	<230 U	<470 U	<110 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs																	
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	--	--	--
Organics - VOCs																	
									--	--	--	--	--	--	--	--	--
Asbestos																	
									ND	--	--	--	ND	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHLL-SB21		CHLL-SB22		CHLL-SB50	CHLL-SB55		CHLL-SB56	CHLL-SB109
Field Sample ID									CHLL-SB 21 3''-9''	CHLL-SB 21 9''-4'	CHLL-SB 22 3''-9''	CHLL-SB 22 1'-4'	CHLL-SB 50 0''-12''	CHLL-SB 55 0-6''	CHLL-SB 55 6''-4'	CHLL-SB56-0-6	CHLL-SB109-0-6''
Sample Date:									6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	8/20/2014
Sample Interval (bgs):									0.25 - 0.75 ft	0.75 - 4 ft	0.25 - 0.75 ft	1 - 4 ft	0 - 1 ft	0.5 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:									SAND, Fine to medium grained, Reddish brown	SAND, Coarse to fine grained, Brown to reddish brown	SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown	SAND, Coarse to medium grained, With gravel, Reddish Brown	SAND, Medium to fine grained, Dark gray	SAND, Coarse to fine grained, Brown to reddish brown	No cuttings	TOPSOIL, Sandy Loam, Brown
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	**17000**	**6900**	**9900**	**5700**	**8100**	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	**0.3**	**0.5**	<0.3 U	<0.3 U	<0.3 U	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	--	**6.6**	**5.9**	**2.3**	**1.3**	**5.7**	--	**9.2**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	**34**	**110**	**19**	**15**	**25**	--	**43**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	**0.6**	**0.9**	**0.4**	<0.2 U	**0.8**	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	**36**	**20**	**22**	**13**	**19**	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	**18**	**9.2**	**13**	**5.5**	**9.8**	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	**4900**	**9600**	**730**	**270**	**9100**	--	**3600**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	**22000**	**20000**	**17000**	**9200**	**14000**	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	--	**620**	**640**	**26**	**7.7**	**23**	--	**170**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	**410**	**260**	**350**	**130**	**290**	--	**380**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	**0.08**	**0.1**	**0.1**	<0.05 U	**0.07**	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	**57**	**22**	**31**	**11**	**27**	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	<0.2 U	<0.2 U	**0.2**	<0.2 U	<0.2 U	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	**2.6**	**4.8**	**0.5**	**0.1**	**16**	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	**79**	**86**	**55**	**28**	**81**	--	--
Inorganics - Chromium, Hexavalent																	
									ND	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																	
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	--	<0.11 U	<0.12 U	**0.12**	<0.11 U	<0.11 U	--	<0.11 U
Organics - PCBs (ug/kg)																	
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<590 U	<230 U	<110 U	<2300 U	--	--
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND	--	--
Organics - SVOCs																	
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	--	--	--
Organics - VOCs																	
									--	--	--	--	--	--	--	--	--
Asbestos																	
									--	--	ND	--	ND	ND	--	ND	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHLL-SB110	CHLL-SB111		CHLL-SB112		CHLL-SB113		CHLL-SB114	
Field Sample ID									CHLL-SB110-0-6''	CHLL-SB 111 6''-12''	CHLL-SB 111 12''-3'	CHLL-SB 112 6''-12''	CHLL-SB 112 12''-3'	CHLL-SB113 6-12''	CHLL-SB113 12''-3'	CHLL-SB114 6''-12''	CHLL-SB114 12''-3'
Sample Date:									8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 1 ft	1 - 3 ft	0.5 - 1 ft	1 - 3 ft	0.5 - 1 ft	1 - 3 ft	0.5 - 1 ft	1 - 3 ft
Sample Description:									TOPSOIL, Sandy Loam, Brown	CLAY, Gray	SAND, Medium grained, Reddish brown	CLAY, Gray	SAND, Medium grained, Reddish brown	CLAY, Gray	SAND, Medium grained, Reddish brown	CLAY, Gray	SAND, Medium grained, Reddish brown
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**0.8**	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**17**	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**65**	--	--	--	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**3.3**	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**98**	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--	--	--
Inorganics - Chromium, Hexavalent																	
									--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																	
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	<0.11 U	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																	
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	--	<120 U	<110 U	<110 U	<110 U	<110 U	<110 U	<110 U	<120 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	--	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs																	
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	--	--	--
Organics - VOCs																	
									--	--	--	--	--	--	--	--	--
Asbestos																	
									--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHLL-SB115			CHLL-SB116	CHLL-SB117		CHLL-SB118	
Field Sample ID									CHLL-SB115 6''-12''	CHLL-SB115 12''-5'	CHLL-SB115 12''-5' DUP	CHLL-SB 116 6''-12''	CHLL-SB117 6''-12''	CHLL-SB117 12''-3'	CHLL-SB 118 6''-12''	CHLL-SB 118 12''-3'
Sample Date:									8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/21/2014	8/21/2014
Sample Interval (bgs):									0.5 - 1 ft	1 - 5 ft	1 - 5 ft	0.5 - 1 ft	0.5 - 1 ft	1 - 3 ft	0.5 - 1 ft	1 - 3 ft
Sample Description:									CLAY, Gray	SAND, Medium grained, Reddish brown	Field Duplicate	SAND, Medium grained, Reddish brown	SAND, Medium grained, Reddish brown	SAND, Medium grained, Reddish brown	SAND, Medium grained, Reddish brown	SAND, Medium grained, Reddish brown
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--	--
Inorganics - Chromium, Hexavalent																
									--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<120 U	<120 U	<110 U	<110 U	<110 U	<130 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs																
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	--	--
Organics - VOCs																
									--	--	--	--	--	--	--	--
Asbestos																
									--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHLL-SB119		CHLL-SB120		CHLL-SB121		CHLL-SB122	
Field Sample ID									CHLL-SB 119 6''-12''	CHLL-SB 119 12''-3'	CHLL-SB-120 0-6''	CHLL-SB120 6''-3'	CHLL-SB-121 0-6''	CHLL-SB-121 6''-4'	CHLL-SB-122 0-6''	CHLL-SB-122 6''-3'
Sample Date:									8/21/2014	8/21/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014
Sample Interval (bgs):									0.5 - 1 ft	1 - 3 ft	0 - 0.5 ft	0.5 - 3 ft	0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0.5 - 3 ft
Sample Description:									SAND, Medium grained, Reddish brown	SAND, Medium grained, Reddish brown	SILTY SAND, brown, fine grained	SILTY SAND, brown, fine grained to 1 ft; SAND, Medium grained, Reddish brown	SILTY SAND, Fine grained, Brown to 1.5 ft	SILTY SAND, Fine grained, Brown to 1.5 ft; SAND, Medium grained, Reddish brown	FILL, Sand and gravel, Reddish brown	FILL, Sand and gravel, Reddish brown
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--	--
Inorganics - Chromium, Hexavalent																
									--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<110 U	**57 J**	<120 U	<140 U	<120 U	<120 U	<120 U	<120 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	**57 J**	ND	ND	ND	ND	ND	ND
Organics - SVOCs																
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	--	--
Organics - VOCs																
									--	--	--	--	--	--	--	--
Asbestos																
									--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHLL-SB123		CHLL-SB124			CHLL-SB125		LLV-25	
Field Sample ID									CHLL-SB 123 0-6''	CHLL-SB 123 6''-4'	CHLL-SB-124 0-6''	CHLL-SB-124 6''-4'	CHLL-SB-124 6''-4' DUP	CHLL-SB-125 0-6''	CHLL-SB-125 6''-4'	LLV-25A	LLV-25B
Sample Date:									8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	7/30/2007	7/30/2007
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0.5 - 4 ft	0.5 - 4 ft	0 - 0.5 ft	0.5 - 4 ft	0 - 0.25 ft	1 - 1.5 ft
Sample Description:									FILL, Sand and gravel, Reddish brown	FILL, Sand and gravel, Reddish brown	SAND, Medium grained, Brown to 1.5 ft	SAND, Medium grained, Brown to 1.5 ft; CLAY, Reddish brown to 2 ft; SAND, Medium grained, Reddish brown	Field Duplicate	SAND, Medium grained, Gray to 1 ft	SAND, Medium grained, Gray to 1 ft; SAND, Medium grained, Reddish brown	--	--
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--	**2.0**	**2.0**
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	--	--	--	--	--	--	**5.9**	**1.3**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	--	--	--	**33**	**11**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	--	--	--	**100**	**1200**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	--	--	--	--	--	--	**9.3**	**2.2**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--	--	--
Inorganics - Chromium, Hexavalent																	
									--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																	
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																	
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<120 U	<130 U	<120 U	<120 U	--	--
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs																	
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	<220 U	<220 U	<220 U	<240 U	<260 U	<1200 U	<240 U	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	**320**	**840**	<220 U	<240 U	<260 U	<1200 U	<240 U	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<440 U	**920**	<430 U	<480 U	<520 U	<2300 U	<470 U	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	**490**	**1200**	<430 U	<480 U	<520 U	<2300 U	<470 U	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	<440 U	**640**	<430 U	<480 U	<520 U	<2300 U	<470 U	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<440 U	**450**	<430 U	<480 U	<520 U	<2300 U	<470 U	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	**360**	**910**	<220 U	<240 U	<260 U	<1200 U	<240 U	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<440 U	<440 U	<430 U	<480 U	<520 U	<2300 U	<470 U	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	**650**	**1900**	<220 U	<240 U	<260 U	<1200 U	<240 U	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<440 U	**740**	<430 U	<480 U	<520 U	<2300 U	<470 U	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<220 U	<220 U	<220 U	<240 U	<260 U	<1200 U	<240 U	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	<220 U	**890**	<220 U	<240 U	<260 U	<1200 U	<240 U	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	**690**	**2000**	<220 U	<240 U	<260 U	<1200 U	<240 U	--	--
Organics - VOCs																	
									--	--	--	--	--	--	--	--	--
Asbestos																	
									--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	LLV-26		LLV-27		LLV-28			
Field Sample ID									LLV-26A	LLV-26B	LLV-27A	LLV-27B	LLV-28A	LLV-28A DUP	LLV-28B	LLV-28B DUP
Sample Date:									7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007
Sample Interval (bgs):									0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	0 - 0.25 ft	1 - 1.5 ft	1 - 1.5 ft
Sample Description:									--	--	--	--	--	Field Duplicate	--	Field Duplicate
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	**1.9**	**2.0**	**2.0**	**2.0**	**1.9**	**2.1**	**2.2**	**2.2**
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**3.0**	**1.4**	**14**	**1.5**	**1.6**	**2.0**	**1.5**	**1.5**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**28**	**18**	**110**	**25**	**16**	**18**	**19**	**19**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**60**	**1100**	**2000**	**730**	**33**	**39**	**170**	**250**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**6.5**	**29**	**110**	**43**	**1.6**	**1.9**	**3.0**	**4.7**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--	--
Inorganics - Chromium, Hexavalent																
									--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs																
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	--	--
Organics - VOCs																
									--	--	--	--	--	--	--	--
Asbestos																
									--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	LLV-29		LLV-30		LLV-31		LLV-32	
Field Sample ID									LLV-29A	LLV-29B	LLV-30A	LLV-30B	LLV-31A	LLV-31B	LLV-32A	LLV-32B
Sample Date:									7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/30/2007	7/30/2007
Sample Interval (bgs):									0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft
Sample Description:									--	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	**2.0**	**2.1**	**2.0**	**2.2**	**2.0**	**2.1**	**2.0**	**2.3**
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**2.6**	**1.1**	**1.5**	**1.4**	**1.1**	**1.3**	**0.99**	**2.4**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**34**	**23**	**16**	**12**	**18**	**16**	**17**	**120**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**92**	**820**	**570**	**580**	**200**	**490**	**140**	**1100**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**7.6**	**2.6**	**10**	**2.6**	**3.8**	**2.3**	**0.94**	**4.2**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--	--
Inorganics - Chromium, Hexavalent																
									--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs																
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	--	--
Organics - VOCs																
									--	--	--	--	--	--	--	--
Asbestos																
									--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SB-04		SB-05	SB-06	SB-07	SB-08	SB-09	SB-10
Field Sample ID									SB-04	SB-04D	SB-05	SB-06	SB-07	SB-08	SB-09	SB-10
Sample Date:									10/10/2011	10/10/2011	10/10/2011	10/11/2011	10/11/2011	10/11/2011	10/11/2011	10/11/2011
Sample Interval (bgs):									96 - 144 in	96 - 144 in	33 - 48 in	18 - 33 in	30 - 42 in	22 - 36 in	33 - 48 in	10 - 24 in
Sample Description:									--	Field Duplicate	--	--	--	--	--	--
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	6940	7050	3200	4750	5140	5580	6730	3490
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	0.46 J	0.49 J	0.79 J	0.23 J	0.44 J	0.37 J	0.3 J	0.38 J
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	2.4 J-	3.2 J-	3.0 J-	2.0 J-	2.9 J-	2.4 J-	1.7 J-	3.1 J-
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	39.2	51.4	43.4	16.3 J	57.3	39.9	11.6 J	54.8
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	0.74	0.77	0.7	0.62	0.74	0.81	0.59	0.66
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	1.2	1.2	0.78	0.88	1.0	1.0	1.0	0.59
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	18900	19600	12400	9940	10800	13300	13800	4190
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	29.1	28.7	16.2	19	21.2	24.1	23.4	12.9
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	10.3	9.8	5.7	6.9	8.5	9.3	10.4	4 J
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	1190	1220	5130	411	1170	1460	877	1030
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	18500	18700	11500	14400	14500	14900	14400	10000
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	10.6	14.9	83.4	13.3	43	111	15.8	41.2
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	7370	7600	5210	5190	6530	7940	7340	2770
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	269	280	170	196	226	248	267	121
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	0.021 J	0.041 J	0.041 J	0.035 J	0.58	0.041 J	0.02 J	0.054 J
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	31.7	31.4	15.5	21.3	26.7	27.5	30.3	12.6
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	<500 U	<500 U	<500 U	<500 U	<500 U	<500 U	<500 U	<500 U
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<3.5 U	<3.5 U	<3.5 U	<3.5 U	<3.5 U	<3.5 U	<3.5 U	0.27 J
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	2.3	2.4	7.0	1.0 J	3.2	4.3	2.2	1.1
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	257 J	219 J	203 J	249 J	205 J	158 J	180 J	229 J
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	46.5	48.4	32	32.9	36.2	39.3	34.8	21.9
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	61.6	65.6	79.3	50.6	68.1	147	61.5	37.4
Inorganics - Chromium, Hexavalent																
									--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	<0.5 UJ	<0.5 U	<0.5 UJ	<0.5 UJ	<0.5 UJ	<0.5 UJ	<0.5 UJ	<0.5 UJ
Organics - PCBs (ug/kg)																
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<40 U	<43 U	<41 U	<36 U	<35 U	<34 U	<35 U	<39 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs																
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	410	460	<170 U	<170 U	<170 U	<170 U	<170 U	<170 U
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	130 J	<170 U	240	<170 U	<170 U	<170 U	<170 U	<170 U
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	340	<170 U	760 J	<170 U	<170 U	<170 U	<170 U	<170 U
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	240	<170 U	610 J	<170 U	<170 U	<170 U	<170 U	<170 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	250	<170 U	580 J	<170 U	<170 U	<170 U	<170 U	<170 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	120 J	<170 U	360 J	<170 U	<170 U	<170 U	<170 U	110 J
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	230	<170 U	490 J	<170 U	<170 U	<170 U	<170 U	<170 U
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	<170 U	<170 U	110 J	<170 U	<170 U	<170 U	<170 U	<170 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	350	<170 U	930 J	<170 U	<170 U	<170 U	<170 U	180 J
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<170 U	<170 U	130 J	<170 U	<170 U	<170 U	<170 U	<170 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	800 J	<170 UJ	1800 J	<170 UJ	<170 UJ	<170 UJ	<170 UJ	<170 UJ
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	120 J	<170 U	310 J	<170 U	<170 U	<170 U	<170 U	<170 U
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<170 U	<170 U	<170 U	<170 U	<170 U	<170 U	<170 U	<170 U
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	730	<170 U	1400	<170 U	<170 U	<170 U	<170 U	<170 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	610	<170 U	1900 J	<170 U	<170 U	<170 U	<170 U	340
Organics - VOCs																
									--	--	--	--	--	--	--	--
Asbestos																
									--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SB-13	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09
Field Sample ID									SB-13	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09
Sample Date:									10/11/2011	10/11/2011	10/11/2011	10/11/2011	10/10/2011	10/10/2011	10/10/2011
Sample Interval (bgs):									21 - 30 in	0 - 5 in	2 - 10 in	0 - 1 in	9 - 12 in	0 - 6 in	0 - 2 in
Sample Description:									--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	3720	7540 J	2940 J	3070 J	4430 J	10800 J	7190 J
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	8.5 J	0.4 J	1.1 J	4.5 J	0.49 J	45.4	0.49 J
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	17.5 J-	2.6	5	46.8	7.6	11	5.2
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	108000	33 J	57.1 J	76.2 J	29.2 J	219 J	27.3 J
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	0.78	0.52 J	1.0	2.0	0.96	1.2	0.69
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	8.4	1.1	1.2	8.9	0.88	1.5	1.7
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	7270	6460 J	4640 J	6800 J	9110 J	20600 J	6680 J
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	14.6	24.2	13.6	17.4	19.8	21.6	23.9
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	<5.0 UJ	11.1	5.4	15	9.4	9.2	10.9
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	9940	788 J	989 J	53700 J	16500 J	3710 J	2480 J
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	23800	16000 J	15400 J	153000 J	13400 J	18000 J	17200 J
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	16100	31.5	134	18.5	15.7	6940	39.1
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	4250	7520	4720	3900	8370	4950	6970
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	229	334 J	124 J	189 J	250 J	356 J	302 J
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	0.1	0.018 J-	0.024 J-	1.4 J-	0.036 J-	0.22 J-	0.02 J-
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	24.3	29.2	9.8	35.7	23.3	29.8	31.5
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	<500 U	<500 U	<500 U	<500 U	<500 U	<500 U	435
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<3.5 U	<3.5 U	<3.5 U	<3.5 U	<3.5 U	<3.5 U	<3.5 U
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	3.2	0.53 J	2.5	40.9	8.1	1.7	1.4
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	472	205 J	106 J	339 J	217 J	278 J	175 J
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	21.6	34.6 J	33.2 J	32.2 J	40.2 J	25.4 J	38.6 J
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	607	69.7 J	60.5 J	81.7 J	144 J	175 J	139 J
Inorganics - Chromium, Hexavalent															
									--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)															
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	<0.5 UJ	0.12 J	<0.5 U	0.17 J	<0.5 U	0.23 J	<0.5 U
Organics - PCBs (ug/kg)															
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<37 U	<37 U	<38 U	<40 U	<35 U	<39 U	<36 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs															
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	<170 U	<170 U	<170 U	<170 U	<170 U	<170 U	<170 U
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	<170 U	<170 U	<170 U	<170 U	<170 U	<170 U	94 J
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<170 U	<170 U	<170 U	400	<170 U	300	610 J
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<170 U	93 J	<170 UJ	390	<170 U	290	620 J
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	<170 U	120 J	<170 UJ	490	110 J	310	570 J
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	<170 U	99 J	<170 UJ	310	<170 U	230	430 J
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<170 U	<170 U	<170 UJ	470	<170 U	300	650 J
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	<170 U	<170 U	<170 U	<170 U	<170 U	<170 U	110 J
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	<170 U	<170 U	<170 U	500	180	340	800 J
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<170 U	<170 U	<170 UJ	110 J	<170 U	<170 U	160 J
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	<170 U	100 J	<170 UJ	730	280	590 J	2000 J
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<170 U	<170 U	<170 UJ	300	<170 U	220	390 J
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<170 U	<170 U	<170 U	<170 U	<170 U	<170 U	<170 U
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	<170 U	<170 U	<170 U	160 J	360	220	1200
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	<170 UJ	130 J	<170 U	680	160 J	560	1700 J
Organics - VOCs															
									--	--	--	--	--	--	--
Asbestos															
									--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-1
Sample Analytical Summary - Soil
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Soil Table Footnotes:

- MDEQ Part 201 residential and non-residential generic cleanup criteria and screening levels criteria were originally promulgated December 21, 2002 within the Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. This table reflects revisions to the criteria pursuant to the December 2010 Part 201 amendments and new criteria consistent with the provisions of R299.5706a.Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Release Date: December 30, 2013.
- Only detected analytes are listed - Gray rows indicate requested analyses. If no analytes are listed below a gray row then all analytes of that group were either not analyzed or not detected. ND indicates that one or more analyte of that goup was tested and not detected and a -- indicates not analyzed.
- **Bold** values are concentrations detected above the laboratory reporting limit.
- **Shaded values indicate analyte concentration exceed applicable criteria. Color presented is the criteria with the highest value that was exceeded:**

Residential Drinking Water Protection Criteria
Groundwater Surface Water Interface Protection Criteria
Residential Particulate Soil Inhalation Criteria
Residential Direct Contact Criteria
Nonresidential Drinking Water Protection Criteria
Nonresidential Particulate Soil Inhalation Criteria
Nonresidential Direct Contact Criteria

-- = Not analyzed/Not Reported
bgs = Below ground surface
ft = Feet
in = Inches
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls
SVOC = Semi-volatile organic compound
ug/kg = Micrograms per kilogram
VOC = Volatile organic compound

Criteria Footnotes

ID = Insufficient data to develop criterion.

NA = A criterion or value is not available

NLL = Hazardous substance is not likely to leach under most soil conditions.

NLV = Hazardous substance is not likely to volatilize under most conditions.

(B) = Background, as defined in R 299.1(b), may be substituted if higher than the calculated cleanup criterion. Background levels may be less than criteria for some inorganic compounds.

(BB) = The state drinking water standard for asbestos (fibers greater than 10 micrometers in length) is in units of a million fibers per liter of water (MFL). Soil concentrations of asbestos are determined by polarized light microscopy.

(C) = The criterion developed under R 299.20 to R 299.26 exceeds the chemical- specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control free-phase liquids or NAPL to protect against risks associated with free-phase liquids by using methods appropriate for the free-phase liquids present. Development of a site-specific Csat or methods presented in R 299.22, R 299.24(5), and R 299.26(8) may be conducted for the relevant exposure pathways.

(D) = Calculated criterion exceeds 100 percent, hence it is reduced to 100 percent or 1.0E+9 parts per billion (ppb).

(DD) = Hazardous substance causes developmental effects. Residential direct contact criteria are protective of both prenatal and postnatal exposure. Nonresidential direct contact criteria are protective for a pregnant adult receptor.

(G) = Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water. The final chronic value (FCV) for the protection of aquatic life shall be calculated based on the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg CaCO3/L, use 400 mg CaCO3/L for the FCV calculation. The FCV formula provides values in units of ug/L or ppb. The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote. A spreadsheet that may be used to calculate GSI and GSI protection criteria for (G)-footnoted hazardous substances is available on the Department of Environmental Quality (DEQ) internet web site.

(H) = Valence-specific chromium data (Cr III and Cr VI) shall be compared to the corresponding valence-specific cleanup criteria. If both Cr III and Cr VI are present in groundwater, the total concentration of both cannot exceed the drinking water criterion of 100 ug/L. If analytical data are provided for total chromium only, they shall be compared to the cleanup criteria for Cr VI. Cr III soil cleanup criterion for protectio

(I) = Hazardous substance may exhibit the characteristic of ignitability as defined in 40 C.F.R. §261.21 (revised as of July 1, 2001), which is adopted by reference in these rules and is available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of $45, from the Superintendent of documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the DEQ, Remediation and Redevelopment Division (RRD), 525 West Allegan Street, Lansing, Michigan 48933, at cost.

(J) = Hazardous substance may be present in several isomer forms. Isomer-specific concentrations shall be added together for comparison to criteria.

(M) = Calculated criterion is below the analytical target detection limit, therefore, the criterion defaults to the target detection limit.

(P) = Amenable cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with all groundwater criteria. Total cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with soil criteria.
Nonresidential direct contact criteria may not be protective of the potential for release of hydrogen cyanide gas. Additional land or resource use restrictions may be necessary to protect for the acute inhalation concerns associated with hydrogen cyanide gas.

(Q) = Criteria for carcinogenic polycyclic aromatic hydrocarbons were developed using relative potential potencies to benzo(a)pyrene.

(R) = Hazardous substance may exhibit the characteristic of reactivity as defined in 40 C.F.R. §261.23 (revised as of July 1, 2001), which is adopted by reference in these rules and is available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of $45, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the DEQ, RRD, 525 West Allegan Street, Lansing, Michigan 48933, at cost.

(T) = Refer to the federal Toxic Substances Control Act (TSCA), 40 C.F.R. §761, Subpart D and 40 C.F.R. §761, Subpart G, to determine the applicability of TSCA cleanup standards. Subpart D and Subpart G of 40 C.F.R. §761 (July 1, 2001) are adopted by reference in these rules and are available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulations may be purchased, at a cost as of the time of adoption of these rules of $55, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401, or from the DEQ, RRD, 525 West Allegan Street, Lansing, Michigan 48933, at cost. Alternatives to compliance with the TSCA standards listed below are possible under 40 C.F.R. §761 Subpart D. New releases may be subject to the standards identified in 40 C.F.R. §761, Subpart G. Use Part 201 soil direct contact cleanup criteria in the published table if TSCA standards are not applicable.

(X) = The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source. (See R 299.49 Footnotes for generic cleanup criteria tables for additional information.)

(Z) = Mercury is typically measured as total mercury. The generic cleanup criteria, however, are based on data for different species of mercury. Specifically, data for elemental mercury, chemical abstract service (CAS) number 7439976, serve as the basis for the soil volatilization to indoor air criteria, groundwater volatilization to indoor air, and soil inhalation criteria. Data for methyl mercury, CAS number 22967926, serve as the basis for the GSI criterion; and data for mercuric chloride, CAS number 7487947, serve as the basis for the drinking water, groundwater contact, soil direct contact, and the groundwater protection criteria. Comparison to criteria shall be based on species-specific analytical data only if sufficient facility characterization has been conducted to rule out the presence of other species of mercury.

Laboratory Footnotes

J = Estimated result

ND = Not detected

U = Analyte analyzed for but not detected above the reported sample reporting limit.

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHLL-GW04	CHLL-GW08	CHLL-GW09	CHLL-GW10	CHLL-GW11	CHLL-GW35	CHLL-GW38	CHLL-GW42
Field Sample ID									CHLL-GW 04 28-33'	CHLL-GW 08 12'-17'	CHLL-GW 09 12'-17'	CHLL-GW 10 12'-17'	CHLL-GW 11 10'-15'	CHLL-GW 35 6'-11'	CHLL-GW 38 10'-15'	CHLL-GW-42 7-12'
Sample Date									6/16/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	8/20/2014
Sample Interval (bgs)									28 - 33 ft	12 - 17 ft	12 - 17 ft	12 - 17 ft	10 - 15 ft	6 - 11 ft	10 - 15 ft	7 - 12 ft
Sample Description									--	--	--	--	--	--	--	--
Inorganics - Metals (ug/l)																
ALUMINUM	7429-90-5	50 (V)	50 (V)	NA	NLV	NLV	NA	ID	**23000**	**1800**	**1300**	**420**	**920**	**140000**	**4700**	--
ANTIMONY	7440-36-0	6.0 (A)	6.0 (A)	2.0 (M,X)	NLV	NLV	NA	ID	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<10 U	<1.0 U	--
ARSENIC	7440-38-2	10 (A)	10 (A)	10	NLV	NLV	NA	ID	**9.7**	**3.0**	**19**	<1.0 U	**3.0**	**150**	**1.5**	--
BARIUM	7440-39-3	2,000 (A)	2,000 (A)	200 (G)	NLV	NLV	NA	ID	**290**	**180**	**1400**	**380**	**210**	**3200**	**400**	--
BERYLLIUM	7440-41-7	4.0 (A)	4.0 (A)	0.36 (G)	NLV	NLV	NA	ID	**2.0**	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<10 U	<1.0 U	--
BORON	7440-42-8	500 (F)	500 (F)	4,000 (X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	5.0 (A)	5.0 (A)	1.3 (G,X)	NLV	NLV	NA	ID	**0.2**	<0.2 U	**0.3**	<0.2 U	<0.2 U	**6.8**	<0.2 U	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	100 (A,H)	100 (A,H)	40 (G,H,X)	NLV	NLV	NA	ID	**89**	**3.7**	**3.8**	<1.0 U	**1.5**	**270**	**24**	--
COBALT	7440-48-4	40	100	100	NLV	NLV	NA	ID	**33**	<5.0 U	<5.0 U	<5.0 U	<5.0 U	**130**	<5.0 U	--
COPPER	7440-50-8	1,000 (E)	1,000 (E)	4.7 (G)	NLV	NLV	NA	ID	**2300**	**690**	**1100**	**11**	**13**	**37000**	**2400**	--
IRON	7439-89-6	300 (E)	300 (E)	NA	NLV	NLV	NA	ID	**27000**	**6800**	**3500**	**2000**	**14000**	**180000**	**16000**	--
LEAD	7439-92-1	4.0 (L)	4.0 (L)	11 (G,X)	NLV	NLV	NA	ID	**6.5**	**7.6**	**18**	<1.0 U	<1.0 U	**180**	**1.2**	--
MAGNESIUM	7439-95-4	400,000	1,100,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	50 (E)	50 (E)	1,000 (G,X)	NLV	NLV	NA	ID	**830**	**320**	**820**	**570**	**750**	**10000**	**770**	--
MERCURY	7439-97-6	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56	ID	**0.6**	<0.2 U	<0.2 U	<0.2 U	<0.2 U	**7.1**	<0.2 U	--
NICKEL	7440-02-0	100 (A)	100 (A)	28 (G)	NLV	NLV	NA	ID	**120**	**9.4**	**12**	**9.4**	**8.8**	**450**	**17**	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	50 (A)	50 (A)	5	NLV	NLV	NA	ID	**2.8**	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<10 U	<1.0 U	--
SILVER	7440-22-4	34	98	0.2 (M)	NLV	NLV	NA	ID	**23**	**0.6**	**7.4**	<0.2 U	<0.2 U	**33**	**2.1**	--
SODIUM	7440-23-5	230, 000 (HH)	350,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
STRONTIUM	7440-24-6	4,600	13,000	21,000	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
TITANIUM METAL POWDER	7440-32-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	4.5	62	27	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	5,000 (E)	63 (G)	NLV	NLV	NA	ID	**420**	**35**	**85**	**5.2**	**50**	**920**	**23**	--
Inorganics - Cyanide (ug/l)																
									--	--	--	--	--	--	--	ND
Organics - PCBs (ug/l)																
									ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/l)																
ACENAPHTHENE	83-32-9	1,300	3,800	38	4,200 (S)	4,200 (S)	4,240	ID	<1.0 U	--	<1.0 U	<1.0 UJ	<1.0 UJ	<1.0 U	<1.0 UJ	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	6.0 (A)	6.0 (A)	25	NLV	NLV	340	NA	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	520	1,500	11	31,000 (S)	31,000 (S)	31,000	NA	<1.0 UJ	--	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	--
PHENANTHRENE	85-01-8	52	150	2.0 (M)	1,000 (S)	1,000 (S)	1,000	ID	<1.0 U	--	<1.0 U	<1.0 UJ	<1.0 UJ	<1.0 U	<1.0 UJ	--

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHLL-GW04	CHLL-GW08	CHLL-GW09	CHLL-GW10	CHLL-GW11	CHLL-GW35	CHLL-GW38	CHLL-GW42
Field Sample ID									CHLL-GW 04 28-33'	CHLL-GW 08 12'-17'	CHLL-GW 09 12'-17'	CHLL-GW 10 12'-17'	CHLL-GW 11 10'-15'	CHLL-GW 35 6'-11'	CHLL-GW 38 10'-15'	CHLL-GW-42 7-12'
Sample Date									6/16/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	8/20/2014
Sample Interval (bgs)									28 - 33 ft	12 - 17 ft	12 - 17 ft	12 - 17 ft	10 - 15 ft	6 - 11 ft	10 - 15 ft	7 - 12 ft
Sample Description									--	--	--	--	--	--	--	--
Organics - VOCs (ug/l)																
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	<1.0 UJ	--	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	**1.1 J**	--
1,2,4-TRIMETHYLBENZENE	95-63-6	63 (E,I)	63 (E,I)	17 (I)	56,000 (I,S)	56,000 (I,S)	55,890 (I)	56,000 (I,S)	<1.0 UJ	--	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	**1.9 J**	--
1,4-DICHLOROBENZENE	106-46-7	75 (A)	75 (A)	17	16,000	74,000 (S)	73,800	NA	<1.0 UJ	--	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	--
BENZENE	71-43-2	5.0 (A,I)	5.0 (A,I)	12 (I,X)	5,600 (I)	35,000 (I)	1,750,000 (I)	68,000 (I)	<1.0 UJ	--	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	**100 J**	--
CHLOROBENZENE	108-90-7	100 (A,I)	100 (A,I)	25 (I)	210,000 (I)	470,000 (I,S)	472,000 (I)	160,000 (I)	<1.0 UJ	--	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	--
CHLOROETHANE	75-00-3	430	1,700	170 (X)	5,700,000 (S)	5,700,000 (S)	5,740,000	110,000	<5.0 UJ	--	<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0 UJ	--
CHLOROMETHANE	74-87-3	260 (I)	1,100 (I)	ID	8,600 (I)	45,000 (I)	6,340,000 (I)	36,000 (I)	<5.0 UJ	--	<5.0 UJ	<5.0 UJ	<5.0 UJ	**26 J**	<5.0 UJ	--
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	<5.0 UJ	--	<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0 UJ	**8.1 J**	--
ETHYLBENZENE	100-41-4	74 (E,I)	74 (E,I)	18 (I)	110,000 (I)	170,000 (I,S)	169,000 (I)	43,000 (I)	<1.0 UJ	--	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	**7.4 J**	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<2.0 UJ	--	<2.0 UJ	<2.0 UJ	<2.0 UJ	<2.0 UJ	**7.9 J**	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	<1.0 UJ	--	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	**1.5 J**	--
TOLUENE	108-88-3	790 (E,I)	790 (E,I)	270 (I)	530,000 (I,S)	530,000 (I,S)	526,000 (I)	61,000 (I)	<1.0 UJ	--	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	**2.8 J**	--
XYLENE - TOTAL	1330-20-7 95-47-6	280 (E,I)	280 (E,I)	41 (I)	190,000 (I,S)	190,000 (I,S)	186,000 (I)	70,000 (I)	ND	--	ND	ND	ND	ND	**9.4 J**	--
Other (mg/l)																
AMMONIA	7664-41-7	10 (N)	10 (N)	(CC)	3,200	7,100	530,000	ID	--	--	--	--	--	--	--	--
COD	COD	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
NITROGEN	7727-37-9	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
TOC	7440-44-0	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
TOTAL KJELDAHL NITROGEN	TKN	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
TOTAL PHOSPHORUS	7723-14-0	63	240	1 (EE)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
Field Measurements																
Conductivity (mS/cm)	NA	NA	NA	NA	NA	NA	NA	NA	--	**0.61**	**0.433**	**0.64**	**0.468**	**0.392**	**0.89**	**0.6**
DO (%)	NA	NA	NA	NA	NA	NA	NA	NA	--	**0.9**	**7.5**	**3.6**	**15.6**	**62.3**	**95**	**3.0**
pH	NA	NA	NA	NA	NA	NA	NA	NA	--	**7.04**	**7.5**	**7.02**	**6.63**	**7.33**	**7.32**	**7.52**
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	--	**8.0**	**7.0**	**8.6**	**9.2**	**9.7**	**12.2**	**14.7**

Note: Analytical and Criteria Footnotes
are included on the last page of the table.

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHLL-GW43	CHLL-GW44		CHLL-GW45	CHLL-GW46	CHLL-GW47	CHLL-GW48	CHLL-GW49
Field Sample ID									CHLL-GW-43 8-13	CHLL-GW-44 7-12	CHLL-GW-44 7-12 DUP	CHLL-GW-45 9-14'	CHLL-GW-46 10-15	CHLL-GW-47 6-11'	CHLL-GW-48 8-13	CHLL-GW-49 8-13'
Sample Date									8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/21/2014
Sample Interval (bgs)									8 - 13 ft	7 - 12 ft	7 - 12 ft	9 - 14 ft	10 - 15 ft	6 - 11 ft	8 - 13 ft	8 - 13 ft
Sample Description									--	--	Field Duplicate	--	--	--	--	--
Inorganics - Metals (ug/l)																
ALUMINUM	7429-90-5	50 (V)	50 (V)	NA	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	6.0 (A)	6.0 (A)	2.0 (M,X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	10 (A)	10 (A)	10	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	2,000 (A)	2,000 (A)	200 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	4.0 (A)	4.0 (A)	0.36 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
BORON	7440-42-8	500 (F)	500 (F)	4,000 (X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	5.0 (A)	5.0 (A)	1.3 (G,X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	100 (A,H)	100 (A,H)	40 (G,H,X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
COBALT	7440-48-4	40	100	100	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
COPPER	7440-50-8	1,000 (E)	1,000 (E)	4.7 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
IRON	7439-89-6	300 (E)	300 (E)	NA	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
LEAD	7439-92-1	4.0 (L)	4.0 (L)	11 (G,X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	400,000	1,100,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	50 (E)	50 (E)	1,000 (G,X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56	ID	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100 (A)	100 (A)	28 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	50 (A)	50 (A)	5	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
SILVER	7440-22-4	34	98	0.2 (M)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	230, 000 (HH)	350,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
STRONTIUM	7440-24-6	4,600	13,000	21,000	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
TITANIUM METAL POWDER	7440-32-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	4.5	62	27	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	5,000 (E)	63 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
Inorganics - Cyanide (ug/l)																
									ND	ND	ND	ND	ND	ND	ND	ND
Organics - PCBs (ug/l)																
									ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/l)																
ACENAPHTHENE	83-32-9	1,300	3,800	38	4,200 (S)	4,200 (S)	4,240	ID	--	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	6.0 (A)	6.0 (A)	25	NLV	NLV	340	NA	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	520	1,500	11	31,000 (S)	31,000 (S)	31,000	NA	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	52	150	2.0 (M)	1,000 (S)	1,000 (S)	1,000	ID	--	--	--	--	--	--	--	--

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHLL-GW43	CHLL-GW44		CHLL-GW45	CHLL-GW46	CHLL-GW47	CHLL-GW48	CHLL-GW49
Field Sample ID									CHLL-GW-43 8-13	CHLL-GW-44 7-12	CHLL-GW-44 7-12 DUP	CHLL-GW-45 9-14'	CHLL-GW-46 10-15	CHLL-GW-47 6-11'	CHLL-GW-48 8-13	CHLL-GW-49 8-13'
Sample Date									8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/21/2014
Sample Interval (bgs)									8 - 13 ft	7 - 12 ft	7 - 12 ft	9 - 14 ft	10 - 15 ft	6 - 11 ft	8 - 13 ft	8 - 13 ft
Sample Description									--	--	Field Duplicate	--	--	--	--	--
Organics - VOCs (ug/l)																
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	63 (E,I)	63 (E,I)	17 (I)	56,000 (I,S)	56,000 (I,S)	55,890 (I)	56,000 (I,S)	--	--	--	--	--	--	--	--
1,4-DICHLOROBENZENE	106-46-7	75 (A)	75 (A)	17	16,000	74,000 (S)	73,800	NA	--	--	--	--	--	--	--	--
BENZENE	71-43-2	5.0 (A,I)	5.0 (A,I)	12 (I,X)	5,600 (I)	35,000 (I)	1,750,000 (I)	68,000 (I)	--	--	--	--	--	--	--	--
CHLOROBENZENE	108-90-7	100 (A,I)	100 (A,I)	25 (I)	210,000 (I)	470,000 (I,S)	472,000 (I)	160,000 (I)	--	--	--	--	--	--	--	--
CHLOROETHANE	75-00-3	430	1,700	170 (X)	5,700,000 (S)	5,700,000 (S)	5,740,000	110,000	--	--	--	--	--	--	--	--
CHLOROMETHANE	74-87-3	260 (I)	1,100 (I)	ID	8,600 (I)	45,000 (I)	6,340,000 (I)	36,000 (I)	--	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	74 (E,I)	74 (E,I)	18 (I)	110,000 (I)	170,000 (I,S)	169,000 (I)	43,000 (I)	--	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
TOLUENE	108-88-3	790 (E,I)	790 (E,I)	270 (I)	530,000 (I,S)	530,000 (I,S)	526,000 (I)	61,000 (I)	--	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7 95-47-6	280 (E,I)	280 (E,I)	41 (I)	190,000 (I,S)	190,000 (I,S)	186,000 (I)	70,000 (I)	--	--	--	--	--	--	--	--
Other (mg/l)																
AMMONIA	7664-41-7	10 (N)	10 (N)	(CC)	3,200	7,100	530,000	ID	--	--	--	--	--	--	--	--
COD	COD	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
NITROGEN	7727-37-9	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
TOC	7440-44-0	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
TOTAL KJELDAHL NITROGEN	TKN	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
TOTAL PHOSPHORUS	7723-14-0	63	240	1 (EE)	NLV	NLV	NA	ID	--	--	--	--	--	--	--	--
Field Measurements																
Conductivity (mS/cm)	NA	NA	NA	NA	NA	NA	NA	NA	**0.58**	**0.56**	**--**	**0.69**	**0.74**	**0.57**	**0.425**	**0.433**
DO (%)	NA	NA	NA	NA	NA	NA	NA	NA	**2.7**	**2.2**	**--**	**42**	**59.5**	**4.5**	**54.1**	**1.0**
pH	NA	NA	NA	NA	NA	NA	NA	NA	**7.6**	**7.52**	**--**	**8.4**	**8.19**	**7.37**	**7.09**	**7.43**
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	**13.8**	**15.7**	**--**	**16.7**	**18**	**15.2**	**15.6**	**13.2**

Note: Analytical and Criteria Footnotes
are included on the last page of the table.

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHLL-GW50	CHLL-GW51	CHLL-GW52	CHLL-GW53	CHLL-GW54	CHLL-GW55	CHLL-GW56
Field Sample ID									CHLL-GW-50 8-13'	CHLL-GW-51 8-13	CHLL-GW-52 9-14	CHLL-GW-53 8-13	CHLL-GW-54 10-15	CHLL-GW-55 9-14	CHLL-GW-56 9-14
Sample Date									8/21/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014
Sample Interval (bgs)									8 - 13 ft	8 - 13 ft	9 - 14 ft	8 - 13 ft	10 - 15 ft	9 - 14 ft	9 - 14 ft
Sample Description									--	--	--	--	--	--	--
Inorganics - Metals (ug/l)															
ALUMINUM	7429-90-5	50 (V)	50 (V)	NA	NLV	NLV	NA	ID	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	6.0 (A)	6.0 (A)	2.0 (M,X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
ARSENIC	7440-38-2	10 (A)	10 (A)	10	NLV	NLV	NA	ID	--	--	--	--	--	--	--
BARIUM	7440-39-3	2,000 (A)	2,000 (A)	200 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	4.0 (A)	4.0 (A)	0.36 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
BORON	7440-42-8	500 (F)	500 (F)	4,000 (X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
CADMIUM	7440-43-9	5.0 (A)	5.0 (A)	1.3 (G,X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	100 (A,H)	100 (A,H)	40 (G,H,X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
COBALT	7440-48-4	40	100	100	NLV	NLV	NA	ID	--	--	--	--	--	--	--
COPPER	7440-50-8	1,000 (E)	1,000 (E)	4.7 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
IRON	7439-89-6	300 (E)	300 (E)	NA	NLV	NLV	NA	ID	--	--	--	--	--	--	--
LEAD	7439-92-1	4.0 (L)	4.0 (L)	11 (G,X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	400,000	1,100,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--	--
MANGANESE	7439-96-5	50 (E)	50 (E)	1,000 (G,X)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
MERCURY	7439-97-6	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56	ID	--	--	--	--	--	--	--
NICKEL	7440-02-0	100 (A)	100 (A)	28 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
SELENIUM	7782-49-2	50 (A)	50 (A)	5	NLV	NLV	NA	ID	--	--	--	--	--	--	--
SILVER	7440-22-4	34	98	0.2 (M)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
SODIUM	7440-23-5	230, 000 (HH)	350,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--	--
STRONTIUM	7440-24-6	4,600	13,000	21,000	NLV	NLV	NA	ID	--	--	--	--	--	--	--
TITANIUM METAL POWDER	7440-32-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
VANADIUM	7440-62-2	4.5	62	27	NLV	NLV	NA	ID	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	5,000 (E)	63 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
Inorganics - Cyanide (ug/l)															
									ND	ND	ND	ND	ND	ND	ND
Organics - PCBs (ug/l)															
									ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/l)															
ACENAPHTHENE	83-32-9	1,300	3,800	38	4,200 (S)	4,200 (S)	4,240	ID	--	--	--	--	<1.0 U	<1.0 U	<1.0 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	6.0 (A)	6.0 (A)	25	NLV	NLV	340	NA	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	520	1,500	11	31,000 (S)	31,000 (S)	31,000	NA	--	--	--	--	<1.0 U	<1.0 U	<1.0 U
PHENANTHRENE	85-01-8	52	150	2.0 (M)	1,000 (S)	1,000 (S)	1,000	ID	--	--	--	--	<1.0 U	<1.0 U	<1.0 U

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHLL-GW50	CHLL-GW51	CHLL-GW52	CHLL-GW53	CHLL-GW54	CHLL-GW55	CHLL-GW56
Field Sample ID									CHLL-GW-50 8-13'	CHLL-GW-51 8-13	CHLL-GW-52 9-14	CHLL-GW-53 8-13	CHLL-GW-54 10-15	CHLL-GW-55 9-14	CHLL-GW-56 9-14
Sample Date									8/21/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014
Sample Interval (bgs)									8 - 13 ft	8 - 13 ft	9 - 14 ft	8 - 13 ft	10 - 15 ft	9 - 14 ft	9 - 14 ft
Sample Description									--	--	--	--	--	--	--
Organics - VOCs (ug/l)															
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	63 (E,I)	63 (E,I)	17 (I)	56,000 (I,S)	56,000 (I,S)	55,890 (I)	56,000 (I,S)	--	--	--	--	--	--	--
1,4-DICHLOROBENZENE	106-46-7	75 (A)	75 (A)	17	16,000	74,000 (S)	73,800	NA	--	--	--	--	--	--	--
BENZENE	71-43-2	5.0 (A,I)	5.0 (A,I)	12 (I,X)	5,600 (I)	35,000 (I)	1,750,000 (I)	68,000 (I)	--	--	--	--	--	--	--
CHLOROBENZENE	108-90-7	100 (A,I)	100 (A,I)	25 (I)	210,000 (I)	470,000 (I,S)	472,000 (I)	160,000 (I)	--	--	--	--	--	--	--
CHLOROETHANE	75-00-3	430	1,700	170 (X)	5,700,000 (S)	5,700,000 (S)	5,740,000	110,000	--	--	--	--	--	--	--
CHLOROMETHANE	74-87-3	260 (I)	1,100 (I)	ID	8,600 (I)	45,000 (I)	6,340,000 (I)	36,000 (I)	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	74 (E,I)	74 (E,I)	18 (I)	110,000 (I)	170,000 (I,S)	169,000 (I)	43,000 (I)	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
TOLUENE	108-88-3	790 (E,I)	790 (E,I)	270 (I)	530,000 (I,S)	530,000 (I,S)	526,000 (I)	61,000 (I)	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7 95-47-6	280 (E,I)	280 (E,I)	41 (I)	190,000 (I,S)	190,000 (I,S)	186,000 (I)	70,000 (I)	--	--	--	--	--	--	--
Other (mg/l)															
AMMONIA	7664-41-7	10 (N)	10 (N)	(CC)	3,200	7,100	530,000	ID	--	--	--	--	--	--	--
COD	COD	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
NITROGEN	7727-37-9	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
TOC	7440-44-0	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
TOTAL KJELDAHL NITROGEN	TKN	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
TOTAL PHOSPHORUS	7723-14-0	63	240	1 (EE)	NLV	NLV	NA	ID	--	--	--	--	--	--	--
Field Measurements															
Conductivity (mS/cm)	NA	NA	NA	NA	NA	NA	NA	NA	**0.33**	**0.404**	**0.418**	**0.408**	**0.94**	**1.42**	**0.98**
DO (%)	NA	NA	NA	NA	NA	NA	NA	NA	**1.3**	**2.2**	**3.8**	**2.8**	**61**	**2.3**	**3.4**
pH	NA	NA	NA	NA	NA	NA	NA	NA	**7.4**	**7.43**	**7.63**	**8.13**	**7.09**	**8.1**	**8.05**
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	**15.1**	**11.9**	**13.2**	**14.2**	**13.8**	**12**	**12.5**

Note: Analytical and Criteria Footnotes
are included on the last page of the table.

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHLL-GW76		CHLL-GW77	CHLL-GW78	LL ML2	MW-04	MW-05	
Field Sample ID									CHLL-GW76-10'-15'	CHLL-GW76-10'-15' DUP	CHLL-GW77-10'-15'	CHLL-GW78-10'-15'	LLML2-30'bgs	MW-04	MW-05	MW-05D
Sample Date									8/19/2015	8/19/2015	8/19/2015	8/19/2015	10/13/2011	10/11/2011	10/11/2011	10/11/2011
Sample Interval (bgs)									10 - 15 ft	10 - 15 ft	10 - 15 ft	10 - 15 ft	0 - 0 ft	4.54 - 9.54 ft	2.9 - 7.9 ft	2.9 - 7.9 ft
Sample Description									--	Field Duplicate	--	--	--	--	--	Field Duplicate
Inorganics - Metals (ug/l)																
ALUMINUM	7429-90-5	50 (V)	50 (V)	NA	NLV	NLV	NA	ID	--	--	--	--	**500**	**541**	**78.4 J**	**46.4 J**
ANTIMONY	7440-36-0	6.0 (A)	6.0 (A)	2.0 (M,X)	NLV	NLV	NA	ID	--	--	--	--	<1 U	<60 U	<60 U	<60 U
ARSENIC	7440-38-2	10 (A)	10 (A)	10	NLV	NLV	NA	ID	--	--	--	--	**51**	**15.3**	**6 J**	**5.3 J**
BARIUM	7440-39-3	2,000 (A)	2,000 (A)	200 (G)	NLV	NLV	NA	ID	--	--	--	--	**1100**	**1580 J**	**738 J**	**742 J**
BERYLLIUM	7440-41-7	4.0 (A)	4.0 (A)	0.36 (G)	NLV	NLV	NA	ID	--	--	--	--	<1 U	<5 U	<5 U	<5 U
BORON	7440-42-8	500 (F)	500 (F)	4,000 (X)	NLV	NLV	NA	ID	--	--	--	--	**320**	--	--	--
CADMIUM	7440-43-9	5.0 (A)	5.0 (A)	1.3 (G,X)	NLV	NLV	NA	ID	--	--	--	--	<0.2 U	**0.4 J**	**0.33 J**	**0.31 J**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	**103000 J**	**96500 J**	**96900 J**
CHROMIUM	7440-47-3	100 (A,H)	100 (A,H)	40 (G,H,X)	NLV	NLV	NA	ID	--	--	--	--	**1.3**	<10 U	<10 U	<10 U
COBALT	7440-48-4	40	100	100	NLV	NLV	NA	ID	--	--	--	--	<15 U	<50 U	<50 U	<50 U
COPPER	7440-50-8	1,000 (E)	1,000 (E)	4.7 (G)	NLV	NLV	NA	ID	--	--	--	--	**71**	**415**	**614**	**457**
IRON	7439-89-6	300 (E)	300 (E)	NA	NLV	NLV	NA	ID	--	--	--	--	**12000**	**5350**	**985**	**880**
LEAD	7439-92-1	4.0 (L)	4.0 (L)	11 (G,X)	NLV	NLV	NA	ID	--	--	--	--	**3.1**	**51.3**	**60.8**	**32**
MAGNESIUM	7439-95-4	400,000	1,100,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	**7650 J**	**5650 J+**	**5660 J+**
MANGANESE	7439-96-5	50 (E)	50 (E)	1,000 (G,X)	NLV	NLV	NA	ID	--	--	--	--	**1700**	**624 J**	**167 J**	**163 J**
MERCURY	7439-97-6	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56	ID	--	--	--	--	<0.2 U	<0.2 U	<0.2 U	**0.22**
NICKEL	7440-02-0	100 (A)	100 (A)	28 (G)	NLV	NLV	NA	ID	--	--	--	--	**2.8**	**2.3 J**	**3.4 J**	**2.3 J**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	<5000 U	<5000 U	<5000 U
SELENIUM	7782-49-2	50 (A)	50 (A)	5	NLV	NLV	NA	ID	--	--	--	--	<1 U	<35 U	<35 U	<35 U
SILVER	7440-22-4	34	98	0.2 (M)	NLV	NLV	NA	ID	--	--	--	--	<0.2 U	<10 U	<10 U	<10 U
SODIUM	7440-23-5	230, 000 (HH)	350,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	**22300 J+**	**8220 J+**	**7490 J+**
STRONTIUM	7440-24-6	4,600	13,000	21,000	NLV	NLV	NA	ID	--	--	--	--	**340**	--	--	--
TITANIUM METAL POWDER	7440-32-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	**130**	--	--	--
VANADIUM	7440-62-2	4.5	62	27	NLV	NLV	NA	ID	--	--	--	--	**2.1**	<50 U	<50 U	<50 U
ZINC	7440-66-6	2,400	5,000 (E)	63 (G)	NLV	NLV	NA	ID	--	--	--	--	<10 U	<60 U	<60 U	<60 U
Inorganics - Cyanide (ug/l)																
									--	--	--	--	--	ND	ND	ND
Organics - PCBs (ug/l)																
									ND	ND	ND	ND	--	ND	ND	ND
Organics - SVOCs (ug/l)																
ACENAPHTHENE	83-32-9	1,300	3,800	38	4,200 (S)	4,200 (S)	4,240	ID	<1.0 U	<1.0 U	<1.0 U	<1.0 U	--	**0.88 J**	<5 U	<5 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	6.0 (A)	6.0 (A)	25	NLV	NLV	340	NA	--	--	--	--	--	<5 U	<5 U	<5 U
NAPHTHALENE (SVOC)	91-20-3S	520	1,500	11	31,000 (S)	31,000 (S)	31,000	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 U	--	**1 J**	<5 U	<5 U
PHENANTHRENE	85-01-8	52	150	2.0 (M)	1,000 (S)	1,000 (S)	1,000	ID	<1.0 U	<1.0 U	<1.0 U	<1.0 U	--	<5 U	**0.47 J**	<5 U

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHLL-GW76		CHLL-GW77	CHLL-GW78	LL ML2	MW-04	MW-05	
Field Sample ID									CHLL-GW76-10'-15'	CHLL-GW76-10'-15' DUP	CHLL-GW77-10'-15'	CHLL-GW78-10'-15'	LLML2-30'bgs	MW-04	MW-05	MW-05D
Sample Date									8/19/2015	8/19/2015	8/19/2015	8/19/2015	10/13/2011	10/11/2011	10/11/2011	10/11/2011
Sample Interval (bgs)									10 - 15 ft	10 - 15 ft	10 - 15 ft	10 - 15 ft	0 - 0 ft	4.54 - 9.54 ft	2.9 - 7.9 ft	2.9 - 7.9 ft
Sample Description									--	Field Duplicate	--	--	--	--	--	Field Duplicate
Organics - VOCs (ug/l)																
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 U	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	63 (E,I)	63 (E,I)	17 (I)	56,000 (I,S)	56,000 (I,S)	55,890 (I)	56,000 (I,S)	<1.0 U	<1.0 U	1.5	<1.0 U	--	--	--	--
1,4-DICHLOROBENZENE	106-46-7	75 (A)	75 (A)	17	16,000	74,000 (S)	73,800	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 U	--	**0.44 J**	**0.4 J**	**0.14 J**
BENZENE	71-43-2	5.0 (A,I)	5.0 (A,I)	12 (I,X)	5,600 (I)	35,000 (I)	1,750,000 (I)	68,000 (I)	4.4	4.8	**31**	**8.1**	--	<5 U	<5 U	<5 U
CHLOROBENZENE	108-90-7	100 (A,I)	100 (A,I)	25 (I)	210,000 (I)	470,000 (I,S)	472,000 (I)	160,000 (I)	<1.0 U	<1.0 U	<1.0 U	<1.0 U	--	<5 U	**0.21 J**	<5 U
CHLOROETHANE	75-00-3	430	1,700	170 (X)	5,700,000 (S)	5,700,000 (S)	5,740,000	110,000	<5.0 U	<5.0 U	<5.0 U	<5.0 U	--	<5 U	<5 U	<5 U
CHLOROMETHANE	74-87-3	260 (I)	1,100 (I)	ID	8,600 (I)	45,000 (I)	6,340,000 (I)	36,000 (I)	<5.0 U	<5.0 U	<5.0 U	<5.0 U	--	<5 U	<5 U	<5 U
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	<5.0 U	<5.0 U	<5.0 U	<5.0 U	--	<5 U	<5 U	<5 U
ETHYLBENZENE	100-41-4	74 (E,I)	74 (E,I)	18 (I)	110,000 (I)	170,000 (I,S)	169,000 (I)	43,000 (I)	<1.0 U	<1.0 U	<1.0 U	<1.0 U	--	<5 U	<5 U	<5 U
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<2.0 U	<2.0 U	5.5	<2.0 U	--	**0.13 J**	<5 U	<5 U
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 U	--	**0.18 J**	<5 U	<5 U
TOLUENE	108-88-3	790 (E,I)	790 (E,I)	270 (I)	530,000 (I,S)	530,000 (I,S)	526,000 (I)	61,000 (I)	<1.0 U	<1.0 U	1.1	<1.0 U	--	<5 U	<5 U	<5 U
XYLENE - TOTAL	1330-20-7 95-47-6	280 (E,I)	280 (E,I)	41 (I)	190,000 (I,S)	190,000 (I,S)	186,000 (I)	70,000 (I)	ND	ND	5.5	ND	--	**0.31**	ND	ND
Other (mg/l)																
AMMONIA	7664-41-7	10 (N)	10 (N)	(CC)	3,200	7,100	530,000	ID	--	--	--	--	**0.87**	--	**0.18**	--
COD	COD	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	**12**	--	**6.1**	--
NITROGEN	7727-37-9	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	**0.1**	--	**0.1**	--
TOC	7440-44-0	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	**5.1**	--	**3.1**	--
TOTAL KJELDAHL NITROGEN	TKN	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	**2.32**	--	**0.5**	--
TOTAL PHOSPHORUS	7723-14-0	63	240	1 (EE)	NLV	NLV	NA	ID	--	--	--	--	**0.087**	--	**0.063**	--
Field Measurements																
Conductivity (mS/cm)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
DO (%)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
pH	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	MW-06	MW-07	MW-08	MW-09	MW-12
Field Sample ID									MW-06	MW-07	MW-08	MW-09	MW 12
Sample Date									10/11/2011	10/11/2011	10/12/2011	10/12/2011	10/13/2011
Sample Interval (bgs)									2.47 - 7.47 ft	2.28 - 7.28 ft	7.34 - 12.34 ft	12.23 - 17.23 ft	7.73 - 12.73 ft
Sample Description									--	--	--	--	--
Inorganics - Metals (ug/l)													
ALUMINUM	7429-90-5	50 (V)	50 (V)	NA	NLV	NLV	NA	ID	**69.4 J**	**9020**	**384**	**1970**	**8500**
ANTIMONY	7440-36-0	6.0 (A)	6.0 (A)	2.0 (M,X)	NLV	NLV	NA	ID	<60 U	**7.5 J**	<60 U	<60 U	**1.1**
ARSENIC	7440-38-2	10 (A)	10 (A)	10	NLV	NLV	NA	ID	**6.4 J**	**136**	**2.5 J**	<10 U	**220**
BARIUM	7440-39-3	2,000 (A)	2,000 (A)	200 (G)	NLV	NLV	NA	ID	**778 J**	**587 J**	<200 UJ	**257 J**	**26000**
BERYLLIUM	7440-41-7	4.0 (A)	4.0 (A)	0.36 (G)	NLV	NLV	NA	ID	<5 U	**1.5 J**	<5 U	<5 U	<1 U
BORON	7440-42-8	500 (F)	500 (F)	4,000 (X)	NLV	NLV	NA	ID	--	--	--	--	**140**
CADMIUM	7440-43-9	5.0 (A)	5.0 (A)	1.3 (G,X)	NLV	NLV	NA	ID	**0.16 J**	**3.7 J**	**0.18 J**	**0.15 J**	<0.2 U
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**104000 J**	**159000 J**	**80200 J**	**50700 J**	--
CHROMIUM	7440-47-3	100 (A,H)	100 (A,H)	40 (G,H,X)	NLV	NLV	NA	ID	<10 U	**46.1 J+**	<10 U	<10 U	**9.2**
COBALT	7440-48-4	40	100	100	NLV	NLV	NA	ID	<50 U	**10.7 J**	<50 U	**1.4 J**	<15 U
COPPER	7440-50-8	1,000 (E)	1,000 (E)	4.7 (G)	NLV	NLV	NA	ID	**210**	**24700**	**480**	**71.7**	**1200**
IRON	7439-89-6	300 (E)	300 (E)	NA	NLV	NLV	NA	ID	<100 U	**22900**	**2500**	**1800**	**4000**
LEAD	7439-92-1	4.0 (L)	4.0 (L)	11 (G,X)	NLV	NLV	NA	ID	**3.2 J**	**282**	**21.9**	**2.7 J**	**310**
MAGNESIUM	7439-95-4	400,000	1,100,000	NA	NLV	NLV	NA	ID	<5000 UJ	**15400 J**	**8140 J**	**27400 J**	--
MANGANESE	7439-96-5	50 (E)	50 (E)	1,000 (G,X)	NLV	NLV	NA	ID	**104 J**	**744 J**	**470 J**	**369 J**	**290**
MERCURY	7439-97-6	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56	ID	<0.2 U	**0.7**	**0.19 J**	<0.2 U	<0.2 U
NICKEL	7440-02-0	100 (A)	100 (A)	28 (G)	NLV	NLV	NA	ID	**1.4 J**	**65.1**	**16.2 J**	**5.4 J**	**15**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	<5000 U	**6700**	**5890**	**17600**	--
SELENIUM	7782-49-2	50 (A)	50 (A)	5	NLV	NLV	NA	ID	<35 U	<35 U	<35 U	<35 U	<1 U
SILVER	7440-22-4	34	98	0.2 (M)	NLV	NLV	NA	ID	**1.1 J**	**75.4**	<10 U	<10 U	**1.1**
SODIUM	7440-23-5	230, 000 (HH)	350,000	NA	NLV	NLV	NA	ID	<5000 U	**37800 J+**	**16100 J+**	**75600**	--
STRONTIUM	7440-24-6	4,600	13,000	21,000	NLV	NLV	NA	ID	--	--	--	--	**800**
TITANIUM METAL POWDER	7440-32-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	**190**
VANADIUM	7440-62-2	4.5	62	27	NLV	NLV	NA	ID	<50 U	<50 U	<50 U	<50 U	**29**
ZINC	7440-66-6	2,400	5,000 (E)	63 (G)	NLV	NLV	NA	ID	<60 U	**404**	<60 U	<60 U	**57**
Inorganics - Cyanide (ug/l)													
									ND	ND	ND	ND	--
Organics - PCBs (ug/l)													
									ND	ND	ND	ND	--
Organics - SVOCs (ug/l)													
ACENAPHTHENE	83-32-9	1,300	3,800	38	4,200 (S)	4,200 (S)	4,240	ID	<5 U	<5 U	<5 U	<5 U	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	6.0 (A)	6.0 (A)	25	NLV	NLV	340	NA	<5 U	<5 U	<5 U	**3.1 J**	--
NAPHTHALENE (SVOC)	91-20-3S	520	1,500	11	31,000 (S)	31,000 (S)	31,000	NA	<5 U	<5 U	<5 U	<5 U	--
PHENANTHRENE	85-01-8	52	150	2.0 (M)	1,000 (S)	1,000 (S)	1,000	ID	<5 U	<5 UJ	<5 U	<5 U	--

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	MW-06	MW-07	MW-08	MW-09	MW-12
Field Sample ID									MW-06	MW-07	MW-08	MW-09	MW 12
Sample Date									10/11/2011	10/11/2011	10/12/2011	10/12/2011	10/13/2011
Sample Interval (bgs)									2.47 - 7.47 ft	2.28 - 7.28 ft	7.34 - 12.34 ft	12.23 - 17.23 ft	7.73 - 12.73 ft
Sample Description									--	--	--	--	--
Organics - VOCs (ug/l)													
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	63 (E,I)	63 (E,I)	17 (I)	56,000 (I,S)	56,000 (I,S)	55,890 (I)	56,000 (I,S)	--	--	--	--	--
1,4-DICHLOROBENZENE	106-46-7	75 (A)	75 (A)	17	16,000	74,000 (S)	73,800	NA	<5 U	<5 U	<5 U	<5 U	--
BENZENE	71-43-2	5.0 (A,I)	5.0 (A,I)	12 (I,X)	5,600 (I)	35,000 (I)	1,750,000 (I)	68,000 (I)	<5 U	<5 U	<5 U	<5 U	--
CHLOROBENZENE	108-90-7	100 (A,I)	100 (A,I)	25 (I)	210,000 (I)	470,000 (I,S)	472,000 (I)	160,000 (I)	<5 U	<5 U	<5 U	<5 U	--
CHLOROETHANE	75-00-3	430	1,700	170 (X)	5,700,000 (S)	5,700,000 (S)	5,740,000	110,000	<5 U	**0.48 J**	<5 U	<5 U	--
CHLOROMETHANE	74-87-3	260 (I)	1,100 (I)	ID	8,600 (I)	45,000 (I)	6,340,000 (I)	36,000 (I)	<5 U	<5 U	<5 U	<5 U	--
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	--
ETHYLBENZENE	100-41-4	74 (E,I)	74 (E,I)	18 (I)	110,000 (I)	170,000 (I,S)	169,000 (I)	43,000 (I)	<5 U	<5 U	<5 U	<5 U	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	--
TOLUENE	108-88-3	790 (E,I)	790 (E,I)	270 (I)	530,000 (I,S)	530,000 (I,S)	526,000 (I)	61,000 (I)	<5 U	<5 U	<5 U	<5 U	--
XYLENE - TOTAL	1330-20-7 95-47-6	280 (E,I)	280 (E,I)	41 (I)	190,000 (I,S)	190,000 (I,S)	186,000 (I)	70,000 (I)	ND	ND	ND	ND	--
Other (mg/l)													
AMMONIA	7664-41-7	10 (N)	10 (N)	(CC)	3,200	7,100	530,000	ID	--	--	**23**	**28**	**28**
COD	COD	NA	NA	NA	NA	NA	NA	NA	--	--	**15**	**15**	**14**
NITROGEN	7727-37-9	NA	NA	NA	NA	NA	NA	NA	--	--	**0.1**	**2.9**	**1.8**
TOC	7440-44-0	NA	NA	NA	NA	NA	NA	NA	--	--	**6.7**	**6**	**5.5**
TOTAL KJELDAHL NITROGEN	TKN	NA	NA	NA	NA	NA	NA	NA	--	--	**24**	**32**	**27**
TOTAL PHOSPHORUS	7723-14-0	63	240	1 (EE)	NLV	NLV	NA	ID	--	--	**0.29**	**0.14**	**0.44**
Field Measurements													
Conductivity (mS/cm)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--
DO (%)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--
pH	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-2
Sample Analytical Summary - Groundwater
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Groundwater Table Footnotes:

- MDEQ Part 201 residential and non-residential generic cleanup criteria and screening levels criteria were originally promulgated December 21, 2002 within the Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. This table reflects revisions to the criteria pursuant to the December 2010 Part 201 amendments and new criteria consistent with the provisions of R299.5706a.Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Release Date: December 30, 2013.
- Only detected analytes are listed - Gray rows indicate requested analyses. If no analytes are listed below a gray row then all analytes of that group were either not analyzed or not detected. ND indicates that one or more analyte of that goup was tested and not detected and a – indicates not analyzed.
- **Bold** values are concentrations detected above the reporting limit.
- **Shaded values indicate analyte concentration exceed applicable criteria. Color presented is the criteria below with the highest value that was exceeded:**

Residential Drinking Water Criteria
Nonresidential Drinking Water Criteria
Groundwater Surface Water Interface Criteria
Residential Groundwater Volatilization to Indoor Air Inhalation Criteria
Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria
Water Solubility
Flammability and Explosivity Screening Level

-- = Not analyzed/Not reported
bgs = Below ground surface
DO = Dissolved oxygen
ft = Feet
in = Inches
mg/L = Milligrams per liter
PCBs = Polychlorinated biphenyls
SVOC = Semi-volatile organic compound
ug/l = Micrograms per liter
VOC = Volatile organic compound
°C = Degrees Celsius
mS/cm = MilliSiemens per centimeter
% = Percent

Groundwater Table Footnotes:

ID = Insufficient data to develop criterion.
NA = A criterion or value is not available
NLL = Hazardous substance is not likely to leach under most soil conditions.
NLV = Hazardous substance is not likely to volatilize under most conditions.

(A) Criterion is the state of Michigan drinking water standard established pursuant to Section 5 of 1976 PA 399, MCL 325.1005.

(BB) = The state drinking water standard for asbestos (fibers greater than 10 micrometers in length) is in units of a million fibers per liter of water (MFL). Soil concentrations of asbestos are determined by polarized light microscopy.

(D) = Calculated criterion exceeds 100 percent, hence it is reduced to 100 percent or 1.0E+9 parts per billion (ppb).

(E) = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). A notice of aesthetic impact may be employed as an institutional control mechanism if groundwater concentrations exceed the aesthetic drinking water criterion, but do not exceed the applicable health-based drinking water value provided in a table available on the Department of Environmental Quality (DEQ) internet web site. (See R 299.49 Footnotes for generic cleanup criteria tables for additional information)

(G) = Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water. The final chronic value (FCV) for the protection of aquatic life shall be calculated based on the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg $CaCO_3$/L, use 400 mg $CaCO_3$/L for the FCV calculation. The FCV formula provides values in units of ug/L or ppb. The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote. A spreadsheet that may be used to calculate GSI and GSI protection criteria for (G)-footnoted hazardous substances is available on the Department of Environmental Quality (DEQ) internet web site.

(H) = Valence-specific chromium data (Cr III and Cr VI) shall be compared to the corresponding valence-specific cleanup criteria. If both Cr III and Cr VI are present in groundwater, the total concentration of both cannot exceed the drinking water criterion of 100 ug/L. If analytical data are provided for total chromium only, they shall be compared to the cleanup criteria for Cr VI. Cr III soil cleanu

(HH) = The residential criterion for sodium is 230,000 ug/l in accordance with the Sodium Advisory Council recommendation and revised Groundwater Discharge Standards.

(I) = Hazardous substance may exhibit the characteristic of ignitability as defined in 40 C.F.R. §261.21 (revised as of July 1, 2001), which is adopted by reference in these rules and is available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of $45, from the Superintendent of documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the DEQ, Remediation and Redevelopment Division (RRD), 525 West Allegan Street, Lansing, Michigan 48933, at cost.

(J) = Hazardous substance may be present in several isomer forms. Isomer-specific concentrations shall be added together for comparison to criteria.

(L) = Criteria for lead are derived using a biologically based model, as allowed for under Section 20120a(9) of the NREPA, and are not calculated using the algorithms and assumptions specified in pathway-specific rules. The generic residential drinking water criterion of 4 ug/L is linked to the generic residential soil direct contact criterion of 400 mg/kg. A higher concentration in the drinking water, up to the state action level of 15 ug/L, may be allowed as a site-specific remedy and still allow for drinking water use, under Section 20120a(2) and 20120b of the NREPA if soil concentrations are appropriately lower than 400 mg/kg. If a site-specific criterion is approved based on this subdivision, a notice shall be filed on the deed for all property where the groundwater concentrations will exceed 4 ug/L to provide notice of the potential for unacceptable risk if soil or groundwater concentrations increase. Acceptable combinations of site-specific soil and drinking water concentrations are presented in a table available on the Department of Environmental Quality (DEQ) internet web site (See R 299.49 Footnotes for generic cleanup criteria tables for additional information).

(M) = Calculated criterion is below the analytical target detection limit, therefore, the criterion defaults to the target detection limit.

(N) = The concentrations of all potential sources of nitrate-nitrogen (e.g., ammonia-N, nitrite-N, nitrate-N) in groundwater that is used as a source of drinking water shall not, when added together, exceed the nitrate drinking water criterion of 10,000 ug/L. Where leaching to groundwater is a relevant pathway, soil concentrations of all potential sources of nitrate-nitrogen shall not, when added together, exceed the nitrate drinking water protection criterion of 2.0E+5 ug/kg.

(P) = Amenable cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with all groundwater criteria. Total cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with soil criteria. Nonresidential direct contact criteria may not be protective of the potential for release of hydrogen cyanide gas. Additional land or resource use restrictions may be necessary to protect for the acute inhalation concerns associated with hydrogen cyanide gas.

(Q) = Criteria for carcinogenic polycyclic aromatic hydrocarbons were developed using relative potential potencies to benzo(a)pyrene.

(R) = Hazardous substance may exhibit the characteristic of reactivity as defined in 40 C.F.R. §261.23 (revised as of July 1, 2001), which is adopted by reference in these rules and is available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of $45, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the DEQ, RRD, 525 West Allegan Street, Lansing, Michigan 48933, at cost.

(S) = Criterion defaults to the hazardous substance-specific water solubility limit.

(T) = Refer to the federal Toxic Substances Control Act (TSCA), 40 C.F.R. §761, Subpart D and 40 C.F.R. §761, Subpart G, to determine the applicability of TSCA cleanup standards. Subpart D and Subpart G of 40 C.F.R. §761 (July 1, 2001) are adopted by reference in these rules and are available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulations may be purchased, at a cost as of the time of adoption of these rules of $55, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401, or from the DEQ, RRD, 525 West Allegan Street, Lansing, Michigan 48933, at cost. Alternatives to compliance with the TSCA standards listed below are possible under 40 C.F.R. §761 Subpart D. New releases may be subject to the standards identified in 40 C.F.R. §761, Subpart G. Use Part 201 soil direct contact cleanup criteria in the published table if TSCA standards are not applicable.

(V) = Criterion is the aesthetic drinking water value as required by Section 20120(a)(5) of the NREPA. Concentrations up to 200 ug/L may be acceptable, and still allow for drinking water use, as part of a site-specific cleanup under Section 20120a(2) and 20120b of the NREPA.

(X) = The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source. (See R 299.49 Footnotes for generic cleanup criteria tables for additional information.)

(Z) = Mercury is typically measured as total mercury. The generic cleanup criteria, however, are based on data for different species of mercury. Specifically, data for elemental mercury, chemical abstract service (CAS) number 7439976, serve as the basis for the soil volatilization to indoor air criteria, groundwater volatilization to indoor air, and soil inhalation criteria. Data for methyl mercury, CAS number 22967926, serve as the basis for the GSI criterion; and data for mercuric chloride, CAS number 7487947, serve as the basis for the drinking water, groundwater contact, soil direct contact, and the groundwater protection criteria. Comparison to criteria shall be based on species-specific analytical data only if sufficient facility characterization has been conducted to rule out the presence of other species of mercury.

Laboratory Footnotes:

ND = Not detected
J = Estimated result
U = Analyte analyzed for but not detected above the reported sample reporting limit.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD12		CHLL-SD13			CHLL-SD14			CHLL-SD15	
Field Sample ID					CHLL-SD 12-0''-6''	CHLL-SD 12-1'-2.5'	CHLL-SD13-0''-6''	CHLL-SD 13-1'-2'	CHLL-SD 13-1'-2' dup	CHLL-SD-14-0''-6''	CHLL-SD-14-1'-3'	CHLL-SD-14-3'-4'	CHLL-SD 15-0-6''	CHLL-SD 15-1'-2.7'
Sample Date					6/15/2014	6/15/2014	6/15/2014	6/15/2014	6/15/2014	7/11/2014	7/11/2014	7/11/2014	6/16/2014	6/16/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 2.5 ft	0 - 0.5 ft	1 - 2 ft	1 - 2 ft	0 - 0.5 ft	1 - 3 ft	3 - 4 ft	0 - 0.5 ft	1 - 2.7 ft
Sample Description					SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown	Field Duplicate	SILT, Dark brown	SILT, Reddish brown	SILT, Reddish brown	SILT, Reddish brown	SAND, Silty, Fine grained, Reddish brown
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	--	--	**7700**	--	--	**15000**	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	<0.6 U	--	--	**15**	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	**1.9**	--	--	**16**	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	**26**	--	--	**2300 J**	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	**0.8**	--	--	**1.3**	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	<0.2 U	--	--	**3.6**	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	**19**	--	--	**42**	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	**8.8**	--	--	**19**	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	**550**	--	--	**9800**	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	**14000**	--	--	**31000**	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	**4.3**	--	--	**2200**	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	**270 J**	--	--	**420**	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	<0.07 U	--	--	**0.3**	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	**25**	--	--	**52**	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	<0.4 U	--	--	**1.6**	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	**1.7**	--	--	**26**	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	**61**	--	--	**430**	--	--	--	--
Inorganics - Cyanide (mg/kg)														
					--	--	ND	--	--	ND	--	--	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<140 U	<130 U	<140 U	<130 U	<130 U	**340 J**	<300 U	<290 U	<240 UJ	<210 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<140 U	<130 U	<140 U	<130 U	<130 U	<340 UJ	<300 U	<290 U	**230 J**	<210 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<140 U	<130 U	<140 U	<130 U	<130 U	**390 J**	<300 U	<290 U	**270 J**	<180 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<140 U	<130 U	<140 U	<130 U	<130 U	<230 UJ	<300 U	<290 U	<170 UJ	**290**
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	**730 J**	ND	ND	**500 J**	**290**
Organics - SVOCs (ug/kg)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	<280 UJ	--	--	<1100 U	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	<280 UJ	--	--	<1100 U	--	--	--	--
Organics - VOCs (ug/kg)														
					--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)														
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD16				CHLL-SD17			CHLL-SD18	
Field Sample ID					CHLL-SD-16-0''-6''	CHLL-SD-16-1'-3'	CHLL-SD-16-3'-4'	CHLL-SD-16-3'-4' DUP	CHLL-SD 17-0''-6''	CHLL-SD 17-1'-3'	CHLL-SD 17-3'-5'	CHLL-SD 18-0''-6''	CHLL-SD 18-1'-2.7'
Sample Date					7/11/2014	7/11/2014	7/11/2014	7/11/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 4 ft	3 - 4 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 2.7 ft
Sample Description					SILT, Dark brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	Field Duplicate	SILT, Dark brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SAND, Silty, Fine grained, Reddish brown	SAND, Silty, Poorly sorted, Reddish brown
Inorganics - Metals (mg/kg)													
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	**4800**	**3200**
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	<0.3 U	**17**
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--	**1.7**	**2.3**
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	**78 J**	**2700 J**
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	**0.5**	**1.0**
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	<0.2 U	**3.1**
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	**9.0**	**13**
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	**4.5**	**6.4**
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--	**130**	**4400**
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	**12000**	**9900**
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--	**27**	**1600**
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	**160**	**120**
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	<0.07 U	**0.1**
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	**12**	**17**
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	<0.2 U	**1.1**
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	**0.3**	**13**
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	**24**	**220**
Inorganics - Cyanide (mg/kg)													
					--	--	--	--	--	--	--	ND	ND
Organics - PCBs (ug/kg)													
AROCLOR-1242	53469-21-9	NA	NA	NA	**340 J**	<300 U	<300 U	<290 U	**760 J**	<300 U	<150 U	<140 U	**360 J**
AROCLOR-1248	12672-29-6	NA	NA	NA	<430 UJ	<300 U	<300 U	<290 U	<790 UJ	<300 U	<150 U	<140 U	<370 UJ
AROCLOR-1254	11097-69-1	NA	NA	NA	**220 J**	<300 U	<300 U	<290 U	**890 J**	<300 U	<150 U	<140 U	**360 J**
AROCLOR-1262	37324-23-5	NA	NA	NA	<430 UJ	<300 U	<300 U	<290 U	<420 UJ	<300 U	<150 U	<140 U	<120 UJ
TOTAL PCBS	TPCB	59.8	59.8	676	**560 J**	ND	ND	ND	**1650 J**	ND	ND	ND	**720 J**
Organics - SVOCs (ug/kg)													
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	<700 U	<620 U
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	<700 U	<620 U
Organics - VOCs (ug/kg)													
					--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)													
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD19		CHLL-SD20		CHLL-SD21	CHLL-SD22			CHLL-SD23	
Field Sample ID					CHLL-SD 19-0''-6''	CHLL-SD-19-1'-2.4'	CHLL-SD 20-0-6''	CHLL-SD 20-1'-2'	CHLL-SD21-0''-6''	CHLL-SD 22-0-6''	CHLL-SD 22-0-6'' dup	CHLL-SD 22-1'-1.5'	CHLL-SD23-0''-6''	CHLL-SD-23-1'-1.5'
Sample Date					7/12/2014	7/12/2014	6/16/2014	6/16/2014	7/10/2014	6/16/2014	6/16/2014	6/16/2014	7/10/2014	7/10/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 2.4 ft	0 - 0.5 ft	1 - 2 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	1 - 1.5 ft	0 - 0.5 ft	1 - 1.5 ft
Sample Description					SAND, Poorly sorted, Brown	SAND, Poorly sorted, Few Pebbles, Brown	SAND, Fine grained, Reddish brown	SAND, Poorly sorted, Reddish brown	SAND, Poorly sorted, Reddish brown	SAND, Poorly sorted, Reddish brown	Field Duplicate	SAND, Poorly sorted, Reddish brown	SAND, Silty, Fine grained, Dark brown, With wood debris	SAND, Silty, Fine grained, Reddish brown
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	**4400**	**3800**	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	<0.3 U	<0.3 U	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	**1.2**	**1.4**	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	**31 J**	**20 J**	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	**0.4**	**0.3**	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	<0.2 U	<0.2 U	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	**8.5**	**8.5**	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	**4.5**	**4.5**	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**89**	**140**	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	**10000**	**9000**	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**5.6**	**5.4**	--	--	--	--	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	**130**	**110**	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	<0.08 U	<0.07 U	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	**12**	**12**	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	<0.2 U	<0.2 U	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	<0.1 U	**0.2**	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	**23**	**25**	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)														
					ND	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<150 U	<130 U	<150 U	<120 U	<260 U	<120 U	<110 U	<110 U	<320 U	<150 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<150 U	<130 U	<150 U	<120 U	<260 U	<120 U	<110 U	<110 U	<320 U	<150 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<150 U	<130 U	<150 U	<120 U	<260 U	<120 U	<110 U	<110 U	<320 U	<150 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<150 U	<130 U	<150 U	<120 U	<260 U	<120 U	<110 U	<110 U	<320 U	<150 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	<750 U	<660 U	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	<750 U	<660 U	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)														
					--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)														
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD73				CHLL-SD74			CHLL-SD75		
Field Sample ID					CHLL-SD-73 0'-6''	CHLL-SD-73 1'-3'	CHLL-SD-73 1'-3' DUP	CHLL-SD-73 3'-4.9'	CHLL-SD-74 0'-6''	CHLL-SD-74 1'-3'	CHLL-SD-74 3'-5'	CHLL-SD-75 0'-6''	CHLL-SD-75 1'-3'	CHLL-SD-75 3'-5'
Sample Date					5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 4.9 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft
Sample Description					SILT, Dark Brown, sandy	SAND, Reddish brown, fine grained, silty to 2.1 ft; SILT, Reddish brown	Field Duplicate	Reddish brown	SILT, Dark brown	SILT, Reddish brown	SILT, Reddish brown to 3.9 ft; SAND, Reddish brown, fine-medium grained, silty	SAND, Brown, poorly sorted	SAND, Reddish brown, poorly sorted to 2 ft; SAND, Reddish brown, fine to medium grained	SAND, Reddish brown, fine to medium grained
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	**7100**	--	--	--	**11000**	--	--	**5000**	--	--
ANTIMONY	7440-36-0	NA	NA	NA	**13**	--	--	--	**7.5**	--	--	<0.3 U	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	**4.8**	--	--	--	**12**	--	--	**1.3**	--	--
BARIUM	7440-39-3	NA	NA	NA	**2300**	--	--	--	**570**	--	--	**17**	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	**0.8**	--	--	--	<2.0 U	--	--	**0.4**	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	**2.7**	--	--	--	**2.6**	--	--	<0.2 U	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	**19**	--	--	--	**30**	--	--	**12**	--	--
COBALT	7440-48-4	50	NA	NA	**8.9**	--	--	--	**13**	--	--	**6.2**	--	--
COPPER	7440-50-8	31.6	31.6	149	**3800**	--	--	--	**4000**	--	--	**480**	--	--
IRON	7439-89-6	NA	NA	NA	**12000**	--	--	--	**20000**	--	--	**7200**	--	--
LEAD	7439-92-1	35.8	35.8	128	**1900**	--	--	--	**1100**	--	--	**8.2**	--	--
LITHIUM	7439-93-2	NA	NA	NA	**6.8**	--	--	--	**10**	--	--	**3.4**	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	**6000**	--	--	--	**8600**	--	--	**4900**	--	--
MANGANESE	7439-96-5	NA	NA	NA	**190**	--	--	--	**320**	--	--	**150**	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	**0.1**	--	--	--	**0.2**	--	--	<0.06 U	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	**27**	--	--	--	**43**	--	--	**17**	--	--
SELENIUM	7782-49-2	NA	NA	NA	**0.4**	--	--	--	<2.0 U	--	--	<0.2 U	--	--
SILVER	7440-22-4	0.5	NA	NA	**13**	--	--	--	**7.8**	--	--	**1.7**	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	**290**	--	--	--	**440**	--	--	**40**	--	--
Inorganics - Cyanide (mg/kg)														
					<0.20 U	--	--	--	<0.23 U	--	--	<0.13 U	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<400 UJ	<330 UJ	<320 UJ	<300 U	<450 UJ	<300 U	<260 U	<250 U	<110 U	<120 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<400 UJ	<330 UJ	<320 UJ	<300 U	<450 UJ	<300 U	<260 U	<250 U	<110 U	<120 U
AROCLOR-1254	11097-69-1	NA	NA	NA	180 J	250 J	230 J	<300 U	210 J	<300 U	<260 U	<250 U	<110 U	<120 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<400 UJ	<330 UJ	<320 UJ	<300 U	160 J	<300 U	<260 U	<250 U	<110 U	<120 U
TOTAL PCBS	TPCB	59.8	59.8	676	**180 J**	**250 J**	**230 J**	ND	**370 J**	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	**940 J**	**1200**	--	--	<740 U	--	--	<230 U	--
PYRENE	129-00-0	195	195	1,520	--	**700 J**	**890**	--	--	<740 U	--	--	<230 U	--
Organics - VOCs (ug/kg)														
					--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)														
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD76				CHLL-SD77			CHLL-SD78		
Field Sample ID					CHLL-SD-76 0-6''	CHLL-SD-76 1'-3'	CHLL-SD-76 1'-3' DUP	CHLL-SD-76 3'-5'	CHLL-SD-77 0-6''	CHLL-SD-77 1'-3'	CHLL-SD-77 3'-5'	CHLL-SD-78 0-6''	CHLL-SD-78 1'-3'	CHLL-SD-78 3'-5'
Sample Date					5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft
Sample Description					SAND, Reddish brown, fine to medium grained	SAND, Reddish brown, poorly sorted to 3.75 ft; SAND, Reddish brown, fine grained	Field Duplicate	SAND, Reddish brown, fine to medium grained	SAND, Reddish brown, fine to medium grained	SAND, Reddish brown, fine to medium grained	SAND, Reddish brown, fine to medium grained, Silty	SILT, Dark Brown	SILT, Reddish brown, Clayey	SAND, Reddish brown, fine grained
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	**7400**	--	--	--	**6600**	--	--	**12000**	--	--
ANTIMONY	7440-36-0	NA	NA	NA	<0.3 U	--	--	--	<0.3 U	--	--	**1.5**	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	**1.8**	--	--	--	**1.5**	--	--	**10**	--	--
BARIUM	7440-39-3	NA	NA	NA	**20**	--	--	--	**32**	--	--	**77**	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	**0.7**	--	--	--	**0.7**	--	--	<2.0 U	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	<0.2 U	--	--	--	<0.2 U	--	--	**0.6**	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	**18**	--	--	--	**17**	--	--	**32**	--	--
COBALT	7440-48-4	50	NA	NA	**9.4**	--	--	--	**9.3**	--	--	**17**	--	--
COPPER	7440-50-8	31.6	31.6	149	**490**	--	--	--	**490**	--	--	**1900**	--	--
IRON	7439-89-6	NA	NA	NA	**11000**	--	--	--	**10000**	--	--	**23000**	--	--
LEAD	7439-92-1	35.8	35.8	128	**16**	--	--	--	**3.7**	--	--	**330**	--	--
LITHIUM	7439-93-2	NA	NA	NA	**5.0**	--	--	--	**4.7**	--	--	**7.5**	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	**7900**	--	--	--	**7800**	--	--	**12000**	--	--
MANGANESE	7439-96-5	NA	NA	NA	**240**	--	--	--	**230**	--	--	**410**	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	<0.06 U	--	--	--	<0.07 U	--	--	**0.1**	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	**25**	--	--	--	**24**	--	--	**46**	--	--
SELENIUM	7782-49-2	NA	NA	NA	<0.2 U	--	--	--	<0.2 U	--	--	<2.0 U	--	--
SILVER	7440-22-4	0.5	NA	NA	**3.0**	--	--	--	**2.2**	--	--	**5.5**	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	**68**	--	--	--	**65**	--	--	**150**	--	--
Inorganics - Cyanide (mg/kg)														
					<0.13 U	--	--	--	<0.14 U	--	--	<0.18 U	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<130 U	<120 U	<120 U	<120 U	<140 U	<130 U	<280 UJ	<350 U	<290 U	<290 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<130 U	<120 U	<120 U	<120 U	<140 U	<130 U	<280 UJ	<350 U	<290 U	<290 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<130 U	<120 U	<120 U	<120 U	<140 U	<130 U	**88 J**	<350 U	<290 U	<290 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<130 U	<120 U	<120 U	<120 U	<140 U	<130 U	<280 UJ	<350 U	<290 U	<290 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	**88 J**	ND	ND	ND
Organics - SVOCs (ug/kg)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	<230 U	<250 U	--	--	<260 U	--	--	<720 U	--
PYRENE	129-00-0	195	195	1,520	--	<230 U	<250 U	--	--	<260 U	--	--	<720 U	--
Organics - VOCs (ug/kg)														
					--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)														
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD79				CHLL-SD80			CHLL-SD81		
Field Sample ID					CHLL-SD-79 0-6''	CHLL-SD-79 1'-3'	CHLL-SD-79 1'-3' DUP	CHLL-SD-79 3'-4.75'	CHLL-SD-80 0'-6''	CHLL-SD-80 1'-3'	CHLL-SD-80 3'-4.75'	CHLL-SD-81 0'-6''	CHLL-SD-81 1'-3'	CHLL-SD-81 3'-4'
Sample Date					5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 4.75 ft	0 - 0.5 ft	1 - 3 ft	3 - 4.75 ft	0 - 0.5 ft	1 - 3 ft	3 - 4 ft
Sample Description					SILT, Dark Brown	SILT, Reddish brown, Clayey	Field Duplicate	SILT, Reddish brown, Clayey	SILT, Dark Brown	SILT, Reddish brown, Clayey	SILT, Reddish brown, Clayey	SILT, Dark Brown	SILT, Reddish brown	SILT, Reddish brown
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	**17000**	--	--	--	**15000**	--	--	**10000**	--	--
ANTIMONY	7440-36-0	NA	NA	NA	**14**	--	--	--	**11**	--	--	**12**	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	**14**	--	--	--	**14**	--	--	**6.8**	--	--
BARIUM	7440-39-3	NA	NA	NA	**1000**	--	--	--	**660**	--	--	**800**	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	**1.2**	--	--	--	<2.0 U	--	--	**1.3**	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	**3.8**	--	--	--	**2.7**	--	--	**2.9**	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	**40**	--	--	--	**40**	--	--	**23**	--	--
COBALT	7440-48-4	50	NA	NA	**21**	--	--	--	**19**	--	--	**13**	--	--
COPPER	7440-50-8	31.6	31.6	149	**11000**	--	--	--	**6700**	--	--	**9900**	--	--
IRON	7439-89-6	NA	NA	NA	**27000**	--	--	--	**23000**	--	--	**18000**	--	--
LEAD	7439-92-1	35.8	35.8	128	**2800**	--	--	--	**1800**	--	--	**1700**	--	--
LITHIUM	7439-93-2	NA	NA	NA	**15**	--	--	--	**15**	--	--	**21**	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	**16000**	--	--	--	**12000**	--	--	**11000**	--	--
MANGANESE	7439-96-5	NA	NA	NA	**480**	--	--	--	**450**	--	--	**340**	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	**0.2**	--	--	--	**0.3**	--	--	**0.3**	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	**53**	--	--	--	**51**	--	--	**33**	--	--
SELENIUM	7782-49-2	NA	NA	NA	**0.5**	--	--	--	<2.0 U	--	--	**0.6**	--	--
SILVER	7440-22-4	0.5	NA	NA	**28**	--	--	--	**16**	--	--	**20**	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	**330**	--	--	--	**310**	--	--	**290**	--	--
Inorganics - Cyanide (mg/kg)														
					<0.22 U	--	--	--	<0.27 U	--	--	<0.18 U	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<440 UJ	<290 U	<300 U	<300 U	<550 UJ	<300 U	<300 U	<360 UJ	<290 U	<290 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<440 UJ	<290 U	<300 U	<300 U	<550 UJ	<300 U	<300 U	<360 UJ	<290 U	<290 U
AROCLOR-1254	11097-69-1	NA	NA	NA	**140 J**	<290 U	<300 U	<300 U	**210 J**	<300 U	<300 U	**130 J**	<290 U	<290 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<440 UJ	<290 U	<300 U	<300 U	<550 UJ	<300 U	<300 U	<360 UJ	<290 U	<290 U
TOTAL PCBS	TPCB	59.8	59.8	676	**140 J**	ND	ND	ND	**210 J**	ND	ND	**130 J**	ND	ND
Organics - SVOCs (ug/kg)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	<740 U	<740 U	--	--	<750 U	--	--	<720 U	--
PYRENE	129-00-0	195	195	1,520	--	<740 U	<740 U	--	--	<750 U	--	--	<720 U	--
Organics - VOCs (ug/kg)														
					--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)														
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD82			CHLL-SD101			CHLL-SD102		
Field Sample ID					CHLL-SD-82 0"-6"	CHLL-SD-82 1'-3'	CHLL-SD-82 3'-4.75'	CHLL-SD-101-0-6"	CHLL-SD-101-1-3'	CHLL-SD-101-3-4.75'	CHLL-SD-102-0-6"	CHLL-SD-102-1-3'	CHLL-SD-102-3-5'
Sample Date					5/28/2015	5/28/2015	5/28/2015	7/12/2015	7/12/2015	7/12/2015	7/12/2015	7/12/2015	7/12/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 4.75 ft	0 - 0.5 ft	1 - 3 ft	3 - 4.75 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft
Sample Description					SILT, Dark Brown, Sandy	SILT, Dark Brown, Sandy to 2 ft; SAND, Reddish-Brown, fine to medium grained	SAND, Reddish-Brown, fine to medium grained	SILT WITH ORGANICS, dark brown to black, wet, soft	CLAY WITH SILT, dark brown, wet, soft; SILT WITH TRACE SAND, dark brown, wet, soft to firm	SILT WITH TRACE SAND, dark brown, wet, soft to firm	SILT WITH SAND, light brown to black, wet, soft	SAND WITH SILT, dark brown, wet, loose to medium dense, fine to medium, angular to1.75 ft; SILT WITH SAND, dark brown, wet, firm, angular	SILTWITH SAND, dark brown, wet, firm, silt with fine angular sand
Inorganics - Metals (mg/kg)													
ALUMINUM	7429-90-5	NA	NA	NA	**10000**	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	**0.9**	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	**2.2**	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	**160**	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	**0.7**	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	**0.4**	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	**15**	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	**7.4**	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**110**	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	**15000**	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**85**	--	--	--	--	--	**160**	--	--
LITHIUM	7439-93-2	NA	NA	NA	**13**	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	**5300**	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	**230**	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	<0.1 UJ	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	**18**	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	**0.3**	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	**1.5**	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	**210**	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)													
					--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)													
AROCLOR-1242	53469-21-9	NA	NA	NA	<430 U	<410 UJ	<120 U	<490 U	<300 U	<290 U	<360 U	<310 U	<290 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<430 U	**400 J**	<120 U	<490 U	<300 U	<290 U	<360 U	<310 U	<290 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<430 U	**500 J**	<120 U	<490 U	<300 U	<290 U	<360 U	<310 U	<290 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<430 U	<320 UJ	<120 U	<490 U	<300 U	<290 U	<360 U	**920**	<290 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	**900 J**	ND	ND	ND	ND	ND	**920**	ND
Organics - SVOCs (ug/kg)													
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)													
					--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)													
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	**75,000**	**60,000**	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	**420,000**	**370,000**	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	LLV-1		LLV-3		LLV-4		LLV-5	
Field Sample ID					LLV-1A	LLV-1B	LLV-3A	LLV-3B	LLV-4A	LLV-4B	LLV-5A	LLV-5B
Sample Date					7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007
Sample Interval (bgs)					0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft
Sample Description					--	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)												
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	**2.5**	**3.1**	**2.6**	**2.6**	**2.5**	**2.4**	**2.6**	**2.4**
ARSENIC	7440-38-2	9.79	9.79	33.0	**2.6**	**2.1**	**6.5**	**7.0**	**1.5**	**1.7**	**1.7**	**1.4**
BARIUM	7440-39-3	NA	NA	NA	**20**	**21**	**12**	**10**	**21**	**19**	**17**	**16**
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**1900**	**7100**	**810**	**1200**	**770**	**1500**	**6400**	**1300**
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**23**	**40**	**19**	**14**	**16**	**8.3**	**20**	**20**
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)												
					--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)												
AROCLOR-1242	53469-21-9	NA	NA	NA	<100 U	<100 U	<110 U	<100 U	<100 U	<100 U	<110 U	<100 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<100 U	<100 U	<110 U	<100 U	<100 U	<100 U	<110 U	<100 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<100 U	<100 U	<110 U	<100 U	<100 U	<100 U	<110 U	<100 U
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)												
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)												
					--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)												
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	LLV-6		LLV-7				LLV-8		LLV-9	
Field Sample ID					LLV-6A	LLV-6B	LLV-7A	LLV-7A DUP	LLV-7B	LLV-7B DUP	LLV-8A	LLV-8B	LLV-9A	LLV-9B
Sample Date					7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007
Sample Interval (bgs)					0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	0 - 0.25 ft	1 - 1.5 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft
Sample Description					--	--	--	Field Duplicate	--	Field Duplicate	--	--	--	--
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	**2.6**	**2.3**	**2.5**	**2.4**	**2.6**	**2.4**	**2.2**	**2.3**	**2.1**	**2.4**
ARSENIC	7440-38-2	9.79	9.79	33.0	**2.4**	**2.3**	**3.0**	**3.1**	**1.8**	**1.6**	**1.1**	**1.2**	**1.6**	**1.6**
BARIUM	7440-39-3	NA	NA	NA	**14**	**11**	**16**	**14**	**11**	**9.3**	**7.2**	**7.4**	**11**	**12**
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**2600**	**3900**	**1000**	**1100**	**560**	**470**	**1500**	**1000**	**1700**	**2200**
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**35**	**13**	**27**	**25**	**22**	**18**	**11**	**14**	**59**	**36**
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)														
					--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<100 U	<94 U	<100 U	<98 U	<110 U	<100 U	<95 U	<97 U	<92 U	<97 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<100 U	<94 U	<100 U	<98 U	<110 U	<100 U	<95 U	<97 U	<92 U	<97 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<100 U	<94 U	<100 U	<98 U	<110 U	<100 U	<95 U	<97 U	<92 U	<97 U
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)														
					--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)														
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	LLV-10		LLV-11		LLV-13				LLV-14	
Field Sample ID					LLV-10A	LLV-10B	LLV-11A	LLV-11B	LLV-13A	LLV-13A DUP	LLV-13B	LLV-13B DUP	LLV-14A	LLV-14B
Sample Date					7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/31/2007	7/31/2007
Sample Interval (bgs)					0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	0 - 0.25 ft	1 - 1.5 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft
Sample Description					--	--	--	--	--	Field Duplicate	--	Field Duplicate	--	--
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	**2.5**	**2.3**	**2.2**	**2.4**	**2.5**	**2.6**	**2.6**	**2.6**	**2.4**	**2.3**
ARSENIC	7440-38-2	9.79	9.79	33.0	**2.2**	**1.2**	**2.7**	**1.3**	**1.7**	**1.7**	**3.2**	**2.0**	**1.2**	**11**
BARIUM	7440-39-3	NA	NA	NA	**14**	**8.0**	**43**	**41**	**54**	**49**	**100**	**41**	**19**	**110**
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**910**	**970**	**800**	**780**	**300**	**440**	**1100**	**300**	**72**	**1500**
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**74**	**18**	**79**	**16**	**23**	**20**	**49**	**20**	**4.5**	**470**
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)														
					--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<100 U	<96 U	<92 U	<94 U	<100 U	<110 U	<100 U	<110 U	<97 U	<100 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<100 U	<96 U	<92 U	<94 U	<100 U	<110 U	<100 U	<110 U	<97 U	<100 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<100 U	<96 U	<92 U	<94 U	<100 U	<110 U	<100 U	<110 U	<97 U	<100 U
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)														
					--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)														
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	LLV-15				LLV-16		LLV-17		LLV-18	
Field Sample ID					LLV-15A	LLV-15A DUP	LLV-15B	LLV-15B DUP	LLV-16A	LLV-16B	LLV-17A	LLV-17B	LLV-18A	LLV-18B
Sample Date					7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007
Sample Interval (bgs)					0 - 0.25 ft	0 - 0.25 ft	1 - 1.5 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft
Sample Description					--	Field Duplicate	--	Field Duplicate	--	--	--	--	--	--
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	**2.3**	**2.3**	**2.4**	**2.4**	**2.3**	**2.5**	**2.4**	**2.5**	**2.2**	**2.4**
ARSENIC	7440-38-2	9.79	9.79	33.0	**1.2**	**1.2**	**2.6**	**3.1**	**1.2**	**1.6**	**2.2**	**2.2**	**2.0**	**1.2**
BARIUM	7440-39-3	NA	NA	NA	**15**	**13**	**21**	**22**	**14**	**23**	**21**	**40**	**17**	**20**
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**130**	**130**	**590**	**550**	**160**	**380**	**390**	**440**	**290**	**930**
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**2.5**	**2.4**	**20**	**27**	**2.7**	**16**	**10**	**49**	**9.4**	**13**
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)														
					--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<96 U	<94 U	<100 U	<99 U	<95 U	<96 U	<100 U	<100 U	<87 U	<98 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<96 U	<94 U	<100 U	<99 U	<95 U	<96 U	<100 U	<100 U	<87 U	<98 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<96 U	<94 U	<100 U	<99 U	<95 U	<96 U	<100 U	<100 U	<87 U	<98 U
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)														
					--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)														
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	LLV-19		LLV-20		LLV-21		LLV-22			
Field Sample ID					LLV-19A	LLV-19B	LLV-20A	LLV-20B	LLV-21A	LLV-21B	LLV-22A	LLV-22A DUP	LLV-22B	LLV-22B DUP
Sample Date					7/31/2007	7/31/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007
Sample Interval (bgs)					0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	0 - 0.25 ft	1 - 1.5 ft	1 - 1.5 ft
Sample Description					--	--	--	--	--	--	--	Field Duplicate	--	Field Duplicate
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	**2.3**	**2.7**	**2.5**	**2.4**	**2.3**	**2.5**	**2.3**	**2.4**	**2.4**	**2.3**
ARSENIC	7440-38-2	9.79	9.79	33.0	**2.8**	**2.1**	**3.9**	**1.5**	**10**	**5.0**	**2.3**	**1.9**	**1.7**	**1.6**
BARIUM	7440-39-3	NA	NA	NA	**19**	**25**	**28**	**23**	**57**	**49**	**22**	**21**	**22**	**18**
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**440**	**930**	**410**	**850**	**3200**	**760**	**580**	**720**	**580**	**570**
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**4.7**	**39**	**9.7**	**4.0**	**10**	**9.6**	**8.5**	**3.9**	**2.5**	**2.2**
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)														
					--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<95 U	<100 U	<100 U	<99 U	<100 U	<100 U	<99 U	<100 U	<95 U	<98 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<95 U	<100 U	<100 U	<99 U	<100 U	<100 U	<99 U	<100 U	<95 U	<98 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<95 U	<100 U	<100 U	<99 U	<100 U	<100 U	<99 U	<100 U	<95 U	<98 U
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)														
					--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)														
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	LLV-23		LLV-24		LLV-MP3	LLV-MP4	LLV-MP5	LLV-MP6	LLV-MP7	LLV-MP8
Field Sample ID					LLV-23A	LLV-23B	LLV-24A	LLV-24B	LLV-MP3-01	LLV-MP4-01	LLV-MP5-01	LLV-MP6-01	LLV-MP7-01	LLV-MP8-01
Sample Date					7/30/2007	7/30/2007	7/30/2007	7/30/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007
Sample Interval (bgs)					0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description					--	--	--	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	**2.6**	**2.2**	**2.5**	**2.3**	**4.7**	**5.2**	**4.8**	**6.2**	**5.0**	**7.4**
ARSENIC	7440-38-2	9.79	9.79	33.0	**5.0**	**1.6**	**4.6**	**2.1**	**2.3**	**2.6**	**2.4**	**3.1**	**2.5**	**4.1**
BARIUM	7440-39-3	NA	NA	NA	**66**	**27**	**80**	**23**	**29**	**25**	**170**	**120**	**32**	**150**
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**630**	**880**	**750**	**570**	**200**	**340**	**310**	**330**	**100**	**540**
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**15**	**3.0**	**5.6**	**3.7**	**40**	**21**	**130**	**110**	**11**	**68**
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)														
					--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<100 U	<100 U	<110 U	<100 U	<100 U	<110 U	<100 U	<130 U	<110 U	<150 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<100 U	<100 U	<110 U	<100 U	<100 U	<110 U	<100 U	<130 U	<110 U	<150 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<100 U	<100 U	<110 U	<100 U	<100 U	<110 U	<100 U	<130 U	<110 U	<150 U
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)														
					--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)														
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	SD-03		TL07-01				TL07-02		
Field Sample ID					SD-03	SD-03D	TL07-01 0-6	TL07-01 6-24	TL07-01 24-43	TL07-01 43-64	TL07-02 0-28	TL07-02 28-48	TL07-02 48-64
Sample Date					10/12/2011	10/12/2011	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007
Sample Interval (bgs)					0 - 3 in	0 - 3 in	0 - 6 in	6 - 24 in	24 - 43 in	43 - 64 in	0 - 28 in	28 - 48 in	48 - 64 in
Sample Description					--	Field Duplicate	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)													
ALUMINUM	7429-90-5	NA	NA	NA	**2060**	**2140**	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	**0.27 J**	**0.34 J**	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	<1.0 UJ	**1.4 J-**	**1.0**	**1.3**	**2.7**	**49**	**2.3**	**38**	**8.2**
BARIUM	7440-39-3	NA	NA	NA	**20.7 J**	**26.5**	**22**	**52**	**220**	**130000**	**310**	**84000**	**4100**
BERYLLIUM	7440-41-7	NA	NA	NA	**0.28 J**	**0.33 J**	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	**0.51 J**	**0.56**	<0.2 U	<0.2 U	**0.33**	**85**	**0.27**	**38**	**3.6**
CALCIUM	7440-70-2	NA	NA	NA	**1630**	**1600**	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	**8.4**	**7.9**	**9.5**	**11**	**15**	**200**	**13**	**130**	**38**
COBALT	7440-48-4	50	NA	NA	**3.2 J**	**2.8 J**	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**164**	**97.7**	**140**	**430**	**670**	**120000**	**370**	**78000**	**8600**
IRON	7439-89-6	NA	NA	NA	**8430**	**9320**	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**7.6**	**8.5**	**9.2**	**110**	**150**	**75000**	**100**	**44000**	**2500**
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	**1910**	**1680**	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	**101**	**107**	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	<0.1 U	<0.1 U	<0.05 U	<0.05 U	**0.09**	**1.5**	<0.05 U	**1.7**	**0.3**
NICKEL	7440-02-0	22.7	22.7	48.6	**8.6**	**7.3**	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	<3.5 U	<3.5 U	<0.2 U	<0.2 U	**0.27**	**20**	**0.27**	**18**	**2.6**
SILVER	7440-22-4	0.5	NA	NA	<1.0 U	<1 U	**0.22**	**1.3**	**1.2**	**450**	**0.87**	**290**	**39**
SODIUM	7440-23-5	NA	NA	NA	**313 J**	**145 J**	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	**15.6**	**18.4**	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	**28.4**	**26**	**23**	**40**	**80**	**6800**	**54**	**3500**	**430**
Inorganics - Cyanide (mg/kg)													
					ND	ND	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)													
AROCLOR-1242	53469-21-9	NA	NA	NA	<48 U	<45 U	<130 U	<120 U	<170 U	**5100**	<180 U	**3000**	<140 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<48 U	<45 U	<130 U	<120 U	<170 U	<5200 U	<180 U	<3100 U	**130**
AROCLOR-1254	11097-69-1	NA	NA	NA	<48 U	<45 U	<130 U	<120 U	<170 U	**3800**	<180 U	**2800**	**150**
AROCLOR-1262	37324-23-5	NA	NA	NA	<48 U	<45 U	<130 U	<120 U	<170 U	<1000 U	<180 U	<970 U	<140 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	**8900**	ND	**5800**	**280**
Organics - SVOCs (ug/kg)													
ACETOPHENONE	98-86-2	NA	NA	NA	**130 J**	<170 U	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	<170 UJ	<170 UJ	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	<170 U	<170 UJ	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)													
					--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)													
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL07-03			TL07-04				TL07-13				
Field Sample ID					TL07-03 0-21	TL07-03 21-41	TL07-03 41-70	TL07-04 0-6	TL07-04 6-26	TL07-04 36-60	TL07-04 60-95	TL07-13 0-6	TL07-13 6-26	TL07-13 26-40	TL07-13 40-66	TL07-13 40-66 D
Sample Date					8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007
Sample Interval (bgs)					0 - 21 in	21 - 41 in	41 - 70 in	0 - 6 in	6 - 26 in	36 - 60 in	60 - 95 in	0 - 6 in	6 - 26 in	26 - 40 in	40 - 66 in	40 - 66 in
Sample Description					--	--	--	--	--	--	--	--	--	--	--	Field Duplicate
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	**1.6**	**55**	**5.6**	**26**	**5.7**	**5.8**	**4.7**	**7.5**	**8.7**	**18**	**3.8**	**2.6**
BARIUM	7440-39-3	NA	NA	NA	**150**	**99000**	**620**	**12000**	**410**	**88**	**71**	**15**	**19**	**21**	**17**	**15**
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	<0.2 U	**37**	**0.59**	<0.2 U	**0.6**	<0.2 U	<0.2 U	<0.2 U	**0.22**	**0.27**	<0.2 U	<0.2 U
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	**8.7**	**120**	**44**	**51**	**45**	**44**	**44**	**28**	**27**	**32**	**20**	**18**
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**160**	**120000**	**3500**	**28000**	**3900**	**3400**	**3000**	**800**	**1300**	**2400**	**7100**	**5800**
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**19**	**42000**	**300**	**7800**	**400**	**39**	**23**	**34**	**70**	**72**	**10**	**7.8**
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	<0.05 U	**2.6**	**0.12**	**0.6**	**0.13**	**0.07**	**0.07**	<0.05 U	**0.09**	**0.12**	**0.07**	<0.05 U
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	<0.2 U	**23**	**0.31**	**5**	**0.4**	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	**0.21**
SILVER	7440-22-4	0.5	NA	NA	**0.31**	**380**	**9.3**	**80**	**11**	**6.1**	**5.4**	**3.3**	**4.0**	**8.1**	**8.0**	**6.9**
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	**38**	**4100**	**140**	**1000**	**180**	**110**	**110**	**98**	**120**	**120**	**78**	**65**
Inorganics - Cyanide (mg/kg)																
					--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1242	53469-21-9	NA	NA	NA	<140 U	**3200**	<130 U	**460**	<140 U	<140 U	<140 U	<130 U	<130 U	<130 U	<130 U	<130 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<140 U	<3200 U	<130 U	**470**	<140 U	<140 U	<140 U	<130 U	<130 U	<130 U	<130 U	<130 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<140 U	**2900**	<130 U	**450**	**180**	<140 U	<140 U	<130 U	<130 U	<130 U	<130 U	<130 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<140 U	<1000 U	<130 U	<210 U	<140 U	<140 U	**50**	<130 U	<130 U	<130 U	<130 U	<130 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	**6100**	ND	**910**	**180**	ND	**50**	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																
					--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Analytical and Criteria Footnotes
are included on the last page of the table.

TABLE 7-3
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Sediment Table Footnotes:

- ESLs, TECs, and PECs are adapted from Appendix A and Appendix B of Michigan Department of Environmental Quality - Remediation and Redevelopment Division Operational Memorandum No. 4 Attachment 3, Interim Final August 2, 2006

- Only detected analytes are listed - Gray rows indicate requested analyses. If no analytes are listed below a gray row then all analytes of that group were either not analyzed or not detected. ND indicates that one or more analyte of that goup was tested and not detected and a -- indicates not analyzed.

- **Bold** values are concentrations detected above the reporting limit.

- **Shaded values indicate analyte concentration exceed applicable criteria. Color presented is the criteria with the highest value that was exceeded:**

EPA Region 5 RCRA ESLs dated August 22, 2003

TECs from MacDonald *et al.* 2000

PECs from MacDonald *et al.* 2000

-- = Not analyzed/Not Reported

bgs = Below ground surface

ESL = Ecological Screening Level

DRO/ORO = Diesel Rande Organics and Oil Range Organics

ft = Feet

in = Inches

mg/kg = Milligrams per kilogram.

PCBs = Polychlorindated biphenyls

PEC = Probable Effect Concentration

RCRA = Resource Conservation and Recovery Act

SVOC = Semi-volatile organic compound

TEC = Threshold Effect Concentration

ug/kg = Micrograms per kilogram

VOC = Volatile organic compound

Criteria Footnotes:

NA = A criterion or value is not available

Laboratory Footnotes:

J = Estimated result

ND = Analyte analyzed for but not detected above the reported sample reporting limit.

U = Analyte analyzed for but not detected above the reported sample reporting limit.

TABLE 7-4
Sample Analytical Summary - Surface Water and SPMD
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CASNumber	EPA Region 5 Ecological Screening Level	Rule 57 HCV Drink	Rule 57 HNV Drink	Rule 57 WV	CHLL-SW01	CHLL-SW02	CHLL-SW03	CHLL-SW04	LLV-Beach1	LLV-Creek1	SPMD Site #3	SW-03	
Field Sample ID						CHLL-SW01- 6.7-7.7'	CHLL-SW02-12.5-13.5'	CHLL-SW03-18.4-19.4'	CHLL-SW04-11.5-12.5'	LLV Beach 1	LLV Creek 1	SPMD Site #3	SW-03	SW-03D
Sample Date						5/27/2015	5/27/2015	5/28/2015	5/28/2015	7/26/2007	7/26/2007	11/18/2005	10/12/2011	10/12/2011
Sample Interval						6.7 - 7.7 ft	12.5 - 13.5 ft	18.4 - 19.4 ft	11.5 - 12.5 ft	0 - 0 ft	0 - 0 ft	3 - 3 ft	0 - 6 in	0 - 6 in
Inorganics - Metals (ug/l)														**Field Duplicate**
ALUMINUM	7429-90-5	NA	NA	NA	NA	--	--	--	--	**3100**	**3900**	--	**16.7 J**	**22.6 J**
ANTIMONY	7440-36-0	80	NA	1.7	NA	--	--	--	--	<2 U	**3.0**	--	<60 U	<60 U
ARSENIC	7440-38-2	148	10	10	NA	--	--	--	--	**9.0**	**20**	--	<10 U	<10 U
BARIUM	7440-39-3	220	NA	1,900	NA	--	--	--	--	**270**	**530**	--	**44.1 J**	**39.6 J**
CADMIUM	7440-43-9	0.15	NA	2.5	NA	--	--	--	--	<1 U	**1.0**	--	<5 U	<5 U
CALCIUM	7440-70-2	NA	NA	NA	NA	--	--	--	--	**57000**	**33000**	--	**17300**	**16900**
CHROMIUM	7440-47-3	42	NA	120	NA	--	--	--	--	<10 U	**14**	--	**1.1 J**	<10 U
COPPER	7440-50-8	1.58	NA	470	na	--	--	--	--	**240**	**990**	--	**19.6 J**	**28.2**
IRON	7439-89-6	NA	NA	NA	NA	--	--	--	--	**2800**	**14000**	--	<100 U	**110**
LEAD	7439-92-1	1.17	NA	14	NA	--	--	--	--	**44**	**550**	--	**1.5 J**	<10 U
MAGNESIUM	7439-95-4	NA	NA	NA	NA	--	--	--	--	**5000**	**7000**	--	**1220 J**	**2330 J**
MANGANESE	7439-96-5	NA	NA	1,300	NA	--	--	--	--	**180**	**720**	--	**5.5 J**	**11.5 J**
NICKEL	7440-02-0	28.9	NA	2,600	NA	--	--	--	--	<20 U	<20 U	--	**1.8 J**	**1.3 J**
Potassium	7440-09-7	NA	NA	NA	NA	--	--	--	--	**1600**	**3800**	--	<5000 U	<5000 U
SILVER	7440-22-4	0.12	NA	130	NA	--	--	--	--	**0.8**	**4.0**	--	<10 U	<10 U
SODIUM	7440-23-5	NA	NA	NA	NA	--	--	--	--	**7700**	**14000**	--	**3610000**	**1700000**
VANADIUM	7440-62-2	12	NA	53	NA	--	--	--	--	**7.0**	**20**	--	<50 U	<50 U
ZINC	7440-66-6	65.7	NA	3,300	NA	--	--	--	--	<50 U	**110**	--	<60 U	<60 U
Inorganics - Cyanide (ug/l)														
CYANIDE	57-12-5	5.2	NA	600	NA	--	--	--	--	<5 U	<5 U	--	**20.7 J**	<10 UJ
Organics - PCBs (ug/l)														
PCB 018	PCB 018	NA	NA	NA	NA	--	--	--	--	--	--	**1.300**	--	--
PCB 028	PCB 028	NA	NA	NA	NA	--	--	--	--	--	--	**3.300**	--	--
PCB 031	PCB 031	NA	NA	NA	NA	--	--	--	--	--	--	**2.400**	--	--
PCB 033	PCB 033	NA	NA	NA	NA	--	--	--	--	--	--	**1.900**	--	--
PCB 037-042	PCB 037-042	NA	NA	NA	NA	--	--	--	--	--	--	**2.500**	--	--
PCB 044	PCB 044	NA	NA	NA	NA	--	--	--	--	--	--	**2.700**	--	--
PCB 049	PCB 049	NA	NA	NA	NA	--	--	--	--	--	--	**6.500**	--	--
PCB 052	PCB 052	NA	NA	NA	NA	--	--	--	--	--	--	**5.300**	--	--
PCB 056-060	PCB 056-060	NA	NA	NA	NA	--	--	--	--	--	--	**1.100**	--	--
PCB 064	PCB 064	NA	NA	NA	NA	--	--	--	--	--	--	**1.500**	--	--
PCB 066-095	PCB 066-095	NA	NA	NA	NA	--	--	--	--	--	--	**5.200**	--	--
PCB 070	PCB 070	NA	NA	NA	NA	--	--	--	--	--	--	**2.800**	--	--
PCB 074	PCB 074	NA	NA	NA	NA	--	--	--	--	--	--	**1.100**	--	--
PCB 077a-110	PCB 077a-110	NA	NA	NA	NA	--	--	--	--	--	--	**8.500**	--	--
PCB 084	PCB 084	NA	NA	NA	NA	--	--	--	--	--	--	**0.900**	--	--
PCB 087	PCB 087	NA	NA	NA	NA	--	--	--	--	--	--	**2.300**	--	--
PCB 090-101	PCB 090-101	NA	NA	NA	NA	--	--	--	--	--	--	**4.900**	--	--
PCB 091	PCB 091	NA	NA	NA	NA	--	--	--	--	--	--	**0.600**	--	--
PCB 092	PCB 092	NA	NA	NA	NA	--	--	--	--	--	--	**0.700**	--	--
PCB 097	PCB 097	NA	NA	NA	NA	--	--	--	--	--	--	**1.400**	--	--
PCB 099	PCB 099	NA	NA	NA	NA	--	--	--	--	--	--	**2.200**	--	--
PCB 105a	PCB 105a	NA	NA	NA	NA	--	--	--	--	--	--	**1.300**	--	--
PCB 118a	PCB 118a	NA	NA	NA	NA	--	--	--	--	--	--	**3.600**	--	--
PCB 128	PCB 128	NA	NA	NA	NA	--	--	--	--	--	--	**0.600**	--	--
PCB 132	PCB 132	NA	NA	NA	NA	--	--	--	--	--	--	**1.000**	--	--
PCB 138a-163	PCB 138a-163	NA	NA	NA	NA	--	--	--	--	--	--	**3.300**	--	--
PCB 149	PCB 149	NA	NA	NA	NA	--	--	--	--	--	--	**0.700**	--	--
PCB 151	PCB 151	NA	NA	NA	NA	--	--	--	--	--	--	**0.700**	--	--
PCB 153	PCB 153	NA	NA	NA	NA	--	--	--	--	--	--	**2.500**	--	--
PCB 158a	PCB 158a	NA	NA	NA	NA	--	--	--	--	--	--	**0.600**	--	--
PCB 170	PCB 170	NA	NA	NA	NA	--	--	--	--	--	--	**0.200**	--	--
PCB 174	PCB 174	NA	NA	NA	NA	--	--	--	--	--	--	**1.000**	--	--
PCB 180	PCB 180	NA	NA	NA	NA	--	--	--	--	--	--	**0.500**	--	--
TOTAL PCBS	TPCB	0.00012	0.000026	NLS	0.00012	ND	ND	ND	ND	<0.2 U	<0.2 U	**74**	<1 U	<1 U

TABLE 7-4
Sample Analytical Summary - Surface Water and SPMD
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CASNumber	EPA Region 5 Ecological Screening Level	Rule 57 HCV Drink	Rule 57 HNV Drink	Rule 57 WV	CHLL-SW01	CHLL-SW02	CHLL-SW03	CHLL-SW04	LLV-Beach1	LLV-Creek1	SPMD Site #3	SW-03	
Field Sample ID						CHLL-SW01- 6.7-7.7'	CHLL-SW02-12.5-13.5'	CHLL-SW03-18.4-19.4'	CHLL-SW04-11.5-12.5'	LLV Beach 1	LLV Creek 1	SPMD Site #3	SW-03	SW-03D
Sample Date						5/27/2015	5/27/2015	5/28/2015	5/28/2015	7/26/2007	7/26/2007	11/18/2005	10/12/2011	10/12/2011
Sample Interval						6.7 - 7.7 ft	12.5 - 13.5 ft	18.4 - 19.4 ft	11.5 - 12.5 ft	0 - 0 ft	0 - 0 ft	3 - 3 ft	0 - 6 in	0 - 6 in
Organics - SVOCs (ug/l)														
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	0.3	25	120	NA	--	--	--	--	<5.0 U	<5.0 U	--	<5 U	**3.6 J**
Organics - VOCs (ug/l)														
1,4-DICHLOROBENZENE	106-46-7	9.4	24	1,100	NA	--	--	--	--	<5.0 U	<5.0 U	--	**0.12 J**	<5 U
Other														
pH	PH	NA	NA	NA	NA	--	--	--	--	**7.55**	**7.72**	--	--	--

Surface Water Table Footnotes:

- MDEQ Rule 57 values derived from the Michigan Department of Environmental Quality, Water Bureau, Water Resources Protection, filed with the Secretary of State on January 13, 2006. Part 4 Water Quality Standards, Rule 323.1057 Toxic Substances, as amended. Updated on February 27, 2014.
- ESLs are adapted from Appendix A and Appendix B of Michigan Department of Environmental Quality - Remediation and Redevelopment Division Operational Memorandum No. 4 Attachment 3, Interim Final August 2, 2006
- Only detected analytes are listed - Gray rows indicate requested analyses. If no analytes are listed below a gray row then all analytes of that group were either not analyzed or not detected. ND indicates that one or more analyte of that goup was tested and not detected and a -- indicates not analyzed.
- SPMD results are not compared to surface water criteria.
- **Bold** values are concentrations detected above the reporting limit.
- **Shaded values indicate analyte concentration exceed applicable criteria. Color presented is the criteria with the highest value that was exceeded:**

EPA Region 5 RCRA ESLs dated August 22, 2003
MDEQ Rule 57 Water Quality Value, HCV, drinking water source, dated February 27, 2014
MDEQ Rule 57 Water Quality Value, HNV, drinking water source, dated February 27, 2014
MDEQ Rule 57 Water Quality Value, WV, dated February 27, 2014

-- = Not analyzed/Not reported
bgs = below ground surface
EPA = United States Environmental Protection Agency
ESL = Ecological Screening Level
ft = feet
HCV = Human Non-Cancer Value
HNV = Human Cancer Value
in = Inches
MDEQ = Michigan Department of Environmental Quality
mS/cm = MilliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
PCBs = Polychlorindated biphenyls
RCRA = Resource Conservation and Recovery Act
SPMD = Semi-permeable membrane device
SVOC = Semi-volatile organic compound
ug/l = Micrograms per liter
VOC = Volatile organic compound
WV = Wildlife Value

Criteria Footnotes:

NA = a criterion or value is not available
NLS = no literature search has been conducted

Laboratory Footnotes:

J = estimated result
ND = not detected
U = analyte analyzed for but not detected above the reported sample reporting limit.