

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA****10. DETAILED FINDINGS REPORT – HUBBELL SLAG DUMP AND BEACH AREA**

This Section summarizes the findings derived from implementation of the sampling and analysis plan (SAP) in the Hubbell Slag Dump and Beach Area. The narrative follows the investigative approach outlined in **Section 3**, while providing specific details about the study area and the potential human health and ecological risks associated with mining era operations.

10.1 SITE INSPECTION AND INVESTIGATION RESULTS

The implementation of the site inspection and investigation activities provided critical lines of evidence that link the findings of the archival research to the current environmental conditions in and around Torch Lake. The following subsections present the findings of the inspection and investigation activities and provide correlation of mining era operations and their potential impacts on the nearshore environment of Torch Lake.

10.1.1 Site Inspection

The site inspection at the Hubbell Slag Dump and Beach Area included the locating and inventory of structures and similar surficial artifacts associated with the mining era industrial operations. The study area was also inspected for potential physical and health hazards which were documented, photographed, and located with a global positioning system (GPS) unit. The inventoried hazards were then qualitatively assessed for potential human health and environmental risks to determine if analytical sampling was warranted during the targeted inspection phase of the work.

10.1.1.1 Reconnaissance

On 7 October 2014 and 1 July 2015, a field team comprised of Weston Solutions of Michigan, Inc. (WESTON®) and Michigan Department of Environmental Quality (MDEQ) personnel performed reconnaissance activities at the properties in the Hubbell Slag Dump and Beach Area where written access was granted to the MDEQ. In the cases where access was not requested based on historic operational and investigative findings, property conditions were evaluated from a neighboring property or public right of way where access was permitted.

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

Five properties or grouped parcels were visually inspected and observations were recorded. The following provides a summary of the relevant findings associated with the reconnaissance activities.

Hubbell Slag Dump and Beach Area – Reconnaissance Summary	
Potential Chemical or Physical Hazards	Recorded Observations
Suspect Asbestos Containing Material (SACM)	SACM was observed during inspection of the Hubbell Slag Dump
Residual Process Materials	The majority of the properties in the northern half of the area are comprised of U.S. Environmental Protection Agency (EPA) soil capped slag piles. The areas are well to sparsely vegetated; however, slag deposits are exposed at the water's edge due to cap erosion.
Potentially Abandoned Containers	Two empty steel drums were observed on one property in the capped slag pile portion of the area.
Soil Staining/Stressed Vegetation	The slag piles in the northern portion of the area are generally well to sparsely vegetated. No barren or stressed areas of the ground surface were documented on the inspected properties.
Potential Polychlorinated Biphenyl (PCB) or Mercury Containing Equipment	No potential PCB or mercury containing equipment was observed on the inspected properties.
Other: Household Waste and Debris	Metal and porcelain-like debris were observed in the shallow water near the Hubbell Beach. Similarly, metal debris was observed protruding from the ground on the point adjacent to and directly north of the beach area. The observed debris is believed to be related to mining era operations and a reported historical municipal landfill located on the point.

In general, no significant hazards were identified during the reconnaissance activities. As discussed in **Section 2.1**, the slag deposits are consistent with waste deposits that have been addressed under previous cleanup and removal actions undertaken in the area. The observed metal debris and ceramic-like material observed in the vicinity of the Hubbell Beach are consistent with the location of a reported historical landfill. Field logs documenting reconnaissance observations are included in **Appendix D** of the Site Investigation (SI) Report.

10.1.1.2 Targeted Inspection

The qualitative assessment of the reconnaissance findings in the Hubbell Slag Dump and Beach Area warranted the performance of targeted inspection activities at the Hubbell Slag Dump property. On 1 July 2015 a WESTON field team conducted targeted inspection activities at the

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

Hubbell Slag Dump property that included the collection of bulk material samples. The following subsections summarize the findings of these sampling efforts.

10.1.1.2.1 Bulk Material Sampling

Based on the SACM hazards noted during the reconnaissance activities a limited asbestos survey was conducted as part of the SI to identify suspect potentially friable asbestos containing materials (ACMs) located at the Hubbell Slag Dump property. The asbestos survey was limited to SACMs in open areas of the property. The sampling approach used when conducting a traditional asbestos survey is based upon the building's functional spaces and homogeneous areas of intact building materials. These regulatory criteria determine the quantity and location of bulk samples to be collected. Since the asbestos survey at the Hubbell Slag Dump was limited to non-intact debris, the traditional asbestos sampling approach could not be directly applied. Although the SACMs were not intact, the quantity of bulk samples collected per similar types of building materials were consistent with the sampling requirements defined in 40 Code of Federal Regulations (CFR) 763.83 "Sampling".

On 1 July 2015, a total of three bulk samples were collected from one SACM. SACM identified on properties within the Hubbell Slag Dump and Beach Area is summarized as follows:

- Black asphaltic roofing material (CHLL-ASBBLK58) located on the surface of the Hubbell Slag Dump property northeast of the Hubbell Beach.

The samples were analyzed in accordance with EPA Method 600/R-93/116, "Method for the Determination of Asbestos in Bulk Building Materials" using Polarized Light Microscopy (PLM). This laboratory analytical method identifies the presence and estimated concentration of asbestos fibers in sampled building materials. A detailed summary of bulk asbestos sample analytical results collected from the Hubbell Slag Dump and Beach Area during the targeted inspection are provided in [Table 10-1](#) and the sample location is depicted on [Figure 10-1](#).

10.1.2 Site Investigation

The SI at the Hubbell Slag Dump and Beach Area was developed based on a variety of data and information as outlined in **Section 3**. In addition to the historical accounts and documentation,

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

current land use and potential exposure pathways were also taken into consideration when selecting the sampling locations specific to the Hubbell Slag Dump and Beach Area. The following subsections present the outcomes of investigative activities completed in the area by summarizing the laboratory analytical results and characterizing their impacts on the environmental media in which they were detected.

10.1.2.1 Terrestrial Investigation

Intrusive investigation activities in the Hubbell Slag Dump and Beach Area were generally guided by several factors. The slag dump, making up the majority of the northern portion of the study area, had generally been addressed by previous EPA response actions. The Hubbell Beach area, despite being developed as a public park, had very little historical screening or analytical data available. Further, the proximity to the reported historic landfill and unrestricted public access to the property increases the potential for exposure to people accessing the properties. Consequently, the majority of the upland investigative work was completed in the vicinity of the Hubbell Beach property. The following subsections present a summary of the analytical results derived from the terrestrial sampling activities

10.1.2.1.1 Field Observations – Soil and Groundwater

Borings in the Hubbell Slag Dump and Beach Area were advanced to depths between 11 and 17 feet (ft) below the ground surface (bgs). Boring locations are depicted on **Figure 10-1**. Soil observations documented on field logs indicate that the subsurface in the investigated area is primarily comprised of medium to fine grained sands, ranging from brown, reddish brown, and gray in color. Gravel was also documented in several borings at various depths. Four boring locations (CHLL-SB53, CHLL-SB54, CHLL-SB132, and CHLL-SB134) were comprised of fill in the upper 1.5 ft of the soil interval that included landfill debris.

During groundwater sampling, temporary well points were generally established between 6 ft and 14 ft bgs; however, location CHLL-GW33 was advanced to a maximum depth of 17 ft. Saturated soil conditions were generally encountered between depths of 1 ft and 4 ft. Groundwater quality parameters, including temperature, conductivity, dissolved oxygen (DO) and pH, measured at the time of sample collection were generally considered normal. DO measurements were greater than

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

40 percent (%) in five of the sample locations. Elevated DO concentrations are typically indicative of low bio-activity, indicating that oxygen is not being consumed by aerobic organisms in the subsurface. These conditions may persist in the study area due to the presence of stamp sands deposits along the shoreline of Torch Lake. Alternatively, the presence of other volatile chemicals in soil or groundwater and inconsistencies in sample collection could also cause interference within the instrument, causing inaccurate or false measurements. Additional evaluation would be required to determine if these results are indicators of variability in sample collection or the presence of chemical interference.

10.1.2.1.2 Soil Sampling Results

Terrestrial investigation activities were completed in the Hubbell Slag Dump and Beach Area during three mobilizations. The first round of investigative work was completed on 12 June 2014, the second followed on 19 August 2014, and the third on 20 August 2015. Between the two mobilizations, a total of 37 soil samples and four duplicate soil samples were collected from 27 boring locations. Soil sampling locations are depicted on [Figure 10-1](#). Investigative methodologies and soil sampling techniques were conducted using the procedures outlined in **Section 3**.

Soil sampling locations included 23 surficial soil samples, generally ranging from 0 to 12 inches (in.) in depth depending on the thickness of the soil cover. The investigation also included the collection of 14 subsurface soil samples ranging from 1.5 ft to 12 ft in depth. All samples were analyzed for PCBs. Select samples were also analyzed for other contaminants of concern (COCs) including cyanide, inorganics, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs). The selection of analytical parameters was generally based upon potential environmental impacts associated with mining era operations in the vicinity of the sampling location or field observations.

The surficial and subsurface soil analytical results for the Hubbell Slag Dump and Beach Area contained a variety of inorganic COCs and cyanide at concentrations at or above applicable regulatory criteria. VOCs and SVOCs were also detected in a limited number of samples; however, the COC concentrations were below applicable regulatory criteria. PCBs were not detected in any of the samples collected from the Hubbell Slag Dump and Beach Area.

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

A detailed summary of soil analytical results collected from the Hubbell Slag Dump and Beach area are provided in [Table 10-2](#). X-ray fluorescence (XRF) soil screening results and soil analytical results from the Hubbell Slag Dump and Beach are depicted on [Figure 10-2](#) and [Figure 10-3](#), respectively.

10.1.2.1.3 Groundwater Sampling Results

During the installation of soil borings in the Hubbell Slag Dump and Beach Area, 15 temporary groundwater sampling locations were established to characterize groundwater in the area. The groundwater sampling locations were installed and sampled using the methodologies presented in **Section 3**. The screened interval in each of the sampling locations ranged from 4-9 ft to 12-17 ft with the majority of the wells being screened between 6 ft and 13 ft bgs. One permanent monitoring well, located in the northern limits of the study area in the slag dump was also sampled. A total of 17 groundwater samples, including one duplicate sample were collected from the Hubbell Slag Dump and Beach Area. Permanent and temporary groundwater sampling locations are depicted on [Figure 10-1](#).

All groundwater samples were analyzed for PCBs. Select samples were also analyzed for other COCs including VOCs and SVOCs. Total PCBs, VOCs, and SVOCs were not detected in any of the samples collected from the Hubbell Slag Dump and Beach Area during the SI. A detailed summary of groundwater analytical results collected from the Hubbell Slag Dump and Beach area are provided in [Table 10-3](#). Groundwater analytical results from the Hubbell Slag Dump and Beach are depicted on [Figure 10-4](#). Soil boring logs are included in **Appendix G** of the SI Report.

10.1.2.2 Offshore Investigation

Similar to the terrestrial investigation, the offshore investigation activities conducted during the SI in the Hubbell Slag Dump and Beach Area were also guided by several factors. First, historical analytical data was evaluated to determine if adequate characterization data was available in the study area to assess the overall sediment and surface water quality in the nearshore environment. In addition, underwater surveillance of the area, as described in **Section 3**, was used to locate and assess potential offshore waste deposits. Lastly, field observations, both terrestrial and offshore, were used to position sampling locations. As a result, the offshore investigative work was generally

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

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.

10.1.2.2.1 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 are depicted on [Figure 10-1](#). Investigative methodologies and sediment sampling techniques were conducted using the procedures outlined in [Section 3](#).

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 1 ft to 4.5 ft in depth. All samples were analyzed for PCBs. One sample (CHLL-SD66) was also analyzed for other COCs including cyanide, inorganics, and SVOCs.

The sediment analytical results for the Hubbell Slag Dump and Beach Area contained multiple inorganic COCs at concentrations 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. One previous sample from offshore of the Hubbell Slag Dump did contain Total PCBs in excess of Ecological Screening Levels (ESLs) and Threshold Effect Concentration (TEC).

A detailed summary of sediment analytical results collected from the Hubbell Slag Dump and Beach area are provided in [Table 10-4](#). Sediment analytical results from the Hubbell Slag Dump and Beach are depicted on [Figure 10-5](#). Sediment core logs are included in [Appendix H](#) of the SI Report.

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA****10.1.2.2.2 Surface Water Sampling Results**

Surface water sampling activities were 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. Surface water sampling locations are depicted on [Figure 10-1](#). Investigative methodologies and surface water sampling techniques were conducted using the procedures outlined in **Section 3**. Both samples were analyzed for PCBs. Total PCBs were not detected in either surface water sample.

One previous Semi-permeable Membrane Device (SPMD) sampling location was located in the area. The general purpose of the SPMD 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. PCB congeners were detected in the SPMD sample. 2015 surface water sample CHLL-SW09, which did not contain Total PCBs, was collected proximal to the past SPMD sample location.

Analytical results for the surface water and SPMD sampling locations in the Hubbell Slag Dump and Beach Area are presented in [Table 10-5](#). The SPMD sampling location in the Hubbell Slag Dump and Beach Area is depicted on [Figure 10-5](#).

10.2 NATURE AND EXTENT OF CONTAMINATION

Utilizing the established regulatory criteria presented in **Section 4** for various land use categories and exposure pathways, the laboratory analytical results summarized in the preceding section for the Hubbell Slag Dump and Beach Area were reviewed and compared to the following regulatory criteria as applicable for the sampled environmental media:

- MDEQ Cleanup Criteria Requirements for Response Activity;
- MDEQ – Rule 57 Water Quality Values;
- EPA ESLs; and,
- Sediment Quality Guidelines, TECs and Probable Effect Concentrations (PECs), MacDonald, et al, 2000.

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA****10.2.1 Comprehensive Exposure Assessment**

The comparison was completed to determine which ecological and human exposure pathways, risks, and conditions are relevant in the Hubbell Slag Dump and Beach Area. Although not inclusive of relevant pathways where regulatory criteria were not exceeded, the following exposure pathways were determined to be relevant in the Hubbell Slag Dump and Beach Area:

- Risks due to hazardous substances when considering acute toxic effects, physical hazards, and other hazards not accounted for in the development of generic cleanup regulatory criteria.
- Risks due to hazardous substances in soil as a result of direct contact with soil in both residential and nonresidential settings.
- Risks due to hazardous substances in soil as a result of the inhalation of the substances being emitted as particulates and dispersed in ambient air in both residential and nonresidential settings.
- Risks posed by hazardous substances in soil and the potential for the substances to leach to groundwater that could vent to surface water.
- Risks posed by hazardous substances in soil and the potential for direct contact with these soils in both residential and nonresidential settings.
- Risks posed by hazardous substances in sediments that have the potential to have toxic effects on aquatic biota and/or enter the food chain.

As discussed in **Section 4.2.5**, the MDEQ drinking water/surface water pathway criteria exceedances for metals were excluded from the soil and groundwater evaluation. The rationale for this exclusion is twofold:

- The Project investigation and anticipated response actions are being undertaken pursuant to Part 201 of Michigan's Natural Resources and Environmental Protection Act (NREPA), being Public Act (PA) 451 of 1994, as amended. The concentrations of metals in excess of the MDEQ drinking water/surface water pathway criteria are ubiquitous in the study area and are predominantly the result of the presence of stamp sands. Stamp sands are not defined as a hazardous substance nor are 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; and,
- The study area is part of Operable Unit (OU) 2 for which the EPA Record of Decision (ROD) remedy called for No Action. The EPA's ROD OU 2 includes groundwater, surface water, submerged tailings and sediments in Torch Lake, Portage Lake, the Portage Canal,

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

and other area water bodies. Note that EPA's No Action determination relies on the following to mitigate the effects of stamp sand to the extent practicable:

- The reduction of stamp sand loading to surface water bodies expected as a result of the remedial action taken at OU 1 and OU 3.
- Ongoing natural sedimentation and detoxification.
- Institutional programs and practices controlling potential future exposure to site-affected drinking water which were intended to be administered at the county and state level.
- The long-term monitoring and the five year review process monitoring requirements of the remedy selected for OU 1 and OU 3 under the 1992 ROD.

Note that metals criteria for other relevant pathways, and cyanide and organic contaminants for all pathways were included in the evaluation.

10.2.1.1 Building Materials, Containers, and Wastes

During the targeted inspection activities completed in the Hubbell Slag Dump and Beach Area, ACMs were not identified in samples collected from observed roofing material. The following table provides an aggregate summary of the sample locations with respect to the total number of samples and how they compare to applicable regulatory criteria. The table is based solely on the total number of samples collected from the Hubbell Slag Dump and Beach Area. They list only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion. Bulk asbestos samples were compared to applicable National Emissions Standard for Hazardous Air Pollutants (NESHAP) standards.

Building Materials, Containers, and Wastes Analytical Result Summary	Analytical Summary			National Emissions Standard for Hazardous Air Pollutants			
	Total Number of Samples	Detected Analytes	Total Exceedances	Friable Asbestos Material	Category I Nonfriable ACM	Category II Nonfriable ACM	Asbestos-Containing Waste Materials
Asbestos (Bulk)	3	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				None			

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

10.2.1.2 Soil Exposure Pathway Assessment

Soil analytical results from the Hubbell Slag Dump and Beach Area included COC concentrations in soil that were at or above concentrations that trigger a “Facility” designation as defined in Section 20101(1) (s) of NREPA.

The following tables provide an aggregate summary of the soil sample locations with respect to the total number of samples and how they compare to the applicable MDEQ’s Cleanup Criteria for Response Activity under both Residential and Nonresidential exposure scenarios. The tables are based solely on the total number of samples, inclusive of historical samples, collected from the Hubbell Slag Dump and Beach Area. They list only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion.

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

Soil Analytical Result Summary Table	Cleanup Criteria Requirements for Response Activity – Residential											
	Analytical Summary			Groundwater Protection		Indoor Air	Ambient Air (Y) (C)				Contact	Csat
	Total Number of Samples	Detected Analytes	Total Exceedances	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinite Source Volatile Soil Inhalation Criteria (VSIC)	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels
Inorganics	32	366	16	0	0	0	0	0	0	1	10	0
Cyanide	28	6	6	0	6	0	0	0	0	0	0	0
VOCs	15	1	0	0	0	0	0	0	0	0	0	0
SVOCs	17	18	0	0	0	0	0	0	0	0	0	0
Asbestos	0	0	0	0	0	0	0	0	0	0	0	0
Total PCBs	37	0	0	0	0	0	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more samples				Aluminum, Arsenic, Cyanide, Lead, Manganese								

Soil Analytical Result Summary Table	Cleanup Criteria Requirements for Response Activity – Nonresidential											
	Analytical Summary			Groundwater Protection		Indoor Air	Ambient Air (Y) (C)				Contact	Csat
	Total Number of Samples	Detected Analytes	Total Exceedances	Nonresidential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinite Source Volatile Soil Inhalation Criteria (VSIC)	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels
Inorganics	32	366	6	0	0	0	0	0	0	1	5	0
Cyanide	28	6	6	0	6	0	0	0	0	0	0	0
VOCs	15	1	0	0	0	0	0	0	0	0	0	0
SVOCs	17	18	0	0	0	0	0	0	0	0	0	0
Asbestos	0	0	0	0	0	0	0	0	0	0	0	0
Total PCBs	37	0	0	0	0	0	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				Arsenic, Cyanide, Lead, Manganese								

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA****10.2.1.3 Groundwater Exposure Pathway Assessment**

COCs were not detected in any of the shallow groundwater samples collected from the Hubbell Slag Dump and Beach Area. Similar to the preceding soil tables, the following table provides summary of the aforementioned sample locations with respect to the total number of samples and how they compare to the applicable MDEQ's Cleanup Criteria for Response Activity under both Residential and Nonresidential exposure scenarios.

Groundwater Analytical Result Summary Table	Analytical Summary			Cleanup Criteria Requirements for Response Activity – Residential and Nonresidential						
	Total Number of Samples	Total Number of Detected Analytes	Total Exceedances	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 Levels
Inorganics	0	0	0	0	0	0	0	0	0	0
Cyanide	0	0	0	0	0	0	0	0	0	0
VOCs	1	0	0	0	0	0	0	0	0	0
SVOCs	4	0	0	0	0	0	0	0	0	0
Total PCBs	17	0	0	0	0	0	0	0	0	0
Other – General Chemistry	0	0	0	0	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				None						

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA****10.2.1.4 Sediment 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, Lead, Mercury, Nickel, Silver, Zinc, Total PCBs		

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA****10.2.1.5 Surface Water Exposure Pathway Assessment**

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

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			

10.2.2 Extent of Contamination

The comparison of analytical results to applicable regulatory criteria indicates that potential human health and ecological risks are present in soil and sediment in the Hubbell Slag Dump and Beach Area. Recalling that the goals and objectives of the SI, the following subsections describe the extent of contamination in environmental media in the study area.

10.2.2.1 Soil Extent of Contamination

Soil analytical results exceeded Particulate Soil Inhalation Criteria (PSIC) and Direct Contact Criteria (DCC) in both residential and nonresidential exposure scenarios for inorganic contaminants, and cyanide for Groundwater/Surface Water Interface Protection Criteria (GSIPC). All samples were collected from a zone within 200 ft of the shoreline that has unrestricted access to the public for recreational activities. In addition to chemical hazards, physical hazards including

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

metal and ceramic-like shards were present in the shallow water at the public beach posing a physical hazard.

This area includes the park, public beach, and marina owned and operated by Torch Lake Township as well as a wooded area that separates the aforementioned public access areas from residential properties to the south. Soils with elevated levels of inorganic COCs are ubiquitous in the area, which becomes a limiting factor when evaluating potential exposure pathways. Even so, the potential risks associated with residential and/or public use must remain at the forefront of determinations related to the extent of contamination in the Hubbell Slag Dump and Beach Area.

10.2.2.2 Groundwater Extent of Contamination

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. All groundwater samples were analyzed for PCBs and select samples were also analyzed for VOCs and SVOCs.

10.2.2.3 Sediment Extent of Contamination

Sediment analytical results exceeded ESLs, TECs, and PECs for inorganic contaminants and Total PCBs. All samples were collected from a zone within 350 ft of the shoreline. Elevated COCs, particularly as it relates to the inorganic constituents, were detected in both surficial and deep sediment samples. One of these surficial sediment samples was located approximately 100 ft off of the Hubbell Beach. Total PCBs exceeding applicable regulatory criteria were detected in one surficial sediment sample located within 150 of the shoreline near the slag dump area.

As stated in the preceding subsection, inorganic COCs are prevalent in the area and the related exceedances, although potentially detrimental to aquatic biota, remain a consistent finding in sediment samples collected from Torch Lake. The detection of Total PCBs in one sediment sample; however, presents additional risks both to benthic organisms and human health due to the bioaccumulation of this COC and its potential effect on the food chain.

10.2.2.4 Surface Water Extent of Contamination

Total PCBs and were not detected in any of the surface water samples collected from the Hubbell Slag Dump and Beach Area. Although no surface water samples were analyzed for inorganics, it

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

is presumed that inorganic COCs are present at concentrations that exceed applicable regulatory criteria. This assumption is supported by surface water analytical results from adjacent study areas. The potential risks associated with inorganic constituents, though prevalent in the region, should be considered when evaluating the extent of surface water contamination in the Lake Linden Sands Area.

10.3 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 Hubbell Slag Dump and Beach Area. The following subsections provide a synopsis of these findings and a recommended path forward for mitigating these risks in the Hubbell Slag Dump and Beach Area.

10.3.1 Conclusions

Environmental impacts in the Hubbell Slag Dump and Beach Area are generally characterized by detections of organic and inorganic contaminants in soil and sediment; 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 within the study 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

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

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	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
Potential Receptor															
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.

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA****10.3.2 Recommendations**

The conclusions outlined in the preceding subsection establish that the Hubbell Slag Dump is a Part 201 Facility. 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. Actions have been taken through the implementation of remedial measures, such as the placement of a soil and vegetative cap on the slag dump and municipal dump, to address a portion of these environmental issues.

Based on the results of the SI and 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. 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 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.

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

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.

Analytical results derived from the Hubbell Slag Dump and Beach Area have been provided to 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* (Michigan Department of Community Health [MDCH], September 2014).

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

SECTION 10

**DETAILED FINDINGS REPORT – HUBBELL SLAG DUMP AND BEACH
AREA
TABLES**

DETAILED FINDINGS REPORT**TABLE 10-1 HUBBELL SLAG DUMP AND BEACH AREA****Sample Analytical Summary - Bulk Asbestos
Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site**

Sample Location	Field Sample ID	Sample Date	Asbestos	Note
CHLL-ASBBLK58A	CHLL-ASBBLK58A-070115	7/1/2015	ND	
CHLL-ASBBLK58B	CHLL-ASBBLK58B-070115	7/1/2015	ND	
CHLL-ASBBLK58C	CHLL-ASBBLK58C-070115	7/1/2015	ND	

ND = Not detected

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-2
Sample Analytical Summary - Soil
Hubbell Slag Dump and Beach 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-SB38		CHLL-SB39			CHLL-SB40		CHLL-SB41	
Field Sample ID									CHLL-SB38 6"-12"	CHLL-SB38 1'-4'	CHLL-SB39 6"-12"	CHLL-SB39 1'-4'	CHLL-SB39 1'-4' DUP	CHLL-SB40 6"-12"	CHLL-SB40 1'-4'	CHLL-SB41 6"-12"	CHLL-SB41 1'-4'
Sample Date:									6/12/2014	6/12/2014	6/12/2014	6/12/2014	1406176-12	6/12/2014	6/12/2014	6/12/2014	6/12/2014
Sample Interval (bgs):									0.5 - 1 ft	1 - 4 ft	0.5 - 1 ft	1 - 4 ft	1 - 4 ft	0.5 - 1 ft	1 - 4 ft	0.5 - 1 ft	1 - 4 ft
Sample Description:									SILTY SAND, Fine grained, Brown	SAND, Medium grained, Brown	SAND, Medium to fine grained, Dark brown	SAND, Medium grained, Brown	Field Duplicate	DEBRIS, Landfill waste and SAND	SAND, Medium grained, Brown	SAND, Medium to fine grained, Brown	SAND, Medium to fine grained, Brown to 2 ft; SAND, Medium grained, Brown
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	4800	--	1900	--	--	5300	--	9900	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	0.3	--	<0.3 U	--	--	<0.3 U	--	<0.3 U	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	9.3	--	3.5	--	--	5.0	--	4.5	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	68	--	25	--	--	32	--	21	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	0.6	--	0.2	--	--	0.4	--	0.3	--
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	--
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)	10	--	5.7	--	--	10	--	21	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	4.2	--	1.5	--	--	4.2	--	9.4	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	890	--	300	--	--	530	--	630	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	13000 J	--	5700 J	--	--	11000 J	--	14000 J	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	46	--	14	--	--	26	--	15	--
LITHIUM	7439-93-2	9.8 (B)	9.8 (B)	2,300,000	4,200 (DD)	9.8 (B)	1,000,000	31,000 (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	250	--	76	--	--	180	--	260	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	0.1	--	0.09	--	--	<0.06 U	--	<0.06 U	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	8.9	--	4.3	--	--	9.2	--	21	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	0.4	--	0.2	--	--	0.3	--	0.3	--
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	0.4	--	0.1	--	--	0.4	--	1.0	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	67	--	29	--	--	36	--	43	--
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)	<0.13 U	--	<0.11 U	--	--	--	--	--	--
Organics - PCBs																	
									ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																	
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL (Q)	ID	80,000 (Q)	--	<220 U	--	<240 U	<240 U	--	<220 U	--	<250 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	<220 U	--	<240 U	<240 U	--	<220 U	--	<250 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	<220 U	--	<240 U	<240 U	--	<220 U	--	<250 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	--	<240 U	<240 U	--	<220 U	--	<250 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	<220 U	--	<240 U	<240 U	--	<220 U	--	<250 U
Organics - VOCs (ug/kg)																	
TOLUENE	108-88-3	16,000 (I)	5,400 (I)	2.7E+10 (I)	5E+07 (C,I)	16,000 (I)	1.2E+10 (I)	1.6E+08 (C,I)	--	<61 UJ	--	<69 UJ	<78 UJ	--	70 J	--	<80 UJ

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

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-2
Sample Analytical Summary - Soil
Hubbell Slag Dump and Beach 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-SB42		CHLL-SB43	CHLL-SB44		CHLL-SB45	CHLL-SB46	CHLL-SB47	
Field Sample ID									CHLL-SB 42 6"-12"	CHLL-SB 42 1'-3'	CHLL-SB 43 6-12"	CHLL-SB 44 2"-12"	CHLL-SB 44 2"-12" dup	CHLL-SB 45 0"-8"	CHLL-SB 46 6-12"	CHLL-SB 47 0-6"	CHLL-SB 47 6"-30"
Sample Date:									6/12/2014	6/12/2014	6/12/2014	6/12/2014	1406231-05	6/12/2014	6/12/2014	6/12/2014	6/12/2014
Sample Interval (bgs):									0.5 - 1 ft	1 - 3 ft	0.5 - 1 ft	0.17 - 0.83 ft	0.17 - 0.83 ft	0 - 0.67 ft	0.5 - 1 ft	0 - 0.5 ft	0.5 - 2.5 ft
Sample Description:									SAND, coarse grained, gray	SAND to SILTY SAND, Medium to fine grained, Brown	SAND, Fine to medium grained, Brown	SAND, Fine grained, Yellow	SAND, Fine grained, Yellow	TOPSOIL, Sandy loam	SAND and GRAVEL, Gray to brown	TOPSOIL, Sandy loam	SILTY SAND, Fine grained, Gray
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	10000	--	9500	6400	9300	14000	9200	9700	--
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	3.4	0.4	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	3.4	--	3.8	2.8	3.0	5.8	34	5.2	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	34	--	60	42	56	70	360	72	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	0.4	--	0.4	0.4	0.4	0.5	1.2	0.7	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	<0.2 U	--	0.2	<0.2 U	<0.2 U	0.4	1.7	0.8	--
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)	28	--	39	15	22	43	29	25	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	12	--	10	6.1	8.8	16	7.3	12	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	1100	--	1600	480	670	1700	1600	1300	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	17000	--	16000	10000	13000	24000	52000	15000	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	40	--	66	56	54	160	530	130	--
LITHIUM	7439-93-2	9.8 (B)	9.8 (B)	2,300,000	4,200 (DD)	9.8 (B)	1,000,000	31,000 (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	280	--	270	150	200	410	12000	300	--
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	--	<0.05 U	<0.06 U	<0.06 U	<0.06 U	0.3	<0.06 U	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	20	--	19	13	18	29	18	25	--
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	0.4	4.1	0.3	--
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	0.4	--	0.4	0.3	0.7	0.9	0.9	0.8	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	67	--	66	51	66	230	1300	180	--
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	--	<0.11 U	0.14	<0.13 U	0.71	0.21	<0.12 U	--
Organics - PCBs																	
									ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																	
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL (Q)	ID	80,000 (Q)	--	--	--	220 J	170 J	--	--	--	<240 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	300 J	220 J	--	--	--	250
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	450 J	380 J	--	--	--	450
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	280 J	160 J	--	--	--	<240 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	320 J	270 J	--	--	--	370
Organics - VOCs (ug/kg)																	
TOLUENE	108-88-3	16,000 (I)	5,400 (I)	2.7E+10 (I)	5E+07 (C,I)	16,000 (I)	1.2E+10 (I)	1.6E+08 (C,I)	--	--	--	<72 U	<82 U	--	--	--	<72 U

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

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-2
Sample Analytical Summary - Soil
Hubbell Slag Dump and Beach 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-SB48		CHLL-SB49			CHLL-SB53	CHLL-SB54	CHLL-SB128	CHLL-SB129
Field Sample ID									CHLL-SB 48 0-6"	CHLL-SB 48 6-48"	CHLL-SB 49 0-6"	CHLL-SB 49 1-6'	CHLL-SB 49 1-6' Dup	CHLL-SB53 6"-12"	CHLL-SB54 6"-18"	CHLL-SB128 0-6"	CHLL-SB129 0-6"
Sample Date:									6/12/2014	6/12/2014	6/12/2014	6/12/2014	1406231-14	6/12/2014	6/12/2014	8/19/2014	8/19/2014
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	1 - 6 ft	1 - 6 ft	0.5 - 1 ft	0.5 - 1.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:									FILL, Sand and gravel	SILTY SAND, Fine grained, Brown to 3 ft; GRAVEL to 4 ft	FILL, Sand and gravel	SAND, Coarse to medium grained, With gravel, Reddish brown to Gray	Field Duplicate	FILL, Debris/landfill waste	FILL, Sandy, Debris/landfill waste	SAND, Medium grained, Brown	SAND, Medium grained, Brown
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	9800	--	6900	--	--	4700	3300	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<0.3 U	--	<0.3 U	--	--	1.0	<0.3 U	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	2.4	--	11	--	--	7.5	4.4	1.4	1.2
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	30	--	30	--	--	240	33	24	29
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	0.3	--	0.3	--	--	0.5	0.3	--	--
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	--	--
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)	27	--	13	--	--	13	6.8	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	13	--	6	--	--	4.3	3	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	620	--	3900	--	--	400	440	170	110
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	27000	--	10000	--	--	48000 J	8200 J	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	39	--	11	--	--	2100	27	11	12
LITHIUM	7439-93-2	9.8 (B)	9.8 (B)	2,300,000	4,200 (DD)	9.8 (B)	1,000,000	31,000 (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	270	--	170	--	--	340	120	150	140
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	--	--	0.1	<0.06 U	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	27	--	16	--	--	10	6.9	--	--
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	--	--	0.4	0.3	--	--
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	0.9	--	0.9	--	--	2.1	0.2	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	110	--	30	--	--	250	34	--	--
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	--	<0.11 U	--	--	<0.13 U	--	<0.11 U	<0.11 U
Organics - PCBs																	
									ND	ND	ND	ND	ND	ND	ND	--	--
Organics - SVOCs (ug/kg)																	
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL (Q)	ID	80,000 (Q)	--	<240 U	--	<230 UJ	<240 U	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	<240 U	--	<230 UJ	<240 U	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	240	--	210 J	360	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	<240 U	--	<230 UJ	<240 U	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	<240 U	--	160 J	260	--	--	--	--
Organics - VOCs (ug/kg)																	
TOLUENE	108-88-3	16,000 (I)	5,400 (I)	2.7E+10 (I)	5E+07 (C,I)	16,000 (I)	1.2E+10 (I)	1.6E+08 (C,I)	--	<69 U	--	--	--	--	--	--	--

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

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-2
Sample Analytical Summary - Soil
Hubbell Slag Dump and Beach 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-SB130	CHLL-SB131	CHLL-SB132	CHLL-SB133		CHLL-SB134	CHLL-SB135	CHLL-SB136
Field Sample ID									CHLL-SB-130 6"-12"	CHLL-SB-131 6"-12"	CHLL-SB-132 12"-18"	CHLL-SB-133 6"-12"	CHLL-SB-133 6"-12" DUP	CHLL-SB-134 18-24"	CHLL-SB135 0-6"	CHLL-SB136 0-6"
Sample Date:									8/19/2014	8/19/2014	8/19/2014	8/19/2014	1408238-19	8/19/2014	8/19/2014	8/19/2014
Sample Interval (bgs):									0.5 - 1 ft	0.5 - 1 ft	1 - 1.5 ft	0.5 - 1 ft	0.5 - 1 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:									DEBRIS, Landfill waste .5 ft - .75 ft; SAND, Medium grained, Brown	SAND, Medium grained, Brown	DEBRIS, Landfill waste	SAND, Medium grained, Brown	Field Duplicate	DEBRIS, Landfill waste to 1.5 ft	TOPSOIL, Sandy loam, Organics, Brownish black	TOPSOIL, Sandy loam, Organics, Brownish black
Inorganics - Metals (mg/kg)																
ALUMINIUM	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	0.7	1.4	5.3	<0.5 U	<0.5 U	2.9	7.7	4.1
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	19	45	110	8.0	7.7	74	64	49
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	--	--	--	--	--	--	--	--
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	16	140	390	12	11	270	3700	560
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)	7.1	31	88	1.3	1.0	57	22	60
LITHIUM	7439-93-2	9.8 (B)	9.8 (B)	2,300,000	4,200 (DD)	9.8 (B)	1,000,000	31,000 (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	31	59	120	47	41	150	260	230
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	--	--	--	--	--	--	--	--
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); 0.027	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--	--
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)	<0.12 U	<0.12 U	1.1	<0.11 U	<0.11 U	<0.12 U	0.62	0.2
Organics - PCBs																
									ND	ND	ND	ND	ND	ND	--	--
Organics - SVOCs (ug/kg)																
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL (Q)	ID	80,000 (Q)	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--	--
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 (ug/kg)																
TOLUENE	108-88-3	16,000 (I)	5,400 (I)	2.7E+10 (I)	5E+07 (C,I)	16,000 (I)	1.2E+10 (I)	1.6E+08 (C,I)	--	--	--	--	--	--	--	--

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

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-2
Sample Analytical Summary - Soil
Hubbell Slag Dump and Beach 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-SB162		CHLL-SB163		CHLL-SB164	
Field Sample ID									CHLL - SB - 162 - 6"-12"	CHLL - SB - 162 - 1'-12'	CHLL - SB - 163 - 6"-12"	CHLL - SB - 163 - 1'-12'	CHLL - SB - 164 - 6"-12"	CHLL - SB - 164 - 1'-9'
Sample Date:									8/20/2015	8/20/2015	8/20/2015	8/20/2015	8/20/2015	8/20/2015
Sample Interval (bgs):									0.5 - 1 ft	1 - 12 ft	0.5 - 1 ft	1 - 12 ft	0.5 - 1 ft	1 - 9 ft
Sample Description:									FILL, Concrete to 0.75 ft; SAND, Dark gray, Medium to coarse	FILL, Concrete to 0.75 ft; SAND, Dark gray, Medium to coarse to 12 ft; SAND Reddish brown, Medium to coarse	SAND, Reddish brown, Medium to coarse grained	SAND, Reddish brown, Medium to coarse grained	SAND, Reddish brown, Medium to coarse grained	SAND, Reddish brown, Medium to coarse grained
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	59000	59000	57000	22000	50000	28000
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	8.6	1.5	1.0	1.9	<0.3 U	2.0 J
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	460	140	24 J	85	5.3	48
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	630 J	640 J	490 J	220	350	390
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	<2.0 U	2.2	3.3	2.1	2.1	2.5
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	<2.0 U	<0.2 U	3.9	16	0.2	2.6
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)	720	1200	970	480	580	580
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	17	24	11	7.9	11	13
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	6500	9600	4400	12000	2800	7100
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	90000 J	110000 J	90000 J	53000 J	84000 J	72000 J
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	61	39	86 J	250	120	520
LITHIUM	7439-93-2	9.8 (B)	9.8 (B)	2,300,000	4,200 (DD)	9.8 (B)	1,000,000	31,000 (DD)	17	18	16 J	8.3	15	8.5
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	18000	17000	18000	9300	19000	11000
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	890	980	930	460	780	660
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	18	11	14	29	17	33
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<2.0 U	2.2	<2.0 U	<2.0 U	<2.0 U	<2.0 U
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	1.3	2.4	0.9 J	3.7	1.0	1.5
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	2600	3100	650	790	480	1600
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)	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U
Organics - PCBs														
									ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL (Q)	ID	80,000 (Q)	<200 U	<210 U	<200 U	<210 U	<200 U	<210 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	<200 U	<210 U	<200 U	<210 U	<200 U	<210 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	<200 U	<210 U	<200 U	<210 U	<200 U	<210 U
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	<200 U	<210 U	<200 U	<210 U	<200 U	<210 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	<200 U	<210 U	<200 U	<210 U	<200 U	<210 U
Organics - VOCs (ug/kg)														
TOLUENE	108-88-3	16,000 (I)	5,400 (I)	2.7E+10 (I)	5E+07 (C,I)	16,000 (I)	1.2E+10 (I)	1.6E+08 (C,I)	<52 U	<51 U	<50 U	<55 U	<54 U	<55 U

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

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-2
Sample Analytical Summary - Soil
Hubbell Slag Dump and Beach 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 protection

(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.

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-3
Sample Analytical Summary - Groundwater
Hubbell Slag Dump and Beach
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-GW25	CHLL-GW26	CHLL-GW27	CHLL-GW28	CHLL-GW29	CHLL-GW30	CHLL-GW31	CHLL-GW32	
Field Sample ID									CHLL-GW 25 9'-14'	CHLL-GW 26 9'-14'	CHLL-GW 27 8'-13	CHLL-GW 28 6'-11'	CHLL-GW 29 6'-11'	CHLL-GW 30 4-9'	CHLL-GW 31 8-13'	CHLL-GW 32 8-13'	CHLL-GW 32 8-13' Dup
Sample Date									6/12/2014	6/12/2014	6/12/2014	6/12/2014	6/12/2014	6/12/2014	6/12/2014	6/12/2014	6/12/2014
Sample Interval (bgs)									9 - 14 ft	9 - 14 ft	8 - 13 ft	6 - 11 ft	6 - 11 ft	4 - 9 ft	8 - 13 ft	8 - 13 ft	8 - 13 ft
Sample Description									--	--	--	--	--	--	--	--	Field Duplicate
Organics - PCBs (ug/l)																	
									ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/l)																	
		0.5	0.5	0.2	45	45	44.7	NA	--	ND	ND	--	--	--	--	--	--
Organics - VOCs (ug/l)																	
		0.5	0.5	0.2	45	45	44.7	NA	--	--	--	--	--	--	--	--	--
Field Parameters																	
Conductivity (ms/cm)	NA	NA	NA	NA	NA	NA	NA	NA	0.279	0.301	0.292	0.374	0.426	0.489	0.455	0.9	--
DO (%)	NA	NA	NA	NA	NA	NA	NA	NA	1	2.1	49.1	16.3	75.2	6.2	65	60.4	--
pH	NA	NA	NA	NA	NA	NA	NA	NA	6.4	6.58	6.63	6.98	6.72	7.02	6.93	6.89	--
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	9.4	7.1	9.9	10.2	9.4	8.8	9.8	9.2	--

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

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-3
Sample Analytical Summary - Groundwater
Hubbell Slag Dump and Beach
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-GW33	CHLL-GW34	CHLL-GW59	CHLL-GW60	CHLL-GW61	CHLL-GW62	CHLL-GW63	CHLL-PCI-MW120
Field Sample ID									CHLL-GW 33 12-17'	CHLL-GW 34 10-15'	CHLL-GW-59 6'-11'	CHLL-GW-60 6'-11'	CHLL-GW-61 6'-11'	CHLL-GW-62 6'-11'	CHLL-GW-63 6'-11'	CHLL-PCI MW 120
Sample Date									6/12/2014	6/12/2014	8/19/2014	8/19/2014	8/19/2014	8/19/2014	8/19/2014	6/11/2014
Sample Interval (bgs)									12 - 17 ft	10 - 15 ft	6 - 11 ft	6 - 11 ft	6 - 11 ft	6 - 11 ft	6 - 11 ft	4.7 - 14.7 ft
Sample Description									--	--	--	--	--	--	--	--
Organics - PCBs (ug/l)																
									ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/l)																
		0.5	0.5	0.2	45	45	44.7	NA	--	ND	--	--	--	--	--	ND
Organics - VOCs (ug/l)																
		0.5	0.5	0.2	45	45	44.7	NA	--	ND	--	--	--	--	--	--
Field Parameters																
Conductivity (ms/cm)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	0.381	0.312	0.336	0.202	0.317	0.345
DO (%)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	40.5	16.8	10.2	22.5	3.4	9.30
pH	NA	NA	NA	NA	NA	NA	NA	NA	--	--	6.55	6.61	6.42	6.41	6.52	7.39
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	15.7	15.5	14.8	16.8	16.2	12.5

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

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-3
Sample Analytical Summary - Groundwater
Hubbell Beach and Slag
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

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 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 II

(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.

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-4
Sample Analytical Summary - Sediment
Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD65		CHLL-SD66		CHLL-SD67		CHLL-SD69	
Field Sample ID					CHLL-SD 65-0"-6"	CHLL-SD 65-.75'-1'	CHLL-SD 66-0"-6"	CHLL-SD 66-1'-1.5'	CHLL-SD67-1'-3'	CHLL-SD67-1'-3' DUP	CHLL-SD69-0"-6"	CHLL-SD69-1'-2.5'
Sample Date					6/14/2014	6/14/2014	6/14/2014	6/14/2014	7/8/2014	7/8/2014	7/9/2014	7/9/2014
Sample Interval (bgs)					0 - 0.5 ft	0.75 - 1 ft	0 - 0.5 ft	1 - 1.5 ft	1 - 3 ft	1 - 3 ft	0 - 0.5 ft	1 - 2.5 ft
Sample Description					SILT, Reddish brown	SAND, Silty, Wood debris, Dark brown	SILT, Reddish brown, sandy	SAND, Poorly sorted, Wood debris, Dark brown	SILT, Sandy, Some wood debris, Dark brown; SAND, Poorly sorted, Dark brown to tan	Field Duplicate	SAND, Silty, Medium to fine grained, Dark brown	SAND, Silty, With wood debris, Medium to fine grained, Dark brown
Inorganics - Metals (mg/kg)												
ALUMINUM	7429-90-5	NA	NA	NA	--	--	11000	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	<5.0 U	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	42	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	<0.2 U	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	38	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	14	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	2000	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	23000	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	11	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	290	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	<0.09 U	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	34	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	<2.0 U	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	4.0	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	140	--	--	--	--	--
Inorganics - Cyanide (mg/kg)												
					--	--	ND	--	--	--	--	--
Organics - PCBs (ug/kg)												
AROCLOR-1254	11097-69-1	NA	NA	NA	<210 U	<200 U	<170 U	<220 U	<270 U	<280 U	<390 U	<340 U
TOTAL PCBs	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)												
					--	--	ND	--	--	--	--	--

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

TABLE 10-4
Sample Analytical Summary - Sediment
Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

Station Name	CAS Number	EPA Region 5 Ecological Screening Level	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD70			CHLL-SD97			CHLL-SD98		
Field Sample ID					CHLL-SD 70-0-6"	CHLL-SD 70-1'-3'	CHLL-SD 70-3'-4.5'	CHLL-SD-97-0-6"	CHLL-SD-97-1-3'	CHLL-SD-97-3-5'	CHLL - SD - 98 - 0"-6"	CHLL - SD - 98 - 1'-3.25'	CHLL - SD - 98 - 1'-3.25' DUP
Sample Date					6/14/2014	6/14/2014	6/14/2014	6/2/2015	6/2/2015	6/2/2015	7/8/2015	7/8/2015	7/8/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 4.5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3.25 ft	1 - 3.25 ft
Sample Description					SAND, dark brown	SAND, Medium to fine grained, Reddish brown; SILT, clayey, Reddish brown	SAND, Poorly sorted, Reddish brown; SILT, clayey, Reddish brown	SILT, Dark Brown	SILT, Reddish brown, Clayey	SILT, Reddish brown, Clayey	SAND, Dark brown to purple-brown; loose; wet; fine sand.	SAND, Dark brown to purple-brown; loose; wet; fine sand.	Field Duplicate
Inorganics - Metals (mg/kg)													
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)													
					--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)													
AROCLOR-1254	11097-69-1	NA	NA	NA	<250 U	<140 U	<140 U	<640 U	<420 U	<390 U	<260 U	<260 U	<250 U
TOTAL PCBs	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)													
					--	--	--	--	--	--	--	--	--

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

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-4
Sample Analytical Summary - Sediment
Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL07-05			TL07-11			TL07-18	TL07-19	
Field Sample ID					TL07-05 0-6	TL07-05 0-6 D	TL07-05 6-22	TL07-11 0-6	TL07-11 6-36	TL07-11 36-72	TL07-18	TL07-19	TL07-19D
Sample Date					8/7/2007	8/7/2007	8/7/2007	8/8/2007	8/8/2007	8/8/2007	8/9/2007	8/9/2007	8/9/2007
Sample Interval (bgs)					0 - 6 in	0 - 6 in	6 - 22 in	0 - 6 in	6 - 36 in	36 - 72 in	0 - 2 in	0 - 2 in	0 - 2 in
Sample Description					--	--	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)													
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	19	22	18	20	16	3.6	32	38	40
BARIUM	7440-39-3	NA	NA	NA	200	190	340	110	83	180	82	160	160
CADMIUM	7440-43-9	0.99	0.99	4.98	1.2	1.1	<0.2 U	0.34	0.21	<0.2 U	11	1.0	1.0
CHROMIUM	7440-47-3	43.4	43.4	111	220	200	500	180	130	180	77	61	60
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	3800	3300	3400	2800	1800	2400	2500	2200	2400
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	190	180	33	85	31	12	520	180	190
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	0.37	1.2	0.11	0.14	0.22	0.3	0.23	0.39	0.45
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	0.6	0.42	<0.2 U	0.2	<0.2 U	<0.2 U	<0.2 U	0.82	0.89
SILVER	7440-22-4	0.5	NA	NA	3.1	3.4	5.6	2.2	6.1	2.4	2.5	3.9	4.0
ZINC	7440-66-6	121	121	459	340	330	260	400	260	180	430	270	290
Inorganics - Cyanide (mg/kg)													
					--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)													
AROCLOR-1254	11097-69-1	NA	NA	NA	230	290	<170 U	<220 U	<200 U	<170 U	<290 U	<520 U	<500 U
TOTAL PCBs	TPCB	59.8	59.8	676	230	290	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)													
					--	--	--	--	--	--	--	--	--

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

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-4
Sample Analytical Summary - Sediment
Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL07-20	TL08-073
Field Sample ID					TL07-20	TL08-073
Sample Date					8/9/2007	8/28/2008
Sample Interval (bgs)					0 - 2 in	0 - 0 ft
Sample Description					--	--
Inorganics - Metals (mg/kg)						
ALUMINUM	7429-90-5	NA	NA	NA	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	39	--
BARIUM	7440-39-3	NA	NA	NA	170	--
CADMIUM	7440-43-9	0.99	0.99	4.98	1.1	--
CHROMIUM	7440-47-3	43.4	43.4	111	110	--
COBALT	7440-48-4	50	NA	NA	--	--
COPPER	7440-50-8	31.6	31.6	149	2300	--
IRON	7439-89-6	NA	NA	NA	--	--
LEAD	7439-92-1	35.8	35.8	128	160	--
MANGANESE	7439-96-5	NA	NA	NA	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	0.5	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--
SELENIUM	7782-49-2	NA	NA	NA	0.81	--
SILVER	7440-22-4	0.5	NA	NA	4.7	--
ZINC	7440-66-6	121	121	459	260	--
Inorganics - Cyanide (mg/kg)						
					--	--
Organics - PCBs (ug/kg)						
AROCLOR-1254	11097-69-1	NA	NA	NA	<510 U	--
TOTAL PCBs	TPCB	59.8	59.8	676	ND	ND
Organics - SVOCs (ug/kg)						
					--	--

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

DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-4
Sample Analytical Summary - Sediment
Hubbell Slag Dump and Beach 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 group 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 <i>et al.</i> 2000
PECs from MacDonald <i>et al.</i> 2000

- = Not analyzed/Not Reported
- bgs = Below ground surface
- ESL = Ecological Screening Level
- ft = Feet
- in = Inches
- mg/kg = Milligrams per kilogram.
- PCBs = Polychlorinated 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.

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA****TABLE 10-5****Sample Analytical Summary - Surface Water and SPMD
Hubbell Slag Dump and Beach 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-SW08	CHLL-SW09	SPMD Site #4
Field Sample ID						CHLL-SW08-6.5-7.5'	CHLL - SW - 09 - 4.25-5.25'	SPMD Site #4
Sample Date						6/2/2015	7/8/2015	11/18/2005
Sample Interval (bgs)						6.5 - 7.5 ft	4.25 - 5.25 ft	3 - 3 ft
Organics - PCBs (ug/l)								
PCB 017	PCB 017	NA	NA	NA	NA	--	--	1.2
PCB 018	PCB 018	NA	NA	NA	NA	--	--	1.6
PCB 022	PCB 022	NA	NA	NA	NA	--	--	1.0
PCB 028	PCB 028	NA	NA	NA	NA	--	--	4.4
PCB 031	PCB 031	NA	NA	NA	NA	--	--	3.2
PCB 037-042	PCB 037-042	NA	NA	NA	NA	--	--	3.9
PCB 044	PCB 044	NA	NA	NA	NA	--	--	5.9
PCB 047	PCB 047	NA	NA	NA	NA	--	--	1.2
PCB 049	PCB 049	NA	NA	NA	NA	--	--	13.2
PCB 052	PCB 052	NA	NA	NA	NA	--	--	13.5
PCB 056-060	PCB 056-060	NA	NA	NA	NA	--	--	2.4
PCB 064	PCB 064	NA	NA	NA	NA	--	--	3.0
PCB 066-095	PCB 066-095	NA	NA	NA	NA	--	--	12
PCB 070	PCB 070	NA	NA	NA	NA	--	--	6.3
PCB 071	PCB 071	NA	NA	NA	NA	--	--	1.0
PCB 074	PCB 074	NA	NA	NA	NA	--	--	1.9
PCB 077a-110	PCB 077a-110	NA	NA	NA	NA	--	--	17.5
PCB 082	PCB 082	NA	NA	NA	NA	--	--	0.7
PCB 084	PCB 084	NA	NA	NA	NA	--	--	2.6
PCB 087	PCB 087	NA	NA	NA	NA	--	--	4.2
PCB 090-101	PCB 090-101	NA	NA	NA	NA	--	--	9.7
PCB 091	PCB 091	NA	NA	NA	NA	--	--	1.4
PCB 092	PCB 092	NA	NA	NA	NA	--	--	2.2
PCB 097	PCB 097	NA	NA	NA	NA	--	--	2.7
PCB 099	PCB 099	NA	NA	NA	NA	--	--	4.3
PCB 105a	PCB 105a	NA	NA	NA	NA	--	--	2.2
PCB 118a	PCB 118a	NA	NA	NA	NA	--	--	5.8
PCB 128	PCB 128	NA	NA	NA	NA	--	--	0.9
PCB 132	PCB 132	NA	NA	NA	NA	--	--	1.5
PCB 135-144	PCB 135-144	NA	NA	NA	NA	--	--	0.9
PCB 138a-163	PCB 138a-163	NA	NA	NA	NA	--	--	5.1
PCB 141	PCB 141	NA	NA	NA	NA	--	--	0.8
PCB 146	PCB 146	NA	NA	NA	NA	--	--	0.6
PCB 149	PCB 149	NA	NA	NA	NA	--	--	1.3
PCB 151	PCB 151	NA	NA	NA	NA	--	--	1.5
PCB 153	PCB 153	NA	NA	NA	NA	--	--	4.1
PCB 158a	PCB 158a	NA	NA	NA	NA	--	--	1
PCB 170	PCB 170	NA	NA	NA	NA	--	--	0.4
PCB 174	PCB 174	NA	NA	NA	NA	--	--	1.3
PCB 179	PCB 179	NA	NA	NA	NA	--	--	0.4
PCB 180	PCB 180	NA	NA	NA	NA	--	--	1.1
PCB 182-187	PCB 182-187	NA	NA	NA	NA	--	--	0.9
TOTAL PCBs	TPCB	0.00012	0.000026	NLS	0.00012	ND	ND	150
Field Parameters								
Conductivity (mS/cm)		NA	NA	NA	NA	--	0.3	--
DO (%)		NA	NA	NA	NA	--	7.19	--
pH		NA	NA	NA	NA	--	8.41	--
Temperature (°C)		NA	NA	NA	NA	--	21.8	--
Turbidity (NTU)		NA	NA	NA	NA	--	4.3	--

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

DETAILED FINDINGS REPORT

HUBBELL SLAG DUMP AND BEACH AREA

TABLE 10-5

Sample Analytical Summary - Surface Water and SPMD

Hubbell Slag Dump and Beach Area

Abandoned Mining Wastes - Torch Lake Non-Superfund Site

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 group 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

DO = Dissolved Oxygen

EPA = United States Environmental Protection Agency

ESL = Ecological Screening Level

mS/cm = MilliSiemens per centimeter

ft = feet

HCV = Human Non-Cancer Value

HNV = Human Cancer Value

MDEQ = Michigan Department of Environmental Quality

NTU = Nephelometric Turbidity Unit

PCBs = Polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

SPMD = Semi-permeable membrane device

ug/l = Micrograms per liter

WV = Wildlife Value

°C = Degrees Celsius

% = Percent

Criteria Footnotes:

NA = a criterion or value is not available

NLS = no literature search has been conducted

Laboratory Footnotes:

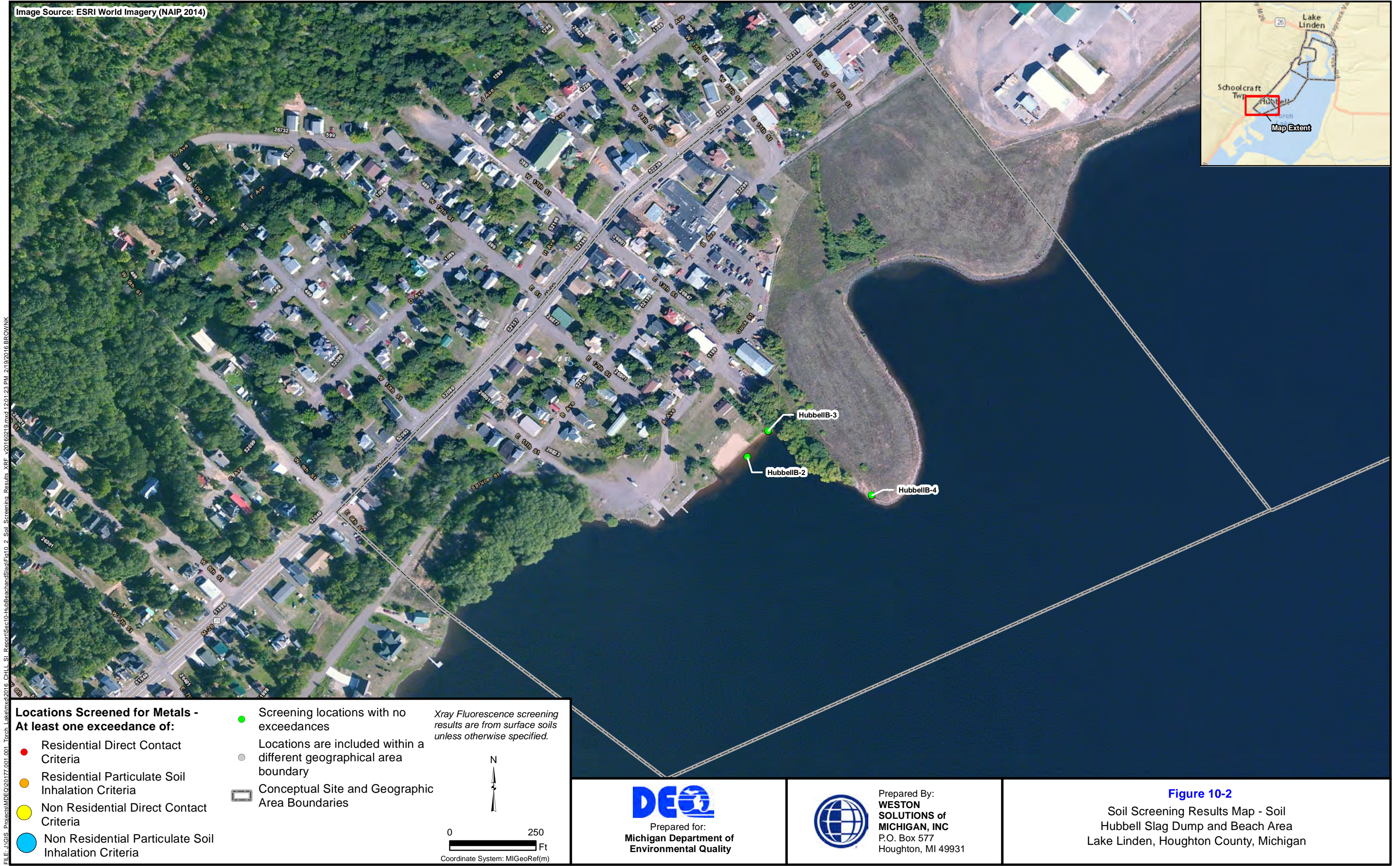
ND = not detected

**DETAILED FINDINGS REPORT
HUBBELL SLAG DUMP AND BEACH AREA**

SECTION 10

**DETAILED FINDINGS REPORT – HUBBELL SLAG DUMP AND BEACH
AREA
FIGURES**





FILE:GIS\Projects\MDQ\2017\001_001_Torch_Lake.mxd 2016 CHLL SL Report\Sect10-HubBeachandSlag\Fig10-2_Soil_Screening_Results_XRF_v20160219.mxd 12:01:23 PM 2/19/2016 BROWNK

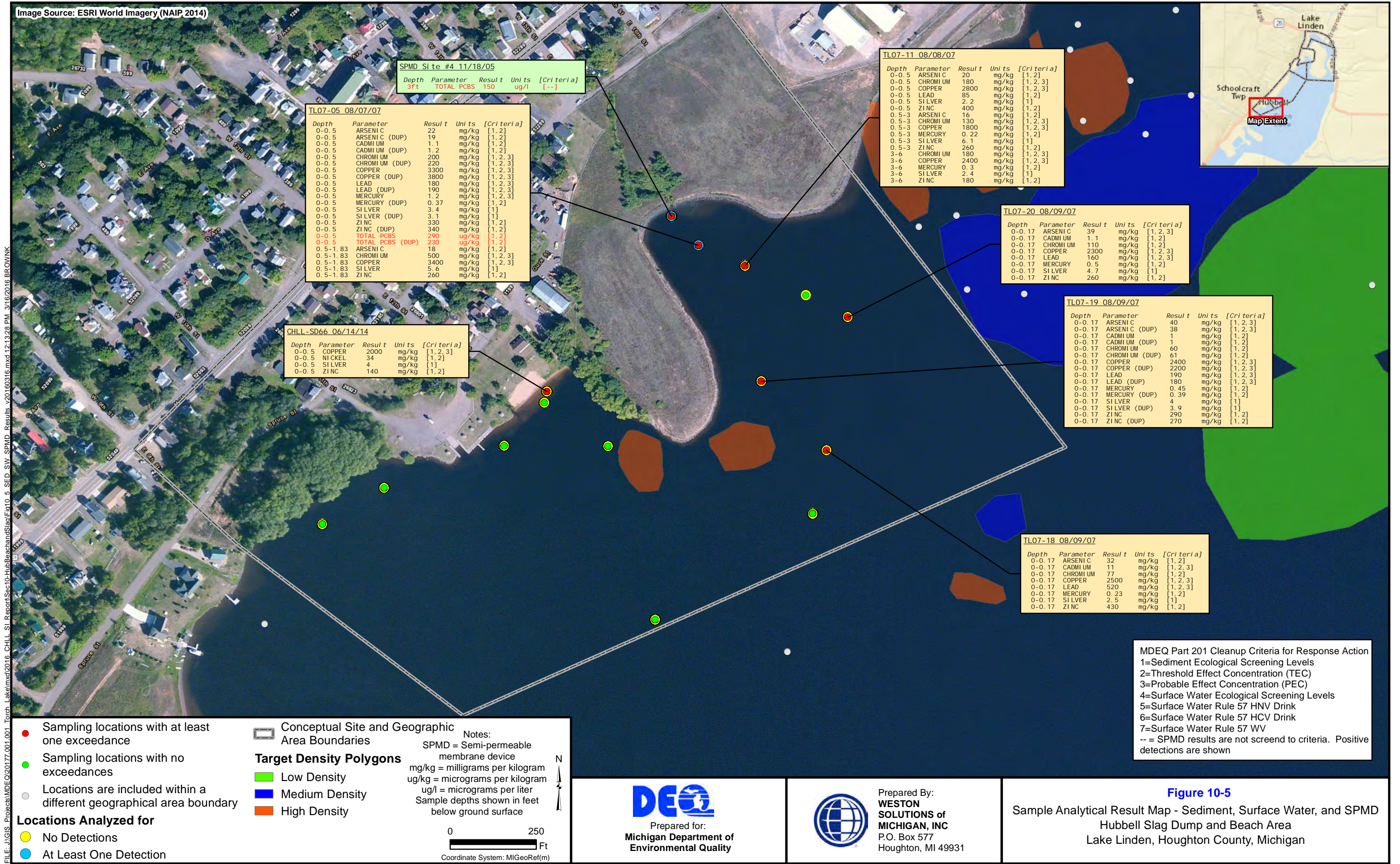


Image Source: ESRI World Imagery (NAIP 2014)



FILE:JGIS Projects\MDEQ\2017\001.001_Torch_Lake.mxd 2016 CHLL SI Report\Sec10-HubBeachandSlag\Fig10_4_GW_Results_v20160219.mxd 3:03:06 PM 2/19/2016 BROWNK





**DETAILED FINDINGS REPORT
TORCH LAKE**

11. DETAILED FINDINGS REPORT – TORCH LAKE

This Section summarizes the findings derived from implementation of the offshore sampling components of the sampling and analysis plan (SAP) and SAP addendum in the Calumet and Hecla (C&H) Lake Linden Operations Area (CHLL). Although critical to the understanding of contaminant migration within Torch Lake, the terrestrial portion of the investigation is emphasized in the preceding detailed findings reports for each study area. This Section provides a comprehensive assessment of Torch Lake using analytical results derived from the Site Investigation (SI) as well as historical investigations, most of which encompass all of Torch Lake versus the geographic area evaluated in the SI. The narrative follows the offshore investigative approach outlined in **Section 3**, while providing specific details about the potential human health and ecological risks associated with mining era operations as they relate to Torch Lake as a whole.

11.1 OFFSHORE INVESTIGATION RESULTS

The SI at CHLL was developed based on a variety of data and information as outlined in **Section 3**. The offshore investigation activities were guided by several factors. First, historical analytical data was evaluated to determine if adequate characterization data was available in each study area to assess the overall sediment and surface water quality in Torch Lake.

Historical and SI sediment and surface water sampling locations are presented on **Figure 11-1**. Fish tissue and semi-permeable membrane device (SPMD) sample locations collected from Torch Lake and connecting waters to Lake Superior are presented on **Figure 11-2**, along with the location of samples analyzed for polychlorinated biphenyl (PCB) congeners part of the SI.

In addition to historical analytical results, underwater surveillance of the area, as described in **Section 3**, was used to locate and assess potential offshore waste deposits. Lastly, field observations, both terrestrial and offshore, were used to position sampling locations. Sediment and surface water sampling completed as part of the SI was conducted in accordance with the sampling methods described in **Section 3**.