SUPPLEMENTAL SITE INVESTIGATION REPORT

ABANDONED MINING WASTES – TORCH LAKE NON-SUPERFUND SITE
CALUMET AND HECLA LAKE LINDEN OPERATIONS AREA
HOUGHTON COUNTY, MICHIGAN
SITE ID# 31000098

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PREPARED FOR:

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION
CALUMET FIELD OFFICE

EXECUTIVE SUMMARY

The Mannik & Smith Group, Inc. (MSG) has prepared this Supplemental Site Investigation (SSI) Report as part of the Abandoned Mining Wastes – Torch Lake non-Superfund Site (Project) DEQ Abandoned Mining Waste (Site ID: 31000098). ***Figure 1-1, Project Location Map*** depicts the Project Location. This SSI references previous studies and summarizes 2017 Michigan Department of Environmental Quality (DEQ) investigations completed in the Calumet and Hecla Lake Linden Operations Area (CHLL), Houghton County, Michigan. ***Figure 1-2, C & H Lake Linden Operations Study Area Map*** depicts the CHLL study area.

The SSI was prepared in accordance with the *Indefinite Scope Indefinite Delivery (ISID) Discretionary Proposal for FS and Remedial Action Activities* (24 February 2016) prepared by MSG in response to a request from the DEQ, Remediation and Redevelopment Division (RRD), Calumet Field Office under MSG's 2015 Environmental Services ISID Contract Number 00538 with the State of Michigan.

Assimilation of information from multiple data sources and DEQ Project studies completed in 2014 and 2015 were documented in the *Site Investigation Report for Abandoned Mining Wastes Torch Lake Non-Superfund Site Calumet and Hecla – Lake Linden Operations, Houghton, County, Michigan Site Identification No. 31000098* (March 2016) that is available at CHLL SI Report. Due to the sizeable nature of the CHLL, the March 2016 Site Investigation (SI) Report was arranged to present organizational and procedural steps that were common to the investigation in the first four sections of the document. Following these discussions that were broadly applicable to the Project as a whole, the SI Report transitioned to a presentation of "Detailed Findings Reports" specific to upland and in lake study areas within the CHLL. The SI Report then closed with a comprehensive summary of conclusions and recommendations.

This SSI Report summarizes the results of DEQ's 2017 SSI activities. Sections of the 2016 SI Report that have not been updated as a result of 2017 activities are not included in this SSI Report. Section 3 provides tabular summaries of the samples collected during the 2017 investigative activities, including their descriptions, requested analyses, and other relevant information as supplements to the tables in the 2016 SI Report. The 2017 activities were conducted to further define the nature and extent of contamination within the Lake Linden Recreation Area (LLRA) and Hubbell Processing Area (HPA) portions of the CHLL study area, which were Section 7 and Section 9, respectively, in the 2016 SI Report and are again presented as Section 7 and Section 9 in this SSI Report. DEQ 2017 supplemental investigation activities that were conducted in the Hubbell Slag Dump and Beach Area, which was Section 10 of the 2016 SI Report, have been included in the discussion for the HPA in Section 9. This organization was selected in order to present the 2017 off-shore sediment evaluation results in a cohesive manner since the areas are adjacent to one another.

In 2017, supplemental investigation activities included surveying the bathymetry of Torch Lake within the LLRA and sediment sampling to aid in identifying polychlorinated biphenyls (PCB), arsenic, and lead contamination in nearshore sediments. Activities at the HPA in 2017:

- Evaluated risks and aided in characterizing the waste piles at the Mineral Building property;
- Sampled suspect asbestos containing material (SACM) and identified numerous asbestos containing materials (ACMs) on the Mineral Building property and the adjacent M-26 right of way (ROW);
- Characterized submerged drum contents; and,
- Further identified the presence of PCB-affected sediments.

Also in 2017, based on the investigation results to date, DEQ referred three portions of the Project area to the U.S. Environmental Protection Agency (EPA) Emergency Response Branch (ERB) which has evaluated the information and is working with potentially responsible parties and other agencies to further evaluate risks and develop potential remedial approaches. For further information, refer to the EPA LLRA web page EPA LLRA and the Calumet and Hecla (C&H) Mineral Building web page EPA C&H Mineral Building.

As noted in the 2016 SI Report and supported by the 2017 assessment results, environmental impacts in the CHLL are generally characterized by detections of organic and inorganic contaminants in soil, groundwater, sediment, and surface water; repercussions of mining era operations in the region. Although specific sources of these contaminants may not be fully understood, historical research related to the operations, closing, and eventual abandonment/scrapping of mining company operations provided substantive evidence for assessing specific operational areas and selecting target analytes anticipated to be present in environmental media throughout the area.

The following provides a summary of 2017 findings derived from the assessment of the LLRA and HPA with respect to the goals and objectives for the Project:

- A total of 15 sediment samples plus two duplicate sediment samples were collected from five sampling locations in the LLRA and analyzed for PCBs, arsenic, and lead. Sediment analytical results for the 2017 samples exceeded Ecological Screening Levels (ESLs), Threshold Effect Concentrations (TECs), and Probable Effect Concentrations (PECs) for inorganic contaminants. In addition, analytical results for PCBs also exceeded the ESL, TEC, and PEC in two surficial sampling locations and the ESL and TEC in one deeper sample from 1 to 3-ft below the sediment surface. Total PCBs were detected in surficial sediment samples and deep sediment samples collected from the LLRA up to a concentration of 8.9 parts per million (ppm).

- The 2017 sampling results in the LLRA aided in identifying the presence of historic waste deposition but did not, in themselves, fully delineate the limits of impact. 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 throughout Torch Lake.

- Concentrations of arsenic and lead in shallow water nearshore sediment samples in the LLRA also exceeded DEQ direct contact criteria and for lead potentially hazardous toxicity values similar to the sediments removed by the EPA ERB in 2007. Direct contact criteria is considered relevant in the nearshore area since there is potential exposure to human receptors that utilize the Lake Linden Recreation Area through direct contact with the contaminated sediments, particularly in areas where swimming or wading may occur, including contact with submerged sediment.

- Based on the investigation results, DEQ referred the sediment impacts in the LLRA to the EPA ERB. EPA ERB evaluated the information provided by DEQ and is working with Honeywell Specialty Materials, Inc. (Honeywell), corporate successor to C&H, and other agencies to further evaluate risks and develop remedial approaches. A Time Critical Removal Action is planned for 2019 to address near-shore sediments followed by post-removal monitoring activities. Sediments further offshore may be addressed at a later date. For further information, refer to the EPA LLRA web page EPA LLRA.

- Assessment activities on the Mineral Building property of the HPA identified, labeled, and mapped 36 visually distinct waste piles plus the stack debris pile which were then categorized as being mining era waste and debris, construction and demolition debris, road work materials, or woody debris. A depositional history of the piles was also developed based on aerial photography review. As part of the site inspection, it was noted that SACM had continued to blow and fall off of the Mineral Building and pieces of SACM were present across the property and in the M-26 ROW despite removal events in 2016 which had picked up and disposed of visible ACM and SACM.

- The waste piles located on the Mineral Building property are spread over an area of approximately five acres, extending to approximately 150 feet (ft) from the shoreline of Torch Lake. The waste pile samples collected in 2017 contained arsenic and lead, with nearly all of the waste pile samples exceeding residential and non-residential Direct Contact Criteria (DCC) for arsenic and 13 of 19 samples exceeding residential and non-residential DCC for lead. Total PCBs were detected in eight of the waste pile samples with three of the samples

exceeding residential and non-residential DCC. Toxicity characteristic leaching procedure (TCLP) lead analysis results for seven waste pile samples exceeded the hazardous waste toxicity value, with three of the samples being within 150 to 200 ft of Torch Lake. Beyond the potential human health exposure risk, these wastes could be contributing appreciably to groundwater and/or surface water impacts. One sample from waste pile WP-48 located 150 ft from Torch Lake had a total lead analysis result that was 13 times the Groundwater/Surface Water Interface Protection Criteria (GSIPC) and a TCLP lead analysis result of 800 milligrams per liter (mg/L), which is 160 times the hazardous waste characteristic limit.

- Based on the investigation results, DEQ referred the waste pile and ACM concerns on the Mineral Building property to the EPA. As part of EPA's evaluation in the *Removal Assessment Report for C&H Mineral Building – RS Site* (TetraTech, Inc. 2018), which included additional sampling on the Mineral Building property, additional criteria were considered (by EPA) including EPA removal management levels (RMLs) and National Emission Standards for Hazardous Air Pollutants (NESHAP) limits, and DEQ Particulate Soil Inhalation Criteria (PSIC). EPA concluded in the report that "The damaged and friable ACBM and ACBM with the potential to become friable pose a potential risk to human health related to the inhalation pathway. ACBM, including roofing materials that have been and will continue to fall and blow off of the Mineral Building roof onto the Site property, bordering properties, and the adjacent Michigan Department of Transportation (MDOT) Highway M-26 ROW increase the potential for human exposure to asbestos. TCLP testing identified wastes likely to leach concentrations of lead that may be harmful to human health or the environment as well. There is also potential exposure of ecological receptors to Site contamination as the potential for wind and water erosion, and deposition of contaminated soils and wastes into the environment, including the adjacent Torch Lake. There is potential exposure of Site contamination to human receptors through inhalation of and direct contact with the contaminated media including RPM, soil, waste, stack debris, ACBM, and potential abandoned containers. Physical hazards associated with the unsecured Mineral Building, and waste pile and stack debris are present at the Site. The close proximity of the MDOT ROW, residences and an operating industrial facility, and potential for trespassers greatly increases the likelihood of human health and environmental impacts." EPA is working with Honeywell and the property owner to further evaluate risks and develop and implement remedial approaches. For further information, refer to the EPA C&H Mineral Building web page EPA C&H Mineral Building.

- Analytical results for various building materials, including but not limited to asphaltic roofing material, felt mastic, TSI, gasket material, and drywall indicated that ACM is present in the HPA on the Mineral Building property and adjacent M-26 ROW. These materials are widely distributed across the property and are subject to migration via wind and water erosion, as well as potential anthropogenic activities such as mowing in the M-26 ROW. Asbestos concentrations in 10 different materials on the Mineral Building property exceeded 1% and in nine out of 10 roofing material samples collected from the M-26 ROW. The damaged and friable nature of these materials poses a potential risk to human health as it relates to the inhalation pathway. Also, although soil samples were not analyzed for asbestos in 2017, and prior soil samples did not contain detectable concentrations of asbestos, the uncontrolled dispersion and exposed nature of these materials makes them subject to further degradation that could potentially impact surface soils in the HPA.

- The sampled submerged drum contents in the HPA contained multiple metals at concentrations that exceeded ESLs, TECs, and PECs. Thirteen of the 14 samples, collected from 12 different drums, contained PCBs at concentrations that exceeded the ESL, TEC, and PEC while the final sample exceeded the ESL and TEC. Total PCBs were detected up to a concentration of 17.4 ppm. The cloth sample contained multiple polynuclear aromatic hydrocarbons (PNAs) exceeding ESLs, TECs, and PECs as did drum content sample CHLL-SDM04. These 12 drums which were sampled near known PCB-contaminated sediments are a portion of the reported hundreds of submerged abandoned containers in the HPA. The submerged drums are generally located off-shore of the former Smelter property.

- Thirteen sediment samples (including duplicates) were collected from five sampling locations to aid in identifying the limits of PCB impacts in sediments offshore from the Hubbell Slag Dump. Sediment sample CHLL-SD114 from 0 to 10-inches in depth was the only sample to contain detectable concentrations of PCBs, but at 74 ppm total PCBs, it was the highest PCB detection in sediments to date in Torch Lake. The total PCB concentration at this location exceeded the ESL, TEC, and PEC, and helped in the presence of PCBs in sediments offshore from the Hubbell Slag Dump. The remaining borings aided in identifying other areas of affected sediments offshore from the HPA.

- The detection of PCBs above applicable regulatory criteria in numerous sediment samples over various depths presents a significant exposure risk particularly as it relates to ecological receptors. The presence of Total PCBs in sediment present additional risks both to benthic organisms and potentially human health due to their proximity to the shoreline, their potential effect on the food chain through bioaccumulation and biomagnification pathways, and ultimately humans through fish ingestion.

- Investigative activities associated with this project, along with prior DEQ and EPA multi-media sampling, have identified two distinct groupings of PCB contamination in Torch Lake sediments. The first grouping is located in the LLRA while the second grouping is located in the HPA. These source areas, as confirmed by the results of the historical semi-permeable membrane device (SPMD) and fish tissue studies, are ongoing sources of PCBs that pose both ecological and potential human health risks and continued degradation of the benthos in Torch Lake. These risks led DEQ in 2017 to refer the submerged drums and sediment impacts in the HPA and the sediment impacts in the LLRA to the EPA. Currently EPA is working with Honeywell through the Great Lakes National Program Office (GLNPO) to further evaluate risks and develop and implement remedial approaches for the offshore sediments in the LLRA and the in-lake sediments and submerged drums in the HPA.

The analytical results and interpretation document potential human health and ecological risks that are present in the LLRA and HPA. With DEQ's referral of the sediment impacts in the LLRA and the waste pile and ACM concerns on the Mineral Building property of the HPA to the EPA ERB, and EPA GLNPO's involvement with the offshore sediments in the LLRA and in-lake sediments and submerged drums in the HPA, the next phase of the path forward for mitigating the identified risks has been enacted. Specific next Project steps for DEQ include:

- DEQ should continue to coordinate with EPA ERB and GLNPO on the EPA assessment and removal/remediation activities as well as continue assessment and delineation of affected areas as may be needed to support risk assessment and removal/remediation planning and implementation. 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.

- Once property-specific exposure risks have been evaluated, remedial objectives can be established with appropriate land use restrictions that minimize or eliminate potential exposure risks. These land-use restrictions, or administrative controls, should be employed to ensure that exposures not addressed through removal actions are reliably restricted by a restrictive covenant, institutional control, or other mechanism allowed for under Part 201.

- DEQ should continue to provide new study data to the RRD SFS which is responsible for monitoring EPA's remedy for the Torch Lake Superfund Site. RRD SFS should evaluate whether any remedy modifications are necessary in Torch Lake or terrestrial areas previously addressed by EPA in light of the additional information provided by the Project.

- DEQ should request that responsible stakeholders confirm 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.

- DEQ should continue to include new study data and reports on the Abandoned Mining Wastes project website https://www.michigan.gov/egle/0,9429,7-135-3311_4109_9846_76560---,00.html in order to provide transparency and easy public access to data and reports.

- Additionally, DEQ should continue to provide new study data to governmental stakeholders responsible for implementation and monitoring EPA's remedy for the terrestrial and in-lake portion of the Torch Lake Superfund Site. This also includes continuing to provide new study data to property owners and governmental stakeholders responsible for assessing potential public health impacts and making recommendations to the public, property owners, and other state agencies.

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APPENDICES

1. INTRODUCTION

The Mannik & Smith Group, Inc. (MSG) has prepared this Supplemental Site Investigation (SSI) Report as part of the Abandoned Mining Wastes – Torch Lake non-Superfund Site (Project) DEQ Abandoned Mining Waste (Site ID: 31000098). ***Figure 1-1, Project Location Map*** depicts the Project Location. This SSI references previous studies and summarizes 2017 Michigan Department of Environmental Quality (DEQ) investigations completed in the Calumet and Hecla Lake Linden Operations Area (CHLL), Houghton County, Michigan. ***Figure 1-2, C & H Lake Linden Operations Study Area Map*** depicts the CHLL study area.

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Also in 2017, based on the investigation results to date, DEQ referred three portions of the Project area to the U.S. Environmental Protection Agency (EPA) Emergency Response Branch (ERB) which has evaluated the information and is working with potentially responsible parties and other agencies to further evaluate risks and develop potential remedial approaches. For further information, refer to the EPA LLRA web page EPA LLRA and the Calumet and Hecla (C&H) Mineral Building web page EPA C&H Mineral Building.

3. FIELD PROCEDURES AND SAMPLE COLLECTION

Refer to Section 3 of the 2016 SI Report for a discussion of the field procedures and sample collection activities that were implemented in a phased approach to evaluate the presence of contaminated environmental media. A summary of the sediment samples collected during the 2017 investigative activities in the LLRA, including their descriptions, requested analyses, and other relevant information is included on ***Table 3-3****, Supplemental SI Sampling and Analysis Summary – Lake Linden Recreation Area*. For the HPA, ***Table 3-4a****, Supplemental SI Sampling and Analysis Summary – Hubbell Processing Area – Submerged Drum Contents and Sediments* provides a summary of the submerged drum contents and sediment samples collected during 2017 while ***Table 3-4b****, Supplemental SI Sampling and Analysis Summary – Hubbell Processing Area - Mineral Building Property* lists waste pile and suspect asbestos containing material (SACM) samples collected from the Mineral Building property and adjacent M-26 Right of Way (ROW).

7. DETAILED FINDINGS REPORT – LAKE LINDEN RECREATION AREA

This Section summarizes the findings derived from the 2017 supplemental site investigation (SSI) activities which were conducted in the Lake Linden Recreation Area (LLRA) following the Sampling and Analysis Plan (SAP) Supplement dated June 2, 2017. The narrative generally follows the systematic investigative approach outlined in Section 3 of the 2016 Site Investigation (SI) Report while providing specific details about only the 2017 supplemental investigation activities.

7.1 INVESTIGATION RESULTS

The following subsections present the findings of the 2017 SSI activities and supplement the previous documentation of environmental conditions in Torch Lake.

7.1.1 Site Investigation

The SSI in the LLRA was developed to survey the bathymetry of Torch Lake within the LLRA and aid in identifying the presence of polychlorinated biphenyl (PCB), arsenic, and lead contamination in nearshore sediments. The following subsections present the outcomes of investigative activities completed in the area by presenting the bathymetry, summarizing the laboratory analytical results, and characterizing their impacts on the sediments in which they were detected.

7.1.1.1 Offshore Investigation

The offshore investigation activities for the LLRA were guided by several factors. First, prior analytical data was evaluated to determine if adequate characterization and delineation data was available in the study area to assess the overall sediment quality. Proposed sampling locations were selected to identify additional sediments that could be impacted by historic waste deposition. In addition, a bathymetric survey was performed to better understand the lake bottom topography and water depths within the affected areas to determine which areas could pose exposure pathways during recreational activities (i.e. swimming, wading, etc.). The following subsections present a summary of the analytical results derived from offshore surveying and sampling activities in the LLRA.

7.1.1.1.1 Bathymetry Survey Results

On June 6, 2017 Michigan Department of Environmental Quality (DEQ) Geological Services Unit (GSU) staff collected bathymetric and hydrographic data using a BSS +3 System manufactured by Specialty Devices, Inc. of Plano, Texas. The BSS +3 System is a hydrographic survey and sub-bottom profiling system that is contained in a single portable unit. The system includes an Intelligent Depth Sounder (IDS) with true digital sub-bottom profiling capability. The BSS +3 System used by the DEQ uses three separate frequencies (24 kHz, 50 kHz, and 200 kHz) that provide bathymetry and high resolution sub-bottom profiling. The 200 kHz frequency can resolve bottom reflection to within a 1-inch resolution accuracy. The BSS +3 System is a survey-grade depth sounder that provides high resolution playback and detail. The DEPTHPIC and SDIDEPTH post-processing software provides the ability to replay and re-process of hydrographic data without resorting to hand digitizing or manual scaling of position. In conjunction with the BSS +3 system, DEQ used a survey-grade Trimble R-10 global positioning system (GPS) to record survey tracks. The survey lines and bathymetry maps generated by DEQ-GSU are provided in ***Appendix A****, DEQ-GSU Survey Lines and Bathymetry Maps*.

7.1.1.1.2 Sediment Sampling Results

Concurrent with the mobilization for bathymetry surveying, DEQ-GSU also conducted offshore sediment investigation activities on June 6, 2017 using procedures outlined in Section 3 of the 2016 SI Report. A total of 15 sediment samples plus two duplicate sediment samples were collected from five sampling locations. Maps from the 2016 SI Report were

updated with the additional sediment sampling locations and analytical results. The updated analytical results are depicted on ***Figure 7-6a*** through ***Figure 7-6c*** along with the DEQ-GSU bathymetry lines. A photograph log of the sampling activities is provided in ***Appendix B****, Lake Linden Recreation Area 2017 Photographic Log*.

All sediment sampling locations included surficial sediment samples, from the sediment surface to 1-foot (ft) in depth. Samples were also collected from 1 to 3-ft and from 3-ft to between 4 and 6-ft depending on the available depth of penetration. The samples were analyzed for PCBs, arsenic, and lead.

The sediment analytical results for each of the samples contained multiple inorganic chemicals of concern (COCs) at or above concentrations that exceeded applicable regulatory criteria. Total PCBs were detected above applicable regulatory criteria in three surficial sediment samples (includes one duplicate) and one deeper sediment sample collected from 1 to 3-ft below the sediment surface. Arsenic and lead were detected in all of the SSI sediment samples from the LLRA, with arsenic only detected above applicable regulatory criteria in three surficial sediment samples (includes one duplicate). Lead was detected above regulatory criteria in nine sediment samples, including four surficial samples (includes one duplicate), three samples collected from 1 to 3-ft (includes one duplicate), and two deeper samples.

A detailed summary of sediment analytical results is provided in ***Table 7-5****, Sample Analytical Summary - Sediment*, inclusive of 2017 and prior analysis results from the 2016 SI Report. Sediment core logs are included in ***Appendix C****, Sediment Core Logs – Lake Linden Recreation Area*. Of note is the observation of dark brown streaks in the upper few feet of the log for sediment sampling location CHLL-SD107, orange streaking in the upper 6-inches of CHLL-SD108, and waste debris noted at approximately 6-ft below the sediment surface in CHLL-SD109.

7.2 NATURE AND EXTENT OF CONTAMINATION

Utilizing the established regulatory criteria presented in Section 4 of the 2016 SI Report for various land use categories and exposure pathways, the laboratory analytical results summarized in the preceding section for the LLRA were reviewed and compared to the following regulatory criteria for sediments:

- U.S. Environmental Protection Agency (EPA), Region 5, Resource Conservation and Recovery Act (RCRA), Ecological Screening Levels (ESLs) (EPA 2003).

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

Based on the investigation results, DEQ referred the sediment impacts in the LLRA to the EPA Emergency Response Branch (ERB). Refer to the EPA LLRA web page EPA LLRA. As part of EPA's evaluation in the *Final Removal Assessment Report for Lake Linden Recreation Area Sediments LLRA Sediments RAR* (TetraTech, Inc. 2017) additional criteria were considered (by EPA) including:

- EPA residential direct contact removal management levels (RMLs) (EPA 2017). EPA RMLs are modified based on target risk levels for carcinogens (TCR) and hazard quotients (HQ). EPA's generic RML tables were used with specific TCR and HQ modifiers. The EPA's RMLs were used with a criterion of 10^{-4} TCR and a HQ of 3 for non-carcinogens. The RMLs were applied to the sediment data, since the soil criteria are considered applicable to sediments.

- Part 201 of Michigan's Natural Resources and Environmental Protection Act (NREPA), being PA 451 of 1994, as amended Residential Direct Contact Cleanup Criteria (RDCC) for Response Activity (December 30, 2013). Similar to the RMLs, the RDCC were applied to the sediment data since the soil criteria are considered applicable to sediments.

Direct contact criteria is considered relevant in the nearshore area since there is potential exposure to human receptors that utilize the LLRA through direct contact with the contaminated sediments, particularly in areas where swimming or wading may occur, including contact with submerged sediment.

7.2.1 Comprehensive Exposure Assessment

The comparison was completed to determine which ecological and human exposure pathways, risks, and conditions are relevant in the LLRA. Although not inclusive of relevant pathways where regulatory criteria were not exceeded, the following exposure pathway was determined to be relevant specific to the 2017 investigative activities:

- Risks posed by hazardous substances in surface water and sediments that have the potential to have toxic effects on aquatic biota and/or enter the food chain.

The LLRA includes the publically accessible Lake Linden Village Park, the swimming beach, campground, marina, and associated sports facilities. In addition to the above risks to aquatic biota, there are additional risks as noted in 2017 *Final Removal Assessment Report for Lake Linden Recreation Area Sediments* (TetraTech, Inc. 2017) which states that there is potential exposure of LLRA site contamination to human receptors that utilize the Lake Linden Recreation Area through direct contact with the contaminated sediments, particularly in areas where swimming or wading may occur. There is also potential exposure of LLRA site contamination to ecological receptors, and the waste deposits in the lake extend outward from the 2007 EPA removal area. This waste serves as a continuing source of PCBs into the environment, as indicated by the semi-permeable membrane device (SPMD) sample result and the presence of PCBs in Torch Lake fish. PCBs in Torch Lake fish create an additional pathway for LLRA site contamination to reach human receptors via ingestion of fish.

7.2.1.1 Sediment Exposure Pathway Assessment

Sediment analytical results from the LLRA included COC concentrations that were at or above concentrations that pose potential risks to sediment dwelling species, and consequently the food chain through bioaccumulation and biomagnification pathways, and ultimately humans through fish ingestion. They also included COC concentrations that exceeded RDCC.

Sediment analytical results for the 2017 samples exceeded ESLs, TECs, and PECs for inorganic contaminants. In addition, analytical results for PCBs also exceeded the ESL, TEC, and PEC in two surficial sampling locations and the ESL and TEC in one deeper sample from 1 to 3-ft below the sediment surface. With respect to risks from human direct contact with sediments, RDCC were exceeded for arsenic and lead in the surficial samples from CHLL-SD106 and CHLL-SD108. At CHLL-SD106, lead also exceeded RDCC in the 1 to 3-ft interval below the sediment surface.

7.2.2 Extent of Contamination

The comparison of analytical results to applicable regulatory criteria indicates that potential human health and ecological risks are present in sediment in the LLRA. Recalling the goals and objectives of the SI and SSI, the following subsection discusses the extent of sediment contamination in the study area.

7.2.2.1 Sediment Extent of Contamination

The 2017 sediment sampling efforts were intended to aid in characterizing and identifying historic waste deposition, including PCBs, arsenic, and lead. For purposes of evaluating and discussing the extent of contamination, the 2017 data was not reviewed in isolation. Instead, a holistic review of the data from 2017 and the 2016 SI Report was conducted.

Sediment analytical results exceeded ESLs, TECs, and PECs for inorganic contaminants. In addition, analytical results for Total PCBs also exceeded the ESL, TEC, and PEC in both surficial and deep sampling locations. The 2017 sampling results aided in defining the presence of historic waste deposition but did not, in themselves, delineate the limits of impact. 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 throughout Torch Lake. The detection of PCBs above applicable regulatory criteria in numerous samples over various depths, however, present a more significant exposure risk particularly as it relates to ecological receptors. The presence of Total PCBs in sediment present additional risks both to benthic organisms and potentially human health due to their proximity to the shoreline and their potential effect on the food chain. In addition, the detection of Total PCBs in both deep and surficial sediment indicates that a significant source of PCBs may be present in the nearshore sediments.

Concentrations of arsenic and lead in shallow water nearshore sediment samples also exceeded DEQ direct contact criteria and for lead potentially hazardous toxicity values similar to the sediments removed by the EPA ERB as reported in the document entitled *Letter Report for Lake Linden Emergency Response Site, Lake Linden, Houghton County, Michigan* (November 2007). Direct contact criteria is considered relevant in the nearshore area since there is potential exposure to human receptors that utilize the Lake Linden Recreation Area through direct contact with the contaminated sediments, particularly in areas where swimming or wading may occur, including contact with submerged sediment. Sediment analysis results were evaluated with respect to direct contact criteria in the *Final Removal Assessment Report for Lake Linden Recreation Area Sediments*, (TetraTech, Inc. 2017) and the *Technical Memorandum Lake Linden Recreation Area Soil and Sediment Sampling Revision 3*, (Honeywell 2018) prepared by potentially responsible party Honeywell Specialty Materials, LLC (Honeywell), corporate successor to C&H, as part of their preparation for a Time Critical Removal Action.

As DEQ notes in their referral letter to EPA ERB, "Our review of the compiled data from 2005 – 2015 in Torch Lake, extending out from the 2007 Lake Linden Emergency Removal action addressing lead, arsenic, and associated polychlorinated biphenyls (PCBs) indicates that concentrations exceeding residential soil direct contact criteria, ecological screening levels and potentially the hazardous waste toxicity values concentrations are present in very near shore as well as off shore samples collected from an approximate 5 acre area".

Total PCBs were detected in surficial sediment samples and deep sediment samples collected from the LLRA up to a concentration of 8.9 parts per million (ppm). Investigative activities associated with this Project, along with prior DEQ and EPA multi-media sampling, have identified two distinct groupings of PCB contamination in Torch Lake sediments. The first grouping is located in the LLRA while the second grouping is located in the Hubbell Processing Area (HPA), which is discussed further in Section 9. These source areas, as confirmed by the results of the historical SPMD and fish tissue studies, are ongoing sources of PCBs that pose both ecological and potential human health risks and continued degradation of the benthos in Torch Lake. For additional detailed information on the distribution and character of PCBs in Torch Lake, please refer to the following report:

- *Distribution of PCBs in the Torch Lake Environment Memorandum*, May 2018, available at https://www.michigan.gov/documents/deq/deq-rrd-amw-AMWPCBMemorandum5-15-18_625028_7.pdf. (MSG 2018).

7.3 CONCLUSIONS AND RECOMMENDATIONS

The analytical results and interpretation summarized in the preceding subsections supplement the previous documentation of environmental conditions and document potential human health and ecological risks that are present in the LLRA. The following subsections provide a synopsis of these findings and a recommended path forward for mitigating these risks.

7.3.1 Conclusions

The SSI was developed to aid in identifying PCB, arsenic, and lead contamination in nearshore sediments resulting from historic waste deposition. In addition, a bathymetric survey was performed to better understand the lake bottom topography and water depths within the affected areas to determine which areas could pose exposure pathways during recreational activities (i.e. swimming, wading, etc.).

A total of 15 sediment samples plus two duplicate sediment samples were collected from five sampling locations and analyzed for PCBs, arsenic, and lead. Sediment analytical results for the 2017 samples exceeded ESLs, TECs, and PECs for inorganic contaminants. In addition, analytical results for PCBs also exceeded the ESL, TEC, and PEC in two surficial sampling locations and the ESL and TEC in one deeper sample from 1 to 3-ft below the sediment surface. Total PCBs were detected in surficial sediment samples and deep sediment samples collected from the LLRA up to a concentration of 8.9 ppm.

The 2017 sampling results aided in defining the presence of historic waste deposition but did not, in themselves, delineate the limits of impact. 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 throughout Torch Lake.

The detection of PCBs above applicable regulatory criteria in numerous samples over various depths, however, present a more significant exposure risk particularly as it relates to ecological receptors. The presence of Total PCBs in sediment present additional risks both to benthic organisms and potentially human health due to their proximity to the shoreline, their potential effect on the food chain through bioaccumulation and biomagnification pathways, and ultimately humans through fish ingestion.

Concentrations of arsenic and lead in shallow water nearshore sediment samples also exceeded DEQ direct contact criteria and for lead potentially hazardous toxicity values similar to the sediments removed by the EPA ERB in 2007. Direct contact criteria is considered relevant in the nearshore area since there is potential exposure to human receptors that utilize the Lake Linden Recreation Area through direct contact with the contaminated sediments, particularly in areas where swimming or wading may occur, including contact with submerged sediment.

Investigative activities associated with this project, along with prior DEQ and EPA multi-media sampling, have identified two distinct groupings of PCB contamination in Torch Lake sediments. The first grouping is located in the LLRA while the second grouping is located in the HPA. These source areas, as confirmed by the results of the historical SPMD and fish tissue studies, are ongoing sources of PCBs that pose both ecological and potential human health risks and continued degradation of the benthos in Torch Lake. These risks led DEQ to refer the sediment impacts in the LLRA to the EPA in early 2017. As DEQ notes in their referral, “Our review of the compiled data from 2005 – 2015 in Torch Lake, extending out from the 2007 Lake Linden Emergency Removal action addressing lead, arsenic, and associated polychlorinated biphenyls (PCBs) indicates that concentrations exceeding residential soil direct contact criteria, ecological screening levels and potentially the hazardous waste toxicity values concentrations are present in very near shore as well as off shore samples collected from an approximate 5 acre area”.

EPA ERB evaluated the information provided by DEQ and is working with Honeywell and other agencies to further evaluate risks and develop remedial approaches. A Time Critical Removal Action is planned for 2019 to address near-shore sediments followed by post-removal monitoring activities. For further information, refer to the EPA LLRA web page EPA LLRA. EPA is also working with Honeywell through the Great Lakes National Program Office (GLNPO) to further evaluate risks and develop and implement remedial approaches for the offshore sediments in the LLRA.

7.3.2 Recommendations

It was previously established in the 2016 SI Report that the LLRA is a Facility as defined in Part 201 of NREPA. The following is an outline of a recommended path forward for managing the identified potential exposure risks in the LLRA.

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. To that end, actions have been taken through the implementation of interim measures, such as the installation of informational signage, washing stations, and fish consumption advisory to address risks associated with the LLRA.

Current actions underway by EPA ERB and Honeywell subsequent to DEQ's referral should continue to mitigate the identified risks associated with near-shore shallow sediments. A Time Critical Removal Action is planned for 2019 to address near-shore sediments followed by post-removal monitoring activities. For offshore sediments in the LLRA, GLNPO is working with Honeywell to further evaluate risks and develop and implement remedial approaches. DEQ should continue to coordinate with EPA ERB and GLNPO on the EPA assessment and removal/remediation activities as well as continue assessment and delineation of affected areas as may be needed to support risk assessment and removal/remediation planning and implementation.

DEQ should continue to provide new study data to the RRD SFS which is responsible for monitoring EPA's remedy for the Torch Lake Superfund Site. RRD SFS should evaluate whether any remedy modifications are necessary in Torch Lake or terrestrial areas previously addressed by EPA in light of the additional information provided by the Project.

The EPA and RRD SFS should verify that administrative controls for areas that have been previously remediated by the EPA have been employed to ensure that the selected remedy is performing as designed and those institutional controls, where required, have been recorded and are being enforced.

Additionally, DEQ should continue information sharing and resolution efforts with all property owners and other stakeholders including providing pertinent data to the Village of Lake Linden, Schoolcraft Township, the Michigan Department of Health and Human Services (MDHHS), and Western Upper Peninsula Health Department (WUPHD) where evaluation of specific potential public health risks is warranted.

9. DETAILED FINDINGS REPORT – HUBBELL PROCESSING AREA

This Section summarizes the findings derived from the 2017 supplemental site investigation (SSI) activities which were conducted in the Hubbell Processing Area (HPA) in five phases. Waste pile and suspect asbestos containing material (SACM) sampling occurred at the Mineral Building property in August and October following Sampling and Analysis Plan (SAP) Supplements dated August 18, 2017 and September 21, 2017, respectively. Additionally, the Michigan Department of Environmental Quality (DEQ) Air Quality Division (AQD) collected SACM samples from the M-26 right of way (ROW) in July 2017. In-lake submerged drum and sediment sampling occurred in June and August following the SAP Supplements dated May 25, 2017 and August 10, 2017, respectively. The narrative generally follows the systematic investigative approach outlined in Section 3 of the 2016 Site Investigation (SI) Report while providing specific details about only the 2017 supplemental investigation activities.

9.1 SITE INSPECTION AND INVESTIGATION RESULTS

The following subsections present the findings of the 2017 inspection and investigation activities. These findings supplement the previous documentation of environmental conditions and the correlation of mining era operations and their potential impacts on the nearshore and offshore environment of Torch Lake.

9.1.1 Site Inspection

Prior to the mobilizations for sampling, a site inspection was conducted at the HPA to label and map each visually distinct waste pile using a global positioning system (GPS). To facilitate and focus the investigation, each of the 36 piles plus the stack debris were then categorized as being mining era waste and debris, construction and demolition debris, road work materials, or woody debris. Refer to ***Appendix D, Waste and Debris Pile Summary*** for a tabular summary of visual characterizations and approximate areas and volumes. In total, the footprint of the waste piles and stack debris is approximately 2.9 acres spread over five acres of the property. Eighteen waste piles totaling an estimated 4,758 tons appear to be mining era waste and debris. The other 17 remaining waste piles totaling an estimated 3,486 tons consist of construction and demolition, roadwork, and/or woody debris and generally do not appear to have originated during the mining era. In addition to the waste piles, an estimated 2,810 cubic yards of mining era stack debris is present on the property. The waste pile locations are depicted on ***Figure 9-8, Sample Analytical Result Map Mineral Building Soil, Waste Pile, Residual Process Material, and Stack Debris***. A depositional history of the piles based on aerial photography review is also provided in ***Appendix D, Waste and Debris Pile Summary***.

Also as part of the site inspection, it was noted that SACM had continued to blow and fall off of the Mineral Building and pieces of SACM were present across the property and in the M-26 ROW. The presence of SACM on the ground both inside and outside the property boundary fence was despite removal events in 2016 which had picked up and disposed of visible SACM.

9.1.1.1 Targeted Inspection

Targeted inspection and waste pile sampling activities were completed by The Mannik & Smith Group, Inc. (MSG) and DEQ during three mobilizations in 2017. DEQ AQD collected SACM samples from the M-26 ROW on July 12, 2017. The first round of sampling by MSG was completed on August 21, 2017 and the second round was completed on October 23, 2017. The targeted inspection activities included field screening of soils and waste piles using an x-ray fluorescence (XRF) meter, use of field test kits for polychlorinated biphenyl (PCB) screening, and collection of waste pile samples and bulk material samples. Targeted inspection forms which were used by MSG to record field sampling information are contained in ***Appendix E, Targeted Inspection Forms***.

9.1.1.1.1 Bulk Material Sampling

Based on the observation of SACM, limited prior asbestos sampling, and continuing SACM deposition on the Mineral Building property and adjacent properties, a limited asbestos survey was conducted by MSG to identify asbestos containing material (ACM) on the Mineral Building property. The asbestos survey was limited to SACMs in open areas of the property, including the outside of buildings, on the debris piles, and on the exteriors of demolished mining era structures. 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 Mineral Building and Coal Dock properties 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 October 23, 2017 a total of 34 bulk samples were collected by MSG from 13 different SACMs. Ten bulk samples were also collected of roofing material within the M-26 ROW by DEQ AQD on July 12, 2017. Sampling locations are depicted on ***Figure 9-9, Sample Analytical Result Map Mineral Building Waste Characterization and Bulk Asbestos***. ACM identified on the Mineral Building property in 2017 included:

- Black felt mastic (CHLL-ASBBLK66) that is damaged and friable, located along the concrete base of the historic storage tank in the southwest corner of the property.
- Gray thermal system insulation (TSI) (CHLL-ASBBLK67) that is damaged, friable, and appears cardboard-like underneath, located on waste pile WP-28.
- Gray/blue/white TSI (CHLL-ASBBLK68) that is damaged and friable, located on WP-28.
- White TSI (CHLL-ASBBLK69) that is damaged and friable, located on WP-28.
- White paper gasket (CHLL-ASBBLK70) that is damaged and friable, located on WP-28.
- Felt roofing (CHLL-ASBBLK72) that is damaged and friable, located on WP-28.
- White and green fibrous material (CHLL-ASBBLK73) that is damaged and friable, located on WP-23.
- White fibrous drywall (CHLL-ASBBLK74) that is damaged and friable, located on WP-23.
- Brown TSI (CHLL-ASBBLK75) that is damaged and friable, located on WP-23.
- Gray rope gasket (CHLL-ASBBLK76) that is damaged and friable, located on the northeast edge of WP-27.

The samples were analyzed in accordance with U.S. Environmental Protection Agency (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.

ACM identified in the M-26 ROW included various roofing material components including mastic layers, white roofing material, the middle layer, and "roofing material/other". The M-26 ROW bulk material samples collected by DEQ-AQD were analyzed by the Occupational Health Laboratory of the Michigan Occupational Safety and Health Administration (MIOSHA) using test method OHL2004M9020M-OPLv031.

A detailed summary of bulk asbestos sample analytical results collected from the HPA Mineral Building property and adjacent M-26 ROW is provided in ***Table 9-7, Sample Analytical Summary – Bulk Asbestos***.

9.1.1.1.2 Waste Pile Sampling

In addition to the collection of bulk material samples, several samples from waste deposits were also collected from the Mineral Building property during the targeted inspection activities. A total of 19 samples were collected from seven waste piles plus the stack debris to evaluate risks and aid in characterizing the materials. The selected piles were those

that appeared to originate from or contain mining-era waste and debris as well as newly identified waste pile WP-48. XRF screening identified elevated levels of lead in soils to the northeast of WP-01. Review of historical aerial photographs identified a corresponding light-colored area in this location, which was subsequently labeled as WP-48. The approximate limits of WP-48 were transferred to Project figures and included in the sampling efforts.

To aid in obtaining representative samples from the larger piles, a front-end loader was used to expose the interior of waste piles WP-01, WP-17, WP-23, and WP-28. Refer to ***Figure 9-8, Sample Analytical Result Map Mineral Building Soil, Waste Pile, Residual Process Material, and Stack Debris*** for sampling locations. Each of the samples was analyzed for arsenic, lead, and Total PCBs. Select samples, based on the total metals results, were also analyzed for toxicity characteristic leaching procedure (TCLP) arsenic and lead for waste characterization purposes. ***Figure 9-9, Sample Analytical Result Map Mineral Building Waste Characterization and Bulk Asbestos*** depicts the locations where TCLP analyses were conducted. Sample analytical results are summarized in ***Table 9-8, Sample Analytical Summary – Soil, Waste Pile, Residual Process Material, and Stack Debris***. Waste characterization analysis results are summarized in ***Table 9-9, Sample Analytical Summary – Waste Characterization***.

9.1.2 Site Investigation

The SSI in the HPA was developed to characterize waste piles, assess SACM, characterize submerged drum contents, and identify areas of PCB detections in sediments. The following subsections present the outcomes of investigative activities by summarizing the laboratory analytical results and characterizing their impacts on the environmental media in which they were detected.

9.1.2.1 Terrestrial Investigation

Intrusive investigation activities in the HPA were guided by several factors to build on previous findings and fill data gaps. Inorganic chemicals of concern (COCs) in the study area soils were generally understood but the waste piles at the Mineral Building had not been adequately characterized. The following subsection presents a summary of the analytical results derived from the terrestrial sampling activities in the HPA in 2017.

9.1.2.1.1 Waste Pile Sampling Results

As noted above, total of 19 samples were collected from seven waste piles plus the stack debris and analyzed for arsenic, lead, and Total PCBs. The selected piles were those that appeared to originate from or contain mining-era waste and debris as well as newly identified waste pile WP-48, which although not a traditional pile, was an area of soil identified through XRF screening as containing residuals with elevated lead levels. Select samples were also analyzed for TCLP arsenic and lead based on the total metals analysis results.

All of the collected samples contained arsenic and lead, with all but one sample exceeding applicable regulatory criteria. Total PCBs were detected in eight of the waste pile samples (from WP-01, WP-23, WP-27, and WP-28), with three of the 2017 samples exceeding applicable regulatory criteria (CHLL-WP01-2, CHLL-WP28-1, and CHLL-WP28-3). PCBs were not detected in the stack debris samples. A detailed summary of the sample analytical results is provided in ***Table 9-8, Sample Analytical Summary – Soil, Waste Pile, Residual Process Material, and Stack Debris***.

Based on the detection of elevated levels of arsenic and/or lead, 11 of the waste pile and stack debris samples were analyzed for TCLP arsenic and lead. While none of the TCLP arsenic analysis results exceeded the hazardous waste toxicity value, seven of the TCLP lead analysis results exceeded the hazardous waste toxicity value of 5.0 mg/L. This indicates that the sampled materials were characteristically hazardous for lead, and included CHLL-Stack-2, CHLL-WP27-1, CHLL-WP28-3, CHLL-WP28-4, CHLL-WP48-1, CHLL-WP48-2, and CHLL-WP48-3. Waste characterization analysis results are summarized in ***Table 9-9, Sample Analytical Summary – Waste Characterization***.

9.1.2.2 Offshore Investigation

Development of the offshore investigation in the HPA was guided by several factors. First, prior underwater surveillance of the area had identified offshore submerged drum deposits which had not been characterized. DEQ recently acquired technology which would allow for scooping and retrieving contents from individual drums while monitoring locational information with GPS and underwater remote surveillance. In addition, prior analytical data was evaluated to determine if adequate characterization had been completed to assess the limits of detected PCBs. These factors were used to select sampling locations for characterizing submerged drum contents and identifying areas of PCB detections in sediments.

The following subsections present a summary of the analytical results derived from offshore sampling activities in the HPA in 2017.

9.1.2.2.1 Submerged Drum Sampling Results

Concurrent with the mobilization for bathymetry surveying in the LLRA, DEQ-GSU conducted offshore submerged drum contents sampling on June 7, 2017 in the HPA using the sampling arm on their autonomous underwater vehicle (AUV). A total of four samples were collected during this mobilization to assess drum contents near previous sample CHLL-SD52 including two sediment samples, one sample of dark brown burlap-like (cloth) material, and one sample of sediment mixed with burlap-like (cloth) material. DEQ-GSU re-mobilized and collected 10 additional drum content samples on August 15 and 16, 2017. All of the samples were analyzed for polynuclear aromatic hydrocarbons (PNAs) and PCBs. All of the samples except the cloth material were also analyzed for metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc). Maps from the 2016 SI Report were updated with the additional sampling locations and analytical results. Refer to the updated maps provided as ***Figure 9-12b**, Sample Analytical Result Map Smelter Sediment, Surface Water, and Submerged Drum Contents* for sampling locations. A photograph log of the sampling activities is provided in ***Appendix F**, Hubbell Processing Area 2017 Photographic Log*.

The analytical results for all of the samples contained PCBs at concentrations that exceeded applicable regulatory criteria. Similarly, all of the samples that were analyzed for metals contained multiple COCs above concentrations that exceeded applicable regulatory criteria. The cloth sample contained multiple PNAs exceeding applicable regulatory criteria as did drum content sample CHLL-SDM04.

A detailed summary of submerged drum contents analytical results is provided in ***Table 9-11**, Sample Analytical Summary – Submerged Drum Contents*. Analytical results are also depicted on ***Figure 9-12b**, Sample Analytical Result Map Smelter Sediment, Surface Water, and Submerged Drum Contents*. Underwater videos from the collection of the samples are included in ***Appendix G**, Underwater Videos*.

9.1.2.2.2 Sediment Sampling Results

DEQ-GSU also conducted offshore sediment investigation activities in the HPA on August 19, 2017 using procedures outlined in Section 3 of the 2016 SI Report. A total of 11 sediment samples plus two duplicate sediment samples were collected from five sampling locations for PCB analysis. Maps from the 2016 SI Report were updated with the additional sediment sampling locations and analytical results. The updated maps are included as ***Figure 9-10*** through ***Figure 9-13***.

All sediment sampling locations included surficial sediment samples, from the sediment surface to up to 10-inches in depth. Samples were also collected from 1 to 3-ft and from 3-ft to between 3.5 and 3.92-ft depending on the available depth of penetration at locations CHLL-SD110 through CHLL-SD112. The samples were analyzed for PCBs.

Sediment sample CHLL-SD114 from 0 to 10-inches in depth was the only sample to contain detectable concentrations of PCBs. The total PCB concentration at this location exceeded applicable regulatory criteria. A detailed summary of

sediment analytical results is provided in ***Table 9-10, Sample Analytical Summary - Sediment***, inclusive of 2017 and prior analysis results from the 2016 SI Report. Sediment core logs are included in ***Appendix H, Sediment Core Logs – Hubbell Processing Area***.

9.2 NATURE AND EXTENT OF CONTAMINATION

Utilizing the established regulatory criteria presented in Section 4 of the 2016 SI Report for various land use categories and exposure pathways, the laboratory analytical results summarized in the preceding section for the HPA were reviewed and compared to the following regulatory criteria as applicable for the sampled environmental media:

- DEQ Cleanup Criteria Requirements for Response Activity (DEQ 2018).
- EPA, RCRA, Identification and Listing of Hazardous Waste Criteria (40 CFR, Part 261, Subpart C) (EPA 2012).
- EPA, Region 5, RCRA, ESLs (EPA 2003).
- Sediment Quality Guidelines, TECs and PECs (MacDonald, et al, 2000).

Based on the investigation results, DEQ referred the waste pile and ACM concerns on the Mineral Building property to the EPA Emergency Response Branch (ERB). Refer to the EPA Calumet and Hecla (C&H) Mineral Building web page EPA C&H Mineral Building. As part of EPA's evaluation in the *Removal Assessment Report for C&H Mineral Building – RS Site C&H Mineral Building RAR* (TetraTech, Inc. 2018), which included additional sampling on the Mineral Building property, additional criteria were considered (by EPA) including:

- EPA industrial direct contact removal management levels (RMLs) (EPA 2017). EPA RMLs are modified based on target risk levels for carcinogens (TCR) and hazard quotients (HQ). EPA's generic RML tables were used with specific TCR and HQ modifiers. The EPA's RMLs were used with a criterion of 10^{-4} TCR and a HQ of 3 for non-carcinogens.
- Part 201 of NREPA, being PA 451 of 1994, as amended Non-Residential Direct Contact Cleanup Criteria (DCC) for Response Activity (DEQ 2018). Similar to the RMLs, the DCC were applied to the soil, waste pile, and stack debris data.
- Part 201 of NREPA, being PA 451 of 1994, as amended Particulate Soil Inhalation Criteria (PSIC) for Response Activity (DEQ 2018). The PSIC were applied to the results evaluation due to the potential for asbestos.
- EPA, National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR, Part 61, Subpart M) (EPA 1984). Similar to the PSIC, the NESHAP standards were applied to the potential for asbestos.

DEQ also referred the submerged drums and sediment impacts in the HPA to the EPA in a November 9, 2017 letter *Calumet & Hecla (C&H) Hubbell Processing Area (HPA) In-Lake Abandoned Drums & Sediments Request for Assistance* (DEQ 2017). It is not known if EPA's evaluation to-date has considered any additional criteria for sediments.

9.2.1 Comprehensive Exposure Assessment

The comparison was completed to determine which ecological and human exposure pathways, risks, and conditions are relevant in the HPA. Although not inclusive of relevant pathways where regulatory criteria were not exceeded, the following exposure pathways were determined to be relevant specific to the 2017 investigative activities:

- Risks posed by hazardous substances in waste, residual process materials, and abandoned containers that may result from the direct transport or runoff of hazardous substances into soil, groundwater, and surface water.
- Risks posed by hazardous substances in debris piles.

- Risks posed by hazardous substances in surface soil that may result from the direct transport or runoff of hazardous substances in soil into surface water.
- Risks posed by hazardous substances in soil and the potential for the substances to leach to groundwater that could be used as a drinking water source 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 the substances to be inhaled if they are emitted as particulates and dispersed in ambient air in in both residential and nonresidential settings.
- 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.

Refer to the 2016 SI Report for the full list of exposure pathways that are applicable in the HPA for environmental media. Also, as explained in Section 4.2.5 of the 2016 SI Report, the DEQ drinking water/surface water pathway criteria exceedances for metals were excluded from the soil and groundwater evaluation.

9.2.1.1 Building Materials, Containers, and Wastes

During the targeted inspection activities in 2017 on the Mineral Building property, 10 different ACMs were identified in samples collected from damaged and friable building materials. In addition, asbestos was identified in nine out of 10 roofing material samples collected from the M-26 ROW by DEQ-AQD. All of these detections were greater than the NESHAP and DEQ PSIC of 1 percent (%) asbestos.

Samples of waste piles were also analyzed to evaluate potential human health and environmental risks posed by these wastes and residuals. All of the collected waste pile samples contained arsenic and lead, with all but one sample exceeding applicable regulatory criteria. Both stack debris samples exceeded residential and non-residential DCC and PSIC for arsenic and residential and non-residential DCC for lead. Nearly all of the waste pile samples exceeded residential and non-residential DCC for arsenic and all of the piles exceeded residential DCC for lead. Total PCBs were detected in eight of the waste pile samples (from WP-01, WP-23, WP-27, and WP-28), with three of the samples exceeding residential and non-residential DCC (CHLL-WP01-2, CHLL-WP28-1, and CHLL-WP28-3). PCBs were not detected in the stack debris samples.

Eleven of the waste pile and stack debris samples were analyzed for TCLP arsenic and lead. None of the TCLP arsenic analysis results exceeded the hazardous waste toxicity value but seven of the TCLP lead analysis results exceeded the hazardous waste toxicity value of 5.0 mg/L. This indicates that the sampled materials were characteristically hazardous for lead. Beyond the potential human health exposure risk, these wastes are proximal to Torch Lake and could be contributing appreciably to groundwater and/or surface water impacts especially in the vicinity of WP-48 which is approximately 150 ft from Torch Lake and had one sample with a TCLP lead analysis result of 800 mg/L, which is 160 times the hazardous waste characteristic limit.

As part of EPA's evaluation in the *Removal Assessment Report for C&H Mineral Building – RS Site* (TetraTech, Inc. 2018), EPA concluded in the report that "The damaged and friable ACBM and ACBM with the potential to become friable pose a potential risk to human health related to the inhalation pathway. ACBM, including roofing materials that have been and will continue to fall and blow off of the Mineral Building roof onto the Site property, bordering properties, and the adjacent MDOT Highway M-26 ROW increase the potential for human exposure to asbestos. TCLP testing identified wastes likely to leach concentrations of lead that may be harmful to human health or the environment as well. There is also potential exposure of ecological receptors to Site contamination as the potential for wind and water erosion, and deposition of contaminated soils and wastes into the environment, including the adjacent Torch Lake. There is potential exposure of Site contamination to human receptors through inhalation of and direct contact with the

contaminated media including RPM, soil, waste, stack debris, ACBM, and potential abandoned containers. Physical hazards associated with the unsecured Mineral Building, and waste pile and stack debris are present at the Site. The close proximity of the MDOT ROW, residences and an operating industrial facility, and potential for trespassers greatly increases the likelihood of human health and environmental impacts." EPA is working with potentially responsible party Honeywell Specialty Materials, LLC (Honeywell), corporate successor to C&H, and the property owner to further evaluate risks and develop and implement remedial approaches.

9.2.1.2 Sediment Exposure Pathway Assessment

Sediment and submerged drum contents analytical results from the HPA included COC concentrations that were above concentrations that pose potential risks to sediment dwelling species, and consequently the food chain.

As discussed previously, a total of 11 sediment samples plus two duplicate sediment samples were collected from five sampling locations to aid in identifying the limits of PCB impacts in sediments. Sediment sample CHLL-SD114 from 0 to 10-inches in depth was the only sample to contain detectable concentrations of PCBs. The total PCB concentration at this location exceeded the ESL, TEC, and PEC, and further identified the presence of PCB impacts in sediments offshore from the Hubbell Slag Dump.

In addition to the sediment sampling, 14 submerged drum contents samples were collected in 2017. The analytical results for 13 of the samples contained PCBs at concentrations that exceeded the ESL, TEC, and PEC while the final sample exceeded the ESL and TEC. Similarly, all of the samples that were analyzed for metals contained multiple COCs at concentrations that exceeded ESLs, TECs, and PECs. The cloth sample contained multiple PNAs exceeding ESLs, TECs, and PECs as did drum content sample CHLL-SDM04.

9.2.2 Extent of Contamination

The comparison of the 2017 analytical results to applicable regulatory criteria indicates that potential human health and ecological risks are present in building materials, waste piles, submerged drum contents, and sediment in the HPA. Recalling the goals and objectives of the SI and SSI, the following subsections discuss the extent of contamination in environmental media in the study area.

9.2.2.1 Building Materials, Containers, and Wastes Extent of Contamination

Analytical results for various building materials, including but not limited to asphaltic roofing material, felt mastic, TSI, gasket material, and drywall indicated that ACM is present in the HPA on the Mineral Building property and adjacent M-26 ROW. These materials are widely distributed across the property and are subject to migration via wind and water erosion, as well as potential anthropogenic activities such as mowing in the M-26 ROW. Asbestos concentrations in 10 different materials on the Mineral Building property exceeded 1% and in nine out of 10 roofing material samples collected from the M-26 ROW. The damaged and friable nature of these materials poses a potential risk to human health as it relates to the inhalation pathway. Also, although soil samples were not analyzed for asbestos in 2017, and prior soil samples did not contain detectable concentrations of asbestos, the uncontrolled dispersion and exposed nature of these materials makes them subject to further degradation that could potentially impact surface soils in the HPA.

The waste piles located on the Mineral Building property are spread over an area of approximately five acres, extending from the east side of the Mineral Building to approximately 150 ft from the shoreline of Torch Lake. The waste pile samples collected in 2017 contained arsenic and lead, with nearly all of the waste pile samples exceeding residential and non-residential DCC for arsenic and 13 of 19 samples exceeding residential and non-residential DCC for lead. Total PCBs were detected in eight of the waste pile samples with three of the samples exceeding residential and non-residential DCC. TCLP lead analysis results for seven waste pile samples exceeded the hazardous waste toxicity

value, with three of the samples being within 150 to 200 ft of Torch Lake. Beyond the potential human health exposure risk, these wastes could be contributing appreciably to groundwater and/or surface water impacts. One sample from WP-48 located 150 ft from Torch Lake had a total lead analysis result that was 13 times the Groundwater/Surface Water Interface Protection Criteria (GSIPC) and a TCLP lead analysis result of 800 mg/L, which is 160 times the hazardous waste characteristic limit.

9.2.2.2 Sediment Extent of Contamination

The 2017 offshore sampling efforts were intended to aid in characterizing submerged drum contents and identifying the presence of PCB-affected sediments. Similar to Section 7, for purposes of evaluating and discussing the extent of contamination, the 2017 data was not reviewed in isolation. Instead, a holistic review of the data from 2017 and the 2016 SI Report was conducted.

The sampled submerged drum contents contained multiple metals at concentrations that exceeded ESLs, TECs, and PECs. Thirteen of the 14 samples, collected from 12 different drums, contained PCBs at concentrations that exceeded the ESL, TEC, and PEC while the final sample exceeded the ESL and TEC. Total PCBs were detected up to a concentration of 17.4 ppm. The cloth sample contained multiple PNAs exceeding ESLs, TECs, and PECs as did drum content sample CHLL-SDM04. These 12 drums which were sampled near known PCB-contaminated sediments are a portion of the reported hundreds of submerged abandoned containers in the HPA. The submerged drums are generally located off-shore of the former Smelter property. As noted in the March 1992 potentially responsible party (PRP) group document entitled *Final Drum Removal Report Torch Lake Drum Removal Houghton County, Michigan*, "The final drum count off-shore of the PCI property (referred to as the HPA Smelter property in this evaluation) was 742 empty drums located, and eight (8) drums of unknown solid contents located. The 742 empty drums were all thoroughly inspected by the divers, and the empty nature of the drums in this area was confirmed by the USEPA OSC, the EMS Field Manager, and the Geraghty & Miller Project Engineer by means of a diver-held video camera and an on-board video monitor. All 8 drums with unknown contents were overpacked and removed from this area."

As discussed previously, 13 sediment samples (including duplicates) were collected from five sampling locations to aid in identifying the presence of PCB impacts in sediments. Sediment sample CHLL-SD114 from 0 to 10-inches in depth was the only sample to contain detectable concentrations of PCBs, but at 74 ppm Total PCBs, it was the highest PCB detection in sediments to date in Torch Lake. The total PCB concentration at this location exceeded the ESL, TEC, and PEC, and helped identify the presence of PCB impacts in sediments offshore from the Hubbell Slag Dump. The remaining borings identified other areas of affected sediments offshore from the HPA. The updated maps provided as ***Figure 9-10*** through ***Figure 9-13*** include a depicted approximate limit of PCBs in sediment that exceed applicable criteria.

As mentioned in Section 7, investigative activities associated with this project, along with prior DEQ and EPA multi-media sampling, have identified two distinct groupings of PCB contamination in Torch Lake sediments. The first grouping is located in the LLRA while the second grouping is located in the HPA. These source areas, as confirmed by the results of the historical SPMD and fish tissue studies, are ongoing sources of PCBs that pose both ecological and potential human health risks and continued degradation of the benthos in Torch Lake. These risks led DEQ to refer the submerged drums and sediment impacts in the HPA to the EPA in a November 9, 2017 letter *Calumet & Hecla (C&H) Hubbell Processing Area (HPA) In-Lake Abandoned Drums & Sediments Request for Assistance* (DEQ 2017). As DEQ notes in their referral, "Our review of the compiled data from 2005 – 2017 in Torch Lake, extending out from the C&H HPA, indicates that concentrations exceeding ecological screening levels and potentially the hazardous waste toxicity values are present in samples collected from an approximate 27 acre area." EPA is working with Honeywell through the Great Lakes National Program Office (GLNPO) to further evaluate risks and develop and implement remedial approaches for the offshore sediments in the LLRA and the in-lake sediments and submerged drums in the HPA.

For additional detailed information on the distribution and character of PCBs in Torch Lake, please refer to the following report:

- *Distribution of PCBs in the Torch Lake Environment Memorandum*, May 2018, available at https://www.michigan.gov/documents/deq/deq-rrd-amw-AMWPCBMemorandum5-15-18_625028_7.pdf (MSG 2018).

For further discussion on the character and extent of inorganic and SVOC impact in sediments, please refer to the 2016 SI Report.

9.3 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 HPA. The following subsections provide a synopsis of these findings and a recommended path forward for mitigating these risks.

9.3.1 Conclusions

In 2017, supplemental investigation activities at the HPA:

- Evaluated risks and aided in characterizing the waste piles at the Mineral Building property;
- Sampled SACM and identified numerous ACMs on the Mineral Building property and the adjacent M-26 ROW;
- Characterized submerged drum contents; and,
- Further identified the presence of PCB-affected sediments.

The findings from these activities supplement the previous documentation of environmental conditions and the correlation of mining era operations and their potential impacts on the nearshore and offshore environment of Torch Lake. Specific findings of these investigative activities are summarized as follows:

- Assessment activities on the Mineral Building property of the HPA identified, labeled, and mapped 36 visually distinct waste piles plus the stack debris pile which were then categorized as being mining era waste and debris, construction and demolition debris, road work materials, or woody debris. A depositional history of the piles was also developed based on aerial photography review. As part of the site inspection, it was noted that SACM had continued to blow and fall off of the Mineral Building and pieces of SACM were present across the property and in the M-26 ROW despite removal events in 2016 which had picked up and disposed of visible ACM and SACM.

- The waste piles located on the Mineral Building property are spread over an area of approximately five acres, extending from the east side of the Mineral Building to approximately 150 ft from the shoreline of Torch Lake. The waste pile samples collected in 2017 contained arsenic and lead, with nearly all of the waste pile samples exceeding residential and non-residential DCC for arsenic and 13 of 19 samples exceeding residential and non-residential DCC for lead. Total PCBs were detected in eight of the waste pile samples with three of the samples exceeding residential and non-residential DCC. TCLP lead analysis results for seven waste pile samples exceeded the hazardous waste toxicity value, with three of the samples being within 150 to 200 ft of Torch Lake. Beyond the potential human health exposure risk, these wastes could be contributing appreciably to groundwater and/or surface water impacts. One sample from WP-48 located 150 ft from Torch Lake had a total lead analysis result that was 13 times the GSIPC and a TCLP lead analysis result of 800 mg/L, which is 160 times the hazardous waste characteristic limit.

- Based on the investigation results, DEQ referred the waste pile and ACM concerns on the Mineral Building property to the EPA. As part of EPA's evaluation in the *Removal Assessment Report for C&H Mineral Building – RS Site* (TetraTech, Inc. 2018), which included additional sampling on the Mineral Building property, additional criteria were considered (by EPA) including EPA RMLs and NESHAP limits, and DEQ PSIC. EPA concluded in the report that "The damaged and friable ACBM and ACBM with the potential to become friable pose a potential risk to human health related to the inhalation pathway. ACBM, including roofing materials that have been and will continue to fall and blow off of the Mineral Building roof onto the Site property, bordering properties, and the adjacent MDOT Highway M-26 ROW increase the potential for human exposure to asbestos. TCLP testing identified wastes likely to leach concentrations of lead that may be harmful to human health or the environment as well. There is also potential exposure of ecological receptors to Site contamination as the potential for wind and water erosion, and deposition of contaminated soils and wastes into the environment, including the adjacent Torch Lake. There is potential exposure of Site contamination to human receptors through inhalation of and direct contact with the contaminated media including RPM, soil, waste, stack debris, ACBM, and potential abandoned containers. Physical hazards associated with the unsecured Mineral Building, and waste pile and stack debris are present at the Site. The close proximity of the MDOT ROW, residences and an operating industrial facility, and potential for trespassers greatly increases the likelihood of human health and environmental impacts." EPA is working with Honeywell and the property owner to further evaluate risks and develop and implement remedial approaches. For further information, refer to the EPA C&H Mineral Building web page EPA C&H Mineral Building.

- Analytical results for various building materials, including but not limited to asphaltic roofing material, felt mastic, TSI, gasket material, and drywall indicated that ACM is present in the HPA on the Mineral Building property and adjacent M-26 ROW. These materials are widely distributed across the property and are subject to migration via wind and water erosion, as well as potential anthropogenic activities such as mowing in the M-26 ROW. Asbestos concentrations in 10 different materials on the Mineral Building property exceeded 1% and in nine out of 10 roofing material samples collected from the M-26 ROW. The damaged and friable nature of these materials poses a potential risk to human health as it relates to the inhalation pathway. Also, although soil samples were not analyzed for asbestos in 2017, and prior soil samples did not contain detectable concentrations of asbestos, the uncontrolled dispersion and exposed nature of these materials makes them subject to further degradation that could potentially impact surface soils in the HPA.

- The sampled submerged drum contents contained multiple metals at concentrations that exceeded ESLs, TECs, and PECs. Thirteen of the 14 samples, collected from 12 different drums, contained PCBs at concentrations that exceeded the ESL, TEC, and PEC while the final sample exceeded the ESL and TEC. Total PCBs were detected up to a concentration of 17.4 ppm. The cloth sample contained multiple PNAs exceeding ESLs, TECs, and PECs as did drum content sample CHLL-SDM04. These 12 drums which were sampled near known PCB-contaminated sediments are a portion of the reported hundreds of submerged abandoned containers in the HPA. The submerged drums are generally located off-shore of the former Smelter property.

- Thirteen sediment samples (including duplicates) were collected from five sampling locations to aid in identifying PCB impacts in sediments. Sediment sample CHLL-SD114 from 0 to 10-inches in depth was the only sample to contain detectable concentrations of PCBs, but at 74 ppm Total PCBs, it was the highest PCB detection in sediments to date in Torch Lake. The total PCB concentration at this location exceeded the ESL, TEC, and PEC, and helped identify the presence of PCB impacts in sediments offshore from the Hubbell Slag Dump. The remaining borings aided in identification of other areas of affected sediments offshore from the HPA.

- Investigative activities associated with this project, along with prior DEQ and EPA multi-media sampling, have identified two distinct groupings of PCB contamination in Torch Lake sediments. The first grouping is located

in the LLRA while the second grouping is located in the HPA. These source areas, as confirmed by the results of the historical SPMD and fish tissue studies, are ongoing sources of PCBs that pose both ecological and potential human health risks and continued degradation of the benthos in Torch Lake. These risks led DEQ to refer the submerged drums and sediment impacts in the HPA to the EPA in a November 9, 2017 letter. As DEQ notes in their referral, "Our review of the compiled data from 2005 – 2017 in Torch Lake, extending out from the C&H HPA, indicates that concentrations exceeding ecological screening levels and potentially the hazardous waste toxicity values are present in samples collected from an approximate 27 acre area." EPA is working with Honeywell through GLNPO to further evaluate risks and develop and implement remedial approaches for the offshore sediments in the LLRA and the in-lake sediments and submerged drums in the HPA.

9.3.2 Recommendations

It was previously established in the 2016 SI Report that the properties encompassed by the HPA are Facilities as defined in Part 201 of NREPA. The following is an outline of a recommended path forward for managing the identified potential exposure risks in the HPA.

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.

Limited actions have been taken through the implementation of remedial measures, such as the placement of a soil and vegetative cap on a portion of the Mineral Building property, the removal of waste pile WP-11 in 2017, and the removal of ACM and SACM (roofing) from the ground on the Mineral Building property and adjacent M-26 ROW. However, roofing material will continue to blow and fall off of the Mineral Building if not abated. Current actions by the property owner to remove the roofing may mitigate this concern but non-roofing ACM remains on the property.

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.

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

DEQ should continue to provide new study data to the RRD SFS which is responsible for monitoring EPA's remedy for the Torch Lake Superfund Site. RRD SFS should evaluate whether any remedy modifications are necessary in Torch Lake or terrestrial areas previously addressed by EPA in light of the additional information provided by the Project.

The EPA and RRD SFS should verify that administrative controls for areas that have been previously remediated by the EPA have been employed to ensure that the selected remedy is performing as designed and those institutional controls, where required, have been recorded and are being enforced.

Additionally, DEQ should continue information sharing and resolution efforts with all property owners and other stakeholders including providing pertinent data to Torch Lake Township and to the MDHHS and WUPHD where evaluation of specific potential public health risks is warranted.

In addition to the overarching recommendations presented above, the following provides additional considerations specific to areas of the HPA where potentially unacceptable risks remain:

- The uncontrolled nature of the identified ACM, regardless of the status of roofing removal, merits response actions to control potential exposure to contaminants. Once these uncontrolled conditions have been stabilized and exposure risks have been evaluated, long-term remedial objectives can be evaluated.

- The identified contaminant concentrations in several of the waste piles, and their uncontrolled nature, merit response actions to control and prevent continued human and ecological interaction and migration of contaminants from the terrestrial portions of the study area. Once these uncontrolled conditions have been stabilized and exposure risks have been evaluated, long-term remedial objectives can be evaluated.

- Based on the investigation results, DEQ referred the waste pile and ACM concerns on the Mineral Building property along with the submerged drums and sediment impacts in the HPA to the EPA ERB. EPA is working with Honeywell and the Mineral+ Building property owner to further evaluate risks and develop and implement remedial approaches on the Mineral Building property. Refer to the EPA C&H Mineral Building web page EPA C&H Mineral Building. EPA is also working with Honeywell through GLNPO to further evaluate risks and develop and implement remedial approaches for the in-lake sediments and submerged drums in the HPA. DEQ should continue to coordinate with EPA ERB and GLNPO on the EPA assessment and removal/remediation activities as well as continue assessment and delineation of affected areas as may be needed to support risk assessment and removal/remediation planning and implementation.

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

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

Supplemental investigation activities conducted in 2017 in the Hubbell Slag Dump and Beach Area of the CHLL are discussed in Section 9 above. This organization was selected in order to present the 2017 off-shore sediment evaluation results in a cohesive manner since the HPA and Hubbell Slag Dump and Beach Area are adjacent to one another.

11. CONCLUSIONS AND RECOMMENDATIONS

In 2017, supplemental investigation activities included surveying the bathymetry of Torch Lake within the LLRA and sediment sampling to identify PCB, arsenic, and lead contamination in nearshore sediments. Activities at the HPA in 2017:

- Evaluated risks and aided in characterizing the waste piles at the Mineral Building property;
- Sampled SACM and identified numerous ACMs on the Mineral Building property and the adjacent M-26 ROW;
- Characterized submerged drum contents; and,
- Further identified PCB-affected sediments.

Also in 2017, based on the investigation results to date, DEQ referred three portions of the Project area to the EPA ERB. At the LLRA, EPA ERB evaluated the information provided by DEQ and is working with Honeywell and other agencies to further evaluate risks and develop remedial approaches. A Time Critical Removal Action is planned for 2019 to address near-shore sediments followed by post-removal monitoring activities. For further information, refer to the EPA LLRA web page EPA LLRA. At the Mineral Building property, EPA is working with Honeywell and the property owner to further evaluate risks and develop and implement remedial approaches. For further information, refer to the EPA C&H Mineral Building web page EPA C&H Mineral Building. EPA is also working with Honeywell through GLNPO to further evaluate risks and develop and implement remedial approaches for the offshore sediments in the LLRA and the in-lake sediments and submerged drums in the HPA.

The analytical results and interpretation summarized in the detailed findings presented in Section 7 and Section 9 document potential human health and ecological risks that are present in the LLRA and HPA, respectively. With DEQ's referral of the sediment impacts in the LLRA and the waste pile and ACM concerns on the Mineral Building property of the HPA to the EPA ERB, the next phase of the path forward for mitigating the identified risks has been enacted.

DEQ should continue to coordinate with EPA ERB and GLNPO on the EPA assessment and removal/remediation activities as well as continue assessment and delineation of affected areas as may be needed to support risk assessment and removal/remediation planning and implementation since the EPA removal actions may not address all applicable exposure pathways. 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.

Once property-specific exposure risks have been evaluated, remedial objectives can be established with appropriate land use restrictions that minimize or eliminate potential exposure risks. These land-use restrictions, or administrative controls, should be employed to ensure that exposures not addressed through removal actions are reliably restricted by a restrictive covenant, institutional control, or other mechanism allowed for under Part 201.

DEQ should continue to provide new study data to the RRD SFS which is responsible for monitoring EPA's remedy for the Torch Lake Superfund Site. RRD SFS should evaluate whether any remedy modifications are necessary in Torch Lake or terrestrial areas previously addressed by EPA in light of the additional information provided by the Project.

DEQ should request that responsible stakeholders confirm that administrative controls for areas that have been previously remediated by the EPA have been employed to ensure that the selected remedy is performing as designed and those institutional controls, where required, have been recorded and are being enforced.

Additionally, DEQ should continue to provide new study data to governmental stakeholders responsible for implementation and monitoring EPA's remedy for the terrestrial and in-lake portion of the Torch Lake Superfund Site.

This also includes continuing to provide new study data to property owners and governmental stakeholders responsible for assessing potential public health impacts and making recommendations to the public, property owners, and other state agencies.

12. REFERENCES

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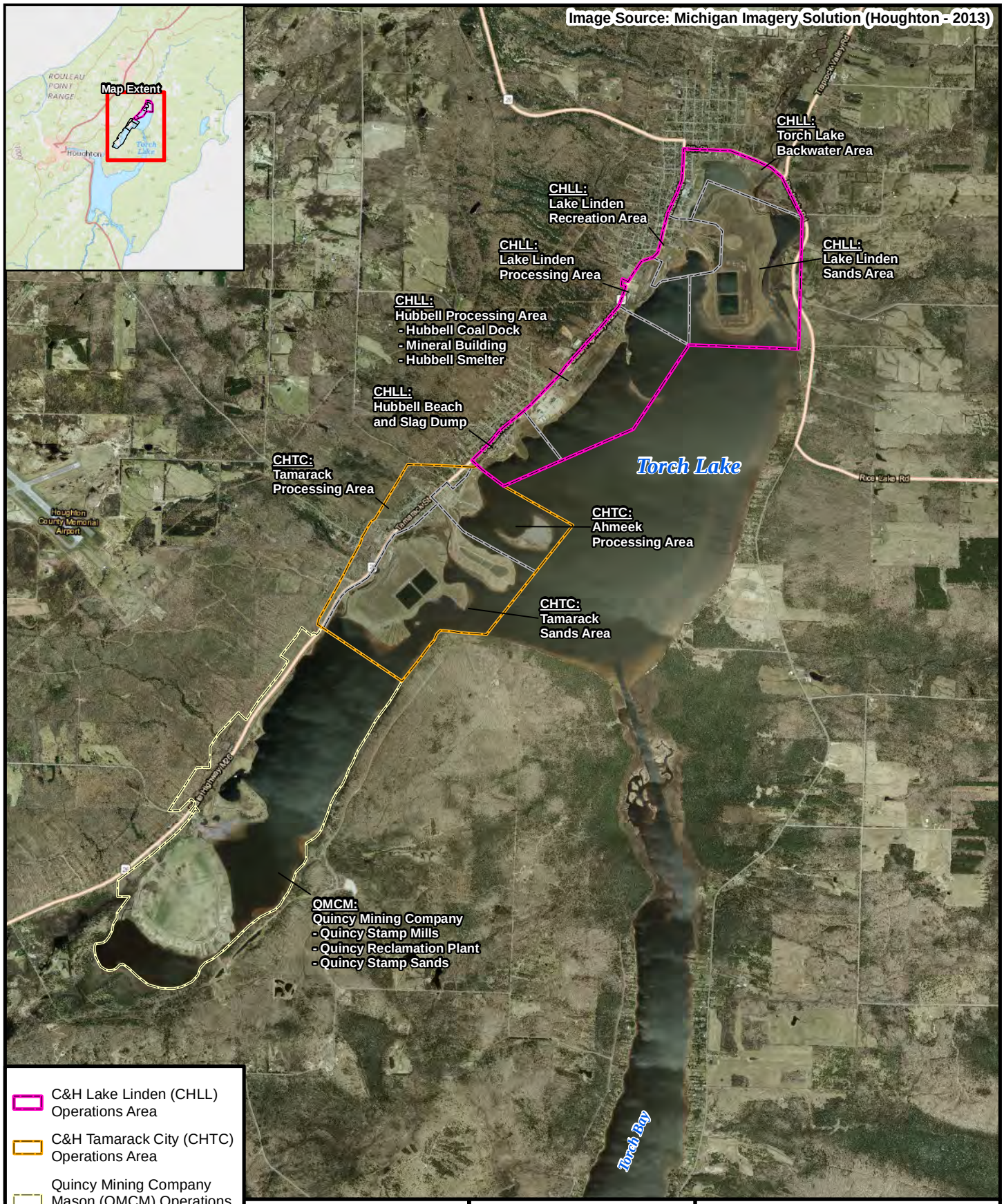
FIGURES



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Michigan Department of Environmental Quality

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Figure 1-1

Project Location Map
C & H Lake Linden Operations
Lake Linden, Houghton County, Michigan

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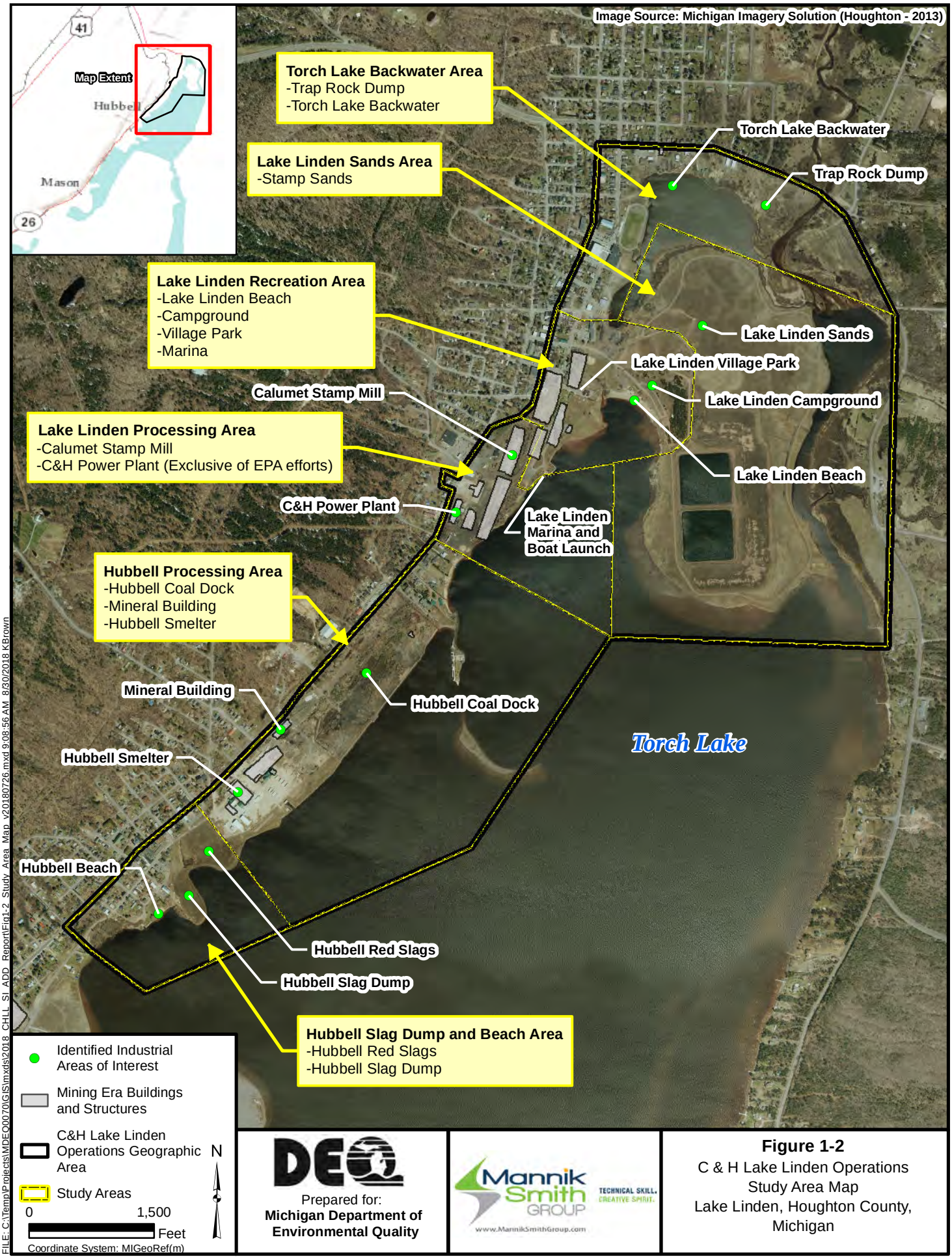

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Figure 1-2
C & H Lake Linden Operations
Study Area Map
Lake Linden, Houghton County, Michigan

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Figure 1-3
Lake Linden Recreation Area
Location and Features Map
C & H Lake Linden Operations
Lake Linden, Houghton County, Michigan

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Figure 1-4
Hubbell Processing Area
Location and Features Map
C & H Lake Linden Operations
Lake Linden, Houghton County, Michigan

Image Source: ESRI (DigitalGlobe 2016)

LLV-15 07/31/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	130	mg/kg	[1,2]
0-0.25	COPPER (DUP)	130	mg/kg	[1,2]
1-1.5	COPPER	590	mg/kg	[1,2,3]
1-1.5	COPPER (DUP)	550	mg/kg	[1,2,3]

LLV-Beach1 07/26/07

Depth	Parameter	Result	Units	[Criteria]
0-0	BARIUM	270	ug/l	[4]
0-0	COPPER	240	ug/l	[4]
0-0	*LEAD*	*44*	*ug/l*	*[4,5]*
0-0	SILVER	0.88	ug/l	[4]

CHLL-SD105 06/06/17

Depth	Parameter	Result	Units	[Criteria]
0 - 1	*LEAD*	*110*	*mg/kg*	*[1,2]**
1 - 3	*LEAD*	*59*	*mg/kg*	*[1,2]*
1 - 3	*LEAD (DUP)*	*57*	*mg/kg*	*[1,2]*
3 - 6	*LEAD*	*37*	*mg/kg*	*[1,2]*

CHLL-SD17 07/12/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	*TOTAL PCBS*	*1650 J*	*ug/kg*	*[1,2,3,8]*

TL07-04 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	*ARSENIC*	*26*	*mg/kg*	*[1,2,8]*
0-0.5	CHROMIUM	51	mg/kg	[1,2]
0-0.5	COPPER	28000	mg/kg	[1,2,3,8]
0-0.5	*LEAD*	*7800*	*mg/kg*	*[1,2,3,8]**
0-0.5	MERCURY	0.6	mg/kg	[1,2]
0-0.5	SILVER	80	mg/kg	[1]
0-0.5	ZINC	1000	mg/kg	[1,2,3]
0-0.5	*TOTAL PCBS*	*910*	*ug/kg*	*[1,2,3]*
0.5-2.17	CHROMIUM	45	mg/kg	[1,2]
0.5-2.17	COPPER	3900	mg/kg	[1,2,3]
0.5-2.17	*LEAD*	*400*	*mg/kg*	*[1,2,3]**
0.5-2.17	SILVER	11	mg/kg	[1]
0.5-2.17	ZINC	180	mg/kg	[1,2]
0.5-2.17	*TOTAL PCBS*	*180*	*ug/kg*	*[1,2]*
3-5	CHROMIUM	44	mg/kg	[1,2]
3-5	COPPER	3400	mg/kg	[1,2,3]
3-5	*LEAD*	*39*	*mg/kg*	*[1,2]*
3-5	SILVER	6.1	mg/kg	[1]
5-7.92	CHROMIUM	44	mg/kg	[1,2]
5-7.92	COPPER	3000	mg/kg	[1,2,3]
5-7.92	SILVER	5.4	mg/kg	[1]

LLV-11 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	800	mg/kg	[1,2,3]
0-0.25	*LEAD*	*79*	*mg/kg*	*[1,2]*
1-1.5	COPPER	780	mg/kg	[1,2,3]

CHLL-SW04 05/28/15

ALL PCBS WERE NON-DETECT

CHLL-SD82 05/28/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	110	mg/kg	[1,2]
0-0.5	*LEAD*	*85*	*mg/kg*	*[1,2]*
0-0.5	SILVER	1.5	mg/kg	[1]
0-0.5	ZINC	210	mg/kg	[1,2]
1-3	*TOTAL PCBS*	*900 J*	*ug/kg*	*[1,2,3]*

LLV-10 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	910	mg/kg	[1,2,3]
0-0.25	*LEAD*	*74*	*mg/kg*	*[1,2]*
1-1.5	COPPER	970	mg/kg	[1,2,3]

SPMD Site #3 11/18/05

Parameter	Result	Units	[Criteria]
TOTAL PCBS	*74*	*ug/l*	*[--]*

LLV-9 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	1700	mg/kg	[1,2,3]
0-0.25	*LEAD*	*59*	*mg/kg*	*[1,2]*
1-1.5	COPPER	2200	mg/kg	[1,2,3]
1-1.5	*LEAD*	*36*	*mg/kg*	*[1]*

CHLL-SD102 07/12/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	*LEAD*	*160*	*mg/kg*	*[1,2,3]**
1-3.0	*TOTAL PCBS*	*920*	*ug/kg*	*[1,2,3]*

CHLL-SD81 05/27/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	CADMIUM	2.9	mg/kg	[1,2]
0-0.5	COPPER	9900	mg/kg	[1,2,3]
0-0.5	*LEAD*	*1700*	*mg/kg*	*[1,2,3,8]**
0-0.5	MERCURY	0.3	mg/kg	[1,2]
0-0.5	NICKEL	33	mg/kg	[1,2]
0-0.5	SILVER	20	mg/kg	[1]
0-0.5	ZINC	290	mg/kg	[1,2]
0-0.5	*TOTAL PCBS*	*130 J*	*ug/kg*	*[1,2]*

CHLL-SD16 07/11/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	*TOTAL PCBS*	*560 J*	*ug/kg*	*[1,2]*

CHLL-SD75 05/27/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	480	mg/kg	[1,2,3]
0-0.5	SILVER	1.7	mg/kg	[1]

CHLL-SD15 06/16/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	*TOTAL PCBS*	*500 J*	*ug/kg*	*[1,2]*
1-2.7	*TOTAL PCBS*	*290*	*ug/kg*	*[1,2]*

LLV-16 07/31/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	160	mg/kg	[1,2,3]
1-1.5	COPPER	380	mg/kg	[1,2,3]

LLV-17 07/31/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	390	mg/kg	[1,2,3]
1-1.5	COPPER	440	mg/kg	[1,2,3]
1-1.5	*LEAD*	*49*	*mg/kg*	*[1,2]*

CHLL-SD76 05/28/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	490	mg/kg	[1,2,3]
0-0.5	NICKEL	25	mg/kg	[1,2]
0-0.5	SILVER	3	mg/kg	[1]

LLV-18 07/31/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	290	mg/kg	[1,2,3]
1-1.5	COPPER	930	mg/kg	[1,2,3]

CHLL-SD14 07/11/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	*ARSENIC*	*16*	*mg/kg*	*[1,2,8]*
0-0.5	CADMIUM	3.6	mg/kg	[1,2]
0-0.5	COPPER	9800	mg/kg	[1,2,3]
0-0.5	*LEAD*	*2200*	*mg/kg*	*[1,2,3,8]**
0-0.5	MERCURY	0.3	mg/kg	[1,2]
0-0.5	NICKEL	52	mg/kg	[1,2,3]
0-0.5	SILVER	26	mg/kg	[1]
0-0.5	ZINC	430	mg/kg	[1,2]
0-0.5	*TOTAL PCBS*	*730 J*	*ug/kg*	*[1,2,3]*

LLV-19 07/31/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	440	mg/kg	[1,2,3]
1-1.5	COPPER	930	mg/kg	[1,2,3]
1-1.5	*LEAD*	*39*	*mg/kg*	*[1,2]*

CHLL-SD77 05/28/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	490	mg/kg	[1,2,3]
0-0.5	NICKEL	24	mg/kg	[1,2]
0-0.5	SILVER	2.2	mg/kg	[1]
3-5	*TOTAL PCBS*	*88 J*	*ug/kg*	*[1,2]*

LLV-20 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	410	mg/kg	[1,2,3]
1-1.5	COPPER	850	mg/kg	[1,2,3]

CHLL-SD78 05/28/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	*ARSENIC*	*10*	*mg/kg*	*[1,2,8]*
0-0.5	COPPER	1900	mg/kg	[1,2,3]
0-0.5	*LEAD*	*330*	*mg/kg*	*[1,2,3]**
0-0.5	NICKEL	46	mg/kg	[1,2]
0-0.5	SILVER	5.5	mg/kg	[1]
0-0.5	ZINC	150	mg/kg	[1,2]

LLV-21 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	*ARSENIC*	*10*	*mg/kg*	*[1,2,8]*
0-0.25	COPPER	3200	mg/kg	[1,2,3]
1-1.5	COPPER	760	mg/kg	[1,2,3]

CHLL-SD13 06/15/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	550	mg/kg	[1,2,3]
0-0.5	NICKEL	25	mg/kg	[1,2]
0-0.5	SILVER	1.7	mg/kg	[1]

CHLL-SD80 05/27/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	*ARSENIC*	*14*	*mg/kg*	*[1,2,8]*
0-0.5	CADMIUM	2.7	mg/kg	[1,2]
0-0.5	COPPER	6700	mg/kg	[1,2,3]
0-0.5	*LEAD*	*1800*	*mg/kg*	*[1,2,3,8]**
0-0.5	MERCURY	0.3	mg/kg	[1,2]
0-0.5	NICKEL	51	mg/kg	[1,2,3]
0-0.5	SILVER	16	mg/kg	[1]
0-0.5	ZINC	310	mg/kg	[1,2]
0-0.5	*TOTAL PCBS*	*210 J*	*ug/kg*	*[1,2]*

CHLL-SW03 05/28/15

PCBS WERE ALL NON-DETECT

CHLL-SD79 05/28/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	*ARSENIC*	*14*	*mg/kg*	*[1,2,8]*
0-0.5	CADMIUM	3.8	mg/kg	[1,2]
0-0.5	COPPER	11000	mg/kg	[1,2,3]
0-0.5	*LEAD*	*2800*	*mg/kg*	*[1,2,3,8]**
0-0.5	MERCURY	0.2	mg/kg	[1,2]
0-0.5	NICKEL	53	mg/kg	[1,2,3]
0-0.5	SILVER	28	mg/kg	[1]
0-0.5	ZINC	330	mg/kg	[1,2]
0-0.5	*TOTAL PCBS*	*140 J*	*ug/kg*	*[1,2]*

See Figure 7-6b

See Figure 7-6c

See Figure 7-6c

DATA SOURCES

Sample IDs — **Date Range**

1) **"SPMD-..."** — **November 2005**
- **MDEQ**, Water Bureau. *Final Report, PCB Study Using Semipermeable Membrane Devices in Torch Lake Houghton County, MDEQ Project Number 05-25.* March 2006

2) **"LLV-..."** — **July 2007 - Aug 2007**
- **USEPA.** *Letter Report for Lake Linden Emergency Response Site, Lake Linden, Houghton County, Michigan.* November 2007

3) **"TL07-..."** — **August 2007**
- **MDEQ**, Water Bureau, *A Sediment Chemistry Survey of Torch Lake, Houghton County, Michigan, August 7, 8, and 9, 2001*, Editor 2008: Lansing, Michigan

4) **"SD-03 / SW-03"** — **October 2011**
- **MDEQ** RRD, Superfund Section, Pre-remedial Group, Site Evaluation Unit, *CERCLA Draft Site Inspection (SI) Report for C&H Lake Linden Operations, Lake Linden, Michigan, 49945, U.S. EPA ID No: MIN000510619*, 2013

5) **"CHLL-SD01 through CHLL-SD104" June 2014 - Aug 2015**
- **MDEQ** RRD. *Site Investigation Report for Abandoned Mining Wastes Torch Lake Non-Superfund Site, Calumet and Hecla – Lake Linden Operations, Houghton County, Michigan.* March 2016

6) **"CHLL-SD105 through CHLL-SD109" June 2017**
- **MDEQ** RRD. *Supplemental sediment sampling* Results not published

MDEQ Part 201 Cleanup Criteria for Response Action
[1]=Sediment Ecological Screening Levels
[2]=Threshold Effect Concentration (TEC)
[3]=Probable Effect Concentration (PEC)
[4]=Surface Water Ecological Screening Levels
[5]=Surface Water Rule 57 HNV Drink
[6]=Surface Water Rule 57 HCV Drink
[7]=Surface Water Rule 57 WV
[8]=Residential Soil Direct Contact Criteria
* = Potentially exceeds hazardous waste toxicity value

Sampling locations with at least one exceedance
Sampling locations with no exceedances
Locations are included on a different figure

Locations Analyzed for PCBs
No Detections
At Least One Detection

Sediment Exceeds MDEQ Part 201 Residential Soil Direct Contact Criteria
MDEQ June 2017 Bathymetry Survey Results (feet below water surface)
Approximate Subject Area of PCBs, Lead, and Arsenic above Criteria
Excavation Extent (EPA's 2007 ER)
Mining Era Buildings and Structures

- mg/kg = milligrams per kilogram
- ug/kg = micrograms per kilogram
- ug/l = micrograms per liter
- Sample depths shown in feet below ground surface
- Only results greater than criteria are shown
- ***RED*** text indicates Total PCBs
- ***BLUE*** text indicates Lead
- ***GREEN*** text indicates Arsenic

0 150 Ft
Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

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Figure 7-6a
Sample Analytical Result Map
Sediment, Surface Water, and SPMD
Lake Linden, Houghton County, Michigan

FILE: C:\Temp\Projects\MDEQ0070\GIS\mxds\2018 CHLL SI ADD Report\Fig7-6a LLRA Results v20180905.mxd 4:13:47 PM 9/5/2018 KBrown

Image Source: ESRI (DigitalGlobe 2016)

LLV-MP4 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	340	mg/kg	[1,2,3]

LLV-Creek1 07/26/07

Depth	Parameter	Result	Units	[Criteria]
0-0	ANTIMONY	3	ug/l	[5]
0-0	*ARSENIC*	*29*	*ug/l*	*[5,6]*
0-0	BARIUM	530	ug/l	[4]
0-0	CADMIUM	1.2	ug/l	[4]
0-0	COPPER	990	ug/l	[4,5]
0-0	*LEAD*	*550*	*ug/l*	*[4,5]**
0-0	SILVER	4.6	ug/l	[4]
0-0	VANADIUM	20	ug/l	[4]
0-0	ZINC	110	ug/l	[4]

LLV-13 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	300	mg/kg	[1,2,3]
0-0.25	COPPER (DUP)	440	mg/kg	[1,2,3]
1-1.5	COPPER	1100	mg/kg	[1,2,3]
1-1.5	COPPER (DUP)	300	mg/kg	[1,2,3]
1-1.5	*LEAD*	*49*	*mg/kg*	*[1,2]*

TL07-01 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	140	mg/kg	[1,2]
0.5-2	COPPER	430	mg/kg	[1,2,3]
0.5-2	*LEAD*	*110*	*mg/kg*	*[1,2]**
0.5-2	SILVER	1.3	mg/kg	[1]
2-3.58	COPPER	670	mg/kg	[1,2,3]
2-3.58	*LEAD*	*150*	*mg/kg*	*[1,2,3]**
2-3.58	SILVER	1.2	mg/kg	[1]
3.58-5.33	*ARSENIC*	*49*	*mg/kg*	*[1,2,3,8]*
3.58-5.33	BARIUM	130000	mg/kg	[8]
3.58-5.33	CADMIUM	85	mg/kg	[1,2,3]
3.58-5.33	CHROMIUM	200	mg/kg	[1,2,3]
3.58-5.33	COPPER	120000	mg/kg	[1,2,3,8]
3.58-5.33	*LEAD*	*75000*	*mg/kg*	*[1,2,3,8]**
3.58-5.33	MERCURY	1.5	mg/kg	[1,2,3]
3.58-5.33	SILVER	450	mg/kg	[1]
3.58-5.33	ZINC	6000	mg/kg	[1,2,3]
3.58-5.33	*TOTAL PCBS*	*8900*	*ug/kg*	*[1,2,3,8]*

CHLL-SD19 07/12/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	89	mg/kg	[1,2]
1-2.4	COPPER	140	mg/kg	[1,2]

LLV-MP3 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	200	mg/kg	[1,2,3]
0-0.5	*LEAD*	*40*	*mg/kg*	*[1,2]*

SW-03 10/12/11

Depth	Parameter	Result		Units	[Criteria]
0-0.5	CYANIDE	20.7	J	ug/l	[4]
0-0.5	COPPER	19.6	J	ug/l	[4]
0-0.5	COPPER (DUP)	28.2		ug/l	[4]
0-0.5	*LEAD*	*1.5*	*J*	*ug/l*	*[4]*
0-0.5	BIS(2-ETHYLHEXYL)PHTHALATE (DUP)	3.6	J	ug/l	[4]

SD-03 10/12/11

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	164	mg/kg	[1,2,3]
0-0.25	COPPER (DUP)	97.7	mg/kg	[1,2]

CHLL-SD18 07/12/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	130	mg/kg	[1,2]
1-2.7	CADMIUM	3.1	mg/kg	[1,2]
1-2.7	COPPER	4400	mg/kg	[1,2,3]
1-2.7	*LEAD*	*1600*	*mg/kg*	*[1,2,3,8]**
1-2.7	SILVER	13	mg/kg	[1]
1-2.7	ZINC	220	mg/kg	[1,2]
1-2.7	*TOTAL PCBS*	*720 J*	*ug/kg*	*[1,2,3]*

LLV-MP5 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	310	mg/kg	[1,2,3]
0-0.5	*LEAD*	*130*	*mg/kg*	*[1,2]**

LLV-MP6 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	330	mg/kg	[1,2,3]
0-0.5	*LEAD*	*110*	*mg/kg*	*[1,2]**

LLV-14 07/31/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	72	mg/kg	[1,2]
1-1.5	*ARSENIC*	*11*	*mg/kg*	*[1,2,8]*
1-1.5	COPPER	1500	mg/kg	[1,2,3]
1-1.5	*LEAD*	*470*	*mg/kg*	*[1,2,3,8]**

CHLL-SW01 05/27/15

PCBS WERE ALL NON-DETECT

CHLL-SD73 05/27/15

Depth	Parameter	Result		Units	[Criteria]
0-0.5	CADMIUM	2.7		mg/kg	[1,2]
0-0.5	COPPER	3800		mg/kg	[1,2,3]
0-0.5	*LEAD*	*1900*		*mg/kg*	*[1,2,3,8]**
0-0.5	NICKEL	27		mg/kg	[1,2]
0-0.5	SILVER	13		mg/kg	[1]
0-0.5	ZINC	290		mg/kg	[1,2]
0-0.5	*TOTAL PCBS*	*180*	*J*	*ug/kg*	*[1,2]*
1-3	*TOTAL PCBS*	*250*	*J*	*ug/kg*	*[1,2]*
1-3	*TOTAL PCBS (DUP)*	*230*	*J*	*ug/kg*	*[1,2]*
1-3	FLUORANTHENE	940	J	ug/kg	[1,2]
1-3	FLUORANTHENE (DUP)	1200		ug/kg	[1,2]
1-3	PYRENE	700	J	ug/kg	[1,2]
1-3	PYRENE (DUP)	890		ug/kg	[1,2]

LLV-MP8 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	540	mg/kg	[1,2,3]
0-0.5	*LEAD*	*68*	*mg/kg*	*[1,2]*

CHLL-SD-106 06/06/17

Depth	Parameter	Result	Units	[Criteria]
0 - 1	*ARSENIC*	*10*	*mg/kg*	*[1,2,8]*
0 - 1	*LEAD*	*1100*	*mg/kg*	*[1,2,3,8]**
0 - 1	*TOTAL PCBS*	*710*	*ug/kg*	*[1,2,3]*
1 - 3	*LEAD*	*590*	*mg/kg*	*[1,2,3,8]**
1 - 3	*TOTAL PCBS*	*180*	*ug/kg*	*[1,2]*
3 - 5	*LEAD*	*41*	*mg/kg*	*[1,2]*

CHLL-SW02 05/27/15

PCBS WERE ALL NON-DETECT

CHLL-SD74 05/27/15

Depth	Parameter	Result		Units	[Criteria]
0-0.5	*ARSENIC*	*12*		*mg/kg*	*[1,2,8]*
0-0.5	CADMIUM	2.6		mg/kg	[1,2]
0-0.5	COPPER	4000		mg/kg	[1,2,3]
0-0.5	*LEAD*	*1100*		*mg/kg*	*[1,2,3,8]**
0-0.5	MERCURY	0.2		mg/kg	[1,2]
0-0.5	NICKEL	43		mg/kg	[1,2]
0-0.5	SILVER	7.8		mg/kg	[1]
0-0.5	ZINC	440		mg/kg	[1,2]
0-0.5	*TOTAL PCBS*	*370*	*J*	*ug/kg*	*[1,2]*

TL07-03 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-1.75	COPPER	160	mg/kg	[1,2,3]
1.75-3.42	*ARSENIC*	*55*	*mg/kg*	*[1,2,3,8]*
1.75-3.42	BARIUM	99000	mg/kg	[8]
1.75-3.42	CADMIUM	37	mg/kg	[1,2,3]
1.75-3.42	CHROMIUM	120	mg/kg	[1,2,3]
1.75-3.42	COPPER	120000	mg/kg	[1,2,3,8]
1.75-3.42	*LEAD*	*42000*	*mg/kg*	*[1,2,3,8]**
1.75-3.42	MERCURY	2.6	mg/kg	[1,2,3]
1.75-3.42	SILVER	380	mg/kg	[1]
1.75-3.42	ZINC	4100	mg/kg	[1,2,3]
1.75-3.42	*TOTAL PCBS*	*6100*	*ug/kg*	*[1,2,3,8]*
3.42-5.83	CHROMIUM	44	mg/kg	[1,2]
3.42-5.83	COPPER	3500	mg/kg	[1,2,3]
3.42-5.83	*LEAD*	*300*	*mg/kg*	*[1,2,3]*
3.42-5.83	SILVER	9.3	mg/kg	[1]
3.42-5.83	ZINC	140	mg/kg	[1,2]

LLV-MP7 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	100	mg/kg	[1,2]

TL07-02 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-2.33	COPPER	370	mg/kg	[1,2,3]
0-2.33	*LEAD*	*100*	*mg/kg*	*[1,2]**
0-2.33	SILVER	0.87	mg/kg	[1]
2.33-4	*ARSENIC*	*38*	*mg/kg*	*[1,2,3,8]*
2.33-4	BARIUM	84000	mg/kg	[8]
2.33-4	CADMIUM	38	mg/kg	[1,2,3]
2.33-4	CHROMIUM	130	mg/kg	[1,2,3]
2.33-4	COPPER	78000	mg/kg	[1,2,3,8]
2.33-4	*LEAD*	*44000*	*mg/kg*	*[1,2,3,8]**
2.33-4	MERCURY	1.7	mg/kg	[1,2,3]
2.33-4	SILVER	290	mg/kg	[1]
2.33-4	ZINC	3500	mg/kg	[1,2,3]
2.33-4	*TOTAL PCBS*	*5800*	*ug/kg*	*[1,2,3,8]*
4-5.33	ARSENIC	8.2	mg/kg	[8]
4-5.33	CADMIUM	3.6	mg/kg	[1,2]
4-5.33	COPPER	8600	mg/kg	[1,2,3]
4-5.33	*LEAD*	*2500*	*mg/kg*	*[1,2,3,8]**
4-5.33	MERCURY	0.3	mg/kg	[1,2]
4-5.33	SILVER	39	mg/kg	[1]
4-5.33	ZINC	430	mg/kg	[1,2]
4-5.33	*TOTAL PCBS*	*280*	*ug/kg*	*[1,2]*

CHLL-SD-108 06/06/17

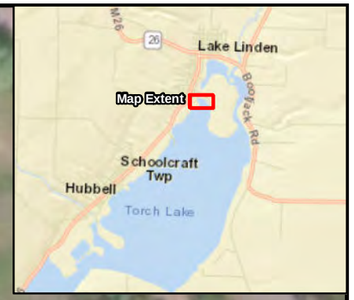
Depth	Parameter	Result	Units	[Criteria]
0 - 1	*ARSENIC*	*11*	*mg/kg*	*[1,2,8]*
0 - 1	*ARSENIC (DUP)*	*12*	*mg/kg*	*[1,2,8]*
0 - 1	*LEAD*	*4500*	*mg/kg*	*[1,2,3,8]**
0 - 1	*LEAD (DUP)*	*3700*	*mg/kg*	*[1,2,3,8]**
0 - 1	*TOTAL PCBS*	*490*	*ug/kg*	*[1,2]*
0 - 1	*TOTAL PCBS (DUP)*	*770*	*ug/kg*	*[1,2,3]*

CHLL-SD109

CHLL-SD107

See Figure 7-8a

5 10 15 20 25



DATA SOURCES

Sample IDs **Date Range**

1) **"SPMD-..."** **November 2005**
- **MDEQ**, Water Bureau. *Final Report, PCB Study Using Semipermeable Membrane Devices in Torch Lake Houghton County, MDEQ Project Number 05-25.* March 2006

2) **"LLV-..."** **July 2007 - Aug 2007**
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3) **"TL07-..."** **August 2007**
- **MDEQ**, Water Bureau, *A Sediment Chemistry Survey of Torch Lake, Houghton County, Michigan, August 7, 8, and 9, 2001,* Editor 2008: Lansing, Michigan

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5) **"CHLL-SD01 through CHLL-SD104" June 2014 - Aug 2015**
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6) **"CHLL-SD105 through CHLL-SD109" June 2017**
- **MDEQ** RRD. *Supplemental sediment sampling* Results not published

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Locations are included on a different figure

Locations Analyzed for PCBs
- No Detections
- At Least One Detection

- Sediment Exceeds MDEQ Part 201 Residential Soil Direct Contact Criteria
- MDEQ June 2017 Bathymetry Survey Results (feet below water surface)
- Approximate Subject Area of PCBs, Lead, and Arsenic above Criteria
- Excavation Extent (EPA's 2007 ER)
- Mining Era Buildings and Structures

- mg/kg = milligrams per kilogram
- ug/kg = micrograms per kilogram
- ug/l = micrograms per liter
- Sample depths shown in feet below ground surface
- Only results greater than criteria are shown
- ***RED*** text indicates Total PCBs
- ***BLUE*** text indicates Lead
- ***GREEN*** text indicates Arsenic

N

0 100 Ft

Coordinate System: MIGeoRef(m)

MDEQ Part 201 Cleanup Criteria for Response Action
[1]=Sediment Ecological Screening Levels
[2]=Threshold Effect Concentration (TEC)
[3]=Probable Effect Concentration (PEC)
[4]=Surface Water Ecological Screening Levels
[5]=Surface Water Rule 57 HNV Drink
[6]=Surface Water Rule 57 HCV Drink
[7]=Surface Water Rule 57 WV
[8]=Residential Soil Direct Contact Criteria
* = Potentially exceeds hazardous waste toxicity value

Prepared for:
Michigan Department of Environmental Quality

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Figure 7-6b
Sample Analytical Result Map
Sediment and Surface Water
Lake Linden, Houghton County, Michigan

FILE: C:\Temp\Projects\MDEQ0070\GIS\mxds\2018_CHLL_SI_ADD_Report\Fig7-6b_LLRA_Results_v20180905.mxd 4:10:02 PM 9/5/2018 KBrown

Image Source: ESRI (DigitalGlobe 2016)

DATA SOURCES

Sample IDs — **Date Range**

1) **"SPMD-..."** — **November 2005**
- **MDEQ**, Water Bureau. *Final Report, PCB Study Using Semipermeable Membrane Devices in Torch Lake Houghton County, MDEQ Project Number 05-25.* March 2006

2) **"LLV-..."** — **July 2007 - Aug 2007**
- **USEPA.** *Letter Report for Lake Linden Emergency Response Site, Lake Linden, Houghton County, Michigan.* November 2007

3) **"TL07-..."** — **August 2007**
- **MDEQ**, Water Bureau, *A Sediment Chemistry Survey of Torch Lake, Houghton County, Michigan, August 7, 8, and 9, 2001*, Editor 2008: Lansing, Michigan

4) **"SD-03 / SW-03"** — **October 2011**
- **MDEQ** RRD, Superfund Section, Pre-remedial Group, Site Evaluation Unit, *CERCLA Draft Site Inspection (SI) Report for C&H Lake Linden Operations, Lake Linden, Michigan, 49945, U.S. EPA ID No: MIN000510619*, 2013

5) **"CHLL-SD01 through CHLL-SD104" June 2014 - Aug 2015**
- **MDEQ** RRD. *Site Investigation Report for Abandoned Mining Wastes Torch Lake Non-Superfund Site, Calumet and Hecla – Lake Linden Operations, Houghton County, Michigan.* March 2016

6) **"CHLL-SD105 through CHLL-SD109" June 2017**
- **MDEQ** RRD. *Supplemental sediment sampling* Results not published

LLV-8 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	1500	mg/kg	[1,2,3]
1-1.5	COPPER	1000	mg/kg	[1,2,3]

LLV-7 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	1000	mg/kg	[1,2,3]
0-0.25	COPPER (DUP)	1100	mg/kg	[1,2,3]
1-1.5	COPPER	560	mg/kg	[1,2,3]
1-1.5	COPPER (DUP)	470	mg/kg	[1,2,3]

LLV-4 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	770	mg/kg	[1,2,3]
1-1.5	COPPER	1500	mg/kg	[1,2,3]

TL07-13 08/08/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	800	mg/kg	[1,2,3]
0-0.5	SILVER	3.3	mg/kg	[1]
0.5-2.17	*ARSENIC*	*8.7*	*mg/kg*	*[8]*
0.5-2.17	COPPER	1300	mg/kg	[1,2,3]
0.5-2.17	*LEAD*	*70*	*mg/kg*	*[1,2]*
0.5-2.17	SILVER	4	mg/kg	[1]
2.17-3.33	*ARSENIC*	*18*	*mg/kg*	*[1,2,8]*
2.17-3.33	COPPER	2400	mg/kg	[1,2,3]
2.17-3.33	*LEAD*	*72*	*mg/kg*	*[1,2]*
2.17-3.33	SILVER	8.1	mg/kg	[1]
3.33-5.5	COPPER	7100	mg/kg	[1,2,3]
3.33-5.5	COPPER (DUP)	5800	mg/kg	[1,2,3]
3.33-5.5	SILVER	8	mg/kg	[1]
3.33-5.5	SILVER (DUP)	6.9	mg/kg	[1]

LLV-1 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	1900	mg/kg	[1,2,3]
1-1.5	COPPER	7100	mg/kg	[1,2,3]
1-1.5	*LEAD*	*40*	*mg/kg*	*[1,2]*

LLV-6 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	2600	mg/kg	[1,2,3]
1-1.5	COPPER	3900	mg/kg	[1,2,3]

LLV-5 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	6400	mg/kg	[1,2,3]
1-1.5	COPPER	1300	mg/kg	[1,2,3]

LLV-3 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	810	mg/kg	[1,2,3]
1-1.5	COPPER	1200	mg/kg	[1,2,3]

LLV-22 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	580	mg/kg	[1,2,3]
0-0.25	COPPER (DUP)	720	mg/kg	[1,2,3]
1-1.5	COPPER	580	mg/kg	[1,2,3]
1-1.5	COPPER (DUP)	570	mg/kg	[1,2,3]

LLV-23 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	630	mg/kg	[1,2,3]
1-1.5	COPPER	880	mg/kg	[1,2,3]

LLV-24 07/30/07

Depth	Parameter	Result	Units	[Criteria]
0-0.25	COPPER	750	mg/kg	[1,2,3]
1-1.5	COPPER	570	mg/kg	[1,2,3]

MDEQ Part 201 Cleanup Criteria for Response Action
[1]=Sediment Ecological Screening Levels
[2]=Threshold Effect Concentration (TEC)
[3]=Probable Effect Concentration (PEC)
[4]=Surface Water Ecological Screening Levels
[5]=Surface Water Rule 57 HNV Drink
[6]=Surface Water Rule 57 HCV Drink
[7]=Surface Water Rule 57 WV
[8]=Residential Soil Direct Contact Criteria
* = Potentially exceeds hazardous waste toxicity value

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Locations are included on a different figure

Locations Analyzed for PCBs
- No Detections
- At Least One Detection

- Sediment Exceeds MDEQ Part 201 Residential Soil Direct Contact Criteria
- MDEQ June 2017 Bathymetry Survey Results (feet below water surface)
- Approximate Subject Area of PCBs, Lead, and Arsenic above Criteria
- Excavation Extent (EPA's 2007 ER)
- Mining Era Buildings and Structures

- mg/kg = milligrams per kilogram
- ug/kg = micrograms per kilogram
- ug/l = micrograms per liter
- Sample depths shown in feet below ground surface
- Only results greater than criteria are shown
- ***RED*** text indicates Total PCBs
- ***BLUE*** text indicates Lead
- ***GREEN*** text indicates Arsenic

N

0 150 Ft

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

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Figure 7-6c
Sample Analytical Result Map
Sediment and Surface Water
Lake Linden, Houghton County, Michigan

FILE: C:\Temp\Projects\MDEQ0070\GIS\mxds\2018_CHLL_Si_ADD_Report\Fig7-6c_LLRA_Results_v20180905.mxd 4:10:18 PM 9/5/2018 KBrown

Image Source: Michigan Imagery Solution (Houghton - 2013)

ACBM IN ROW

SS-19 10/11/11

Depth	Parameter	Result		Units	[Criteria]
0-0.33	ARSENIC	5600	J	mg/kg	[9,10,16,17]*
0-0.33	COPPER	199000	J	mg/kg	[9,10,16,17]
0-0.33	CYANIDE	0.24	J	mg/kg	[2]
0-0.33	LEAD	1610		mg/kg	[10,17]*
0-0.33	HEXACHLOROBENZENE	850		ug/kg	[2]

MineralB-6 09/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0	ARSENIC	230	mg/kg	[10,17]*
0-0	COPPER	44000	mg/kg	[10]
0-0	LEAD	1900	mg/kg	[10,17]*

CHLL-WP28-1 8/21/2017

Parameter	Result	Units	[Criteria]
ARSENIC	200	mg/kg	[10,17]*
LEAD	1900	mg/kg	[10,17]*
TOTAL PCBS	8400 J	ug/kg	[10,17]

CHLL-WP03 10/15/14 (from Waste Pile #28)

Depth	Parameter	Result		Units	[Criteria]
0-0.5	ARSENIC	100		mg/kg	[10,17]*
0-0.5	COPPER	22000		mg/kg	[10]
0-0.5	LEAD	2200		mg/kg	[10,17]*
0-0.5	TOTAL PCBS	1570	J	ug/kg	[10,17]
0-0.5	FLUORANTHENE	8200		ug/kg	[2]
0-0.5	PHENANTHRENE	3100		ug/kg	[2]
0-0.5	1,2,4-TRIMETHYLBENZENE	610	J	ug/kg	[2]
0-0.5	BENZENE	240	J	ug/kg	[4,11]
0-0.5	NAPHTHALENE (VOC)	1500	J	ug/kg	[2]
0-0.5	XYLENE - TOTAL	2770	J	ug/kg	[2]

CHLL-STACK-1 10/23/2017

Parameter	Result	Units	[Criteria]
ARSENIC	7100	mg/kg	[9,10,16,17]*
LEAD	620	mg/kg	[10]*

SS-20 10/11/11

Depth	Parameter	Result		Units	[Criteria]
0-0.06	ARSENIC	66.9	J	mg/kg	[10,17]
0-0.06	COPPER	20300	J	mg/kg	[10]
0-0.06	CYANIDE	0.14	J	mg/kg	[2]
0-0.06	LEAD	1010		mg/kg	[10,17]*

CHLL-WP27-2 8/21/2017

Parameter	Result	Units	[Criteria]
ARSENIC	410	mg/kg	[10,17]*
LEAD	1700	mg/kg	[10,17]*

CHLL-STACK-2 10/23/2017

Parameter	Result	Units	[Criteria]
ARSENIC	1200	mg/kg	[9,10,16,17]*
LEAD	2500	mg/kg	[10,17]*

CHLL-WP27-3 8/21/2017

Parameter	Result	Units	[Criteria]
ARSENIC	190	mg/kg	[10,17]*
LEAD	740	mg/kg	[10]*

CHLL-WP28-4 10/23/2017

Parameter	Result	Units	[Criteria]
ARSENIC	120	mg/kg	[10,17]*
LEAD	6800	mg/kg	[10,17]*

CHLL-WP27-1 8/21/2017

Parameter	Result	Units	[Criteria]
ARSENIC	130	mg/kg	[10,17]*
LEAD	1900	mg/kg	[10,17]*

CHLL-WP28-3 10/23/2017

Parameter	Result	Units	[Criteria]
ARSENIC	73	mg/kg	[10,17]
LEAD	2200	mg/kg	[10,17]*
TOTAL PCBS	5100 J	ug/kg	[10,17]

SB-14 10/11/11

Depth	Parameter	Result	Units	[Criteria]
0-1.17	ARSENIC	41.5 J	mg/kg	[10,17]
0-1.17	CYANIDE	0.15 J	mg/kg	[2]

CHLL-WP28-2 8/21/2017

Parameter	Result	Units	[Criteria]
ARSENIC	170	mg/kg	[10,17]*
LEAD	1600	mg/kg	[10,17]*

MineralB-11 09/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0	ARSENIC	52	mg/kg	[10,17]

CHLL-WP23-1 8/21/2017

Parameter	Result	Units	[Criteria]
ARSENIC	270	mg/kg	[10,17]*
LEAD	450	mg/kg	[10]*

CHLL-SB80 08/20/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	45	mg/kg	[10,17]
0-0.5	ARSENIC (DUP)	37	mg/kg	[10]

CHLL-WP23-2 10/23/2017

Parameter	Result	Units	[Criteria]
ARSENIC	120	mg/kg	[10,17]*
LEAD	1300	mg/kg	[10,17]*

CHLL-WP-11 (resample) Composite 5/17/2017

Parameter	Result	Units	[Criteria]
ARSENIC	82	mg/kg	[10,17]
LEAD	5600	mg/kg	[10,17]*
TOTAL PCBS	190000	ug/kg	[10,17]

SB-11 10/11/11

Depth	Parameter	Result	Units	[Criteria]
0-1.33	ARSENIC	27.1 J	mg/kg	[10]

SB-12 10/11/11

Depth	Parameter	Result	Units	[Criteria]
0.5-1	ARSENIC	8.6 J	mg/kg	[10]
0.5-1	CYANIDE	0.13 J	mg/kg	[2]

CHLL-SB52 06/11/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	120	mg/kg	[10,17]*
0-0.5	COPPER	26000	mg/kg	[10]
0-0.5	LEAD	1700	mg/kg	[10,17]*

CHLL-WP09-2 8/21/2017

Parameter	Result	Units	[Criteria]
ARSENIC	58	mg/kg	[10,17]
LEAD	1100	mg/kg	[10,17]*

CHLL-WP01-2 8/21/2017

Parameter	Result	Units	[Criteria]
ARSENIC	150	mg/kg	[10,17]*
LEAD	1400	mg/kg	[10,17]*
TOTAL PCBS	1010 J	ug/kg	[10,17]

CHLL-WP09-1 8/21/2017

Parameter	Result	Units	[Criteria]
ARSENIC	43	mg/kg	[10,17]
LEAD	830	mg/kg	[10]*

SS-18 10/11/11

Depth	Parameter	Result		Units	[Criteria]
0-0.5	ARSENIC	1220		mg/kg	[9,10,16,17]*
0-0.5	COPPER	26900	J	mg/kg	[10]
0-0.5	CYANIDE	1.9		mg/kg	[2]
0-0.5	PHENANTHRENE	4400		ug/kg	[2]

CHLL-WP48-3 10/23/2017

Parameter	Result	Units	[Criteria]
ARSENIC	28	mg/kg	[10]
LEAD	11000	mg/kg	[10,17]*

CHLL-WP01-1 8/21/2017

Parameter	Result	Units	[Criteria]
ARSENIC	110	mg/kg	[10,17]*
LEAD	460	mg/kg	[10]*

CHLL-WP48-1 10/23/2017

Parameter	Result	Units	[Criteria]
ARSENIC	75	mg/kg	[10,17]
LEAD	25000	mg/kg	[10,17]*

CHLL-WP02 10/15/14 (from Waste Pile #01)

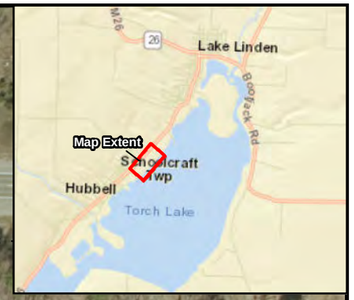
Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	92	mg/kg	[10,17]
0-0.5	COPPER	25000	mg/kg	[10]
0-0.5	CYANIDE	0.33	mg/kg	[2]
0-0.5	LEAD	1100	mg/kg	[10,17]*

CHLL-WP48-2 10/23/2017

Parameter	Result	Units	[Criteria]
ARSENIC	650	mg/kg	[10,17]*
LEAD	11000	mg/kg	[10,17]*

APPROXIMATE AREA OF JULY 12, 2017 DEQ POSITIVE ACBM SAMPLE LOCATIONS

CHLL-SB103
CHLL-SB107
CHLL-RPM-04
MW-10
WP-30
WP-32
WP-28
WP-31
CHLL-WP32-1
WP-33
WP-27
CHLL-SB79
CHLL-SB75
WP-26
WP-25
WP-29
WP-24
WP-23
WP-20
WP-18
WP-22
WP-19
WP-15
WP-46
WP-21
CHLL-SB76
WP-14
WP-16
WP-17
WP-13
WP-11
WP-12
WP-07
WP-04
CHLL-GW37
MW-11
WP-02
CHLL-SB77
WP-10
WP-03
CHLL-SB81
WP-05
WP-01
WP-06
WP-08
WP-09
WP-48
WP-45
CHLL-SB78
CHLL-SB82
CHLL-SB165
CHLL-GW40
CHLL-SB166



WASTE PILE 17

WASTE PILE 11 REMOVAL

MINERAL BUILDING PROPERTY PANORAMA

Mineral Building Property

- 9.28-acre property, including approximately 35 waste piles and stack debris covering approximately 2.9 acres and totaling an estimated 8,305 cubic yards. Waste piles include mining era waste and demolition debris, roadwork related materials, and woody debris.

- Risks to human health and the environment posed by the property conditions include polychlorinated biphenyls (PCBs) and metals contaminated surface soils and waste, transport of said soils and waste through wind and water erosion, residual process materials (RPM), waste piles, stack debris, and exposed asbestos containing building materials (ACBM).

- WP-11 (approximately 112 tons), a Toxic Substances Control Act (TSCA) waste which contained 100 parts per million (ppm) polychlorinated biphenyls (PCBs) and a Resource Conservation and Recovery Act (RCRA) hazardous waste due to a Toxicity Characteristic Leach Procedure (TCLP) result of 110 milligrams/liter (mg/L) lead was transported off-site for disposal during August 2017 by the Michigan Departmentof Environmental Quality (DEQ). See Figure 2 for remaining waste pile TCLP results.

- 13.58 tons of actual or suspect ACBM were removed and properly disposed of in 2016 by the DEQ. Removed were roofing material, transite, gaskets, insulating material, and any other known or suspected ACBM from the surface of the ground and debris piles. Actual or suspect ACBM remain in the waste and stack debris piles and roofing materials continue to fall and blow off the Mineral Building onto the ground surface on the property, the adjacent Michigan Department of Transportation (MDOT) right of way (ROW), and the waste piles. See Figure 2 for ACM sampling results.

- Sixteen abandoned containers including those with hazardous and non-hazardous contents, and RPM were removed in 2016 by the DEQ. Removed were abandoned containers and RPM from the surface of the ground and debris piles. Other known and potential drums and other significant debris remain within the waste piles.

- Drainage ditch and storm water control measures were implemented on the adjacent property by the DEQ during 2016 and 2017, but the exposed soils and waste on the Mineral Building property continue to pose a risk for water erosion.

- PCB concentrations greater than criteria range from 1,010 – 100,000 ug/kg in on-site soils and waste piles.

- Lead concentrations greater than criteria range from 450 – 25,000 mg/kg in on-site soils and waste piles.

- Other contaminants are also present in concentrations greater than criteria in on-site soils and waste piles.

- Nine out of ten DEQ July 2017 samples in MDOT ROW were positive for asbestos.

MDEQ Part 201 Cleanup Criteria for Response Action
1=Statewide Default Background Level
2=Groundwater Surface Water Interface Protection Criteria
3=Soil Saturation Concentration Screening Levels
4=Residential Drinking Water Protection Criteria
5=Residential Soil Volatilization to Indoor Air Inhalation Criteria (VSIC)
6=Residential Infinite Source Volatile Soil Inhalation Criteria
7=Residential Finite VSIC for 5 Meter Source Thickness
8=Residential Finite VSIC for 2 Meter Source Thickness
9=Residential Particulate Soil Inhalation Criteria
10=Residential Direct Contact Criteria
11=Nonresidential Drinking Water Protection Criteria
12=Nonresidential Soil Volatilization to Indoor Air Inhalation
13=Nonresidential Infinite Source Volatile Soil Inhalation Criteria
14=Nonresidential Finite VSIC for 5 Meter Source Thickness
15=Nonresidential Finite VSIC for 2 Meter Source Thickness
16=Nonresidential Particulate Soil Inhalation Criteria
17=Nonresidential Direct Contact Criteria
18=Hazardous Waste Toxicity Screening Value
* = Potentially exceeds hazardouse waste toxicity value
** Exceedances of criteria 2, 4, and 11 shown for organics and cyanide only

Sampling Location Type

- Soil
- Groundwater
- Residual Process Material
- Waste Pile
- Waste Pile Boundary
- Removed Waste Pile
- Fence
- Property Boundary

RED Symbols = Location with PCB exceedance

YELLOW Symbols = Location with PCBs detected but no exceedance

GREEN Symbols = Location sampled for PCBs but not detected

Underlying Pink Halo = Sample location with at least one exceedance (any parameter)**

Notes:
- Sample locations that have been remediated/removed in 2016 are not shown.
- The residual impact boundary for WP-48 is estimated.
- Evaluation based on MDEQ criteria at time of project completion.

0 140 Ft
Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

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Figure 9-8
Sample Analytical Result Map
Mineral Building Soil, Waste Pile, Residual Process Material, and Stack Debris
Hubbell, Houghton County, Michigan

FILE: C:\temp\Projects\MDEQ0070\GIS\mxds\2018_CHLL_SI_ADD_Report\20180126_DraftFig9-8_HMB_Soil_WP_RPM_SD_v20180312.mxd 11:04:19 AM 3/12/2018 KBrown

Image Source: Michigan Imagery Solution (Houghton - 2013)

CHLL-ASBBLK66A 10/23/2017
BLACK FELT MASTIC - *FRIABLE*
ASBESTOS-CHRYSOTILE 2%

CHLL-ASBBLK66B 10/23/2017
BLACK FELT MASTIC - *FRIABLE*
ASBESTOS-CHRYSOTILE 2%

CHLL-ASBBLK65A
CHLL-ASBBLK65B

CHLL-STACK-2 10/23/17

Parameter	*Result*	*Units*
LEAD (TCLP)	7.3	mg/L

QMCM-ASBBLK68A 10/23/2017
GRAY/BLUE/WHITE TSI - *FRIABLE*
ASBESTOS-AMOSITE 3%
ASBESTOS-CHRYSOTILE 30%

QMCM-ASBBLK68B 10/23/2017
GRAY/BLUE/WHITE TSI - *FRIABLE*
ASBESTOS-AMOSITE 2%
ASBESTOS-CHRYSOTILE 20%

QMCM-ASBBLK68C 10/23/2017
GRAY/BLUE/WHITE TSI - *FRIABLE*
ASBESTOS-AMOSITE 3%
ASBESTOS-CHRYSOTILE 30%

CHLL-STACK-1

CHLL-ASBBLK72A 10/23/2017
FELT ROOFING - *FRIABLE*
ASBESTOS-CHRYSOTILE 50%

CHLL-ASBBLK72B 10/23/2017
FELT ROOFING - *FRIABLE*
ASBESTOS-CHRYSOTILE 50%

APPROXIMATE AREA OF JULY 12, 2017 DEQ POSITIVE ACBM SAMPLE LOCATIONS

CHLL-WP27-1 8/21/17

Parameter	*Result*	*Units*
LEAD (TCLP)	10	mg/L

CHLL-ASBBLK71A
CHLL-ASBBLK71B
CHLL-ASBBLK71C

CHLL-ASBBLK76A 10/23/2017
GRAY ROPE GASKET - *FRIABLE*
ASBESTOS-CHRYSOTILE 65%

CHLL-ASBBLK76B 10/23/2017
GRAY ROPE GASKET - *FRIABLE*
ASBESTOS-CHRYSOTILE 65%

CHLL-WP28-1

CHLL-WP28-4 10/23/17

Parameter	*Result*	*Units*
LEAD (TCLP)	37	mg/L

CHLL-WP28-3 10/23/17

Parameter	*Result*	*Units*
LEAD (TCLP)	28	mg/L

CHLL-ASBBLK70A 10/23/2017
WHITE PAPER GASKET - *FRIABLE*
ASBESTOS-AMOSITE 7%
ASBESTOS-CHRYSOTILE 35%

CHLL-ASBBLK70B 10/23/2017
WHITE PAPER GASKET - *FRIABLE*
ASBESTOS-AMOSITE 7%
ASBESTOS-CHRYSOTILE 35%

CHLL-ASBBLK70C 10/23/2017
WHITE PAPER GASKET - *FRIABLE*
ASBESTOS-AMOSITE 7%
ASBESTOS-CHRYSOTILE 35%

CHLL-WP23-2

CHLL-ASBBLK74A 10/23/2017
WHITE FIBROUS DRYWALL - *FRIABLE*
ASBESTOS-ANTHOPHYLLITE 5%
ASBESTOS-CHRYSOTILE 50%

CHLL-ASBBLK74B 10/23/2017
WHITE FIBROUS DRYWALL - *FRIABLE*
ASBESTOS-ANTHOPHYLLITE 5%
ASBESTOS-CHRYSOTILE 50%

CHLL-ASBBLK74C 10/23/2017
WHITE FIBROUS DRYWALL - *FRIABLE*
ASBESTOS-ANTHOPHYLLITE 5%
ASBESTOS-CHRYSOTILE 50%

CHLL-ASBBLK69A 10/23/2017
WHITE TSI - *FRIABLE*
ASBESTOS-AMOSITE 2%
ASBESTOS-CHRYSOTILE 15%

CHLL-ASBBLK69B 10/23/2017
WHITE TSI - *FRIABLE*
ASBESTOS-AMOSITE 5%
ASBESTOS-CHRYSOTILE 35%

CHLL-ASBBLK69C 10/23/2017
WHITE TSI - *FRIABLE*
ASBESTOS-AMOSITE 5%
ASBESTOS-CHRYSOTILE 35%

CHLL-ASBBLK73A 10/23/2017
WHITE W/ GREEN FIBROUS MATERIAL - *FRIABLE*
ASBESTOS-CHRYSOTILE 40%

CHLL-ASBBLK73B 10/23/2017
WHITE W/ GREEN FIBROUS MATERIAL - *FRIABLE*
ASBESTOS-CHRYSOTILE 30%

CHLL-ASBBLK73C 10/23/2017
WHITE W/ GREEN FIBROUS MATERIAL - *FRIABLE*
ASBESTOS-CHRYSOTILE 40%

CHLL-ASBBLK67A 10/23/2017
GRAY TSI, APPEARS CARDBOARD-LIKE UNDERNEATH - *FRIABLE*
ASBESTOS-CHRYSOTILE 50%

CHLL-ASBBLK67B 10/23/2017
GRAY TSI, APPEARS CARDBOARD-LIKE UNDERNEATH - *FRIABLE*
ASBESTOS-CHRYSOTILE 50%

CHLL-ASBBLK67C 10/23/2017
GRAY TSI, APPEARS CARDBOARD-LIKE UNDERNEATH - *FRIABLE*
ASBESTOS-CHRYSOTILE 50%

CHLL-ASBBLK75A 10/23/2017
BROWN TSI - *FRIABLE*
ASBESTOS-CHRYSOTILE 60%

CHLL-ASBBLK75B 10/23/2017
BROWN TSI - *FRIABLE*
ASBESTOS-CHRYSOTILE 60%

CHLL-ASBBLK75C 10/23/2017
BROWN TSI - *FRIABLE*
ASBESTOS-CHRYSOTILE 60%

CHLL-WP01-2

CHLL-ASBBLK77A
CHLL-ASBBLK77B

CHLL-WP48-3 10/23/17

Parameter	*Result*	*Units*
LEAD (TCLP)	390	mg/L

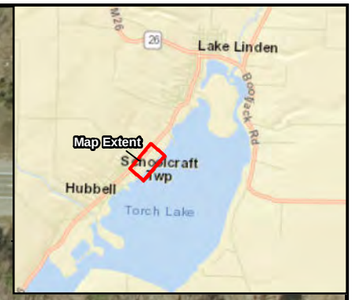
CHLL-WP48-1 10/23/17

Parameter	*Result*	*Units*
LEAD (TCLP)	800	mg/L

CHLL-WP48-2 10/23/17

Parameter	*Result*	*Units*
LEAD (TCLP)	310	mg/L

WP-01 WP-02 WP-03 WP-04 WP-05 WP-06 WP-07 WP-08 WP-09 WP-10 WP-11 WP-12 WP-13 WP-14 WP-15 WP-16 WP-17 WP-18 WP-19 WP-20 WP-21 WP-22 WP-23 WP-24 WP-25 WP-26 WP-27 WP-28 WP-29 WP-30 WP-31 WP-32 WP-33 WP-45 WP-46 WP-48



TCLP Sample Locations
- Results Greater than Hazardous Waste Toxicity Screening Value
- Results Less than Hazardous Waste Toxicity Screening Value

Bulk Asbestos Sample Locations
- Detected Greater than 1%
- Not Detected

- Waste Pile Boundary
- Removed Waste Pile
- Fence
- Property Boundary

Notes:
- Sample locations that have been remediated/removed in 2016 are not shown.
- The residual impact boundary for WP-48 is estimated.
- Evaluation based on MDEQ criteria at time of project completion.

0 140 Ft
Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

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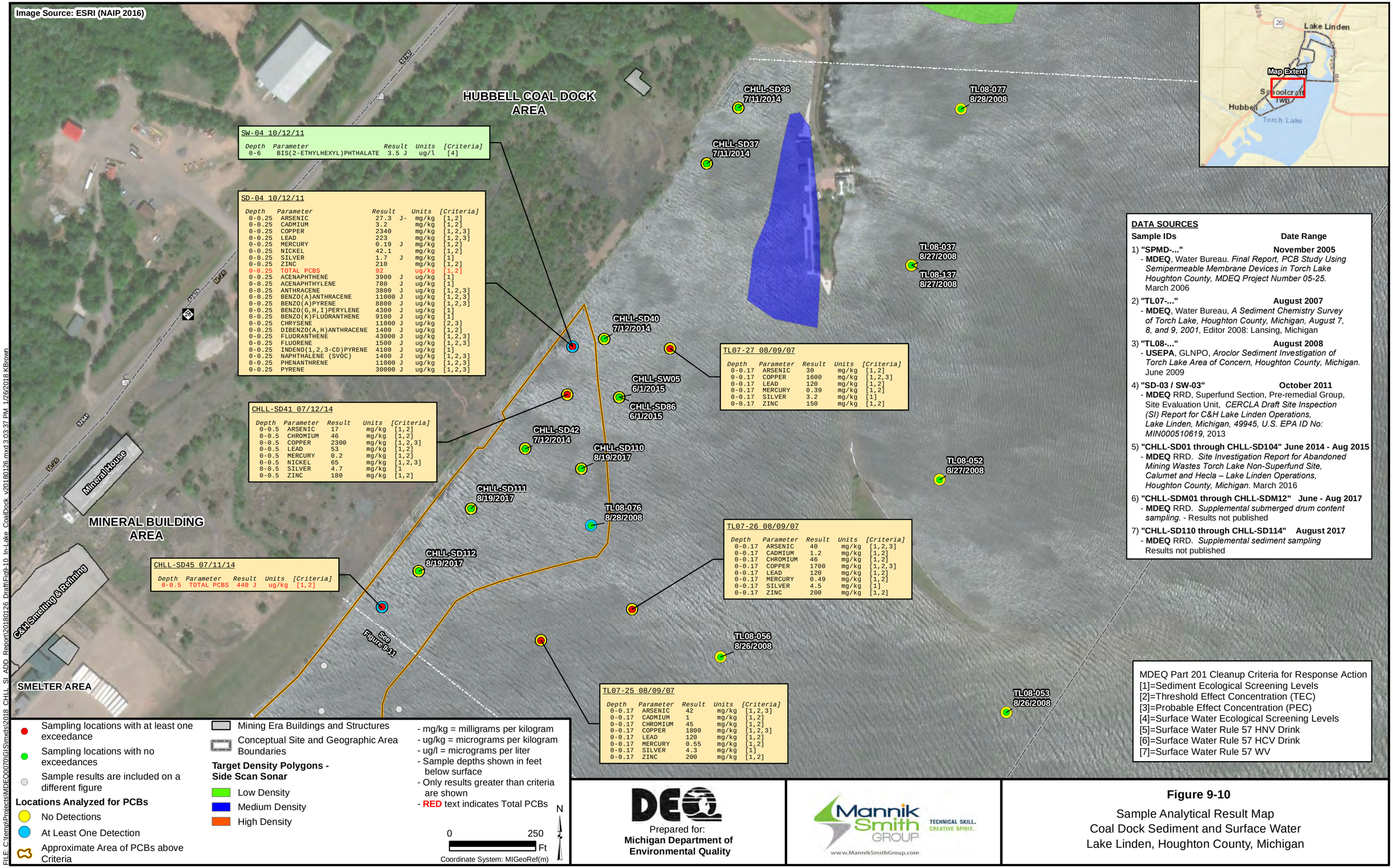
Figure 9-9
Sample Analytical Result Map
Mineral Building Waste Characterization and Bulk Asbestos
Hubbell, Houghton County, Michigan

FILE: C:\temp\Projects\MDEQ0070\GIS\mxds\2018 CHLL SI ADD Report\20180126 DraftFig9-9 HMB ASBBLK Waste v20180312.mxd 3/12/2018 11:05:08 AM kBrown



SW-04 10/12/11

Depth	Parameter	Result		Units	[Criteria]
0-6	BIS(2-ETHYLHEXYL)PHTHALATE	3.5	J	ug/l	[4]

SD-04 10/12/11

Depth	Parameter	Result		Units	[Criteria]
0-0.25	ARSENIC	27.3	J-	mg/kg	[1,2]
0-0.25	CADMIUM	3.2		mg/kg	[1,2]
0-0.25	COPPER	2340		mg/kg	[1,2,3]
0-0.25	LEAD	223		mg/kg	[1,2,3]
0-0.25	MERCURY	0.19	J	mg/kg	[1,2]
0-0.25	NICKEL	42.1		mg/kg	[1,2]
0-0.25	SILVER	1.7	J	mg/kg	[1]
0-0.25	ZINC	210		mg/kg	[1,2]
0-0.25	TOTAL PCBS	92		ug/kg	[1,2]
0-0.25	ACENAPHTHENE	3900	J	ug/kg	[1]
0-0.25	ACENAPHTHYLENE	780	J	ug/kg	[1]
0-0.25	ANTHRACENE	3800	J	ug/kg	[1,2,3]
0-0.25	BENZO(A)ANTHRACENE	11000	J	ug/kg	[1,2,3]
0-0.25	BENZO(A)PYRENE	8800	J	ug/kg	[1,2,3]
0-0.25	BENZO(G,H,I)PERYLENE	4300	J	ug/kg	[1]
0-0.25	BENZO(K)FLUORANTHENE	9100	J	ug/kg	[1]
0-0.25	CHRYSENE	11000	J	ug/kg	[2,3]
0-0.25	DIBENZO(A,H)ANTHRACENE	1400	J	ug/kg	[1,2]
0-0.25	FLUORANTHENE	43000	J	ug/kg	[1,2,3]
0-0.25	FLUORENE	1500	J	ug/kg	[1,2,3]
0-0.25	INDENO(1,2,3-CD)PYRENE	4100	J	ug/kg	[1]
0-0.25	NAPHTHALENE (SVOC)	1400	J	ug/kg	[1,2,3]
0-0.25	PHENANTHRENE	11000	J	ug/kg	[1,2,3]
0-0.25	PYRENE	30000	J	ug/kg	[1,2,3]

CHLL-SD41 07/12/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	17	mg/kg	[1,2]
0-0.5	CHROMIUM	46	mg/kg	[1,2]
0-0.5	COPPER	2300	mg/kg	[1,2,3]
0-0.5	LEAD	53	mg/kg	[1,2]
0-0.5	MERCURY	0.2	mg/kg	[1,2]
0-0.5	NICKEL	65	mg/kg	[1,2,3]
0-0.5	SILVER	4.7	mg/kg	[1
0-0.5	ZINC	180	mg/kg	[1,2]

CHLL-SD45 07/11/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	TOTAL PCBS	440 J	ug/kg	[1,2]

TL07-27 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	30	mg/kg	[1,2]
0-0.17	COPPER	1600	mg/kg	[1,2,3]
0-0.17	LEAD	120	mg/kg	[1,2]
0-0.17	MERCURY	0.39	mg/kg	[1,2]
0-0.17	SILVER	3.2	mg/kg	[1]
0-0.17	ZINC	150	mg/kg	[1,2]

TL07-26 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	40	mg/kg	[1,2,3]
0-0.17	CADMIUM	1.2	mg/kg	[1,2]
0-0.17	CHROMIUM	46	mg/kg	[1,2]
0-0.17	COPPER	1700	mg/kg	[1,2,3]
0-0.17	LEAD	120	mg/kg	[1,2]
0-0.17	MERCURY	0.49	mg/kg	[1,2]
0-0.17	SILVER	4.5	mg/kg	[1]
0-0.17	ZINC	200	mg/kg	[1,2]

TL07-25 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	42	mg/kg	[1,2,3]
0-0.17	CADMIUM	1	mg/kg	[1,2]
0-0.17	CHROMIUM	45	mg/kg	[1,2]
0-0.17	COPPER	1800	mg/kg	[1,2,3]
0-0.17	LEAD	120	mg/kg	[1,2]
0-0.17	MERCURY	0.55	mg/kg	[1,2]
0-0.17	SILVER	4.3	mg/kg	[1]
0-0.17	ZINC	200	mg/kg	[1,2]

DATA SOURCES

Sample IDs — **Date Range**

1) **"SPMD-..."** — **November 2005**
- **MDEQ**, Water Bureau. *Final Report, PCB Study Using Semipermeable Membrane Devices in Torch Lake Houghton County, MDEQ Project Number 05-25.* March 2006

2) **"TL07-..."** — **August 2007**
- **MDEQ**, Water Bureau, *A Sediment Chemistry Survey of Torch Lake, Houghton County, Michigan, August 7, 8, and 9, 2001*, Editor 2008: Lansing, Michigan

3) **"TL08-..."** — **August 2008**
- **USEPA**, GLNPO, *Aroclor Sediment Investigation of Torch Lake Area of Concern, Houghton County, Michigan.* June 2009

4) **"SD-03 / SW-03"** — **October 2011**
- **MDEQ** RRD, Superfund Section, Pre-remedial Group, Site Evaluation Unit, *CERCLA Draft Site Inspection (SI) Report for C&H Lake Linden Operations, Lake Linden, Michigan, 49945, U.S. EPA ID No: MIN000510619,* 2013

5) **"CHLL-SD01 through CHLL-SD104" June 2014 - Aug 2015**
- **MDEQ** RRD. *Site Investigation Report for Abandoned Mining Wastes Torch Lake Non-Superfund Site, Calumet and Hecla – Lake Linden Operations, Houghton County, Michigan.* March 2016

6) **"CHLL-SDM01 through CHLL-SDM12" June - Aug 2017**
- **MDEQ** RRD. *Supplemental submerged drum content sampling.* - Results not published

7) **"CHLL-SD110 through CHLL-SD114" August 2017**
- **MDEQ** RRD. *Supplemental sediment sampling* Results not published

MDEQ Part 201 Cleanup Criteria for Response Action
[1]=Sediment Ecological Screening Levels
[2]=Threshold Effect Concentration (TEC)
[3]=Probable Effect Concentration (PEC)
[4]=Surface Water Ecological Screening Levels
[5]=Surface Water Rule 57 HNV Drink
[6]=Surface Water Rule 57 HCV Drink
[7]=Surface Water Rule 57 WV

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Sample results are included on a different figure

Locations Analyzed for PCBs
- No Detections
- At Least One Detection
- Approximate Area of PCBs above Criteria

- Mining Era Buildings and Structures
- Conceptual Site and Geographic Area Boundaries

Target Density Polygons - Side Scan Sonar
- Low Density
- Medium Density
- High Density

- mg/kg = milligrams per kilogram
- ug/kg = micrograms per kilogram
- ug/l = micrograms per liter
- Sample depths shown in feet below surface
- Only results greater than criteria are shown
- **RED** text indicates Total PCBs

0 250 Ft
N
Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

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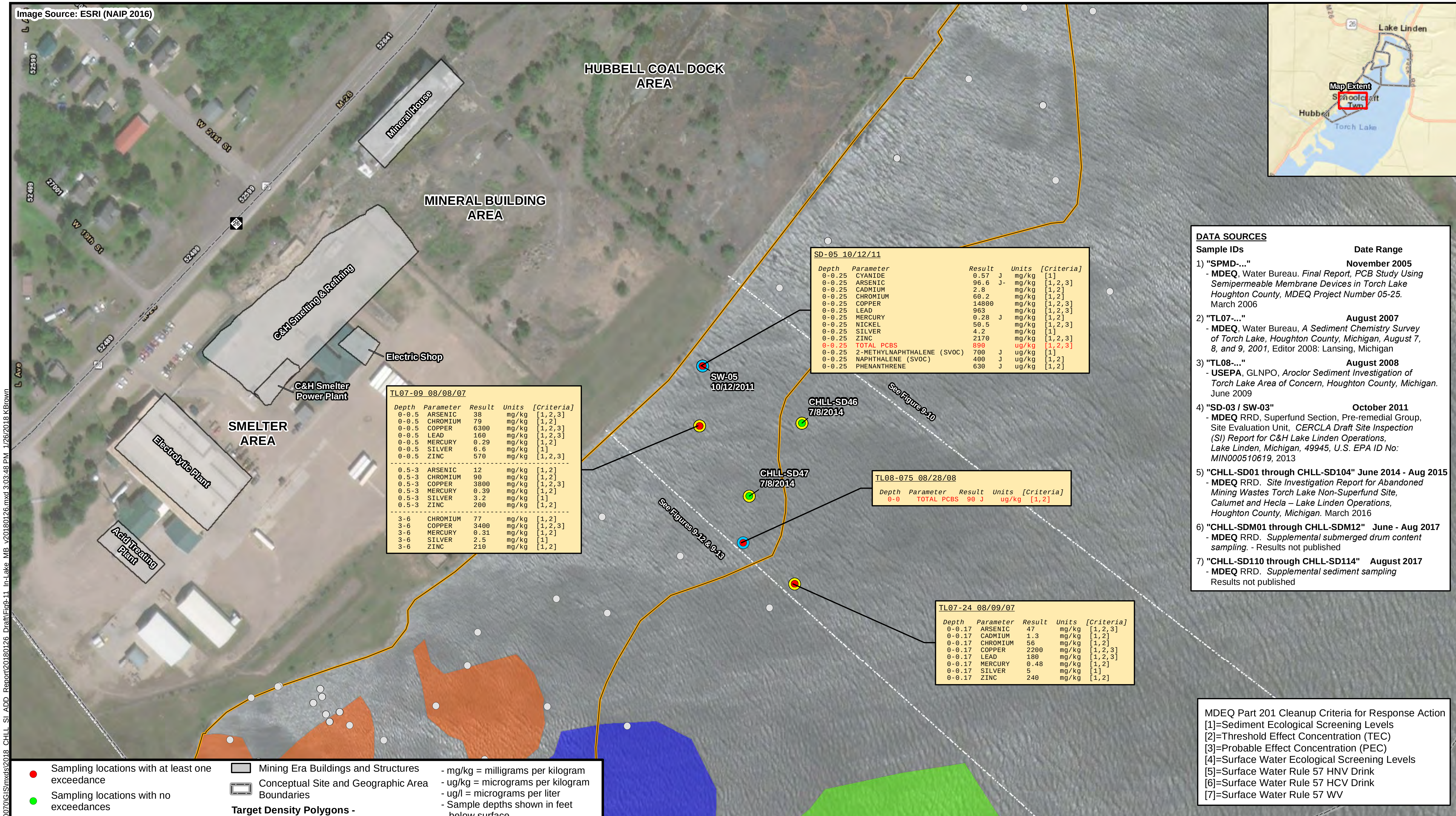
Figure 9-10

Sample Analytical Result Map
Coal Dock Sediment and Surface Water
Lake Linden, Houghton County, Michigan

FILE: C:\temp\Projects\MDEQ0070\GIS\mxds\p2018_CHLL_SI_ADD_Report\20180126_DraftFig9-10_In-Lake_CoalDock_v20180126.mxd 3:03:37 PM 1/26/2018 KBrown



SD-05 10/12/11

Depth	Parameter	Result		Units	[Criteria]
0-0.25	CYANIDE	0.57	J	mg/kg	[1]
0-0.25	ARSENIC	96.6	J-	mg/kg	[1,2,3]
0-0.25	CADMIUM	2.8		mg/kg	[1,2]
0-0.25	CHROMIUM	60.2		mg/kg	[1,2]
0-0.25	COPPER	14800		mg/kg	[1,2,3]
0-0.25	LEAD	963		mg/kg	[1,2,3]
0-0.25	MERCURY	0.28	J	mg/kg	[1,2]
0-0.25	NICKEL	50.5		mg/kg	[1,2,3]
0-0.25	SILVER	4.2		mg/kg	[1]
0-0.25	ZINC	2170		mg/kg	[1,2,3]
0-0.25	TOTAL PCBS	890		ug/kg	[1,2,3]
0-0.25	2-METHYLNAPHTHALENE (SVOC)	700	J	ug/kg	[1]
0-0.25	NAPHTHALENE (SVOC)	400	J	ug/kg	[1,2]
0-0.25	PHENANTHRENE	630	J	ug/kg	[1,2]

TL07-09 08/08/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	38	mg/kg	[1,2,3]
0-0.5	CHROMIUM	79	mg/kg	[1,2]
0-0.5	COPPER	6300	mg/kg	[1,2,3]
0-0.5	LEAD	160	mg/kg	[1,2,3]
0-0.5	MERCURY	0.29	mg/kg	[1,2]
0-0.5	SILVER	6.6	mg/kg	[1]
0-0.5	ZINC	570	mg/kg	[1,2,3]
0.5-3	ARSENIC	12	mg/kg	[1,2]
0.5-3	CHROMIUM	90	mg/kg	[1,2]
0.5-3	COPPER	3800	mg/kg	[1,2,3]
0.5-3	MERCURY	0.39	mg/kg	[1,2]
0.5-3	SILVER	3.2	mg/kg	[1]
0.5-3	ZINC	200	mg/kg	[1,2]
3-6	CHROMIUM	77	mg/kg	[1,2]
3-6	COPPER	3400	mg/kg	[1,2,3]
3-6	MERCURY	0.31	mg/kg	[1,2]
3-6	SILVER	2.5	mg/kg	[1]
3-6	ZINC	210	mg/kg	[1,2]

TL08-075 08/28/08

Depth	Parameter	Result	Units	[Criteria]
0-0	TOTAL PCBS	90 J	ug/kg	[1,2]

TL07-24 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	47	mg/kg	[1,2,3]
0-0.17	CADMIUM	1.3	mg/kg	[1,2]
0-0.17	CHROMIUM	56	mg/kg	[1,2]
0-0.17	COPPER	2200	mg/kg	[1,2,3]
0-0.17	LEAD	180	mg/kg	[1,2,3]
0-0.17	MERCURY	0.48	mg/kg	[1,2]
0-0.17	SILVER	5	mg/kg	[1]
0-0.17	ZINC	240	mg/kg	[1,2]

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   - **MDEQ** RRD. *Supplemental submerged drum content sampling.* - Results not published
7) **"CHLL-SD110 through CHLL-SD114" August 2017**
   - **MDEQ** RRD. *Supplemental sediment sampling* Results not published

MDEQ Part 201 Cleanup Criteria for Response Action
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[2]=Threshold Effect Concentration (TEC)
[3]=Probable Effect Concentration (PEC)
[4]=Surface Water Ecological Screening Levels
[5]=Surface Water Rule 57 HNV Drink
[6]=Surface Water Rule 57 HCV Drink
[7]=Surface Water Rule 57 WV

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Sample results are included on a different figure

Locations Analyzed for PCBs
- No Detections
- At Least One Detection
- Approximate Area of PCBs above Criteria

- Mining Era Buildings and Structures
- Conceptual Site and Geographic Area Boundaries

Target Density Polygons - Side Scan Sonar
- Low Density
- Medium Density
- High Density

- mg/kg = milligrams per kilogram
- ug/kg = micrograms per kilogram
- ug/l = micrograms per liter
- Sample depths shown in feet below surface
- Only results greater than criteria are shown
- RED text indicates Total PCBs

N
0 200 Ft
Coordinate System: MIGeoRef(m)

DEQ
Prepared for:
Michigan Department of Environmental Quality

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Figure 9-11

Sample Analytical Result Map
Mineral Building Sediment and Surface Water
Lake Linden, Houghton County, Michigan

FILE: C:\temp\Projects\MDEQ0070\GIS\mxds\2018_CHLL_SI_ADD_Report\20180126_Draft\Fig9-11_In-Lake_MB_v20180126.mxd 3:03:48 PM 1/26/2018 KBrown

Image Source: ESRI (NAIP 2016)

TL07-07 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	40	mg/kg	[1,2,3]
0-0.5	CADMIUM	1.3	mg/kg	[1,2]
0-0.5	CHROMIUM	96	mg/kg	[1,2]
0-0.5	COPPER	4300	mg/kg	[1,2,3]
0-0.5	LEAD	320	mg/kg	[1,2,3]
0-0.5	MERCURY	0.21	mg/kg	[1,2]
0-0.5	SILVER	6.4	mg/kg	[1]
0-0.5	ZINC	670	mg/kg	[1,2,3]
0-0.5	TOTAL PCBS	320	ug/kg	[1,2]
0.5-3	ARSENIC	13	mg/kg	[1,2]
0.5-3	CHROMIUM	92	mg/kg	[1,2]
0.5-3	COPPER	2900	mg/kg	[1,2,3]
0.5-3	MERCURY	0.43	mg/kg	[1,2]
0.5-3	SILVER	4.3	mg/kg	[1]
0.5-3	ZINC	240	mg/kg	[1,2]
3-6	CHROMIUM (DUP)	51	mg/kg	[1,2]
3-6	COPPER	1900	mg/kg	[1,2,3]
3-6	COPPER (DUP)	2700	mg/kg	[1,2,3]
3-6	MERCURY (DUP)	0.19	mg/kg	[1,2]
3-6	SILVER	2	mg/kg	[1]
3-6	SILVER (DUP)	3	mg/kg	[1]
3-6	ZINC (DUP)	160	mg/kg	[1,2]

TL07-06 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	32	mg/kg	[1,2]
0-0.5	CADMIUM	2.4	mg/kg	[1,2]
0-0.5	CHROMIUM	98	mg/kg	[1,2]
0-0.5	COPPER	4000	mg/kg	[1,2,3]
0-0.5	LEAD	160	mg/kg	[1,2,3]
0-0.5	MERCURY	0.39	mg/kg	[1,2]
0-0.5	SILVER	10	mg/kg	[1]
0-0.5	ZINC	430	mg/kg	[1,2]
0-0.5	TOTAL PCBS	130	ug/kg	[1,2]
0.5-3	ARSENIC	15	mg/kg	[1,2]
0.5-3	CHROMIUM	64	mg/kg	[1,2]
0.5-3	COPPER	2700	mg/kg	[1,2,3]
0.5-3	MERCURY	0.46	mg/kg	[1,2]
0.5-3	SILVER	3.9	mg/kg	[1]
0.5-3	ZINC	190	mg/kg	[1,2]
3-6	CHROMIUM	74	mg/kg	[1,2]
3-6	COPPER	3000	mg/kg	[1,2,3]
3-6	MERCURY	0.33	mg/kg	[1,2]
3-6	SILVER	2.4	mg/kg	[1]
3-6	ZINC	220	mg/kg	[1,2]

TL07-08 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	47	mg/kg	[1,2,3]
0-0.5	CHROMIUM	97	mg/kg	[1,2]
0-0.5	COPPER	4800	mg/kg	[1,2,3]
0-0.5	LEAD	350	mg/kg	[1,2,3]
0-0.5	MERCURY	0.19	mg/kg	[1,2]
0-0.5	SILVER	5.6	mg/kg	[1]
0-0.5	ZINC	930	mg/kg	[1,2,3]
0-0.5	TOTAL PCBS	320	ug/kg	[1,2]
0.5-3	ARSENIC	18	mg/kg	[1,2]
0.5-3	CHROMIUM	77	mg/kg	[1,2]
0.5-3	COPPER	3500	mg/kg	[1,2,3]
0.5-3	LEAD	55	mg/kg	[1,2]
0.5-3	MERCURY	0.35	mg/kg	[1,2]
0.5-3	SILVER	4.2	mg/kg	[1]
0.5-3	ZINC	270	mg/kg	[1,2]
3-6	CHROMIUM	48	mg/kg	[1,2]
3-6	COPPER	2600	mg/kg	[1,2,3]
3-6	MERCURY	0.2	mg/kg	[1,2]
3-6	SILVER	2.9	mg/kg	[1]
3-6	ZINC	150	mg/kg	[1,2]

TL07-12 08/08/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	93	mg/kg	[1,2,3]
0-0.5	CADMIUM	3.6	mg/kg	[1,2]
0-0.5	CHROMIUM	73	mg/kg	[1,2]
0-0.5	COPPER	7600	mg/kg	[1,2,3]
0-0.5	LEAD	280	mg/kg	[1,2,3]
0-0.5	MERCURY	0.19	mg/kg	[1,2]
0-0.5	SILVER	6.3	mg/kg	[1]
0-0.5	ZINC	860	mg/kg	[1,2,3]
0-0.5	TOTAL PCBS	510	ug/kg	[1,2]
0.5-3	ARSENIC	11	mg/kg	[1,2]
0.5-3	CHROMIUM	59	mg/kg	[1,2]
0.5-3	COPPER	4200	mg/kg	[1,2,3]
0.5-3	MERCURY	0.29	mg/kg	[1,2]
0.5-3	SILVER	3.4	mg/kg	[1]
0.5-3	ZINC	220	mg/kg	[1,2]
3-5.92	COPPER	90	mg/kg	[1,2]

TL07-17 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	150	mg/kg	[1,2,3]
0-0.17	CADMIUM	1.9	mg/kg	[1,2]
0-0.17	CHROMIUM	64	mg/kg	[1,2]
0-0.17	COPPER	4400	mg/kg	[1,2,3]
0-0.17	LEAD	430	mg/kg	[1,2,3]
0-0.17	MERCURY	0.57	mg/kg	[1,2]
0-0.17	SILVER	6.8	mg/kg	[1]
0-0.17	ZINC	340	mg/kg	[1,2]
0-0.17	TOTAL PCBS	1100	ug/kg	[1,2,3]
0-0.5	ARSENIC	37	mg/kg	[1,2,3]
0-0.5	CHROMIUM	73	mg/kg	[1,2]
0-0.5	COPPER	3200	mg/kg	[1,2,3]
0-0.5	LEAD	170	mg/kg	[1,2,3]
0-0.5	SILVER	4.3	mg/kg	[1]
0-0.5	ZINC	460	mg/kg	[1,2,3]
0-0.5	TOTAL PCBS	160	ug/kg	[1,2]
0.5-3	ARSENIC	18	mg/kg	[1,2]
0.5-3	ARSENIC (DUP)	17	mg/kg	[1,2]
0.5-3	CHROMIUM	69	mg/kg	[1,2]
0.5-3	CHROMIUM (DUP)	66	mg/kg	[1,2]
0.5-3	COPPER	3100	mg/kg	[1,2,3]
0.5-3	COPPER (DUP)	3200	mg/kg	[1,2,3]
0.5-3	MERCURY	0.38	mg/kg	[1,2]
0.5-3	MERCURY (DUP)	0.4	mg/kg	[1,2]
0.5-3	SILVER	4.7	mg/kg	[1]
0.5-3	SILVER (DUP)	4.9	mg/kg	[1]
0.5-3	ZINC	230	mg/kg	[1,2]
0.5-3	ZINC (DUP)	210	mg/kg	[1,2]
3-6	CHROMIUM	48	mg/kg	[1,2]
3-6	COPPER	3000	mg/kg	[1,2,3]
3-6	MERCURY	0.23	mg/kg	[1,2]
3-6	SILVER	1.9	mg/kg	[1]
3-6	ZINC	170	mg/kg	[1,2]

TL07-23 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	70	mg/kg	[1,2,3]
0-0.17	ARSENIC (DUP)	79	mg/kg	[1,2,3]
0-0.17	CADMIUM	1.1	mg/kg	[1,2]
0-0.17	CADMIUM (DUP)	1.4	mg/kg	[1,2]
0-0.17	CHROMIUM	52	mg/kg	[1,2]
0-0.17	CHROMIUM (DUP)	53	mg/kg	[1,2]
0-0.17	COPPER	3800	mg/kg	[1,2,3]
0-0.17	COPPER (DUP)	3900	mg/kg	[1,2,3]
0-0.17	LEAD	240	mg/kg	[1,2,3]
0-0.17	LEAD (DUP)	260	mg/kg	[1,2,3]
0-0.17	MERCURY	0.54	mg/kg	[1,2]
0-0.17	MERCURY (DUP)	0.6	mg/kg	[1,2]
0-0.17	SILVER	5.2	mg/kg	[1]
0-0.17	SILVER (DUP)	5.5	mg/kg	[1]
0-0.17	ZINC	210	mg/kg	[1,2]
0-0.17	ZINC (DUP)	240	mg/kg	[1,2]
0-0.17	TOTAL PCBS	620	ug/kg	[1,2]
0-0.17	TOTAL PCBS (DUP)	730	ug/kg	[1,2,3]

CHLL-SD89 06/01/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	32	mg/kg	[1,2]
0-0.5	CADMIUM	1.4	mg/kg	[1,2]
0-0.5	CHROMIUM	96	mg/kg	[1,2]
0-0.5	COBALT	55	mg/kg	[1]
0-0.5	COPPER	2900	mg/kg	[1,2,3]
0-0.5	LEAD	180	mg/kg	[1,2,3]
0-0.5	MERCURY	0.4	mg/kg	[1,2]
0-0.5	NICKEL	110	mg/kg	[1,2,3]
0-0.5	SILVER	3.8	mg/kg	[1]
0-0.5	ZINC	320	mg/kg	[1,2]
0-0.5	TOTAL PCBS	270 J	ug/kg	[1,2]
0.7-0.9	ARSENIC	28	mg/kg	[1,2]
0.7-0.9	CHROMIUM	95	mg/kg	[1,2]
0.7-0.9	COBALT	63	mg/kg	[1]
0.7-0.9	COPPER	1800	mg/kg	[1,2,3]
0.7-0.9	LEAD	100	mg/kg	[1,2]
0.7-0.9	MERCURY	0.2	mg/kg	[1,2]
0.7-0.9	NICKEL	130	mg/kg	[1,2,3]
0.7-0.9	SILVER	2.2	mg/kg	[1]
0.7-0.9	ZINC	290	mg/kg	[1,2]

CHLL-SD95 07/11/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	CYANIDE	0.63	mg/kg	[1]
0-0.5	ARSENIC	49	mg/kg	[1,2,3]
0-0.5	CADMIUM	1.5	mg/kg	[1,2]
0-0.5	CHROMIUM	94	mg/kg	[1,2]
0-0.5	COPPER	3100	mg/kg	[1,2,3]
0-0.5	LEAD	250	mg/kg	[1,2,3]
0-0.5	MERCURY	0.5	mg/kg	[1,2]
0-0.5	NICKEL	99	mg/kg	[1,2,3]
0-0.5	SILVER	4.9	mg/kg	[1]
0-0.5	ZINC	350	mg/kg	[1,2]
1-3	ARSENIC	19	mg/kg	[1,2]
1-3	CHROMIUM	110	mg/kg	[1,2]
1-3	COBALT	65	mg/kg	[1]
1-3	COPPER	1800	mg/kg	[1,2,3]
1-3	MERCURY	0.3	mg/kg	[1,2]
1-3	NICKEL	140	mg/kg	[1,2,3]
1-3	SILVER	6.5	mg/kg	[1]
1-3	ZINC	310	mg/kg	[1,2]
3-5	CHROMIUM	61	mg/kg	[1,2]
3-5	COPPER	1600	mg/kg	[1,2,3]
3-5	MERCURY	0.6	mg/kg	[1,2]
3-5	NICKEL	85	mg/kg	[1,2,3]
3-5	SILVER	6.1	mg/kg	[1]
3-5	ZINC	170	mg/kg	[1,2]

MINERAL BUILDING AREA
SMELTER AREA
HUBBELL SLAG DUMP AND BEACH AREA
Mineral House
C&H Smelting & Refining
Electric Shop
C&H Smelter Power Plant
Electrolytic Plant
Acid Treating Plant
See Figure 9-10
See Figure 9-11
See Figure 9-12b
See Figure 9-13
CHLL-SD48 7/8/2014
CHLL-SD49 7/8/2014
CHLL-SD87 6/1/2015
CHLL-SD88 6/1/2015
TL08-074 8/28/2008
TL08-08 8/26/2008
TL08-108 8/26/2008
TL08-029 8/26/2008
W 16th St
W 17th St
J Ave
W 15th St
E 15th St
E 13th St
B Ave
A Ave
Guck St

Lake Linden
Map Extent
Schoolcraft Twp
Hubbell
Torch Lake

DATA SOURCES

Sample IDs — **Date Range**

1) **"SPMD-..."** — **November 2005**
- **MDEQ**, Water Bureau. *Final Report, PCB Study Using Semipermeable Membrane Devices in Torch Lake Houghton County, MDEQ Project Number 05-25.* March 2006

2) **"TL07-..."** — **August 2007**
- **MDEQ**, Water Bureau, *A Sediment Chemistry Survey of Torch Lake, Houghton County, Michigan, August 7, 8, and 9, 2001*, Editor 2008: Lansing, Michigan

3) **"TL08-..."** — **August 2008**
- **USEPA**, GLNPO, *Aroclor Sediment Investigation of Torch Lake Area of Concern, Houghton County, Michigan.* June 2009

4) **"SD-03 / SW-03"** — **October 2011**
- **MDEQ** RRD, Superfund Section, Pre-remedial Group, Site Evaluation Unit, *CERCLA Draft Site Inspection (SI) Report for C&H Lake Linden Operations, Lake Linden, Michigan, 49945, U.S. EPA ID No: MIN000510619*, 2013

5) **"CHLL-SD01 through CHLL-SD104" June 2014 - Aug 2015**
- **MDEQ** RRD. *Site Investigation Report for Abandoned Mining Wastes Torch Lake Non-Superfund Site, Calumet and Hecla – Lake Linden Operations, Houghton County, Michigan.* March 2016

6) **"CHLL-SDM01 through CHLL-SDM12" June - Aug 2017**
- **MDEQ** RRD. *Supplemental submerged drum content sampling.* - Results not published

7) **"CHLL-SD110 through CHLL-SD114"** **August 2017**
- **MDEQ** RRD. *Supplemental sediment sampling* Results not published

MDEQ Part 201 Cleanup Criteria for Response Action
1=Sediment Ecological Screening Levels
2=Threshold Effect Concentration (TEC)
3=Probable Effect Concentration (PEC)
4=Surface Water Ecological Screening Levels
5=Surface Water Rule 57 HNV Drink
6=Surface Water Rule 57 HCV Drink
7=Surface Water Rule 57 WV

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Sample results are included on a different figure

Locations Analyzed for
- No Detections
- At Least One Detection
- Approximate Area of PCBs above Criteria

- Mining Era Buildings and Structures
- Conceptual Site and Geographic Area Boundaries

Target Density Polygons - Side Scan Sonar
- Low Density
- Medium Density
- High Density

- mg/kg = milligrams per kilogram
- ug/kg = micrograms per kilogram
- ug/l = micrograms per liter
- Sample depths shown in feet below surface
- Only results greater than criteria are shown
- **RED** text indicates Total PCBs

0 300 Ft
N
Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

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Figure 9-12a

Sample Analytical Result Map
Smelter Sediment, Surface Water, and Submerged Drum Contents
Lake Linden, Houghton County, Michigan

FILE: C:\temp\Projects\MDEQ0070\GIS\mxds\2018_CHLL_SI_ADD_Report\20180126_Draft\Fig9-12a_In-Lake_Smelter_v20180126.mxd 3:08:13 PM 1/26/2018 KBrown

Image Source: ESRI (NAIP 2012)

CHLL-SD103 08/20/15

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	91	mg/kg	[1,2,3]
0-0.17	CADMIUM	3.4	mg/kg	[1,2]
0-0.17	CHROMIUM	210	mg/kg	[1,2,3]
0-0.17	COPPER	16000	mg/kg	[1,2,3]
0-0.17	LEAD	1400	mg/kg	[1,2,3]
0-0.17	NICKEL	27	mg/kg	[1,2]
0-0.17	SILVER	28	mg/kg	[1]
0-0.17	ZINC	1200	mg/kg	[1,2,3]
0-0.17	TOTAL PCBS	1600	ug/kg	[1,2,3]

CHLL-SDM08 8/15/2017

Parameter	Result	Units	[Criteria]
ARSENIC	750	mg/kg	[1,2,3]
CADMIUM	13	mg/kg	[1,2,3]
CHROMIUM	140	mg/kg	[1,2,3]
COPPER	14000	mg/kg	[1,2,3]
LEAD	6000	mg/kg	[1,2,3]
MERCURY	1.2	mg/kg	[1,2,3]
NICKEL	120	mg/kg	[1,2,3]
SILVER	24	mg/kg	[1]
ZINC	1700	mg/kg	[1,2,3]
TOTAL PCBS	3890 J	ug/kg	[1,2,3]

CHLL-SDM03 8/15/2017

Parameter	Result	Units	[Criteria]
ARSENIC	490	mg/kg	[1,2,3]
CADMIUM	5.9	mg/kg	[1,2,3]
CHROMIUM	180	mg/kg	[1,2,3]
COPPER	11000	mg/kg	[1,2,3]
LEAD	2300	mg/kg	[1,2,3]
MERCURY	0.3	mg/kg	[1,2]
NICKEL	280	mg/kg	[1,2,3]
SILVER	13	mg/kg	[1]
ZINC	910	mg/kg	[1,2,3]
TOTAL PCBS	1610 J	ug/kg	[1,2,3]

CHLL-SW12 08/20/15

Parameter	Result	Units	[Criteria]
ANTIMONY	49	ug/l	[5]
ARSENIC	300	ug/l	[4,5,6]
BARIUM	1900	ug/l	[4]
CADMIUM	18	ug/l	[4,5]
CHROMIUM	97	ug/l	[4]
COPPER	130000	ug/l	[4,5]
LEAD	5700	ug/l	[4,5]
MERCURY	2	ug/l	[4,5,7]
NICKEL	80	ug/l	[4]
SILVER	32	ug/l	[4]
ZINC	6400	ug/l	[4,5]
TOTAL PCBS	2.3 J	ug/l	[4,6,7]

CHLL-SD104 08/20/15

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	120	mg/kg	[1,2,3]
0-0.17	CADMIUM	13	mg/kg	[1,2,3]
0-0.17	CHROMIUM	310	mg/kg	[1,2,3]
0-0.17	COPPER	25000	mg/kg	[1,2,3]
0-0.17	LEAD	2200	mg/kg	[1,2,3]
0-0.17	MERCURY	0.5	mg/kg	[1,2]
0-0.17	NICKEL	77	mg/kg	[1,2,3]
0-0.17	SILVER	14	mg/kg	[1]
0-0.17	ZINC	2000	mg/kg	[1,2,3]
0-0.17	TOTAL PCBS	540 J	ug/kg	[1,2]

CHLL-SDM05 8/15/2017

Parameter	Result	Units	[Criteria]
ARSENIC	230	mg/kg	[1,2,3]
CADMIUM	3.9	mg/kg	[1,2]
COPPER	4500	mg/kg	[1,2,3]
LEAD	2900	mg/kg	[1,2,3]
MERCURY	0.4	mg/kg	[1,2]
NICKEL	180	mg/kg	[1,2,3]
SILVER	12	mg/kg	[1]
ZINC	430	mg/kg	[1,2]
TOTAL PCBS	1830 J	ug/kg	[1,2,3]

CHLL-SD99 07/09/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	44	mg/kg	[1,2,3]
0-0.5	CADMIUM	9	mg/kg	[1,2,3]
0-0.5	CHROMIUM	320 J	mg/kg	[1,2,3]
0-0.5	COPPER	11000	mg/kg	[1,2,3]
0-0.5	LEAD	820	mg/kg	[1,2,3]
0-0.5	MERCURY	0.4	mg/kg	[1,2]
0-0.5	NICKEL	63	mg/kg	[1,2,3]
0-0.5	SILVER	12	mg/kg	[1]
0-0.5	ZINC	1000	mg/kg	[1,2,3]
0-0.5	TOTAL PCBS	630 J	ug/kg	[1,2]
1-2.5	ARSENIC	28	mg/kg	[1,2]
1-2.5	CHROMIUM	120 J	mg/kg	[1,2,3]
1-2.5	COPPER	4300	mg/kg	[1,2,3]
1-2.5	LEAD	39 J	mg/kg	[1,2]
1-2.5	MERCURY	0.4	mg/kg	[1,2]
1-2.5	NICKEL	100	mg/kg	[1,2,3]
1-2.5	SILVER	8.1	mg/kg	[1]
1-2.5	ZINC	450	mg/kg	[1,2]

CHLL-SDM04 8/15/2017

Parameter	Result	Units	[Criteria]
ARSENIC	540	mg/kg	[1,2,3]
CADMIUM	41	mg/kg	[1,2,3]
CHROMIUM	120	mg/kg	[1,2,3]
COPPER	19000	mg/kg	[1,2,3]
LEAD	1900	mg/kg	[1,2,3]
MERCURY	12	mg/kg	[1,2,3]
NICKEL	120	mg/kg	[1,2,3]
SILVER	20	mg/kg	[1]
ZINC	1700	mg/kg	[1,2,3]
TOTAL PCBS	13300 J	ug/kg	[1,2,3]
BENZO(A)ANTHRACENE	1200	ug/kg	[1,2,3]
CHRYSENE	1300	ug/kg	[1,2,3]
FLUORANTHENE	3800	ug/kg	[1,2,3]
PHENANTHRENE	2700	ug/kg	[1,2,3]
PYRENE	2800	ug/kg	[1,2,3]

CHLL-SDM06 8/15/2017

Parameter	Result	Units	[Criteria]
ARSENIC	560	mg/kg	[1,2,3]
CADMIUM	5.1	mg/kg	[1,2,3]
CHROMIUM	62	mg/kg	[1,2]
COPPER	4500	mg/kg	[1,2,3]
LEAD	3300	mg/kg	[1,2,3]
MERCURY	0.7	mg/kg	[1,2]
NICKEL	55	mg/kg	[1,2,3]
SILVER	7.1	mg/kg	[1]
ZINC	350	mg/kg	[1,2]
TOTAL PCBS	2160 J	ug/kg	[1,2,3]

TL07-10 08/08/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	23	mg/kg	[1,2]
0-0.5	CHROMIUM	85	mg/kg	[1,2]
0-0.5	COPPER	3400	mg/kg	[1,2,3]
0-0.5	LEAD	100	mg/kg	[1,2]
0-0.5	MERCURY	0.44	mg/kg	[1,2]
0-0.5	SILVER	4.7	mg/kg	[1]
0-0.5	ZINC	260	mg/kg	[1,2]
0.5-3	CHROMIUM	84	mg/kg	[1,2]
0.5-3	COPPER	2600	mg/kg	[1,2,3]
0.5-3	LEAD	39	mg/kg	[1,2]
0.5-3	MERCURY	0.32	mg/kg	[1,2]
0.5-3	SILVER	2.7	mg/kg	[1]
0.5-3	ZINC	220	mg/kg	[1,2]
3-6	CHROMIUM	57	mg/kg	[1,2]
3-6	COPPER	2100	mg/kg	[1,2,3]
3-6	MERCURY	0.28	mg/kg	[1,2]
3-6	SILVER	2.2	mg/kg	[1]
3-6	ZINC	180	mg/kg	[1,2]

CHLL-SDM07 8/15/2017

Parameter	Result	Units	[Criteria]
ARSENIC	260	mg/kg	[1,2,3]
CADMIUM	7.6	mg/kg	[1,2,3]
CHROMIUM	100	mg/kg	[1,2]
COPPER	8100	mg/kg	[1,2,3]
LEAD	7100	mg/kg	[1,2,3]
MERCURY	0.7	mg/kg	[1,2]
NICKEL	130	mg/kg	[1,2,3]
SILVER	18	mg/kg	[1]
ZINC	1100	mg/kg	[1,2,3]
TOTAL PCBS	4290 J	ug/kg	[1,2,3]

CHLL-SD01 06/07/17

Parameter	Result	Units	[Criteria]
ARSENIC	110	mg/kg	[1,2,3]
CADMIUM	14	mg/kg	[1,2,3]
CHROMIUM	430 J	mg/kg	[1,2,3]
COPPER	20000	mg/kg	[1,2,3]
LEAD	1000	mg/kg	[1,2,3]
MERCURY	0.4	mg/kg	[1,2]
NICKEL	62	mg/kg	[1,2,3]
SILVER	12	mg/kg	[1]
ZINC	1400	mg/kg	[1,2,3]
TOTAL PCBS	1120 J	ug/kg	[1,2,3]

CHLL-SD52 07/09/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	TOTAL PCBS	3350 J	ug/kg	[1,2,3]

CHLL-SDM02 06/07/17

Parameter	Result	Units	[Criteria]
ARSENIC	140	mg/kg	[1,2,3]
CADMIUM	8.4	mg/kg	[1,2,3]
CHROMIUM	760	mg/kg	[1,2,3]
COPPER	6600	mg/kg	[1,2,3]
LEAD	400	mg/kg	[1,2,3]
NICKEL	170	mg/kg	[1,2,3]
SILVER	3.2	mg/kg	[1]
ZINC	670	mg/kg	[1,2,3]
TOTAL PCBS	150 J	ug/kg	[1,2]

CHLL-SDM02 Cloth/Drum Content Mixture

ARSENIC	560	mg/kg	[1,2,3]
CADMIUM	7.4	mg/kg	[1,2,3]
CHROMIUM	110	mg/kg	[1,2]
COPPER	21000	mg/kg	[1,2,3]
LEAD	2400	mg/kg	[1,2,3]
MERCURY	1.1	mg/kg	[1,2,3]
NICKEL	82	mg/kg	[1,2,3]
SILVER	14	mg/kg	[1]
ZINC	760	mg/kg	[1,2,3]
TOTAL PCBS	7000 J	ug/kg	[1,2,3]

CHLL-SDM02 Cloth

CHRYSENE	6700	mg/kg	[1,2,3]
FLUORANTHE	7600	mg/kg	[1,2,3]
PHENANTHRENE	6900	mg/kg	[1,2,3]
TOTAL PCBS	2440 J	ug/kg	[1,2,3]

CHLL-SDM09 8/16/2017

Parameter	Result	Units	[Criteria]
ARSENIC	78	mg/kg	[1,2,3]
CADMIUM	8.7	mg/kg	[1,2,3]
CHROMIUM	160	mg/kg	[1,2,3]
COPPER	17000	mg/kg	[1,2,3]
LEAD	920	mg/kg	[1,2,3]
MERCURY	0.7	mg/kg	[1,2]
NICKEL	110	mg/kg	[1,2,3]
SILVER	23	mg/kg	[1]
ZINC	1300	mg/kg	[1,2,3]
TOTAL PCBS	17400 J	ug/kg	[1,2,3]

CHLL-SDM11 8/16/2017

Parameter	Result	Units	[Criteria]
ARSENIC	160	mg/kg	[1,2,3]
CADMIUM	5.3	mg/kg	[1,2,3]
CHROMIUM	280	mg/kg	[1,2,3]
COPPER	16000	mg/kg	[1,2,3]
LEAD	870	mg/kg	[1,2,3]
MERCURY	0.3	mg/kg	[1,2]
NICKEL	73	mg/kg	[1,2,3]
SILVER	15	mg/kg	[1]
ZINC	1300	mg/kg	[1,2,3]
TOTAL PCBS	1130 J	ug/kg	[1,2,3]

CHLL-SD63 07/15/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	TOTAL PCBS	1430 J	ug/kg	[1,2,3]

CHLL-SDM12 8/16/2017

Parameter	Result	Units	[Criteria]
ARSENIC	290	mg/kg	[1,2,3]
CADMIUM	45	mg/kg	[1,2,3]
CHROMIUM	230	mg/kg	[1,2,3]
COPPER	27000	mg/kg	[1,2,3]
LEAD	4800	mg/kg	[1,2,3]
MERCURY	0.6	mg/kg	[1,2]
NICKEL	120	mg/kg	[1,2,3]
SILVER	43	mg/kg	[1]
ZINC	2200	mg/kg	[1,2,3]
TOTAL PCBS	2460 J	ug/kg	[1,2,3]

CHLL-SDM10 8/16/2017

Parameter	Result	Units	[Criteria]
ARSENIC	170	mg/kg	[1,2,3]
CADMIUM	14	mg/kg	[1,2,3]
CHROMIUM	320	mg/kg	[1,2,3]
COPPER	13000	mg/kg	[1,2,3]
LEAD	910	mg/kg	[1,2,3]
MERCURY	0.5	mg/kg	[1,2]
NICKEL	92	mg/kg	[1,2,3]
SILVER	12	mg/kg	[1]
ZINC	1100	mg/kg	[1,2,3]
TOTAL PCBS	1620 J	ug/kg	[1,2,3]

CHLL-SD64 07/15/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	TOTAL PCBS	680 J	ug/kg	[1,2,3]

TL07-21 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	59	mg/kg	[1,2,3]
0-0.17	CADMIUM	1.8	mg/kg	[1,2]
0-0.17	CHROMIUM	89	mg/kg	[1,2]
0-0.17	COPPER	3200	mg/kg	[1,2,3]
0-0.17	LEAD	250	mg/kg	[1,2,3]
0-0.17	MERCURY	0.48	mg/kg	[1,2]
0-0.17	SILVER	5.1	mg/kg	[1]
0-0.17	ZINC	270	mg/kg	[1,2]
0-0.17	TOTAL PCBS	340	ug/kg	[1,2]

TL07-22 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	310	mg/kg	[1,2,3]
0-0.17	CADMIUM	1.8	mg/kg	[1,2]
0-0.17	CHROMIUM	57	mg/kg	[1,2]
0-0.17	COPPER	2500	mg/kg	[1,2,3]
0-0.17	LEAD	550	mg/kg	[1,2,3]
0-0.17	MERCURY	0.6	mg/kg	[1,2]
0-0.17	SILVER	6.4	mg/kg	[1]
0-0.17	ZINC	270	mg/kg	[1,2]
0-0.17	TOTAL PCBS	450	ug/kg	[1,2]

CHLL-SD90 06/01/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	TOTAL PCBS	190 J	ug/kg	[1,2]

CHLL-SD91 06/01/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	TOTAL PCBS	160 J	ug/kg	[1,2]

CHLL-SD61 7/15/2014

CHLL-SD51 6/14/2014

CHLL-SW11 7/09/2015

CHLL-SD50 6/14/2014

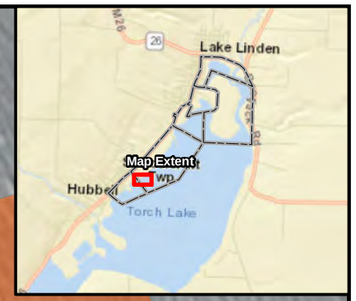
TL08-074 8/28/2008

CHLL-SW06 6/1/2015

CHLL-SW07 6/1/2015

See Figure 9-12a

See Figure 9-13



DATA SOURCES

Sample IDs **Date Range**

1) **"SPMD-..."** **November 2005**
- **MDEQ**, Water Bureau. *Final Report, PCB Study Using Semipermeable Membrane Devices in Torch Lake Houghton County, MDEQ Project Number 05-25.* March 2006

2) **"TL07-..."** **August 2007**
- **MDEQ**, Water Bureau, *A Sediment Chemistry Survey of Torch Lake, Houghton County, Michigan, August 7, 8, and 9, 2001*, Editor 2008: Lansing, Michigan

3) **"TL08-..."** **August 2008**
- **USEPA**, GLNPO, *Aroclor Sediment Investigation of Torch Lake Area of Concern, Houghton County, Michigan.* June 2009

4) **"SD-03 / SW-03"** **October 2011**
- **MDEQ** RRD, Superfund Section, Pre-remedial Group, Site Evaluation Unit, *CERCLA Draft Site Inspection (SI) Report for C&H Lake Linden Operations, Lake Linden, Michigan, 49945, U.S. EPA ID No: MIN000510619,* 2013

5) **"CHLL-SD01 through CHLL-SD104" June 2014 - Aug 2015**
- **MDEQ** RRD. *Site Investigation Report for Abandoned Mining Wastes Torch Lake Non-Superfund Site, Calumet and Hecla – Lake Linden Operations, Houghton County, Michigan.* March 2016

6) **"CHLL-SDM01 through CHLL-SDM12" June - Aug 2017**
- **MDEQ** RRD. *Supplemental submerged drum content sampling.* - Results not published

7) **"CHLL-SD110 through CHLL-SD114"** **August 2017**
- **MDEQ** RRD. *Supplemental sediment sampling* Results not published

MDEQ Part 201 Cleanup Criteria for Response Action
1=Sediment Ecological Screening Levels
2=Threshold Effect Concentration (TEC)
3=Probable Effect Concentration (PEC)
4=Surface Water Ecological Screening Levels
5=Surface Water Rule 57 HNV Drink
6=Surface Water Rule 57 HCV Drink
7=Surface Water Rule 57 WV

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Sample results are included on a different figure

Locations Analyzed for
- No Detections
- At Least One Detection
- Approximate Area of PCBs above Criteria

- Mining Era Buildings and Structures
- Conceptual Site and Geographic Area Boundaries

Target Density Polygons - Side Scan Sonar
- Low Density
- Medium Density
- High Density

- mg/kg = milligrams per kilogram
- ug/kg = micrograms per kilogram
- ug/l = micrograms per liter
- Sample depths shown in feet below surface
- Only results greater than criteria are shown
- **RED** text indicates Total PCBs

0 75 Ft

N

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

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Figure 9-12b

Sample Analytical Result Map
Smelter Sediment, Surface Water, and Submerged Drum Contents
Lake Linden, Houghton County, Michigan

FILE: C:\temp\Projects\MDEQ0070\GIS\mxds\2018_CHLL_SI_ADD_Report\20180126_DraftFig9-12b_In-Lake_Smelter_v20180126.mxd 3:12:28 PM 1/26/2018 KBrown

Image Source: ESRI (NAIP 2016)

SMELTER AREA

HUBBELL SLAG DUMP AND BEACH AREA

CHLL-SD114 08/19/17

Depth	Parameter	Result	Units	[Criteria]
0-0.83	TOTAL PCBS	74000	ug/kg	[1,2,3]

SPMD Site #4 11/18/05

Depth	Parameter	Result	Units	[Criteria]
3ft	TOTAL PCBS	150	ug/l	[--]

TL07-05 08/07/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	22	mg/kg	[1,2]
0-0.5	ARSENIC (DUP)	19	mg/kg	[1,2]
0-0.5	CADMIUM	1.1	mg/kg	[1,2]
0-0.5	CADMIUM (DUP)	1.2	mg/kg	[1,2]
0-0.5	CHROMIUM	200	mg/kg	[1,2,3]
0-0.5	CHROMIUM (DUP)	220	mg/kg	[1,2,3]
0-0.5	COPPER	3300	mg/kg	[1,2,3]
0-0.5	COPPER (DUP)	3800	mg/kg	[1,2,3]
0-0.5	LEAD	180	mg/kg	[1,2,3]
0-0.5	LEAD (DUP)	190	mg/kg	[1,2,3]
0-0.5	MERCURY	1.2	mg/kg	[1,2,3]
0-0.5	MERCURY (DUP)	0.37	mg/kg	[1,2]
0-0.5	SILVER	3.4	mg/kg	[1]
0-0.5	SILVER (DUP)	3.1	mg/kg	[1]
0-0.5	ZINC	330	mg/kg	[1,2]
0-0.5	ZINC (DUP)	340	mg/kg	[1,2]
0-0.5	TOTAL PCBS	290	ug/kg	[1,2]
0-0.5	TOTAL PCBS (DUP)	230	ug/kg	[1,2]
0.5-1.83	ARSENIC	18	mg/kg	[1,2]
0.5-1.83	CHROMIUM	500	mg/kg	[1,2,3]
0.5-1.83	COPPER	3400	mg/kg	[1,2,3]
0.5-1.83	SILVER	5.6	mg/kg	[1]
0.5-1.83	ZINC	260	mg/kg	[1,2]

CHLL-SD66 06/14/14

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	2000	mg/kg	[1,2,3]
0-0.5	NICKEL	34	mg/kg	[1,2]
0-0.5	SILVER	4	mg/kg	[1]
0-0.5	ZINC	140	mg/kg	[1,2]

CHLL-SW09 7/8/2015

CHLL-SD113 8/19/2017

See Figures 9-12a & 9-12b

TL08-073 8/28/2008

TL07-11 08/08/07

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	20	mg/kg	[1,2]
0-0.5	CHROMIUM	180	mg/kg	[1,2,3]
0-0.5	COPPER	2800	mg/kg	[1,2,3]
0-0.5	LEAD	85	mg/kg	[1,2]
0-0.5	SILVER	2.2	mg/kg	[1]
0-0.5	ZINC	400	mg/kg	[1,2]
0.5-3	ARSENIC	16	mg/kg	[1,2]
0.5-3	CHROMIUM	130	mg/kg	[1,2,3]
0.5-3	COPPER	1800	mg/kg	[1,2,3]
0.5-3	MERCURY	0.22	mg/kg	[1,2]
0.5-3	SILVER	6.1	mg/kg	[1]
0.5-3	ZINC	260	mg/kg	[1,2]
3-6	CHROMIUM	180	mg/kg	[1,2,3]
3-6	COPPER	2400	mg/kg	[1,2,3]
3-6	MERCURY	0.3	mg/kg	[1,2]
3-6	SILVER	2.4	mg/kg	[1]
3-6	ZINC	180	mg/kg	[1,2]

TL07-20 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	39	mg/kg	[1,2,3]
0-0.17	CADMIUM	1.1	mg/kg	[1,2]
0-0.17	CHROMIUM	110	mg/kg	[1,2]
0-0.17	COPPER	2300	mg/kg	[1,2,3]
0-0.17	LEAD	160	mg/kg	[1,2,3]
0-0.17	MERCURY	0.5	mg/kg	[1,2]
0-0.17	SILVER	4.7	mg/kg	[1]
0-0.17	ZINC	260	mg/kg	[1,2]

TL07-19 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	40	mg/kg	[1,2,3]
0-0.17	ARSENIC (DUP)	38	mg/kg	[1,2,3]
0-0.17	CADMIUM	1	mg/kg	[1,2]
0-0.17	CADMIUM (DUP)	1	mg/kg	[1,2]
0-0.17	CHROMIUM	60	mg/kg	[1,2]
0-0.17	CHROMIUM (DUP)	61	mg/kg	[1,2]
0-0.17	COPPER	2400	mg/kg	[1,2,3]
0-0.17	COPPER (DUP)	2200	mg/kg	[1,2,3]
0-0.17	LEAD	190	mg/kg	[1,2,3]
0-0.17	LEAD (DUP)	180	mg/kg	[1,2,3]
0-0.17	MERCURY	0.45	mg/kg	[1,2]
0-0.17	MERCURY (DUP)	0.39	mg/kg	[1,2]
0-0.17	SILVER	4	mg/kg	[1]
0-0.17	SILVER (DUP)	3.9	mg/kg	[1]
0-0.17	ZINC	290	mg/kg	[1,2]
0-0.17	ZINC (DUP)	270	mg/kg	[1,2]

TL07-18 08/09/07

Depth	Parameter	Result	Units	[Criteria]
0-0.17	ARSENIC	32	mg/kg	[1,2]
0-0.17	CADMIUM	11	mg/kg	[1,2,3]
0-0.17	CHROMIUM	77	mg/kg	[1,2]
0-0.17	COPPER	2500	mg/kg	[1,2,3]
0-0.17	LEAD	520	mg/kg	[1,2,3]
0-0.17	MERCURY	0.23	mg/kg	[1,2]
0-0.17	SILVER	2.5	mg/kg	[1]
0-0.17	ZINC	430	mg/kg	[1,2]

CHLL-SW08 6/2/2015

CHLL-SD67 7/8/2014

CHLL-SD65 6/14/2014

CHLL-SD69 7/9/2014

CHLL-SD70 6/14/2014

CHLL-SD97 6/2/2015

CHLL-SD98 7/8/2015

Lake Linden

Schoolcraft

Hubbell

Map Extent

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- **MDEQ** RRD. *Site Investigation Report for Abandoned Mining Wastes Torch Lake Non-Superfund Site, Calumet and Hecla – Lake Linden Operations, Houghton County, Michigan.* March 2016

6) **"CHLL-SDM01 through CHLL-SDM12" June - Aug 2017**
- **MDEQ** RRD. *Supplemental submerged drum content sampling.* - Results not published

7) **"CHLL-SD110 through CHLL-SD114" August 2017**
- **MDEQ** RRD. *Supplemental sediment sampling* Results not published

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Sample results are included on a different figure

Locations Analyzed for PCBs
- No Detections
- At Least One Detection
- Approximate Area of PCBs above Criteria

- Mining Era Buildings and Structures
- Conceptual Site and Geographic Area Boundaries

Target Density Polygons - Side Scan Sonar
- Low Density
- Medium Density
- High Density

- SPMD = Semi-permeable membrane device
- mg/kg = milligrams per kilogram
- ug/kg = micrograms per kilogram
- ug/l = micrograms per liter
- Sample depths shown in feet below surface
- Only results greater than criteria are shown
- **RED** text indicates Total PCBs

0 250 Ft

N

Coordinate System: MIGeoRef(m)

MDEQ Part 201 Cleanup Criteria for Response Action
1=Sediment Ecological Screening Levels
2=Threshold Effect Concentration (TEC)
3=Probable Effect Concentration (PEC)
4=Surface Water Ecological Screening Levels
5=Surface Water Rule 57 HNV Drink
6=Surface Water Rule 57 HCV Drink
7=Surface Water Rule 57 WV
-- = SPMD results are not screend to criteria. Positive detections are shown

Prepared for:
Michigan Department of Environmental Quality

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Figure 9-13
Sample Analytical Result Map
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Sediment, Surface Water, and SPMD
Lake Linden, Houghton County, Michigan

FILE: C:\temp\Projects\MDEQ0070\GIS\mxds\2018_CHLL_SI_ADD_Report\20180126_Draft\Fig9-13_In-Lake_HPA_HSBA_v20180126.mxd 3:18:20 PM 1/26/2018 KBrown

TABLES

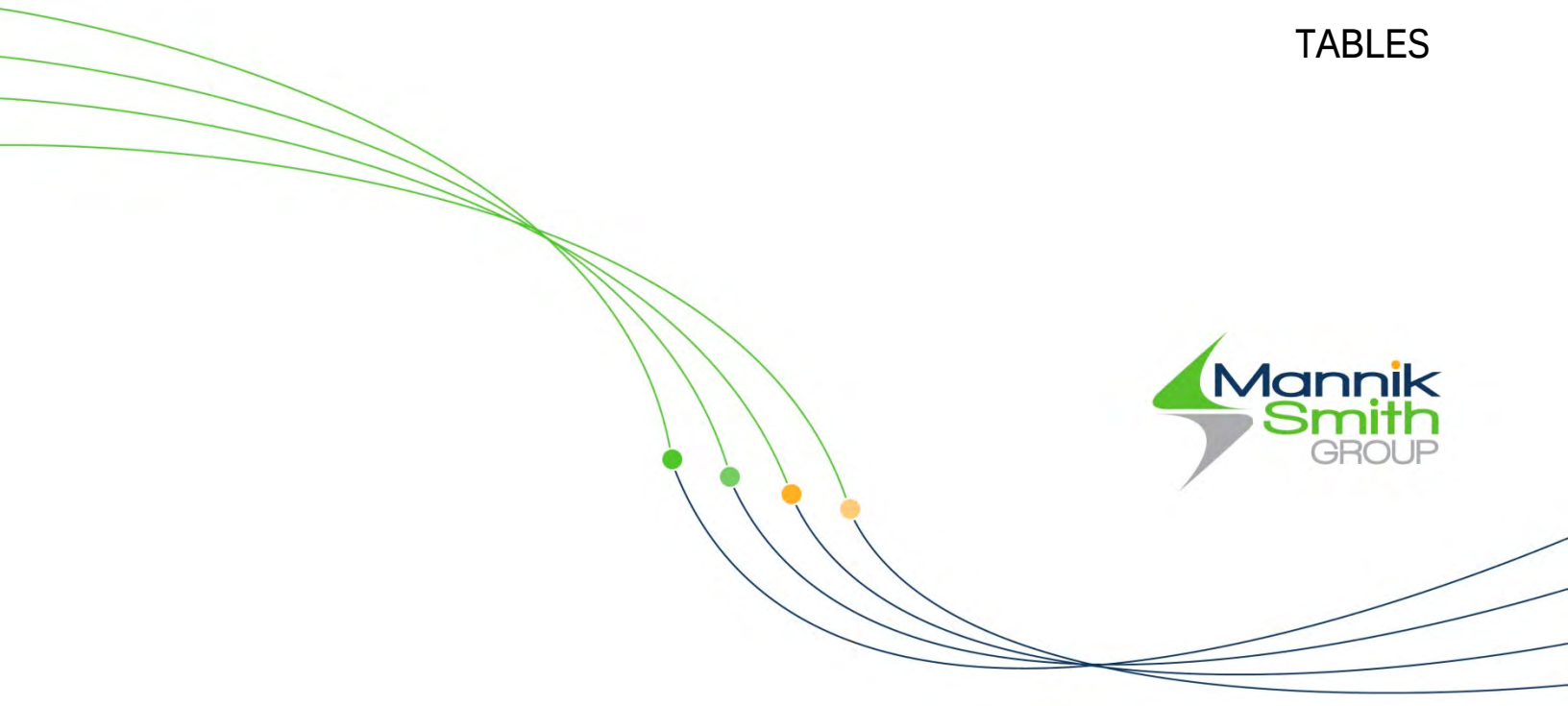


TABLE 3-3
Supplemental SI Sampling and Analysis Summary
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Sampling Location	Sample Date	Field Sample ID	Laboratory Work Order Number	Longitude	Latitude	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/ Matrix	Sample Analyses		Duplicate Analyses	
										Sediment	PCBs	Metals (As, Pb)	PCBs	Metals (As, Pb)
Lake Linden Recreation Area														
CHLL-SD105	6/06/2017	CHLL-SD-105-0-1'	1706167	-88.406282602	47.189118545	Delineate Nearshore Sediment Contamination	SAND, coarse grain, trace fines and gravel, reddish brown, firm, wet	Duplicate omitted	Post Pounder/Direct Push	X	X	X		
	6/06/2017	CHLL-SD-105-1-3'	1706167			Delineate Nearshore Sediment Contamination	SAND, coarse grain, trace fines and gravel, reddish brown, firm, wet	Duplicate added	Post Pounder/Direct Push	X	X	X	X	X
	6/06/2017	CHLL-SD-105-3-6'	1706167			Delineate Nearshore Sediment Contamination	SAND, Coarse grain, trace fines and gravel, reddish brown, firm, wet		Post Pounder/Direct Push	X	X	X		
CHLL-SD106	6/06/2017	CHLL-SD-106-0-1'	1706167	-88.406419064	47.189026379	Delineate Nearshore Sediment Contamination	SILT, dark brown, trace gravel and organics, cohesive, non-plastic		Vibracore	X	X	X		
	6/06/2017	CHLL-SD-106-1-3'	1706167			Delineate Nearshore Sediment Contamination	SILT, reddish brown, trace gravel and organics, soft, cohesive, non-plastic		Vibracore	X	X	X		
	6/06/2017	CHLL-SD-106-3-5'	1706167			Delineate Nearshore Sediment Contamination	CLAY, red-brown mottled, firm, cohesive, slightly plastic		Vibracore	X	X	X		
CHLL-SD107	6/06/2017	CHLL-SD-107-0-1'	1706167	-88.406709060	47.188951010	Delineate Nearshore Sediment Contamination	SAND, reddish brown, organics (wood debris), dark brown streaks		Post Pounder/Direct Push	X	X	X		
	6/06/2017	CHLL-SD-107-1-3'	1706167			Delineate Nearshore Sediment Contamination	SAND, reddish brown, organics (wood debris), dark brown streaks		Post Pounder/Direct Push	X	X	X		
	6/06/2017	CHLL-SD-107-3-6'	1706167			Delineate Nearshore Sediment Contamination	SAND, reddish brown, trace to few organics		Post Pounder/Direct Push	X	X	X		
CHLL-SD108	6/06/2017	CHLL-SD-108-0-1'	1706167	-88.406548338	47.188796330	Delineate Nearshore Sediment Contamination	SILTY CLAY, dark brown, orange streaking, organics, soft, wet to SILTY CLAY, reddish brown, organics, soft, noncohesive, non-plastic		Vibracore	X	X	X	X	X
	6/06/2017	CHLL-SD-108-1-3'	1706167			Delineate Nearshore Sediment Contamination	SILTY CLAY, reddish brown, stiff, plastic cohesive		Vibracore	X	X	X		
	6/06/2017	CHLL-SD-108-3-4'	1706167			Delineate Nearshore Sediment Contamination	SILTY CLAY, reddish brown, soft, plastic, cohesive		Vibracore	X	X	X		
CHLL-SD109	6/06/2017	CHLL-SD-109-0-1'	1706167	-88.406789640	47.188905275	Delineate Nearshore Sediment Contamination	SAND, medium to coarse grain, reddish brown, firm		Post Pounder/Direct Push	X	X	X		
	6/06/2017	CHLL-SD-109-1-3'	1706167			Delineate Nearshore Sediment Contamination	SAND, coarse grain, brown, some small gravel, firm		Post Pounder/Direct Push	X	X	X		
	6/06/2017	CHLL-SD-109-3-6'	1706167			Delineate Nearshore Sediment Contamination	SAND, coarse grain, reddish brown, some small to large gravel		Post Pounder/Direct Push	X	X	X		

Notes:

CHLL = Calumet & Hecla Lake Linden Operations Area

PCBs = Polychlorinated Biphenyls

As = Arsenic

Pb = Lead

X = Completed sampling based on the sampling rationale and the horizontal and vertical location of the sample

Samples described in this evaluation may actually refer to stamp sands or to other mining waste from historic mining and reclamation processes conducted in the area.

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

In areas that have been resurfaced or capped, analytical samples were collected from directly beneath the cap/resurfacing medium (i.e. soil cap, beach sand, gravel, etc...) so that samples are representative of historical waste deposits.

TABLE 3-4a
Supplemental SI Sampling and Analysis Summary
Hubbell Processing Area - Submerged Drum Contents and Sediments
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Proposed Sampling Location	Sample Date	Field Sample ID	Laboratory Work Order Number	Longitude	Latitude	Sampling Rationale	Sample Description	Sample Notes	Sampling Method	Sample Type/Matrix		Sample Analyses			Duplicate Analyses
										Sediment	Drums, Containers, and Building Materials/SACM	PNAs	PCBs	Metals (As, Cd, Cr,Cu, Pb, Hg, Ni, Ag, Zn)	PCBs
Hubbell Processing Area															
CHLL-SDM01	6/7/2017	CHLL-SDM01	1706167	-88.42315667	47.17389500	Assess Drum Contents Near CHLL-SD52	Dark brown sediment with yellow material	Approximate sample depth: 43ft	AUV Sampling Arm		X	X	X	X	
CHLL-SDM02	6/7/2017	CHLL-SDM02	1706167	-88.42301833	47.17393833	Assess Drum Contents Near CHLL-SD52	Brown sediment with green, orange, white material	Duplicate omitted, renamed to CHLL-SDM02-Cloth/ Drum Content Mixture; Approximate sample depth: 43ft	AUV Sampling Arm		X	X	X	X	
CHLL-SDM02-Cloth	6/7/2017	CHLL-SDM02-Cloth	1706167	-88.42301833	47.17393833	Assess Drum Contents Near CHLL-SD52	Dark brown, burlap-like fabric material	Approximate sample depth: 43ft	AUV Sampling Arm		X	X	X		
CHLL-SDM02-Cloth/ Drum Content Mixture	6/7/2017	CHLL-SDM02-Cloth/ Drum Content Mixture	1706167	-88.42301833	47.17393833	Assess Drum Contents Near CHLL-SD52	Brown sediment with burlap-like fabric	Approximate sample depth: 43ft	AUV Sampling Arm		X	X	X	X	
CHLL-SDM03	8/15/2017	CHLL-SDM03	1708320	-88.42249000	47.17444700	Assess Drum Contents	NA		AUV Sampling Arm		X	X	X	X	
CHLL-SDM04	8/15/2017	CHLL-SDM04	1708320	-88.42243300	47.17429500	Assess Drum Contents	NA		AUV Sampling Arm		X	X	X	X	
CHLL-SDM05	8/15/2017	CHLL-SDM05	1708320	-88.42247300	47.17440000	Assess Drum Contents	NA		AUV Sampling Arm		X	X	X	X	
CHLL-SDM06	8/15/2017	CHLL-SDM06	1708320	-88.42231300	47.17431200	Assess Drum Contents	NA		AUV Sampling Arm		X	X	X	X	
CHLL-SDM07	8/15/2017	CHLL-SDM07	1708320	-88.42240000	47.17425200	Assess Drum Contents	NA		AUV Sampling Arm		X	X	X	X	
CHLL-SDM08	8/15/2017	CHLL-SDM08	1708320	-88.42254800	47.17436200	Assess Drum Contents	NA		AUV Sampling Arm		X	X	X	X	
CHLL-SDM09	8/16/2017	CHLL-SDM09	1708320	-88.42281200	47.17362500	Assess Drum Contents	NA		AUV Sampling Arm		X	X	X	X	
CHLL-SDM10	8/16/2017	CHLL-SDM10	1708320	-88.42306300	47.17356800	Assess Drum Contents	NA		AUV Sampling Arm		X	X	X	X	
CHLL-SDM11	8/16/2017	CHLL-SDM11	1708320	-88.42308800	47.17382500	Assess Drum Contents	NA		AUV Sampling Arm		X	X	X	X	
CHLL-SDM12	8/16/2017	CHLL-SDM12	1708320	-88.42302000	47.17366500	Assess Drum Contents	NA		AUV Sampling Arm		X	X	X	X	
CHLL-SD110-0-6"	8/19/2017	CHLL-SD110-0-6"	1708319	-88.41627323	47.17809170	Proximity to PCB detections requiring delineation	SILTY CLAY, blackish brown, soft, loose		Vibracore Sampler	X			X		
CHLL-SD110-1-3'	8/19/2017	CHLL-SD110-1-3'	1708319			Proximity to PCB detections requiring delineation	SILTY CLAY, reddish-brown, soft, loose		Vibracore Sampler	X			X		
CHLL-SD110-3-3.5'	8/19/2017	CHLL-SD110-3-3.5'	1708319			Proximity to PCB detections requiring delineation	SILTY CLAY, reddish-brown, soft, loose		Vibracore Sampler	X			X		
CHLL-SD111-0-6"	8/19/2017	CHLL-SD111-0-6"	1708319	-88.41754577	47.17774558	Proximity to PCB detections requiring delineation	SILTY CLAY, blackish brown, soft, loose, some coal pieces		Vibracore Sampler	X			X		X
CHLL-SD111-1-3'	8/19/2017	CHLL-SD111-1-3'	1708319			Proximity to PCB detections requiring delineation	SILTY CLAY, reddish brown, soft, loose, some coal pieces		Vibracore Sampler	X			X		
CHLL-SD111-3-3.83'	8/19/2017	CHLL-SD111-3-3.83'	1708319			Proximity to PCB detections requiring delineation	SAND, brown - red, medium grained, well sorted, firm		Vibracore Sampler	X			X		
CHLL-SD112-0-6"	8/19/2017	CHLL-SD112-0-6"	1708319	-88.41813258	47.17723618	Proximity to PCB detections requiring delineation	SILTY CLAY, dark brown to red, loose, soft		Vibracore Sampler	X			X		
CHLL-SD112-1-3'	8/19/2017	CHLL-SD112-1-3'	1708319			Proximity to PCB detections requiring delineation	SILTY CLAY, reddish brown, soft, some wood debris and large gravel		Vibracore Sampler	X			X		
CHLL-SD112-3-3.92'	8/19/2017	CHLL-SD112-3-3.92'	1708319			Proximity to PCB detections requiring delineation	SAND, brown, medium to coarse grain, firm; ORGANIC, black - brown organic material; SAND, brown, medium grained, firm, wet		Vibracore Sampler	X			X		
CHLL-SD113-0-10"	8/19/2017	CHLL-SD113-0-10"	1708319	-88.42374184	47.17316862	Proximity to PCB detections requiring delineation	SAND and GRAVEL, red and black, coarse grains, some fines, angular	No additional intervals; poor recovery	Vibracore Sampler	X			X		X
CHLL-SD114-0-10"	8/19/2017	CHLL-SD114-0-10"	1708319	-88.42471291	47.17303313	Proximity to PCB detections requiring delineation	SAND and GRAVEL, red and black, coarse grains, angular	No additional intervals; poor recovery	Vibracore Sampler	X			X		

Notes:
CHLL = Calumet & Hecla Lake Linden Operations Area
PNAs = Polynuclear Aromatic Compounds
PCBs = Polychlorinated Biphenyls
SACM = Suspect Asbestos Containing Material
AUV = Autonomous underwater vehicle
NA = Not Available
X = Completed sampling based on the sampling rationale and the horizontal and vertical location of the sample
As = Arsenic, Cd = Cadmium, Cr = Chromium, Cu = Copper, Pb = Lead, Hg = Mercury, Ni = Nickel, Ag = Silver, Zn = Zinc
Samples described in this evaluation may actually refer to stamp sands or to other mining waste from historic mining and reclamation processes conducted in the area.
For the purposes of this investigation, sediments include residues and waste material associated with chemical containers and deposits on the lake bottom historically discarded in Torch Lake, unless otherwise noted.
In areas that have been resurfaced or capped, analytical samples were collected from directly beneath the cap/resurfacing medium (i.e. soil cap, beach sand, gravel, etc...) so that samples are representative of historical waste deposits.

TABLE 3-4b
Supplemental SI Sampling and Analysis Summary
Hubbell Processing Area - Mineral Building Property
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Sampling Location	Sample Date	Field Sample ID	Laboratory Work Order Number	Longitude	Latitude	Sampling Rationale	Sample Description	Friable/ Non-Friable	Sample Notes	Sampling Method	Sample Type/Matrix		Sample Analyses			
											Surface Soil	Drums, Containers, and Building Materials/SACM	PCBs	Metals (As, Pb)	TCLP- As, Pb	Asbestos
Hubbell Processing Area																
CHLL-WP01-1	8/21/2017	CHLL-WP01-1	1708320	-88.420347420	47.176642045	Assess Waste Pile 01	Black, oily and blue crystalline material	NA		Hand Tools	X		X	X		
CHLL-WP01-2	8/21/2017	CHLL-WP01-2	17101760, 1708320	-88.420712780	47.176695410	Assess Waste Pile 01	Medium grained, light brown material	NA		Hand Tools	X		X	X	X	
CHLL-WP09-1	8/21/2017	CHLL-WP09-1	1708320	-88.419881595	47.177198613	Assess Waste Pile 09	Dark soil, mixed with debris and charred wood	NA		Hand Tools	X		X	X		
CHLL-WP09-2	8/21/2017	CHLL-WP09-2	1708320	-88.419827341	47.177272204	Assess Waste Pile 09	Blue-ish crystalline material	NA		Hand Tools	X		X	X		
CHLL-WP23-1	8/21/2017	CHLL-WP23-1	1708320	-88.421641228	47.177227041	Assess Waste Pile 23	Darker stained soil	NA		Hand Tools	X		X	X		
CHLL-WP23-2	10/23/2017	CHLL-WP23-2	17101760, 1710220	-88.421585705	47.177266973	Assess Waste Pile 23	Dark brown soil mixed with debris	NA		Hand Tools	X		X	X	X	
CHLL-WP27-1	8/21/2017	CHLL-WP27-1	17101760, 1708320	-88.421684077	47.177556614	Assess Waste Pile 27	White, orange, black, coarse grained material mixed w/ brown soil and black debris	NA	sampled from around and near crushed drum	Hand Tools	X	X	X	X	X	
CHLL-WP27-2	8/21/2017	CHLL-WP27-2	1708320	-88.421748042	47.177595207	Assess Waste Pile 27	Orange granular material, saturated, mixed w/ brown soil, brick debris and roofing	NA	sampled from around and near crushed drum	Hand Tools	X	X	X	X		
CHLL-WP27-3	8/21/2017	CHLL-WP27-3	1708320	-88.421721682	47.177584944	Assess Waste Pile 27	Dark to light brown soil	NA		Hand Tools	X		X	X		
CHLL-WP28-1	8/21/2017, 10/23/2017	CHLL-WP28-1	17101760, 1708320	-88.421790254	47.177445402	Assess Waste Pile 28	Dark brown soil, yellow/mustard brown clay-like seam	NA	pile included electrical components and ceramic insulators	Hand Tools	X		X	X	X	
CHLL-WP28-2	8/21/2017	CHLL-WP28-2	1708320	-88.421729941	47.177468453	Assess Waste Pile 28	Dark brown soil w/ white clay-like material	NA		Hand Tools	X		X	X		
CHLL-WP28-3	10/23/2017	CHLL-WP28-3	17101760, 1710220	-88.421814225	47.177406288	Assess Waste Pile 28	Dark brown soil, mixed with debris	NA		Hand Tools	X		X	X	X	
CHLL-WP28-4	10/23/2017	CHLL-WP28-4	17101760, 1710220	-88.421914755	47.177406470	Assess Waste Pile 28	Dark brown soil, mixed with debris	NA		Hand Tools	X		X	X	X	
CHLL-WP32-1	10/23/2017	CHLL-WP32-1	1710220	-88.421774640	47.177689600	Assess Waste Pile 32	White crystalline material	NA		Hand Tools	X		X	X		
CHLL-STACK-1	10/23/2017	CHLL-STACK-1	17101760, 1710220	-88.422615720	47.177192553	Assess Stack area debris	Fine grained gray soil	NA		Hand Tools	X		X	X	X	
CHLL-STACK-2	10/23/2017	CHLL-STACK-2	17101760, 1710220	-88.423125016	47.176927199	Assess Stack area debris	Fine grained light to dark gray soil	NA		Hand Tools	X		X	X	X	
CHLL-WP48	10/23/2017	CHLL-WP48-1	17101760, 1710220	-88.419661524	47.177000080	Assess Waste Pile 48	Brown sand with gravel	NA		Hand Tools	X		X	X	X	
CHLL-WP48	10/23/2017	CHLL-WP48-2	17101760, 1710220	-88.419753400	47.176942433	Assess Waste Pile 48	Brown sand with gravel	NA		Hand Tools	X		X	X	X	
CHLL-WP48	10/23/2017	CHLL-WP48-3	17101760, 1710220	-88.419805325	47.177051498	Assess Waste Pile 48	Brown sand with gravel	NA		Hand Tools	X		X	X	X	
CHLL-ASBBLK65	10/23/2017	CHLL-ASBBLK65A-102317	240-87026-1	-88.423340663	47.176915575	SACM	Black mastic	non-friable	fair condition, approximately 20SF	Hand Tools		X				X
CHLL-ASBBLK65	10/23/2017	CHLL-ASBBLK65B-102317	240-87026-1			SACM	Black mastic	non-friable		Hand Tools		X				X
CHLL-ASBBLK66	10/23/2017	CHLL-ASBBLK66A-102317	240-87026-1	-88.423304157	47.176928691	SACM	Black felt mastic	friable	fair condition, approximately 15SF	Hand Tools		X				X
CHLL-ASBBLK66	10/23/2017	CHLL-ASBBLK66B-102317	240-87026-1			SACM	Black felt mastic	friable		Hand Tools		X				X
CHLL-ASBBLK67	10/23/2017	CHLL-ASBBLK67A-102317	240-87026-1	-88.421764928	47.177448913	SACM	Gray TSI, appears cardboard-like underneath	friable	poor condition, approximately 5SF visible	Hand Tools		X				X
CHLL-ASBBLK67	10/23/2017	CHLL-ASBBLK67B-102317	240-87026-1			SACM	Gray TSI, appears cardboard-like underneath	friable		Hand Tools		X				X
CHLL-ASBBLK67	10/23/2017	CHLL-ASBBLK67C-102317	240-87026-1			SACM	Gray TSI, appears cardboard-like underneath	friable		Hand Tools		X				X
CHLL-ASBBLK68	10/23/2017	CHLL-ASBBLK68A-102317	240-87026-1	-88.421778537	47.177426510	SACM	Gray/blue/white TSI	friable	poor condition, approximately 5SF visible	Hand Tools		X				X
CHLL-ASBBLK68	10/23/2017	CHLL-ASBBLK68B-102317	240-87026-1			SACM	Gray/blue/white TSI	friable		Hand Tools		X				X
CHLL-ASBBLK68	10/23/2017	CHLL-ASBBLK68C-102317	240-87026-1			SACM	Gray/blue/white TSI	friable		Hand Tools		X				X

TABLE 3-4b
Supplemental SI Sampling and Analysis Summary
Hubbell Processing Area - Mineral Building Property
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Sampling Location	Sample Date	Field Sample ID	Laboratory Work Order Number	Longitude	Latitude	Sampling Rationale	Sample Description	Friable/ Non-Friable	Sample Notes	Sampling Method	Sample Type/Matrix		Sample Analyses			
											Surface Soil	Drums, Containers, and Building Materials/SACM	PCBs	Metals (As, Pb)	TCLP- As, Pb	Asbestos
Hubbell Processing Area (continued)																
CHLL-ASBBLK69	10/23/2017	CHLL-ASBBLK69A-102317	240-87026-1	-88.421747321	47.177458384	SACM	White TSI	friable	poor condition, approximately 15SF visible	Hand Tools		X				X
CHLL-ASBBLK69	10/23/2017	CHLL-ASBBLK69B-102317	240-87026-1			SACM	White TSI	friable		Hand Tools		X				X
CHLL-ASBBLK69	10/23/2017	CHLL-ASBBLK69C-102317	240-87026-1			SACM	White TSI	friable		Hand Tools		X				X
CHLL-ASBBLK70	10/23/2017	CHLL-ASBBLK70A-102317	240-87026-1	-88.421753595	47.177459102	SACM	White paper gasket	friable	poor condition, approximately 25SF visible	Hand Tools		X				X
CHLL-ASBBLK70	10/23/2017	CHLL-ASBBLK70B-102317	240-87026-1			SACM	White paper gasket	friable		Hand Tools		X				X
CHLL-ASBBLK70	10/23/2017	CHLL-ASBBLK70C-102317	240-87026-1			SACM	White paper gasket	friable		Hand Tools		X				X
CHLL-ASBBLK71	10/23/2017	CHLL-ASBBLK71A-102317	240-87026-1	-88.421794785	47.177455764	SACM	Gray/white fibers	friable	poor condition, approximately 5SF visible	Hand Tools		X				X
CHLL-ASBBLK71	10/23/2017	CHLL-ASBBLK71B-102317	240-87026-1			SACM	Gray/white fibers	friable		Hand Tools		X				X
CHLL-ASBBLK71	10/23/2017	CHLL-ASBBLK71C-102317	240-87026-1			SACM	Gray/white fibers	friable		Hand Tools		X				X
CHLL-ASBBLK72	10/23/2017	CHLL-ASBBLK72A-102317	240-87026-1	-88.421779301	47.177496655	SACM	Felt roofing	friable	poor condition, approximately 25SF visible, WP-28	Hand Tools		X				X
CHLL-ASBBLK72	10/23/2017	CHLL-ASBBLK72B-102317	240-87026-1			SACM	Felt roofing	friable		Hand Tools		X				X
CHLL-ASBBLK73	10/23/2017	CHLL-ASBBLK73A-102317	240-87026-1	-88.421633431	47.177228507	SACM	White w/ green fibrous material	friable	poor condition, approximately 10SF	Hand Tools		X				X
CHLL-ASBBLK73	10/23/2017	CHLL-ASBBLK73B-102317	240-87026-1			SACM	White w/ green fibrous material	friable		Hand Tools		X				X
CHLL-ASBBLK73	10/23/2017	CHLL-ASBBLK73C-102317	240-87026-1			SACM	White w/ green fibrous material	friable		Hand Tools		X				X
CHLL-ASBBLK74	10/23/2017	CHLL-ASBBLK74A-102317	240-87026-1	-88.421682721	47.177195535	SACM	White fibrous drywall	friable	poor condition, approximately 15SF scattered	Hand Tools		X				X
CHLL-ASBBLK74	10/23/2017	CHLL-ASBBLK74B-102317	240-87026-1			SACM	White fibrous drywall	friable		Hand Tools		X				X
CHLL-ASBBLK74	10/23/2017	CHLL-ASBBLK74C-102317	240-87026-1			SACM	White fibrous drywall	friable		Hand Tools		X				X
CHLL-ASBBLK75	10/23/2017	CHLL-ASBBLK75A-102317	240-87026-1	-88.421576120	47.177249480	SACM	Brown TSI	friable	poor condition, approximately 10SF visible, WP-23	Hand Tools		X				X
CHLL-ASBBLK75	10/23/2017	CHLL-ASBBLK75B-102317	240-87026-1			SACM	Brown TSI	friable		Hand Tools		X				X
CHLL-ASBBLK75	10/23/2017	CHLL-ASBBLK75C-102317	240-87026-1			SACM	Brown TSI	friable		Hand Tools		X				X
CHLL-ASBBLK76	10/23/2017	CHLL-ASBBLK76A-102317	240-87026-1	-88.421653814	47.177610049	SACM	Gray rope gasket	friable	poor condition, approximately 5SF visible	Hand Tools		X				X
CHLL-ASBBLK76	10/23/2017	CHLL-ASBBLK76B-102317	240-87026-1			SACM	Gray rope gasket	friable		Hand Tools		X				X
CHLL-ASBBLK77	10/23/2017	CHLL-ASBBLK77A-102317	240-87026-1	-88.419892016	47.177189016	SACM	Brown fibrous cardboard material	friable	poor condition, approximately 50SF scattered	Hand Tools		X				X
CHLL-ASBBLK77	10/23/2017	CHLL-ASBBLK77B-102317	240-87026-1			SACM	Brown fibrous cardboard material	friable		Hand Tools		X				X
K330273	7/12/2017	K330273	C&H1	--	--	SACM in ROW	Roofing	--		Hand Tools		X				X
K330274	7/12/2017	K330274	C&H1	--	--	SACM in ROW	Roofing	--		Hand Tools		X				X
K330275	7/12/2017	K330275	C&H1	--	--	SACM in ROW	Roofing	--		Hand Tools		X				X
K330276	7/12/2017	K330276	C&H1	--	--	SACM in ROW	Roofing	--		Hand Tools		X				X
K330277	7/12/2017	K330277	C&H1	--	--	SACM in ROW	Roofing	--		Hand Tools		X				X
K330278	7/12/2017	K330278	C&H1	--	--	SACM in ROW	Roofing	--		Hand Tools		X				X
K330279	7/12/2017	K330279	C&H2	--	--	SACM in ROW	Roofing	--		Hand Tools		X				X
K330280	7/12/2017	K330280	C&H2	--	--	SACM in ROW	Roofing	--		Hand Tools		X				X
K330281	7/12/2017	K330281	C&H2	--	--	SACM in ROW	Roofing	--		Hand Tools		X				X
K330282	7/12/2017	K330282	C&H2	--	--	SACM in ROW	Roofing	--		Hand Tools		X				X

TABLE 3-4b
Supplemental SI Sampling and Analysis Summary
Hubbell Processing Area - Mineral Building Property
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Notes:

CHLL = Calumet & Hecla Lake Linden Operations Area

SACM = Suspect Asbestos Containing Material

PCBs = Polychlorinated Biphenyls

TCLP = Toxicity Characteristic Leaching Procedure

As = Arsenic

Pb = Lead

ROW = Right-of-Way

TSI = Thermal System Insulation

SF = Square Feet

NA = Not Applicable

-- = Information not available

X = Completed sampling based on the sampling rationale and the horizontal and vertical location of the sample

Samples described in this evaluation may actually refer to stamp sands or to other mining waste from historic mining and reclamation processes conducted in the area.

In areas that have been resurfaced or capped, analytical samples were collected from directly beneath the cap/resurfacing medium (i.e. soil cap, beach sand, gravel, etc...) so that samples are representative of historical waste deposits.

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD12		CHLL-SD13			CHLL-SD14			CHLL-SD15		CHLL-SD16			
Field Sample ID					CHLL-SD 12-0"-6"	CHLL-SD 12-1'-2.5'	CHLL-SD13-0"-6"	CHLL-SD 13-1'-2'	CHLL-SD 13-1'-2' dup	CHLL-SD-14-0"-6"	CHLL-SD-14-1'-3'	CHLL-SD-14-3'-4'	CHLL-SD 15-0-6"	CHLL-SD 15-1'-2.7'	CHLL-SD-16-0"-6"	CHLL-SD-16-1'-3'	CHLL-SD-16-3'-4'	CHLL-SD-16-3'-4' DUP
Sample Date					6/15/2014	6/15/2014	6/15/2014	6/15/2014	6/15/2014	7/11/2014	7/11/2014	7/11/2014	6/16/2014	6/16/2014	7/11/2014	7/11/2014	7/11/2014	7/11/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 2.5 ft	0 - 0.5 ft	1 - 2 ft	1 - 2 ft	0 - 0.5 ft	1 - 3 ft	3 - 4 ft	0 - 0.5 ft	1 - 2.7 ft	0 - 0.5 ft	1 - 3 ft	3 - 4 ft	3 - 4 ft
Sample Description					SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown	SAND, Fine to medium grained, Reddish brown	Field Duplicate	SILT, Dark brown	SILT, Reddish brown	SILT, Reddish brown	SILT, Reddish brown	SAND, Silty, Fine grained, Reddish brown	SILT, Dark brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	Field Duplicate
Inorganics - Metals (mg/kg)																		
ALUMINUM	7429-90-5	NA	NA	NA	--	--	7700	--	--	15000	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	<0.6 U	--	--	15	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	1.9	--	--	16	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	26	--	--	2300 J	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	0.8	--	--	1.3	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	<0.2 U	--	--	3.6	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	19	--	--	42	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	8.8	--	--	19	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	550	--	--	9800	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	14000	--	--	31000	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	4.3	--	--	2200	--	--	--	--	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	270 J	--	--	420	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	<0.07 U	--	--	0.3	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	25	--	--	52	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	<0.4 U	--	--	1.6	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	1.7	--	--	26	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	61	--	--	430	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																		
CYANIDE	57-12-5	0.0001	NA	NA	--	--	ND	--	--	ND	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																		
AROCLOR-1242	53469-21-9	NA	NA	NA	<140 U	<130 U	<140 U	<130 U	<130 U	340 J	<300 U	<290 U	<240 UJ	<210 U	340 J	<300 U	<300 U	<290 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<140 U	<130 U	<140 U	<130 U	<130 U	<340 UJ	<300 U	<290 U	230 J	<210 U	<430 UJ	<300 U	<300 U	<290 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<140 U	<130 U	<140 U	<130 U	<130 U	390 J	<300 U	<290 U	270 J	<180 U	220 J	<300 U	<300 U	<290 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<140 U	<130 U	<140 U	<130 U	<130 U	<230 UJ	<300 U	<290 U	<170 UJ	290	<430 UJ	<300 U	<300 U	<290 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	730 J	ND	ND	500 J	290	560 J	ND	ND	ND
Organics - SVOCs (ug/kg)																		
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	<280 UJ	--	--	<1100 U	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	<280 UJ	--	--	<1100 U	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																		
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																		
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD17			CHLL-SD18		CHLL-SD19		CHLL-SD20		CHLL-SD21	CHLL-SD22			CHLL-SD23	
Field Sample ID					CHLL-SD 17-0"-6"	CHLL-SD 17-1'-3'	CHLL-SD 17-3'-5'	CHLL-SD 18-0"-6"	CHLL-SD 18-1'-2.7'	CHLL-SD 19-0"-6"	CHLL-SD-19-1'-2.4'	CHLL-SD 20-0-6"	CHLL-SD 20-1'-2'	CHLL-SD21-0"-6"	CHLL-SD 22-0-6"	CHLL-SD 22-0-6" dup	CHLL-SD 22-1'-1.5'	CHLL-SD23-0"-6"	CHLL-SD-23-1'-1.5'
Sample Date					7/12/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014	6/16/2014	6/16/2014	7/10/2014	6/16/2014	6/16/2014	6/16/2014	7/10/2014	7/10/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 2.7 ft	0 - 0.5 ft	1 - 2.4 ft	0 - 0.5 ft	1 - 2 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	1 - 1.5 ft	0 - 0.5 ft	1 - 1.5 ft
Sample Description					SILT, Dark brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SAND, Silty, Fine grained, Reddish brown	SAND, Silty, Poorly sorted, Reddish brown	SAND, Poorly sorted, Brown	SAND, Poorly sorted, Few Pebbles, Brown	SAND, Fine grained, Reddish brown	SAND, Poorly sorted, Reddish brown	SAND, Poorly sorted, Reddish brown	SAND, Poorly sorted, Reddish brown	Field Duplicate	SAND, Poorly sorted, Reddish brown	SAND, Silty, Fine grained, Dark brown, With wood debris	SAND, Silty, Fine grained, Reddish brown
Inorganics - Metals (mg/kg)																			
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	4800	3200	4400	3800	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	<0.3 U	17	<0.3 U	<0.3 U	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	1.7	2.3	1.2	1.4	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	78 J	2700 J	31 J	20 J	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	0.5	1.0	0.4	0.3	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	<0.2 U	3.1	<0.2 U	<0.2 U	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	9.0	13	8.5	8.5	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	4.5	6.4	4.5	4.5	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	130	4400	89	140	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	12000	9900	10000	9000	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	27	1600	5.6	5.4	--	--	--	--	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	160	120	130	110	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	<0.07 U	0.1	<0.08 U	<0.07 U	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	12	17	12	12	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	<0.2 U	1.1	<0.2 U	<0.2 U	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	0.3	13	<0.1 U	0.2	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	24	220	23	25	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																			
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	ND	ND	ND	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																			
AROCLOR-1242	53469-21-9	NA	NA	NA	760 J	<300 U	<150 U	<140 U	360 J	<150 U	<130 U	<150 U	<120 U	<260 U	<120 U	<110 U	<110 U	<320 U	<150 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<790 UJ	<300 U	<150 U	<140 U	<370 UJ	<150 U	<130 U	<150 U	<120 U	<260 U	<120 U	<110 U	<110 U	<320 U	<150 U
AROCLOR-1254	11097-69-1	NA	NA	NA	890 J	<300 U	<150 U	<140 U	360 J	<150 U	<130 U	<150 U	<120 U	<260 U	<120 U	<110 U	<110 U	<320 U	<150 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<420 UJ	<300 U	<150 U	<140 U	<120 UJ	<150 U	<130 U	<150 U	<120 U	<260 U	<120 U	<110 U	<110 U	<320 U	<150 U
TOTAL PCBS	TPCB	59.8	59.8	676	1650 J	ND	ND	ND	720 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																			
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	<700 U	<620 U	<750 U	<660 U	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	<700 U	<620 U	<750 U	<660 U	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																			
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																			
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD73				CHLL-SD74			CHLL-SD75			CHLL-SD76			
Field Sample ID					CHLL-SD-73 0'-6"	CHLL-SD-73 1'-3'	CHLL-SD-73 1'-3' DUP	CHLL-SD-73 3'-4.9'	CHLL-SD-74 0'-6"	CHLL-SD-74 1'-3'	CHLL-SD-74 3'-5'	CHLL-SD-75 0'-6"	CHLL-SD-75 1'-3'	CHLL-SD-75 3'-5'	CHLL-SD-76 0-6"	CHLL-SD-76 1'-3'	CHLL-SD-76 1'-3' DUP	CHLL-SD-76 3'-5'
Sample Date					5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 4.9 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 5 ft
Sample Description					SILT, Dark Brown, sandy	SAND, Reddish brown, fine grained, silty to 2.1 ft; SILT, Reddish brown	Field Duplicate	Reddish brown	SILT, Dark brown	SILT, Reddish brown	SILT, Reddish brown to 3.9 ft; SAND, Reddish brown, fine-medium grained, silty	SAND, Brown, poorly sorted	SAND, Reddish brown, poorly sorted to 2 ft; SAND, Reddish brown, fine to medium grained	SAND, Reddish brown, fine to medium grained	SAND, Reddish brown, fine to medium grained	SAND, Reddish brown, poorly sorted to 3.75 ft; SAND, Reddish brown, fine grained	Field Duplicate	SAND, Reddish brown, fine to medium grained
Inorganics - Metals (mg/kg)																		
ALUMINUM	7429-90-5	NA	NA	NA	7100	--	--	--	11000	--	--	5000	--	--	7400	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	13	--	--	--	7.5	--	--	<0.3 U	--	--	<0.3 U	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	4.8	--	--	--	12	--	--	1.3	--	--	1.8	--	--	--
BARIUM	7440-39-3	NA	NA	NA	2300	--	--	--	570	--	--	17	--	--	20	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	0.8	--	--	--	<2.0 U	--	--	0.4	--	--	0.7	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	2.7	--	--	--	2.6	--	--	<0.2 U	--	--	<0.2 U	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	19	--	--	--	30	--	--	12	--	--	18	--	--	--
COBALT	7440-48-4	50	NA	NA	8.9	--	--	--	13	--	--	6.2	--	--	9.4	--	--	--
COPPER	7440-50-8	31.6	31.6	149	3800	--	--	--	4000	--	--	480	--	--	490	--	--	--
IRON	7439-89-6	NA	NA	NA	12000	--	--	--	20000	--	--	7200	--	--	11000	--	--	--
LEAD	7439-92-1	35.8	35.8	128	1900	--	--	--	1100	--	--	8.2	--	--	16	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	6.8	--	--	--	10	--	--	3.4	--	--	5.0	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	6000	--	--	--	8600	--	--	4900	--	--	7900	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	190	--	--	--	320	--	--	150	--	--	240	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	0.1	--	--	--	0.2	--	--	<0.06 U	--	--	<0.06 U	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	27	--	--	--	43	--	--	17	--	--	25	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	0.4	--	--	--	<2.0 U	--	--	<0.2 U	--	--	<0.2 U	--	--	--
SILVER	7440-22-4	0.5	NA	NA	13	--	--	--	7.8	--	--	1.7	--	--	3.0	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	290	--	--	--	440	--	--	40	--	--	68	--	--	--
Inorganics - Cyanide (mg/kg)																		
CYANIDE	57-12-5	0.0001	NA	NA	<0.20 U	--	--	--	<0.23 U	--	--	<0.13 U	--	--	<0.13 U	--	--	--
Organics - PCBs (ug/kg)																		
AROCLOR-1242	53469-21-9	NA	NA	NA	<400 UJ	<330 UJ	<320 UJ	<300 U	<450 UJ	<300 U	<260 U	<250 U	<110 U	<120 U	<130 U	<120 U	<120 U	<120 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<400 UJ	<330 UJ	<320 UJ	<300 U	<450 UJ	<300 U	<260 U	<250 U	<110 U	<120 U	<130 U	<120 U	<120 U	<120 U
AROCLOR-1254	11097-69-1	NA	NA	NA	180 J	250 J	230 J	<300 U	210 J	<300 U	<260 U	<250 U	<110 U	<120 U	<130 U	<120 U	<120 U	<120 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<400 UJ	<330 UJ	<320 UJ	<300 U	160 J	<300 U	<260 U	<250 U	<110 U	<120 U	<130 U	<120 U	<120 U	<120 U
TOTAL PCBS	TPCB	59.8	59.8	676	180 J	250 J	230 J	ND	370 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																		
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	940 J	1200	--	--	<740 U	--	--	<230 U	--	--	<230 U	<250 U	--
PYRENE	129-00-0	195	195	1,520	--	700 J	890	--	--	<740 U	--	--	<230 U	--	--	<230 U	<250 U	--
Organics - VOCs (ug/kg)																		
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																		
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD77			CHLL-SD78			CHLL-SD79				CHLL-SD80		
Field Sample ID					CHLL-SD-77 0-6"	CHLL-SD-77 1'-3'	CHLL-SD-77 3'-5'	CHLL-SD-78 0-6"	CHLL-SD-78 1'-3'	CHLL-SD-78 3'-5'	CHLL-SD-79 0-6"	CHLL-SD-79 1'-3'	CHLL-SD-79 1'-3' DUP	CHLL-SD-79 3'-4.75'	CHLL-SD-80 0'-6"	CHLL-SD-80 1'-3'	CHLL-SD-80 3'-4.75'
Sample Date					5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/27/2015	5/27/2015	5/27/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 4.75 ft	0 - 0.5 ft	1 - 3 ft	3 - 4.75 ft
Sample Description					SAND, Reddish brown, fine to medium grained	SAND, Reddish brown, fine to medium grained	SAND, Reddish brown, fine to medium grained, Silty	SILT, Dark Brown	SILT, Reddish brown, Clayey	SAND, Reddish brown, fine grained	SILT, Dark Brown	SILT, Reddish brown, Clayey	Field Duplicate	SILT, Reddish brown, Clayey	SILT, Dark Brown	SILT, Reddish brown, Clayey	SILT, Reddish brown, Clayey
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	NA	NA	NA	6600	--	--	12000	--	--	17000	--	--	--	15000	--	--
ANTIMONY	7440-36-0	NA	NA	NA	<0.3 U	--	--	1.5	--	--	14	--	--	--	11	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	1.5	--	--	10	--	--	14	--	--	--	14	--	--
BARIUM	7440-39-3	NA	NA	NA	32	--	--	77	--	--	1000	--	--	--	660	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	0.7	--	--	<2.0 U	--	--	1.2	--	--	--	<2.0 U	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	<0.2 U	--	--	0.6	--	--	3.8	--	--	--	2.7	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	17	--	--	32	--	--	40	--	--	--	40	--	--
COBALT	7440-48-4	50	NA	NA	9.3	--	--	17	--	--	21	--	--	--	19	--	--
COPPER	7440-50-8	31.6	31.6	149	490	--	--	1900	--	--	11000	--	--	--	6700	--	--
IRON	7439-89-6	NA	NA	NA	10000	--	--	23000	--	--	27000	--	--	--	23000	--	--
LEAD	7439-92-1	35.8	35.8	128	3.7	--	--	330	--	--	2800	--	--	--	1800	--	--
LITHIUM	7439-93-2	NA	NA	NA	4.7	--	--	7.5	--	--	15	--	--	--	15	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	7800	--	--	12000	--	--	16000	--	--	--	12000	--	--
MANGANESE	7439-96-5	NA	NA	NA	230	--	--	410	--	--	480	--	--	--	450	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	<0.07 U	--	--	0.1	--	--	0.2	--	--	--	0.3	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	24	--	--	46	--	--	53	--	--	--	51	--	--
SELENIUM	7782-49-2	NA	NA	NA	<0.2 U	--	--	<2.0 U	--	--	0.5	--	--	--	<2.0 U	--	--
SILVER	7440-22-4	0.5	NA	NA	2.2	--	--	5.5	--	--	28	--	--	--	16	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	65	--	--	150	--	--	330	--	--	--	310	--	--
Inorganics - Cyanide (mg/kg)																	
CYANIDE	57-12-5	0.0001	NA	NA	<0.14 U	--	--	<0.18 U	--	--	<0.22 U	--	--	--	<0.27 U	--	--
Organics - PCBs (ug/kg)																	
AROCLOR-1242	53469-21-9	NA	NA	NA	<140 U	<130 U	<280 UJ	<350 U	<290 U	<290 U	<440 UJ	<290 U	<300 U	<300 U	<550 UJ	<300 U	<300 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<140 U	<130 U	<280 UJ	<350 U	<290 U	<290 U	<440 UJ	<290 U	<300 U	<300 U	<550 UJ	<300 U	<300 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<140 U	<130 U	88 J	<350 U	<290 U	<290 U	140 J	<290 U	<300 U	<300 U	210 J	<300 U	<300 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<140 U	<130 U	<280 UJ	<350 U	<290 U	<290 U	<440 UJ	<290 U	<300 U	<300 U	<550 UJ	<300 U	<300 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	88 J	ND	ND	ND	140 J	ND	ND	ND	210 J	ND	ND
Organics - SVOCs (ug/kg)																	
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	<260 U	--	--	<720 U	--	--	<740 U	<740 U	--	--	<750 U	--
PYRENE	129-00-0	195	195	1,520	--	<260 U	--	--	<720 U	--	--	<740 U	<740 U	--	--	<750 U	--
Organics - VOCs (ug/kg)																	
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																	
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD81			CHLL-SD82			CHLL-SD101			CHLL-SD102		
Field Sample ID					CHLL-SD-81 0'-6"	CHLL-SD-81 1'-3'	CHLL-SD-81 3'-4'	CHLL-SD-82 0"-6"	CHLL-SD-82 1'-3'	CHLL-SD-82 3'-4.75'	CHLL-SD-101-0-6"	CHLL-SD-101-1-3'	CHLL-SD-101-3-4.75'	CHLL-SD-102-0-6"	CHLL-SD-102-1-3'	CHLL-SD-102-3-5'
Sample Date					5/27/2015	5/27/2015	5/27/2015	5/28/2015	5/28/2015	5/28/2015	7/12/2015	7/12/2015	7/12/2015	7/12/2015	7/12/2015	7/12/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 4 ft	0 - 0.5 ft	1 - 3 ft	3 - 4.75 ft	0 - 0.5 ft	1 - 3 ft	3 - 4.75 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft
Sample Description					SILT, Dark Brown	SILT, Reddish brown	SILT, Reddish brown	SILT, Dark Brown, Sandy	SILT, Dark Brown, Sandy to 2 ft; SAND, Reddish-Brown, fine to medium grained	SAND, Reddish-Brown, fine to medium grained	SILT WITH ORGANICS, dark brown to black, wet, soft	CLAY WITH SILT, dark brown, wet, soft; SILT WITH TRACE SAND, dark brown, wet, soft to firm	SILT WITH TRACE SAND, dark brown, wet, soft to firm	SILT WITH SAND, light brown to black, wet, soft	SAND WITH SILT, dark brown, wet, loose to medium dense, fine to medium, angular to1.75 ft; SILT WITH SAND, dark brown, wet, firm, angular	SILT WITH SAND, dark brown, wet, firm, silt with fine angular sand
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	NA	NA	NA	10000	--	--	10000	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	12	--	--	0.9	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	6.8	--	--	2.2	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	800	--	--	160	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	1.3	--	--	0.7	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	2.9	--	--	0.4	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	23	--	--	15	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	13	--	--	7.4	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	9900	--	--	110	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	18000	--	--	15000	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	1700	--	--	85	--	--	--	--	--	160	--	--
LITHIUM	7439-93-2	NA	NA	NA	21	--	--	13	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	11000	--	--	5300	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	340	--	--	230	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	0.3	--	--	<0.1 UJ	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	33	--	--	18	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	0.6	--	--	0.3	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	20	--	--	1.5	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	290	--	--	210	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	0.0001	NA	NA	<0.18 U	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1242	53469-21-9	NA	NA	NA	<360 UJ	<290 U	<290 U	<430 U	<410 UJ	<120 U	<490 U	<300 U	<290 U	<360 U	<310 U	<290 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<360 UJ	<290 U	<290 U	<430 U	400 J	<120 U	<490 U	<300 U	<290 U	<360 U	<310 U	<290 U
AROCLOR-1254	11097-69-1	NA	NA	NA	130 J	<290 U	<290 U	<430 U	500 J	<120 U	<490 U	<300 U	<290 U	<360 U	<310 U	<290 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<360 UJ	<290 U	<290 U	<430 U	<320 UJ	<120 U	<490 U	<300 U	<290 U	<360 U	920	<290 U
TOTAL PCBS	TPCB	59.8	59.8	676	130 J	ND	ND	ND	900 J	ND	ND	ND	ND	ND	920	ND
Organics - SVOCs (ug/kg)																
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	<720 U	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	<720 U	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	75,000	60,000	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	420,000	370,000	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD105				CHLL-SD106			CHLL-SD107			CHLL-SD108			
Field Sample ID					CHLL-SD-105-0-1'	CHLL-SD-105-1-3'	CHLL-SD-105-1-3' Dup	CHLL-SD-105-3-6'	CHLL-SD-106-0-1'	CHLL-SD-106-1-3'	CHLL-SD-106-3-5'	CHLL-SD-107-0-1'	CHLL-SD-107-1-3'	CHLL-SD-107-3-6'	CHLL-SD-108-0-1'	CHLL-SD-108-0-1' Dup	CHLL-SD-108-1-3'	CHLL-SD-108-3-4'
Sample Date					6/6/2017	6/6/2017	6/6/2017	6/6/2017	6/6/2017	6/6/2017	6/6/2017	6/6/2017	6/6/2017	6/6/2017	6/6/2017	6/6/2017	6/6/2017	6/6/2017
Sample Interval (bgs)					0 - 1 ft	1 - 3 ft	1 - 3 ft	3 - 6 ft	0 - 1 ft	1 - 3 ft	3 - 5 ft	0 - 1 ft	1 - 3 ft	3 - 6 ft	0 - 1 ft	0 - 1 ft	1 - 3 ft	3 - 4 ft
Sample Description					SAND, coarse grain, trace fines and gravel, reddish brown, firm, wet	SAND, coarse grain, trace fines and gravel, reddish brown, firm, wet	Field Duplicate	SAND, Coarse grain, trace fines and gravel, reddish brown, firm, wet	SILT, dark brown, trace gravel and organics, cohesive, non-plastic	SILT, reddish brown, trace gravel and organics, soft, cohesive, non-plastic	CLAY, red-brown mottled, firm, cohesive, slightly plastic	SAND, reddish brown, organics (wood debris), dark brown streaks	SAND, reddish brown, organics (wood debris), dark brown streaks	SAND, reddish brown, trace to few organics	SILTY CLAY, dark brown, orange streaking, organics, soft, wet to SILTY CLAY, reddish brown, organics, soft, noncohesive, non-plastic	Field Duplicate	SILTY CLAY, reddish brown, stiff, plastic cohesive	SILTY CLAY, reddish brown, soft, plastic, cohesive
Inorganics - Metals (mg/kg)																		
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	2.2	1.3	1.4	1.5	10	6.7	5.5	1.2	0.9	0.8	11	12	3.9	6.2
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	110	59	57	37	1,100	590	41	4.3	5.8	3.7	4,500	3,700	12	16
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																		
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																		
AROCLOR-1242	53469-21-9	NA	NA	NA	<120 U	<130 U	<120 U	<120 U	<350 U	<180 U	<150 U	<160 U	<130 U	<120 U	<240 U	<350 U	<140 U	<160 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<120 U	<130 U	<120 U	<120 U	330 J	<150 U	<150 U	<160 U	<130 U	<120 U	230 J	330 J	<140 U	<160 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<120 U	<130 U	<120 U	<120 U	380 J	180	<150 U	<160 U	<130 U	<120 U	260 J	440 J	<140 U	<160 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<120 U	<130 U	<120 U	<120 U	<190 U	<150 U	<150 U	<160 U	<130 U	<120 U	<200 U	<200 U	<140 U	<160 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	710 J	180	ND	ND	ND	ND	490 J	770 J	ND	ND
Organics - SVOCs (ug/kg)																		
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																		
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																		
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD109			LLV-1		LLV-3		LLV-4		LLV-5		LLV-6	
Field Sample ID					CHLL-SD-109-0-1'	CHLL-SD-109-1-3'	CHLL-SD-109-3-6'	LLV-1A	LLV-1B	LLV-3A	LLV-3B	LLV-4A	LLV-4B	LLV-5A	LLV-5B	LLV-6A	LLV-6B
Sample Date					6/6/2017	6/6/2017	6/6/2017	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007
Sample Interval (bgs)					0 - 1 ft	1 - 3 ft	3 - 6 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft
Sample Description					SAND, medium to coarse grain, reddish brown, firm	SAND, coarse grain, brown, some small gravel, firm	SAND, coarse grain, reddish brown, some small to large gravel	--	--	--	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	2.5	3.1	2.6	2.6	2.5	2.4	2.6	2.4	2.6	2.3
ARSENIC	7440-38-2	9.79	9.79	33.0	0.8	0.9	1.2	2.6	2.1	6.5	7.0	1.5	1.7	1.7	1.4	2.4	2.3
BARIUM	7440-39-3	NA	NA	NA	--	--	--	20	21	12	10	21	19	17	16	14	11
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	1900	7100	810	1200	770	1500	6400	1300	2600	3900
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	2.8	3.8	4.7	23	40	19	14	16	8.3	20	20	35	13
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																	
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																	
AROCLOR-1242	53469-21-9	NA	NA	NA	<120 U	<120 U	<120 U	<100 U	<100 U	<110 U	<100 U	<100 U	<100 U	<110 U	<100 U	<100 U	<94 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<120 U	<120 U	<120 U	<100 U	<100 U	<110 U	<100 U	<100 U	<100 U	<110 U	<100 U	<100 U	<94 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<120 U	<120 U	<120 U	<100 U	<100 U	<110 U	<100 U	<100 U	<100 U	<110 U	<100 U	<100 U	<94 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<120 U	<120 U	<120 U	--	--	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																	
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																	
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																	
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	LLV-7				LLV-8		LLV-9		LLV-10		LLV-11	
Field Sample ID					LLV-7A	LLV-7A DUP	LLV-7B	LLV-7B DUP	LLV-8A	LLV-8B	LLV-9A	LLV-9B	LLV-10A	LLV-10B	LLV-11A	LLV-11B
Sample Date					7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007
Sample Interval (bgs)					0 - 0.25 ft	0 - 0.25 ft	1 - 1.5 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft
Sample Description					--	Field Duplicate	--	Field Duplicate	--	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	2.5	2.4	2.6	2.4	2.2	2.3	2.1	2.4	2.5	2.3	2.2	2.4
ARSENIC	7440-38-2	9.79	9.79	33.0	3.0	3.1	1.8	1.6	1.1	1.2	1.6	1.6	2.2	1.2	2.7	1.3
BARIUM	7440-39-3	NA	NA	NA	16	14	11	9.3	7.2	7.4	11	12	14	8.0	43	41
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	1000	1100	560	470	1500	1000	1700	2200	910	970	800	780
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	27	25	22	18	11	14	59	36	74	18	79	16
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1242	53469-21-9	NA	NA	NA	<100 U	<98 U	<110 U	<100 U	<95 U	<97 U	<92 U	<97 U	<100 U	<96 U	<92 U	<94 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<100 U	<98 U	<110 U	<100 U	<95 U	<97 U	<92 U	<97 U	<100 U	<96 U	<92 U	<94 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<100 U	<98 U	<110 U	<100 U	<95 U	<97 U	<92 U	<97 U	<100 U	<96 U	<92 U	<94 U
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	LLV-13				LLV-14		LLV-15				LLV-16		LLV-17	
Field Sample ID					LLV-13A	LLV-13A DUP	LLV-13B	LLV-13B DUP	LLV-14A	LLV-14B	LLV-15A	LLV-15A DUP	LLV-15B	LLV-15B DUP	LLV-16A	LLV-16B	LLV-17A	LLV-17B
Sample Date					7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/31/2007
Sample Interval (bgs)					0 - 0.25 ft	0 - 0.25 ft	1 - 1.5 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	0 - 0.25 ft	1 - 1.5 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft
Sample Description					--	Field Duplicate	--	Field Duplicate	--	--	--	Field Duplicate	--	Field Duplicate	--	--	--	--
Inorganics - Metals (mg/kg)																		
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	2.5	2.6	2.6	2.6	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.5	2.4	2.5
ARSENIC	7440-38-2	9.79	9.79	33.0	1.7	1.7	3.2	2.0	1.2	11	1.2	1.2	2.6	3.1	1.2	1.6	2.2	2.2
BARIUM	7440-39-3	NA	NA	NA	54	49	100	41	19	110	15	13	21	22	14	23	21	40
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	300	440	1100	300	72	1500	130	130	590	550	160	380	390	440
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	23	20	49	20	4.5	470	2.5	2.4	20	27	2.7	16	10	49
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																		
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																		
AROCLOR-1242	53469-21-9	NA	NA	NA	<100 U	<110 U	<100 U	<110 U	<97 U	<100 U	<96 U	<94 U	<100 U	<99 U	<95 U	<96 U	<100 U	<100 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<100 U	<110 U	<100 U	<110 U	<97 U	<100 U	<96 U	<94 U	<100 U	<99 U	<95 U	<96 U	<100 U	<100 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<100 U	<110 U	<100 U	<110 U	<97 U	<100 U	<96 U	<94 U	<100 U	<99 U	<95 U	<96 U	<100 U	<100 U
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																		
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																		
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																		
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	LLV-18		LLV-19		LLV-20		LLV-21		LLV-22				LLV-23	
Field Sample ID					LLV-18A	LLV-18B	LLV-19A	LLV-19B	LLV-20A	LLV-20B	LLV-21A	LLV-21B	LLV-22A	LLV-22A DUP	LLV-22B	LLV-22B DUP	LLV-23A	LLV-23B
Sample Date					7/31/2007	7/31/2007	7/31/2007	7/31/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007	7/30/2007
Sample Interval (bgs)					0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft	0 - 0.25 ft	0 - 0.25 ft	1 - 1.5 ft	1 - 1.5 ft	0 - 0.25 ft	1 - 1.5 ft
Sample Description					--	--	--	--	--	--	--	--	--	Field Duplicate	--	Field Duplicate	--	--
Inorganics - Metals (mg/kg)																		
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	2.2	2.4	2.3	2.7	2.5	2.4	2.3	2.5	2.3	2.4	2.4	2.3	2.6	2.2
ARSENIC	7440-38-2	9.79	9.79	33.0	2.0	1.2	2.8	2.1	3.9	1.5	10	5.0	2.3	1.9	1.7	1.6	5.0	1.6
BARIUM	7440-39-3	NA	NA	NA	17	20	19	25	28	23	57	49	22	21	22	18	66	27
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	290	930	440	930	410	850	3200	760	580	720	580	570	630	880
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	9.4	13	4.7	39	9.7	4.0	10	9.6	8.5	3.9	2.5	2.2	15	3.0
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																		
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																		
AROCLOR-1242	53469-21-9	NA	NA	NA	<87 U	<98 U	<95 U	<100 U	<100 U	<99 U	<100 U	<100 U	<99 U	<100 U	<95 U	<98 U	<100 U	<100 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<87 U	<98 U	<95 U	<100 U	<100 U	<99 U	<100 U	<100 U	<99 U	<100 U	<95 U	<98 U	<100 U	<100 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<87 U	<98 U	<95 U	<100 U	<100 U	<99 U	<100 U	<100 U	<99 U	<100 U	<95 U	<98 U	<100 U	<100 U
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																		
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																		
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																		
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	LLV-24		LLV-MP3	LLV-MP4	LLV-MP5	LLV-MP6	LLV-MP7	LLV-MP8	SD-03		TL07-01			
Field Sample ID					LLV-24A	LLV-24B	LLV-MP3-01	LLV-MP4-01	LLV-MP5-01	LLV-MP6-01	LLV-MP7-01	LLV-MP8-01	SD-03	SD-03D	TL07-01 0-6	TL07-01 6-24	TL07-01 24-43	TL07-01 43-64
Sample Date					7/30/2007	7/30/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	10/12/2011	10/12/2011	8/7/2007	8/7/2007	8/7/2007	8/7/2007
Sample Interval (bgs)					0 - 0.25 ft	1 - 1.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 3 in	0 - 3 in	0 - 6 in	6 - 24 in	24 - 43 in	43 - 64 in
Sample Description					--	--	--	--	--	--	--	--	--	Field Duplicate	--	--	--	--
Inorganics - Metals (mg/kg)																		
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	2060	2140	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	2.5	2.3	4.7	5.2	4.8	6.2	5.0	7.4	0.27 J	0.34 J	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	4.6	2.1	2.3	2.6	2.4	3.1	2.5	4.1	<1.0 UJ	1.4 J-	1.0	1.3	2.7	49
BARIUM	7440-39-3	NA	NA	NA	80	23	29	25	170	120	32	150	20.7 J	26.5	22	52	220	130000
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	0.28 J	0.33 J	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	0.51 J	0.56	<0.2 U	<0.2 U	0.33	85
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	1630	1600	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	8.4	7.9	9.5	11	15	200
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	3.2 J	2.8 J	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	750	570	200	340	310	330	100	540	164	97.7	140	430	670	120000
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	8430	9320	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	5.6	3.7	40	21	130	110	11	68	7.6	8.5	9.2	110	150	75000
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	1910	1680	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	101	107	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	<0.1 U	<0.1 U	<0.05 U	<0.05 U	0.09	1.5
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	8.6	7.3	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	<3.5 U	<3.5 U	<0.2 U	<0.2 U	0.27	20
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	<1.0 U	<1 U	0.22	1.3	1.2	450
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	313 J	145 J	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	15.6	18.4	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	28.4	26	23	40	80	6800
Inorganics - Cyanide (mg/kg)																		
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	ND	ND	--	--	--	--
Organics - PCBs (ug/kg)																		
AROCLOR-1242	53469-21-9	NA	NA	NA	<110 U	<100 U	<100 U	<110 U	<100 U	<130 U	<110 U	<150 U	<48 U	<45 U	<130 U	<120 U	<170 U	5100
AROCLOR-1248	12672-29-6	NA	NA	NA	<110 U	<100 U	<100 U	<110 U	<100 U	<130 U	<110 U	<150 U	<48 U	<45 U	<130 U	<120 U	<170 U	<5200 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<110 U	<100 U	<100 U	<110 U	<100 U	<130 U	<110 U	<150 U	<48 U	<45 U	<130 U	<120 U	<170 U	3800
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	<48 U	<45 U	<130 U	<120 U	<170 U	<1000 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8900
Organics - SVOCs (ug/kg)																		
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	130 J	<170 U	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	<170 UJ	<170 UJ	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	<170 U	<170 UJ	--	--	--	--
Organics - VOCs (ug/kg)																		
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																		
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL07-02			TL07-03			TL07-04				TL07-13				
Field Sample ID					TL07-02 0-28	TL07-02 28-48	TL07-02 48-64	TL07-03 0-21	TL07-03 21-41	TL07-03 41-70	TL07-04 0-6	TL07-04 6-26	TL07-04 36-60	TL07-04 60-95	TL07-13 0-6	TL07-13 6-26	TL07-13 26-40	TL07-13 40-66	TL07-13 40-66 D
Sample Date					8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007
Sample Interval (bgs)					0 - 28 in	28 - 48 in	48 - 64 in	0 - 21 in	21 - 41 in	41 - 70 in	0 - 6 in	6 - 26 in	36 - 60 in	60 - 95 in	0 - 6 in	6 - 26 in	26 - 40 in	40 - 66 in	40 - 66 in
Sample Description					--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field Duplicate
Inorganics - Metals (mg/kg)																			
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	2.3	38	8.2	1.6	55	5.6	26	5.7	5.8	4.7	7.5	8.7	18	3.8	2.6
BARIUM	7440-39-3	NA	NA	NA	310	84000	4100	150	99000	620	12000	410	88	71	15	19	21	17	15
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	0.27	38	3.6	<0.2 U	37	0.59	<0.2 U	0.6	<0.2 U	<0.2 U	<0.2 U	0.22	0.27	<0.2 U	<0.2 U
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	13	130	38	8.7	120	44	51	45	44	44	28	27	32	20	18
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	370	78000	8600	160	120000	3500	28000	3900	3400	3000	800	1300	2400	7100	5800
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	100	44000	2500	19	42000	300	7800	400	39	23	34	70	72	10	7.8
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	<0.05 U	1.7	0.3	<0.05 U	2.6	0.12	0.6	0.13	0.07	0.07	<0.05 U	0.09	0.12	0.07	<0.05 U
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	0.27	18	2.6	<0.2 U	23	0.31	5	0.4	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	0.21
SILVER	7440-22-4	0.5	NA	NA	0.87	290	39	0.31	380	9.3	80	11	6.1	5.4	3.3	4.0	8.1	8.0	6.9
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	54	3500	430	38	4100	140	1000	180	110	110	98	120	120	78	65
Inorganics - Cyanide (mg/kg)																			
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																			
AROCLOR-1242	53469-21-9	NA	NA	NA	<180 U	3000	<140 U	<140 U	3200	<130 U	460	<140 U	<140 U	<140 U	<130 U	<130 U	<130 U	<130 U	<130 U
AROCLOR-1248	12672-29-6	NA	NA	NA	<180 U	<3100 U	130	<140 U	<3200 U	<130 U	470	<140 U	<140 U	<140 U	<130 U	<130 U	<130 U	<130 U	<130 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<180 U	2800	150	<140 U	2900	<130 U	450	180	<140 U	<140 U	<130 U	<130 U	<130 U	<130 U	<130 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<180 U	<970 U	<140 U	<140 U	<1000 U	<130 U	<210 U	<140 U	<140 U	50	<130 U	<130 U	<130 U	<130 U	<130 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	5800	280	ND	6100	ND	910	180	ND	50	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																			
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																			
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DRO/ORO (ug/kg)																			
Diesel Range Organics (C10-C20)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics (C20-C34)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 7-5
Sample Analytical Summary - Sediment
Lake Linden Recreation Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Sediment Table Footnotes:

- ESLs, TECs, and PECs are adapted from Appendix A and Appendix B of Michigan Department of Environmental Quality - Remediation and Redevelopment Division Operational Memorandum No. 4 Attachment 3, Interim Final August 2, 2006.
- Only detected analytes are listed - Gray rows indicate requested analyses. If no analytes are listed below a gray row then all analytes of that group were either not analyzed or not detected. ND indicates that one or more analyte of that goup was tested and not detected and a -- indicates not analyzed.
- Bold values are concentrations detected above the reporting limit.
- Shaded values indicate analyte concentration exceeded applicable criteria. Color presented is the criteria with the highest value that was exceeded:

EPA Region 5 RCRA ESLs dated August 22, 2003

TECs from MacDonald *et al.* 2000

PECs from MacDonald *et al.* 2000

Evaluation based on MDEQ Criteria at time of Project completion.

Samples described in this evaluation may actually refer to stamp sands or to other mining waste from historic mining and reclamation processes conducted in the area.

-- = Not analyzed/Not Reported

bgs = Below ground surface

ft = Feet

in = Inches

mg/kg = Milligrams per kilogram.

ug/kg = Micrograms per kilogram

ESL = Ecological Screening Level

TEC = Threshold Effect Concentration

PEC = Probable Effect Concentration

PCBs = Polychlorinated biphenyls

SVOCs = Semi-volatile organic compound

VOC = Volatile organic compound

DRO/ORO = Diesel Range Organics and Oil Range Organics

Criteria Footnotes:

NA = A criterion or value is not available

Laboratory Footnotes:

J = Estimated result

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

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

TABLE 9-7
Sample Analytical Summary - Bulk Asbestos
Hubbell Processing Area - Mineral Building Property
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Sample Location	Field Sample ID	Sample Date	Asbestos	Note	Sample Description
CHLL-ASBBLK01	CHLL-ASBBLK01-073114	7/31/2014	ND		Black asphaltic roofing material from the Mineral Building
CHLL-ASBBLK02	CHLL-ASBBLK02-073114	7/31/2014	ND		Green asphaltic roofing material from sandstone building
CHLL-ASBBLK03	CHLL-ASBBLK03-073114	7/31/2014	ND		Black corrugated asphaltic roofing material from sandstone building
CHLL-ASBBLK04	CHLL-ASBBLK04-073114	7/31/2014	ND		White cementitious material (possible pipe insulation) in debris pile
CHLL-ASBBLK05	CHLL-ASBBLK05-073114	7/31/2014	15 %	CHRYSOTILE	Whitish grey, transite fragment in debris pile
CHLL-ASBBLK06	CHLL-ASBBLK06-073114	7/31/2014	70 %	CHRYSOTILE	Black, weathered roofing material, tar paper
CHLL-ASBBLK25	CHLL-ASBBLK25A-101414	10/14/2014	ND		Tan/Brown, Corrugated paper, Found in multiple debris piles, Damaged.
	CHLL-ASBBLK25B-101414	10/14/2014	ND		Tan/Brown, Corrugated paper, Found in multiple debris piles, Damaged.
	CHLL-ASBBLK25C-101414	10/14/2014	ND		Tan/Brown, Corrugated paper, Found in multiple debris piles, Damaged.
CHLL-ASBBLK26	CHLL-ASBBLK26A-101514	10/15/2014	20 %	CHRYSOTILE	Grayish white, Transite, Found in multiple debris piles, Damaged
	CHLL-ASBBLK26B-101514	10/15/2014	20 %	CHRYSOTILE	Grayish white, Transite, Found in multiple debris piles, Damaged
	CHLL-ASBBLK26C-101514	10/15/2014	20 %	CHRYSOTILE	Grayish white, Transite, Found in multiple debris piles, Damaged
CHLL-ASBBLK27	CHLL-ASBBLK27A-101514	10/15/2014	ND		Grayish brown, Fibrous, Insulating material, Damaged
CHLL-ASBBLK28	CHLL-ASBBLK28A-101514	10/15/2014	ND		White, Some blue-green staining, Fire brick, Labeled "A.P. Green 5 X 6 Key"
	CHLL-ASBBLK28B-101514	10/15/2014	ND		White, Some blue-green staining, Fire brick, Labeled "A.P. Green 5 X 6 Key"
	CHLL-ASBBLK28C-101514	10/15/2014	ND		White, Some blue-green staining, Fire brick, Labeled "A.P. Green 5 X 6 Key"
CHLL-ASBBLK29	CHLL-ASBBLK29A-101514	10/15/2014	ND		Orange with black specks, Fire brick, Labeled "Webster"
	CHLL-ASBBLK29B-101514	10/15/2014	ND		Orange with black specks, Fire brick, Labeled "Webster"
	CHLL-ASBBLK29C-101514	10/15/2014	ND		Orange with black specks, Fire brick, Labeled "Webster"
CHLL-ASBBLK30	CHLL-ASBBLK30A-101514	10/15/2014	ND		Grayish brown, Brick mortar, Damaged
	CHLL-ASBBLK30B-101514	10/15/2014	ND		Grayish brown, Brick mortar, Damaged
	CHLL-ASBBLK30C-101514	10/15/2014	ND		Grayish brown, Brick mortar, Damaged
CHLL-ASBBLK31	CHLL-ASBBLK31A-101514	10/15/2014	15 %	CHRYSOTILE	Black, Tar-like coating on concrete stack components, Damaged
	CHLL-ASBBLK31B-101514	10/15/2014	15 %	CHRYSOTILE	Black, Tar-like coating on concrete stack components, Damaged
	CHLL-ASBBLK31C-101514	10/15/2014	15 %	CHRYSOTILE	Black, Tar-like coating on concrete stack components, Damaged
CHLL-ASBBLK32	CHLL-ASBBLK32A-101514	10/15/2014	60 %	CHRYSOTILE	Black, Asphaltic roofing material, Damaged
	CHLL-ASBBLK32B-101514	10/15/2014	ND		Black, Asphaltic roofing material, Damaged
	CHLL-ASBBLK32C-101514	10/15/2014	ND		Black, Asphaltic roofing material, Damaged
CHLL-ASBBLK33	CHLL-ASBBLK33A-101514	10/15/2014	ND		Whitish gray, Cementitious plaster material, Damaged
	CHLL-ASBBLK33B-101514	10/15/2014	ND		Whitish gray, Cementitious plaster material, Damaged
	CHLL-ASBBLK33C-101514	10/15/2014	ND		Whitish gray, Cementitious plaster material, Damaged
CHLL-ASBBLK34	CHLL-ASBBLK34A-101514	10/15/2014	ND		Yellowish orange, Molded block material, Labeled "Duro 8759-15" Cone, rectangular, and cylinder shaped, Damaged
	CHLL-ASBBLK34B-101514	10/15/2014	ND		Yellowish orange, Molded block material, Labeled "Duro 8759-15" Cone, rectangular, and cylinder shaped, Damaged
CHLL-ASBBLK65	CHLL-ASBBLK65A-102317	10/23/2017	ND		Black mastic
	CHLL-ASBBLK65B-102317	10/23/2017	ND		Black mastic
CHLL-ASBBLK66	CHLL-ASBBLK66A-102317	10/23/2017	2 %	CHRYSOTILE	Black felt mastic
	CHLL-ASBBLK66B-102317	10/23/2017	2 %	CHRYSOTILE	Black felt mastic
CHLL-ASBBLK67	CHLL-ASBBLK67A-102317	10/23/2017	50 %	CHRYSOTILE	Gray TSI, appears cardboard-like underneath
	CHLL-ASBBLK67B-102317	10/23/2017	50 %	CHRYSOTILE	Gray TSI, appears cardboard-like underneath
	CHLL-ASBBLK67C-102317	10/23/2017	50 %	CHRYSOTILE	Gray TSI, appears cardboard-like underneath

TABLE 9-7
Sample Analytical Summary - Bulk Asbestos
Hubbell Processing Area - Mineral Building Property
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Sample Location	Field Sample ID	Sample Date	Asbestos	Note	Sample Description
CHLL-ASBBLK68	CHLL-ASBBLK68A-102317	10/23/2017	3 %	AMOSITE	Gray/blue/white TSI
	CHLL-ASBBLK68A-102317	10/23/2017	30 %	CHRYSOTILE	Gray/blue/white TSI
	CHLL-ASBBLK68B-102317	10/23/2017	2 %	AMOSITE	Gray/blue/white TSI
	CHLL-ASBBLK68B-102317	10/23/2017	20 %	CHRYSOTILE	Gray/blue/white TSI
	CHLL-ASBBLK68C-102317	10/23/2017	3 %	AMOSITE	Gray/blue/white TSI
	CHLL-ASBBLK68C-102317	10/23/2017	30 %	CHRYSOTILE	Gray/blue/white TSI
CHLL-ASBBLK69	CHLL-ASBBLK69A-102317	10/23/2017	2 %	AMOSITE	White TSI
	CHLL-ASBBLK69A-102317	10/23/2017	15 %	CHRYSOTILE	White TSI
	CHLL-ASBBLK69B-102317	10/23/2017	5 %	AMOSITE	White TSI
	CHLL-ASBBLK69B-102317	10/23/2017	35 %	CHRYSOTILE	White TSI
	CHLL-ASBBLK69C-102317	10/23/2017	5 %	AMOSITE	White TSI
	CHLL-ASBBLK69C-102317	10/23/2017	35 %	CHRYSOTILE	White TSI
CHLL-ASBBLK70	CHLL-ASBBLK70A-102317	10/23/2017	7 %	AMOSITE	White paper gasket
	CHLL-ASBBLK70A-102317	10/23/2017	35 %	CHRYSOTILE	White paper gasket
	CHLL-ASBBLK70B-102317	10/23/2017	7 %	AMOSITE	White paper gasket
	CHLL-ASBBLK70B-102317	10/23/2017	35 %	CHRYSOTILE	White paper gasket
	CHLL-ASBBLK70C-102317	10/23/2017	7 %	AMOSITE	White paper gasket
	CHLL-ASBBLK70C-102317	10/23/2017	35 %	CHRYSOTILE	White paper gasket
CHLL-ASBBLK71	CHLL-ASBBLK71A-102317	10/23/2017	ND		Gray/white fibers
	CHLL-ASBBLK71B-102317	10/23/2017	ND		Gray/white fibers
	CHLL-ASBBLK71C-102317	10/23/2017	ND		Gray/white fibers
CHLL-ASBBLK72	CHLL-ASBBLK72A-102317	10/23/2017	50 %	CHRYSOTILE	Felt roofing
	CHLL-ASBBLK72B-102317	10/23/2017	50 %	CHRYSOTILE	Felt roofing
CHLL-ASBBLK73	CHLL-ASBBLK73A-102317	10/23/2017	40 %	CHRYSOTILE	White w/ green fibrous material
	CHLL-ASBBLK73B-102317	10/23/2017	30 %	CHRYSOTILE	White w/ green fibrous material
	CHLL-ASBBLK73C-102317	10/23/2017	40 %	CHRYSOTILE	White w/ green fibrous material
CHLL-ASBBLK74	CHLL-ASBBLK74A-102317	10/23/2017	5 %	ANTHOPHYLLITE	White fibrous drywall
	CHLL-ASBBLK74A-102317	10/23/2017	50 %	CHRYSOTILE	White fibrous drywall
	CHLL-ASBBLK74B-102317	10/23/2017	5 %	ANTHOPHYLLITE	White fibrous drywall
	CHLL-ASBBLK74B-102317	10/23/2017	50 %	CHRYSOTILE	White fibrous drywall
	CHLL-ASBBLK74C-102317	10/23/2017	5 %	ANTHOPHYLLITE	White fibrous drywall
	CHLL-ASBBLK74C-102317	10/23/2017	50 %	CHRYSOTILE	White fibrous drywall
CHLL-ASBBLK75	CHLL-ASBBLK75A-102317	10/23/2017	60 %	CHRYSOTILE	Brown TSI
	CHLL-ASBBLK75B-102317	10/23/2017	60 %	CHRYSOTILE	Brown TSI
	CHLL-ASBBLK75C-102317	10/23/2017	60 %	CHRYSOTILE	Brown TSI
CHLL-ASBBLK76	CHLL-ASBBLK76A-102317	10/23/2017	65 %	CHRYSOTILE	Gray rope gasket
	CHLL-ASBBLK76B-102317	10/23/2017	65 %	CHRYSOTILE	Gray rope gasket
CHLL-ASBBLK77	CHLL-ASBBLK77A-102317	10/23/2017	ND		Brown fibrous cardboard material
	CHLL-ASBBLK77B-102317	10/23/2017	ND		Brown fibrous cardboard material

TABLE 9-7
Sample Analytical Summary - Bulk Asbestos
Hubbell Processing Area - Mineral Building Property
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Sample Location	Field Sample ID	Sample Date	Asbestos	Note	Sample Description
Michigan Department of Transporation M-26 Right-of-Way adjacent to the Mineral Building	K330273	7/12/2017	ND		Roofing material / Tar Mastic
	K330273	7/12/2017	20 %	CHRYSOTILE	Roofing material / Other
	K330274	7/12/2017	ND		Roofing material / Tar Mastic
	K330274	7/12/2017	15 %	CHRYSOTILE	Roofing material / Other
	K330275	7/12/2017	ND		Roofing material / String
	K330275	7/12/2017	ND		Roofing material / Tar Mastic
	K330275	7/12/2017	20 %	CHRYSOTILE	Roofing material / Other
	K330276	7/12/2017	2 %	CHRYSOTILE	Roofing material / Mastic 1
	K330276	7/12/2017	8 %	CHRYSOTILE	Roofing material / Mastic 2
	K330276	7/12/2017	ND		Roofing material / Other
	K330277	7/12/2017	ND		Roofing material / Mastic
	K330277	7/12/2017	25 %	CHRYSOTILE	Roofing material / Other
	K330278	7/12/2017	ND		Roofing material / Mastic
	K330278	7/12/2017	25 %	CHRYSOTILE	Roofing material / Other
	K330279	7/12/2017	ND		Roofing material / Top
	K330279	7/12/2017	ND		Roofing material / Mastic
	K330279	7/12/2017	ND		Roofing material / Other
	K330280	7/12/2017	ND		Roofing material / Top Mastic
	K330280	7/12/2017	ND		Roofing material / Bottom Mastic
	K330280	7/12/2017	15 %	CHRYSOTILE	Roofing material / Middle
	K330281	7/12/2017	30 %	CHRYSOTILE	Roofing material / Bottom White
	K330281	7/12/2017	15 %	CHRYSOTILE	Roofing material / Middle
	K330281	7/12/2017	ND		Roofing material / Top Black
	K330282	7/12/2017	25 %	CHRYSOTILE	Roofing material / White
	K330282	7/12/2017	ND		Roofing material / Mastic Tar
	K330282	7/12/2017	ND		Roofing material / Other

ND = Not detected

Results greater than the National Emissions Standard for Hazardous Air Pollutants (NESHAP) and MDEQ Particulate Soil Inhalation Criteria of 1% are highlighted yellow.

Indicates sampled item/material has been removed from the site.

Evaluation based on MDEQ Criteria at time of Project completion.

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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-RPM-04	CHLL-SB52		CHLL-SB75		CHLL-SB76	CHLL-SB77	CHLL-SB78
Field Sample ID:									CHLL-RPM04-101514	CHLL-SB52 0-6"	CHLL-SB52 6"-4'	CHLL-SB75-0-6"	CHLL-SB75-0-6"-DUP	CHLL-SB76-0-6"	CHLL-SB77-0-6"	CHLL-SB78-6"-12""
Sample Date:									10/15/2014	6/11/2014	6/11/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1 ft
Sample Description:									Greenish gray, Sludge, Eroding from stack debris	SAND, Fine grained, Gray to 1 ft	SAND, Fine grained, Gray to 1 ft; SAND, Medium to fine grained, Reddish Brown	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	8000	3300	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	9.8	0.4	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	120	3.4	--	--	--	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	180	29	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	0.6	0.3	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	1.2	<0.2 U	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	34	8.0	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	7.1	2.6	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	26000	1500	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	19000 J	6100 J	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	1700	28	--	--	--	--	--
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	--	320	87	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	0.1	<0.06 U	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	21	7.5	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	1.0	<0.2 U	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	--	10	0.6	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	<1000 U	23	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	<0.12 U	<0.11 U	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<180 UJ	<120 U	<110 U	<110 U	<110 U	<120 U	<110 U	<110 UJ
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	220 J	<330 U	<110 U	<110 U	<110 U	<120 U	<110 U	190 J
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	150 J	<210 U	<110 U	<150 U	<200 U	<120 U	<110 U	<270 UJ
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<160 UJ	<210 U	<110 U	140	190	<120 U	<110 U	270 J
AROCLOR-1268	11100-14-4	NA	NA	NA	NA	NA	NA	NA	<180 UJ	<120 U	<110 U	<110 U	<110 U	<120 U	<110 U	<110 UJ
TOTAL PCBS	TPCB	NLL	NLL	5,200,00 (J)	1,000 (J,T)	NLL	6,500,000 (J)	1000 (J)	370 J	ND	ND	140	190	ND	ND	460 J
Organics - SVOCs (ug/kg)																
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,500,000	3,300 (X)	6.7E+07	7.7E+07	1,500.000	2.9E+07	2.5E+08		--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	<3000 UJ	<560 UJ	--	--	--	--	--
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	<1200 U	<230 U	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	<1200 U	<230 U	--	--	--	--	--

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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-RPM-04	CHLL-SB52		CHLL-SB75		CHLL-SB76	CHLL-SB77	CHLL-SB78
Field Sample ID:									CHLL-RPM04-101514	CHLL-SB52 0-6"	CHLL-SB52 6"-4'	CHLL-SB75-0-6"	CHLL-SB75-0-6"-DUP	CHLL-SB76-0-6"	CHLL-SB77-0-6"	CHLL-SB78-6"-12""
Sample Date:									10/15/2014	6/11/2014	6/11/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1 ft
Sample Description:									Greenish gray, Sludge, Eroding from stack debris	SAND, Fine grained, Gray to 1 ft	SAND, Fine grained, Gray to 1 ft; SAND, Medium to fine grained, Reddish Brown	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black
Organics - SVOCs (ug/kg) (cont'd)																
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	<1200 U	<230 U	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<1200 U	<230 U	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	<2400 U	<450 U	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<2400 U	<450 U	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08 (Q)	7,000,000 (Q)	--	<2400 U	<450 U	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	<2400 U	<450 U	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	<1200 U	<230 U	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	<2400 U	<450 U	--	--	--	--	--
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2,900,000	ID	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	<1200 U	<230 U	--	--	--	--	--
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	<1200 U	<230 U	--	--	--	--	--
HEXACHLOROBENZENE	118-74-1	1,800	350	6,800,000	8,900	1,800	8,500,000	37,000	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<2400 U	<450 U	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<1200 UJ	<230 UJ	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	<1200 U	<230 U	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	<1200 U	<230 U	--	--	--	--	--
Organics - VOCs (ug/kg)																
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	<70 UJ	<61 UJ	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	2,100 (I)	570 (I)	8.2E+10 (I)	3.2E+07 (C,I)	2,100 (I)	3.6E+10 (I)	1E+08 (C,I)	--	110 J	<61 UJ	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	1,800 (I)	1,100 (I)	8.2E+10 (I)	3.2E+07 (C,I)	1,800 (I)	3.6E+10 (I)	1E+08 (C,I)	--	<70 UJ	<61 UJ	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	<350 UJ	<310 UJ	--	--	--	--	--
BENZENE	71-43-2	100 (I)	240 (I,X)	3.8E+08 (I)	180,000 (I)	100 (I)	4.7E+08 (I)	840,000 (C,I)	--	<70 UJ	<61 UJ	--	--	--	--	--
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	--	<350 UJ	<310 UJ	--	--	--	--	--
ETHYLBENZENE	100-41-4	1,500 (I)	360 (I)	1E+10 (I)	2.2E+07 (C,I)	1,500 (I)	1.3E+10 (I)	7.1E+07 (C, I)	--	<70 UJ	<61 UJ	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	91,000	3,200	5.8E+09	2.5E+07 (C)	260,000	2.6E+09	8E+07 (C)	--	<70 UJ	<61 UJ	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	210 J	<120 UJ	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<350 UJ	<310 UJ	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1,600	ID	2E+09	2,500,000	4,600	8.8E+08	8,000,000	--	<70 UJ	<61 UJ	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	1,600 (I)	ID	1.3E+09 (I)	2,500,000 (I)	4,600 (I)	5.9E+08 (I)	8,000,000 (I)	--	<70 UJ	<61 UJ	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	150 J	<61 UJ	--	--	--	--	--
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)	--	190 J	<61 UJ	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	5,600 (I)	820 (I)	2.9E+11 (I)	4.1E+08 (C,I)	5600 (I)	1.3E+11 (I)	1E+09 (I)	--	360 J	ND	--	--	--	--	--
Asbestos (%)																
ASBESTOS	ASB	NLL	NLL	1.0 (BB)	ID	NLL	1.0 (BB)	ID	ND	ND	--	--	--	--	--	--

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

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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-SB79	CHLL-SB80		CHLL-SB81	CHLL-SB82		CHLL-SB107	
Field Sample ID:									CHLL-SB79-0-6"	CHLL-SB80-0-6"	CHLL-SB80-0-6"-DUP	CHLL-SB81-0-6"	CHLL-SB 82 0-6"	CHLL-SB 82 6"-5'	CHLL-SB 107 0-6"	CHLL-SB 107 6"-3'
Sample Date:									8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/19/2014	8/19/2014	8/19/2014	8/19/2014
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 5 ft	0 - 0.5 ft	0.5 - 3 ft
Sample Description:									SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	Field Duplicate	SAND AND GRAVEL, Black	SAND, Fine to medium grained, Gray	SAND, Fine to medium grained, Reddish brown	SAND, Medium grained, Brown	SAND, Medium grained, Brown to 3 ft; SAND, Medium grained, Reddish brown
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	45	37	--	--	--	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	130	83	--	--	--	--	--
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	--	0.9	1.1	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	33	28	--	--	--	--	--
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	--	17000	11000	--	--	--	--	--
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)	--	330	230	--	--	--	--	--
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	--	310	240	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	0.1	0.1	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	0.4	<0.2 U	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	--	5.7	2.9	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	310	270	--	--	--	--	--
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	<0.12 U	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<110 U	<130 U	<120 U	<230 U	<110 U	<110 UJ	<240 U	<110 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	120	<130 U	<120 U	<230 U	<110 U	220 J	<240 U	<110 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<120 U	<130 U	<120 U	<250 U	<110 U	<260 UJ	<410 U	<110 U
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<110 U	<130 U	<120 U	230	<110 U	260 J	<410 U	<110 U
AROCLOR-1268	11100-14-4	NA	NA	NA	NA	NA	NA	NA	<110 U	<130 U	<120 U	<230 U	<110 U	<180 UJ	<240 U	<110 U
TOTAL PCBS	TPCB	NLL	NLL	5,200,00 (J)	1,000 (J,T)	NLL	6,500,000 (J)	1000 (J)	120	ND	ND	230	ND	480 J	ND	ND
Organics - SVOCs (ug/kg)																
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,500,000	3,300 (X)	6.7E+07	7.7E+07	1,500.000	2.9E+07	2.5E+08	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	<660 U	<600 UJ	--	--	--	--	--
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	<260 U	<240 UJ	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	<260 U	<240 UJ	--	--	--	--	--

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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-SB79	CHLL-SB80		CHLL-SB81	CHLL-SB82		CHLL-SB107	
Field Sample ID:									CHLL-SB79-0-6"	CHLL-SB80-0-6"	CHLL-SB80-0-6"-DUP	CHLL-SB81-0-6"	CHLL-SB 82 0-6"	CHLL-SB 82 6"-5'	CHLL-SB 107 0-6"	CHLL-SB 107 6"-3'
Sample Date:									8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/19/2014	8/19/2014	8/19/2014	8/19/2014
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 5 ft	0 - 0.5 ft	0.5 - 3 ft
Sample Description:									SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	Field Duplicate	SAND AND GRAVEL, Black	SAND, Fine to medium grained, Gray	SAND, Fine to medium grained, Reddish brown	SAND, Medium grained, Brown	SAND, Medium grained, Brown to 3 ft; SAND, Medium grained, Reddish brown
Organics - SVOCs (ug/kg) (cont'd)																
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	<260 U	<240 UJ	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<260 U	<240 UJ	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	<530 U	<480 UJ	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<530 U	<480 UJ	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08 (Q)	7,000,000 (Q)	--	<530 U	<480 UJ	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	<530 U	<480 UJ	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	<260 U	<240 UJ	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	<530 U	<480 UJ	--	--	--	--	--
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2,900,000	ID	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	<260 U	<240 UJ	--	--	--	--	--
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	<260 U	<240 UJ	--	--	--	--	--
HEXACHLOROBENZENE	118-74-1	1,800	350	6,800,000	8,900	1,800	8,500,000	37,000	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<530 U	<480 UJ	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<260 U	<240 UJ	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	260	220 J	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	<260 U	<240 UJ	--	--	--	--	--
Organics - VOCs (ug/kg)																
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	2,100 (I)	570 (I)	8.2E+10 (I)	3.2E+07 (C,I)	2,100 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	1,800 (I)	1,100 (I)	8.2E+10 (I)	3.2E+07 (C,I)	1,800 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--	--
BENZENE	71-43-2	100 (I)	240 (I,X)	3.8E+08 (I)	180,000 (I)	100 (I)	4.7E+08 (I)	840,000 (C,I)	--	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	1,500 (I)	360 (I)	1E+10 (I)	2.2E+07 (C,I)	1,500 (I)	1.3E+10 (I)	7.1E+07 (C, I)	--	--	--	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	91,000	3,200	5.8E+09	2.5E+07 (C)	260,000	2.6E+09	8E+07 (C)	--	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1,600	ID	2E+09	2,500,000	4,600	8.8E+08	8,000,000	--	--	--	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	1,600 (I)	ID	1.3E+09 (I)	2,500,000 (I)	4,600 (I)	5.9E+08 (I)	8,000,000 (I)	--	--	--	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
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)	--	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	5,600 (I)	820 (I)	2.9E+11 (I)	4.1E+08 (C,I)	5600 (I)	1.3E+11 (I)	1E+09 (I)	--	--	--	--	--	--	--	--
Asbestos (%)																
ASBESTOS	ASB	NLL	NLL	1.0 (BB)	ID	NLL	1.0 (BB)	ID	--	--	--	--	--	--	--	--

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

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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-SB108		CHLL-SB165		CHLL-SB166		
Field Sample ID:									CHLL-SB 108 0-6"	CHLL-SB 108 6"-3'	CHLL-SB165 0"-6"	CHLL-SB165 6"-5'	CHLL-SB166 0"-6"	CHLL-SB166 6"-5'	CHLL-SB166 6"-5' DUP
Sample Date:									8/19/2014	8/19/2014	8/19/2015	8/19/2015	8/19/2015	8/19/2015	8/19/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 3 ft	0 - 0.5 ft	0.5 - 5 ft	0 - 0.5 ft	0.5 - 5 ft	0.5 - 5 ft
Sample Description:									SAND, Medium grained, Brown	SAND, Medium grained, Brown to 3 ft; SAND, Medium grained, Reddish brown	TOPSOIL	SAND, Brown, Fine to 1 ft; SAND, Reddish brown, Fine to medium	TOPSOIL	SAND, Light brown, Fine to 0.75 ft; SAND, Dark gray, Fine to medium; to 1 ft; SAND, Reddish brown, Fine to medium	Field Duplicate
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	--	--	--	--	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)															
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)															
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<110 U	<100 U	<110 U	<110 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<160 U	<120 U	<110 U	<110 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<250 U	<150 U	<110 U	<110 U
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	240	150	<110 U	<150 U
AROCLOR-1268	11100-14-4	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<110 U	<100 U	<110 U	<110 U
TOTAL PCBS	TPCB	NLL	NLL	5,200,00 (J)	1,000 (J,T)	NLL	6,500,000 (J)	1000 (J)	ND	ND	ND	240	150	ND	ND
Organics - SVOCs (ug/kg)															
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,500,000	3,300 (X)	6.7E+07	7.7E+07	1,500.000	2.9E+07	2.5E+08	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	--	--	--	--	--	--

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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-SB108		CHLL-SB165		CHLL-SB166		
Field Sample ID:									CHLL-SB 108 0-6"	CHLL-SB 108 6"-3'	CHLL-SB165 0"-6"	CHLL-SB165 6"-5'	CHLL-SB166 0"-6"	CHLL-SB166 6"-5'	CHLL-SB166 6"-5' DUP
Sample Date:									8/19/2014	8/19/2014	8/19/2015	8/19/2015	8/19/2015	8/19/2015	8/19/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 3 ft	0 - 0.5 ft	0.5 - 5 ft	0 - 0.5 ft	0.5 - 5 ft	0.5 - 5 ft
Sample Description:									SAND, Medium grained, Brown	SAND, Medium grained, Brown to 3 ft; SAND, Medium grained, Reddish brown	TOPSOIL	SAND, Brown, Fine to 1 ft; SAND, Reddish brown, Fine to medium	TOPSOIL	SAND, Light brown, Fine to 0.75 ft; SAND, Dark gray, Fine to medium; to 1 ft; SAND, Reddish brown, Fine to medium	Field Duplicate
Organics - SVOCs (ug/kg) (cont'd)															
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08 (Q)	7,000,000 (Q)	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	--
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2,900,000	ID	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	--	--	--	--	--	--
HEXACHLOROBENZENE	118-74-1	1,800	350	6,800,000	8,900	1,800	8,500,000	37,000	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)															
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	2,100 (I)	570 (I)	8.2E+10 (I)	3.2E+07 (C,I)	2,100 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	1,800 (I)	1,100 (I)	8.2E+10 (I)	3.2E+07 (C,I)	1,800 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--
BENZENE	71-43-2	100 (I)	240 (I,X)	3.8E+08 (I)	180,000 (I)	100 (I)	4.7E+08 (I)	840,000 (C,I)	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	1,500 (I)	360 (I)	1E+10 (I)	2.2E+07 (C,I)	1,500 (I)	1.3E+10 (I)	7.1E+07 (C, I)	--	--	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	91,000	3,200	5.8E+09	2.5E+07 (C)	260,000	2.6E+09	8E+07 (C)	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1,600	ID	2E+09	2,500,000	4,600	8.8E+08	8,000,000	--	--	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	1,600 (I)	ID	1.3E+09 (I)	2,500,000 (I)	4,600 (I)	5.9E+08 (I)	8,000,000 (I)	--	--	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
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)	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	5,600 (I)	820 (I)	2.9E+11 (I)	4.1E+08 (C,I)	5600 (I)	1.3E+11 (I)	1E+09 (I)	--	--	--	--	--	--	--
Asbestos (%)															
ASBESTOS	ASB	NLL	NLL	1.0 (BB)	ID	NLL	1.0 (BB)	ID	--	--	--	--	--	--	--

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

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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	STACK DEBRIS		CHLL-WP01	CHLL-WP01		CHLL-WP02	CHLL-WP03
Field Sample ID:									CHLL-Stack-1	CHLL-Stack-2	CHLL-WP01-101514	CHLL-WP-01-1	CHLL-WP-01-2	CHLL-WP02-101514	CHLL-WP03-101514
Sample Date:									10/23/2017	10/23/2017	10/15/2014	8/21/2017	8/21/2017	10/15/2014	10/15/2014
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:									Fine grained gray material	Fine grained light to dark gray material	SAND AND GRAVEL, Black * Waste pile (resampled as WP-11) has been removed	Black, oily, and blue crystalline material	Medium grained, light brown material	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	7100	1200	77	110	150	92	100
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	170	--	--	110	1700 J
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	7800	--	--	25000	22000
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)	620	2500	1800	460	1400	1100	2200
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	--	--	430	--	--	450	350
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--
Inorganics - 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)	--	--	<0.54 U	--	--	0.33	<0.55 U
Organics - PCBs (ug/kg)															
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<150 U	<1200 U	<8500 UJ	<140 U	210 J	<280 UJ	<920 UJ
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<150 U	<2300 U	61000 J	280	490 J	460 J	730 J
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<150 U	<4600 U	8800 J	<140 U	310 J	150 J	840 J
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<150 U	<4600 U	<8900 UJ	<140 U	<310 U	<160 UJ	<850 UJ
AROCLOR-1268	11100-14-4	NA	NA	NA	NA	NA	NA	NA	180	<1200 U	2400 J	<140 U	<120 U	<130 UJ	<760 UJ
TOTAL PCBS	TPCB	NLL	NLL	5,200,00 (J)	1,000 (J,T)	NLL	6,500,000 (J)	1000 (J)	180	ND	72200 J	280	1010 J	610 J	1570 J
Organics - SVOCs (ug/kg)															
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,500,000	3,300 (X)	6.7E+07	7.7E+07	1,500.000	2.9E+07	2.5E+08	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	<560 UJ	--	--	<660 UJ	<7200 UJ
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	--	<220 U	--	--	<260 U	<2900 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	--	<220 U	--	--	<260 U	<2900 U

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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	STACK DEBRIS		CHLL-WP01	CHLL-WP01		CHLL-WP02	CHLL-WP03
Field Sample ID:									CHLL-Stack-1	CHLL-Stack-2	CHLL-WP01-101514	CHLL-WP-01-1	CHLL-WP-01-2	CHLL-WP02-101514	CHLL-WP03-101514
Sample Date:									10/23/2017	10/23/2017	10/15/2014	8/21/2017	8/21/2017	10/15/2014	10/15/2014
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:									Fine grained gray material	Fine grained light to dark gray material	SAND AND GRAVEL, Black * Waste pile (resampled as WP-11) has been removed	Black, oily, and blue crystalline material	Medium grained, light brown material	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black
Organics - SVOCs (ug/kg) (cont'd)															
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	<220 U	--	--	<260 U	<2900 U
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	<220 U	--	--	690	3600
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	<440 U	--	--	590	<5700 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	<440 U	--	--	1100	6100
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08 (Q)	7,000,000 (Q)	--	--	<440 U	--	--	<530 U	<5700 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	<440 U	--	--	<530 U	<5700 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	<220 U	--	--	920	3900
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	<440 U	--	--	<530 U	<5700 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2,900,000	ID	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	<220 U	--	--	1800	8200
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	--	<220 U	--	--	<260 U	<2900 U
HEXACHLOROBENZENE	118-74-1	1,800	350	6,800,000	8,900	1,800	8,500,000	37,000	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	<440 U	--	--	<530 U	<5700 U
NAPHTHALENE (SVOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	<220 UJ	--	--	270 J	<2900 UJ
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	<220 U	--	--	1200	3100
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	<220 U	--	--	1500	6500
Organics - VOCs (ug/kg)															
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	<62 UJ	--	--	<95 UJ	370 J
1,2,4-TRIMETHYLBENZENE	95-63-6	2,100 (I)	570 (I)	8.2E+10 (I)	3.2E+07 (C,I)	2,100 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	<62 UJ	--	--	<95 UJ	610 J
1,3,5-TRIMETHYLBENZENE	108-67-8	1,800 (I)	1,100 (I)	8.2E+10 (I)	3.2E+07 (C,I)	1,800 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	<62 UJ	--	--	<95 UJ	110 J
2-METHYLNAPHTHALENE (VOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	<310 UJ	--	--	<470 UJ	1400 J
BENZENE	71-43-2	100 (I)	240 (I,X)	3.8E+08 (I)	180,000 (I)	100 (I)	4.7E+08 (I)	840,000 (C,I)	--	--	<62 UJ	--	--	<95 UJ	240 J
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	--	--	<310 UJ	--	--	<470 UJ	580 J
ETHYLBENZENE	100-41-4	1,500 (I)	360 (I)	1E+10 (I)	2.2E+07 (C,I)	1,500 (I)	1.3E+10 (I)	7.1E+07 (C, I)	--	--	<62 UJ	--	--	<95 UJ	300 J
ISOPROPYLBENZENE	98-82-8	91,000	3,200	5.8E+09	2.5E+07 (C)	260,000	2.6E+09	8E+07 (C)	--	--	<62 UJ	--	--	<95 UJ	75 J
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	<120 UJ	--	--	<190 UJ	1800 J
NAPHTHALENE (VOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	<310 UJ	--	--	<470 UJ	1500 J
N-BUTYLBENZENE	104-51-8	1,600	ID	2E+09	2,500,000	4,600	8.8E+08	8,000,000	--	--	<62 UJ	--	--	<95 UJ	79 J
N-PROPYLBENZENE	103-65-1	1,600 (I)	ID	1.3E+09 (I)	2,500,000 (I)	4,600 (I)	5.9E+08 (I)	8,000,000 (I)	--	--	<62 UJ	--	--	<95 UJ	110 J
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	61 J	--	--	<95 UJ	970 J
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)	--	--	93 J	--	--	<95 UJ	2500 J
XYLENE - TOTAL	1330-20-7	5,600 (I)	820 (I)	2.9E+11 (I)	4.1E+08 (C,I)	5600 (I)	1.3E+11 (I)	1E+09 (I)	--	--	61 J	--	--	ND	2770 J
Asbestos (%)															
ASBESTOS	ASB	NLL	NLL	1.0 (BB)	ID	NLL	1.0 (BB)	ID	--	--	ND	--	--	ND	0.25 (CHRYSOTILE)

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

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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-WP09		CHLL-WP23		CHLL-WP27		
Field Sample ID:									CHLL-WP-09-1	CHLL-WP-09-2	CHLL-WP-23-1	CHLL-WP 23-2	CHLL-WP-27-1	CHLL-WP-27-2	CHLL-WP-27-3
Sample Date:									8/21/2017	8/21/2017	8/21/2017	10/23/2017	8/21/2017	8/21/2017	8/21/2017
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:									Dark soil, mixed with debris and charred wood	Blue-ish crystalline material	Darker stained soil	Dark brown soil mixed with debris	White, orange, black, coarse grained material mixed w/ brown soil and black debris	Orange granular material, saturated, mixed w/ brown soil, brick debris and roofing	Dark to light brown soil
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	43	58	270	120	130	410	190
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	630	1100	450	1300	1900	1700	740
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	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)															
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)															
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<120 U	<130 U	<130 U	<6400 U	<280 U	<140 U	<130 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<120 U	<130 U	240 J	<5300 U	270 J	410 J	230 J
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<120 U	<130 U	290 J	<7000 U	<500 U	<470 U	<210 U
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<120 U	<130 U	<300 U	<7000 U	<500 U	<470 U	<210 U
AROCLOR-1268	11100-14-4	NA	NA	NA	NA	NA	NA	NA	<120 U	<130 U	<110 U	<2900 U	<130 U	<140 U	<120 U
TOTAL PCBS	TPCB	NLL	NLL	5,200,00 (J)	1,000 (J,T)	NLL	6,500,000 (J)	1000 (J)	ND	ND	530 J	ND	270 J	410 J	230 J
Organics - SVOCs (ug/kg)															
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,500,000	3,300 (X)	6.7E+07	7.7E+07	1,500.000	2.9E+07	2.5E+08	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	--	--	--	--	--	--

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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-WP09		CHLL-WP23		CHLL-WP27		
Field Sample ID:									CHLL-WP-09-1	CHLL-WP-09-2	CHLL-WP-23-1	CHLL-WP 23-2	CHLL-WP-27-1	CHLL-WP-27-2	CHLL-WP-27-3
Sample Date:									8/21/2017	8/21/2017	8/21/2017	10/23/2017	8/21/2017	8/21/2017	8/21/2017
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:									Dark soil, mixed with debris and charred wood	Blue-ish crystalline material	Darker stained soil	Dark brown soil mixed with debris	White, orange, black, coarse grained material mixed w/ brown soil and black debris	Orange granular material, saturated, mixed w/ brown soil, brick debris and roofing	Dark to light brown soil
Organics - SVOCs (ug/kg) (cont'd)															
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08 (Q)	7,000,000 (Q)	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	--
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2,900,000	ID	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	--	--	--	--	--	--
HEXACHLOROBENZENE	118-74-1	1,800	350	6,800,000	8,900	1,800	8,500,000	37,000	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)															
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	2,100 (I)	570 (I)	8.2E+10 (I)	3.2E+07 (C,I)	2,100 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	1,800 (I)	1,100 (I)	8.2E+10 (I)	3.2E+07 (C,I)	1,800 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--
BENZENE	71-43-2	100 (I)	240 (I,X)	3.8E+08 (I)	180,000 (I)	100 (I)	4.7E+08 (I)	840,000 (C,I)	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	1,500 (I)	360 (I)	1E+10 (I)	2.2E+07 (C,I)	1,500 (I)	1.3E+10 (I)	7.1E+07 (C, I)	--	--	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	91,000	3,200	5.8E+09	2.5E+07 (C)	260,000	2.6E+09	8E+07 (C)	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1,600	ID	2E+09	2,500,000	4,600	8.8E+08	8,000,000	--	--	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	1,600 (I)	ID	1.3E+09 (I)	2,500,000 (I)	4,600 (I)	5.9E+08 (I)	8,000,000 (I)	--	--	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
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)	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	5,600 (I)	820 (I)	2.9E+11 (I)	4.1E+08 (C,I)	5600 (I)	1.3E+11 (I)	1E+09 (I)	--	--	--	--	--	--	--
Asbestos (%)															
ASBESTOS	ASB	NLL	NLL	1.0 (BB)	ID	NLL	1.0 (BB)	ID	--	--	--	--	--	--	--

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

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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-WP28				CHLL-WP32	CHLL-WP48		
Field Sample ID:									CHLL-WP-28-1	CHLL-WP-28-2	CHLL-WP 28-3	CHLL-WP 28-4	CHLL-WP 32-1	CHLL-WP 48-1	CHLL-WP 48-2	CHLL-WP 48-3
Sample Date:									8/21/2017	8/21/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 2 in	0 - 2 in	0 - 2 in
Sample Description:									Dark brown soil, yellow/mustard brown clay-like seam	Dark brown soil w/ white clay-like material	Dark brown soil, mixed with debris	Dark brown soil, mixed with debris	White crystalline material	Brown sand with gravel	Brown sand with gravel	Brown sand with gravel
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	200	170	73	120	2.7	75	650	28
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	1900	1600	2200	6800	65	25000	11000	11000
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	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	3100 J	<670 U	<1900 U	<2700 U	<170 U	<1100 U	<1100 U	<100 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	3100 J	<670 U	5100 J	<2700 U	<170 U	<1200 U	<2000 U	<100 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	2200 J	<670 U	<2700 U	<7000 U	<240 U	<1500 U	<5200 U	<100 U
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	<2300 U	<670 U	<2700 U	<7000 U	<240 U	<1500 U	<5200 U	<100 U
AROCLOR-1268	11100-14-4	NA	NA	NA	NA	NA	NA	NA	<1300 U	<670 U	<1100 U	<2700 U	<170 U	<1100 U	<1100 U	<100 U
TOTAL PCBS	TPCB	NLL	NLL	5,200,00 (J)	1,000 (J,T)	NLL	6,500,000 (J)	1000 (J)	8400 J	ND	5100 J	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,500,000	3,300 (X)	6.7E+07	7.7E+07	1,500.000	2.9E+07	2.5E+08	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	--	--	--	--	--	--	--

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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-WP28				CHLL-WP32	CHLL-WP48		
Field Sample ID:									CHLL-WP-28-1	CHLL-WP-28-2	CHLL-WP 28-3	CHLL-WP 28-4	CHLL-WP 32-1	CHLL-WP 48-1	CHLL-WP 48-2	CHLL-WP 48-3
Sample Date:									8/21/2017	8/21/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 2 in	0 - 2 in	0 - 2 in
Sample Description:									Dark brown soil, yellow/mustard brown clay-like seam	Dark brown soil w/ white clay-like material	Dark brown soil, mixed with debris	Dark brown soil, mixed with debris	White crystalline material	Brown sand with gravel	Brown sand with gravel	Brown sand with gravel
Organics - SVOCs (ug/kg) (cont'd)																
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08 (Q)	7,000,000 (Q)	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	--	--
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2,900,000	ID	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	--	--	--	--	--	--	--
HEXACHLOROBENZENE	118-74-1	1,800	350	6,800,000	8,900	1,800	8,500,000	37,000	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	--	--	--	--	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	2,100 (I)	570 (I)	8.2E+10 (I)	3.2E+07 (C,I)	2,100 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	1,800 (I)	1,100 (I)	8.2E+10 (I)	3.2E+07 (C,I)	1,800 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--	--
BENZENE	71-43-2	100 (I)	240 (I,X)	3.8E+08 (I)	180,000 (I)	100 (I)	4.7E+08 (I)	840,000 (C,I)	--	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	1,500 (I)	360 (I)	1E+10 (I)	2.2E+07 (C,I)	1,500 (I)	1.3E+10 (I)	7.1E+07 (C, I)	--	--	--	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	91,000	3,200	5.8E+09	2.5E+07 (C)	260,000	2.6E+09	8E+07 (C)	--	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1,600	ID	2E+09	2,500,000	4,600	8.8E+08	8,000,000	--	--	--	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	1,600 (I)	ID	1.3E+09 (I)	2,500,000 (I)	4,600 (I)	5.9E+08 (I)	8,000,000 (I)	--	--	--	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
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)	--	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	5,600 (I)	820 (I)	2.9E+11 (I)	4.1E+08 (C,I)	5600 (I)	1.3E+11 (I)	1E+09 (I)	--	--	--	--	--	--	--	--
Asbestos (%)																
ASBESTOS	ASB	NLL	NLL	1.0 (BB)	ID	NLL	1.0 (BB)	ID	--	--	--	--	--	--	--	--

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

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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	MineralB-11	MineralB-6	SB-11	SB-12	SB-14	SS-18	SS-19	SS-20
Field Sample ID:									Mineral XRF11	Mineral XRF6	SB-11	SB-12	SB-14	SS-18	SS-19	SS-20
Sample Date:									9/7/2007	9/7/2007	10/11/2011	10/11/2011	10/11/2011	10/11/2011	10/11/2011	10/11/2011
Sample Interval (bgs):									0 - 0 in	0 - 0 in	0 - 16 in	6 - 12 in	0 - 14 in	0 - 6 in	0 - 4 in	0 - 0.75 in
Sample Description:									--	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	6200 J	3200 J	2670	2930	2010	10600 J	8660	8260
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	1.5 J	0.71 J	1.4 J	80.2	13.2	4.8 J
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	52	230	27.1 J-	8.6 J-	41.5 J	1220	5600 J	66.9 J
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	43.9	69.1	33.8	291 J	212	434
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	0.5 J	<3.2 U	0.3 J	0.37 J	0.27 J	1.2	3.6	1.5
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	0.73	0.66	0.8	5.8	96.3	11.4
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	1720	3620	1240	21100 J	2220	26800
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)	6.9 J	56	9.3	10	14.6	244	37.7	56.6
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	6.9	48	2.6 J	3.8 J	<5.0 U	8.8	<5.0 U	9.0
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	17000	44000	6600	3660	14300 J	26900 J	199000 J	20300 J
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	8090	10300	6170	31500 J	4380	92200
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	280	1900	54.7	16.6	83	715	1610	1010
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)	4.7	<0.64 U	--	--	--	--	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	1650	1590	1240	5270	<500 U	6050
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	180	73	105	246	82.4	306 J	31.4	596
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	0.1	0.022	0.058 J	0.018 J	0.041 J	0.21 J-	20.8	1.7
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	24	540	8.2	7.0	9.9	49.4	95.3	31.5
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	<500 U	<500 U	<500 U	1190	1380	727
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	<3.5 U	0.33 J	0.44 J-	<3.5 U	69.3	<3.5 U
SILVER	7440-22-4	4.5	1.0 (M); 0.027	6,700	2,500	13	2,900	9,000	5.0	9.0	1.7	1.0	3.9	9.5	45.5	11.8
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	198 J	165 J	132 J	3930	1390	887
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	18.3	25.9	10.4	39.7 J	30.2	31.7
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	490 J	5400 J	78.7	35.2	181	1310 J	14800	3050
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	--	--	<0.5 UJ	0.13 J	0.15 J	1.9	0.24 J	0.14 J
Organics - PCBs (ug/kg)																
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<68 U	<70 U	<35 U	<38 U	<35 U	<35 U	<57 U	<33 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<68 U	<70 U	23 J	<38 U	<35 U	490	<57 U	30 J
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<68 U	<70 U	21 J	<38 U	<35 U	540	<57 U	28 J
AROCLOR-1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	24 J	<70 U	<35 U	<38 U	<35 U	<35 U	<57 U	<33 U
AROCLOR-1268	11100-14-4	NA	NA	NA	NA	NA	NA	NA	--	--	<35 U	<38 U	<35 U	<35 U	<57 U	<33 U
TOTAL PCBS	TPCB	NLL	NLL	5,200,00 (J)	1,000 (J,T)	NLL	6,500,000 (J)	1000 (J)	24 J	ND	44	ND	ND	ND	ND	58
Organics - SVOCs (ug/kg)																
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,500,000	3,300 (X)	6.7E+07	7.7E+07	1,500.000	2.9E+07	2.5E+08	--	--	<170 U	<170 U	<170 U	<170 U	290 J	<170 U
2-METHYLNAPHTHALENE (SVOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	<170 U	250	<170 U	170 J	<170 U	<170 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	--	<170 U	<170 U	<170 U	380	<170 U	<170 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	--	<170 U	<170 U	<170 U	<170 U	<170 U	130 J

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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	MineralB-11	MineralB-6	SB-11	SB-12	SB-14	SS-18	SS-19	SS-20
Field Sample ID:									Mineral XRF11	Mineral XRF6	SB-11	SB-12	SB-14	SS-18	SS-19	SS-20
Sample Date:									9/7/2007	9/7/2007	10/11/2011	10/11/2011	10/11/2011	10/11/2011	10/11/2011	10/11/2011
Sample Interval (bgs):									0 - 0 in	0 - 0 in	0 - 16 in	6 - 12 in	0 - 14 in	0 - 6 in	0 - 4 in	0 - 0.75 in
Sample Description:									--	--	--	--	--	--	--	--
Organics - SVOCs (ug/kg) (cont'd)																
ACETOPHENONE	98-86-2	30,000	ID	3.3E+10	4.7E+07 (C)	88,000	1.4E+10	1.5E+08 (C)	--	--	<170 U	<170 U	<170 U	<170 U	<170 U	220
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	<170 U	<170 U	<170 U	800	<170 U	<170 U
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	<170 U	<170 U	<170 U	1500 J	<170 UJ	680
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	<170 U	<170 U	<170 U	1300 J	<170 UJ	600
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	<170 U	<170 U	<170 U	<170 UJ	<170 UJ	860
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08 (Q)	7,000,000 (Q)	--	--	<170 U	<170 U	<170 U	640 J	<170 UJ	420
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	<170 U	<170 U	<170 U	1300 J	<170 UJ	770
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	<170 U	<170 U	<170 U	94 J	580	<170 U
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	--	--	<170 U	<170 U	<170 U	330 J	<170 U	84 J
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	<170 U	<170 U	96 J	1700 J	<170 UJ	980
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	<170 U	<170 U	<170 U	300 J	<170 UJ	160 J
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2,900,000	ID	--	--	<170 U	<170 U	<170 U	220 J	<170 U	<170 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	<170 UJ	140 J	<170 U	5200 J	<170 UJ	1700 J
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	--	<170 U	<170 U	<170 U	320 J	<170 U	<170 U
HEXACHLOROBENZENE	118-74-1	1,800	350	6,800,000	8,900	1,800	8,500,000	37,000	--	--	<170 U	<170 U	<170 U	<170 U	850	<170 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	<170 U	<170 U	<170 U	<170 UJ	<170 UJ	420
NAPHTHALENE (SVOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	<170 U	150 J	<170 U	150 J	<170 U	<170 U
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000	--	--	<170 U	180 J	<170 U	4400	<170 U	280
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	<170 U	130 J	<170 UJ	4000	<170 UJ	1300
Organics - VOCs (ug/kg)																
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	2,100 (I)	570 (I)	8.2E+10 (I)	3.2E+07 (C,I)	2,100 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	1,800 (I)	1,100 (I)	8.2E+10 (I)	3.2E+07 (C,I)	1,800 (I)	3.6E+10 (I)	1E+08 (C,I)	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--	--
BENZENE	71-43-2	100 (I)	240 (I,X)	3.8E+08 (I)	180,000 (I)	100 (I)	4.7E+08 (I)	840,000 (C,I)	--	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	1,500 (I)	360 (I)	1E+10 (I)	2.2E+07 (C,I)	1,500 (I)	1.3E+10 (I)	7.1E+07 (C, I)	--	--	--	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	91,000	3,200	5.8E+09	2.5E+07 (C)	260,000	2.6E+09	8E+07 (C)	--	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1,600	ID	2E+09	2,500,000	4,600	8.8E+08	8,000,000	--	--	--	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	1,600 (I)	ID	1.3E+09 (I)	2,500,000 (I)	4,600 (I)	5.9E+08 (I)	8,000,000 (I)	--	--	--	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
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)	--	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	5,600 (I)	820 (I)	2.9E+11 (I)	4.1E+08 (C,I)	5600 (I)	1.3E+11 (I)	1E+09 (I)	--	--	--	--	--	--	--	--
Asbestos (%)																
ASBESTOS	ASB	NLL	NLL	1.0 (BB)	ID	NLL	1.0 (BB)	ID	--	--	--	--	--	--	--	--

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

TABLE 9-8
Sample Analytical Summary - Soil, Waste Pile, Residual Processing Material, and Stack Debris
Hubbell Processing Area - Mineral Building Property
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

Indicates sampled item/material has been removed from the site.

Evaluation based on MDEQ Criteria at time of project completetion.

Samples described in this evaluation may actually refer to stamp sands or to other mining waste from the historic mining and reclamation processes conducted in the area.

-- = 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 of drinking water can only be used at sites where groundwater is prevented from being used as a public water supply, currently and in the future, through an approved land or resource use restriction.

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

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

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

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

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

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

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

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

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

Laboratory Footnotes

J = Estimated result

ND = Not detected

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

TABLE 9-9
Sample Analytical Summary - Waste Characterization
Hubbell Processing Area - Mineral Building Property
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name		Hazardous Waste Toxicity Value	STACK DEBRIS		CHLL-WP01	CHLL-WP23	CHLL-WP27	CHLL-WP28			CHLL-WP48		
Field Sample ID:			CHLL-Stack-1	CHLL-Stack-2	CHLL-WP01-2	CHLL-WP23-2	CHLL-WP27-1	CHLL-WP28-1	CHLL-WP28-3	CHLL-WP28-4	CHLL-WP48-1	CHLL-WP48-2	CHLL-WP48-3
Sample Date:			10/23/2017	10/23/2017	8/21/2017	10/23/2017	8/21/2017	8/21/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017
Chemical Name	Unit												
Inorganics, TCLP													
Arsenic, TCLP	mg/L	5.0	1.4	<0.05 UJ	<0.05 U	<0.05 UJ	<0.05 U	<0.05 U	<0.05 UJ	<0.05 U	<0.05 UJ	0.066	<0.05 U
Lead, TCLP	mg/L	5.0	0.2	7.3	1.1	5	10	1.3	28	37	800	310	390

Hazardous Waste Toxicity Screening values from Title 40 of the *Code of Federal Regulations* , Chapter 1, Section 261.20-24

Notes:

Bolded/Shaded cells indicate analyte concentration exceeds the hazardous waste toxicity value.

Evaluation based on MDEQ Criteria at time of Project completion.

ID = Identification

TCLP = Toxicity Charateristic Leaching Procedure

mg/L = Milligram per liter

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

J = The concentration is an approximate value

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area													
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD36			CHLL-SD37				CHLL-SD40			CHLL-SD41		
Field Sample ID					CHLL-SD-36-0"-6"	CHLL-SD-36-1'-3'	CHLL-SD-36-3'-5'	CHLL-SD-37-0"-6"	CHLL-SD-37-1'-3'	CHLL-SD-37-1'-3' dup	CHLL-SD-37-3'-5'	CHLL-SD-40-0"-6"	CHLL-SD-40-1'-3'	CHLL-SD-40-3'-4'	CHLL-SD-41-0"-6"	CHLL-SD-41-1'-3'	CHLL-SD-41-1'-3' DUP
Sample Date					7/11/2014	7/11/2014	7/11/2014	7/11/2014	7/11/2014	7/11/2014	7/11/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 4 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft
Sample Description					SILT, Dark brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Reddish brown	SILT, Reddish brown	Field Duplicate	SILT, Reddish brown	SILT, Sandy, Reddish brown	SILT, Clayey, Reddish brown	SAND, Medium to fine grained, Tan, Wood debris at 3.7 ft	SILT, Coal fragment, Light brown	SILT, Clayey, Reddish brown; SAND, Poorly sorted, Tan, pebbles at 3 ft	Field Duplicate
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	16000	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	0.6	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--	--	--	--	17	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	68 J	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	1.0	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	<0.2 U	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	46	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	27	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--	--	--	--	2300	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	31000	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--	--	--	--	53	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	550	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	0.2	--	--
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	65	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	0.4	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	4.7	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	180	--	--
Inorganics - Cyanide (mg/kg)																	
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	<0.19 U	--	--
Organics - PCBs (ug/kg)																	
AROCLOR-1242	53469-21-9	NA	NA	NA	<440 UJ	<370 U	<310 U	<440 U	<340 U	<350 U	<320 U	<320 U	<340 U	<150 U	<370 U	<250 U	<250 U
AROCLOR-1248	12672-29-6				<440 UJ	<370 U	<310 U	<440 U	<340 U	<350 U	<320 U	<320 U	<340 U	<150 U	<370 U	<250 U	<250 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<440 UJ	<370 U	<310 U	<440 U	<340 U	<350 U	<320 U	<320 U	<340 U	<150 U	<370 U	<250 U	<250 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<440 UJ	<370 U	<310 U	<440 U	<340 U	<350 U	<320 U	<320 U	<340 U	<150 U	<370 U	<250 U	<250 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<440 UJ	<370 U	<310 U	<440 U	<340 U	<350 U	<320 U	<320 U	<340 U	<150 U	<370 U	<250 U	<250 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																	
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	<2800 U	--	--	--	--	--	--	--	--	--	<2300 U	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	<1100 U	--	--	--	--	--	--	--	--	--	<930 U	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	<1100 U	--	--	--	--	--	--	--	--	--	<930 U	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area													
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD36			CHLL-SD37				CHLL-SD40			CHLL-SD41		
Field Sample ID					CHLL-SD-36-0"-6"	CHLL-SD-36-1'-3'	CHLL-SD-36-3'-5'	CHLL-SD-37-0"-6"	CHLL-SD-37-1'-3'	CHLL-SD-37-1'-3' dup	CHLL-SD-37-3'-5'	CHLL-SD-40-0"-6"	CHLL-SD-40-1'-3'	CHLL-SD-40-3'-4'	CHLL-SD-41-0"-6"	CHLL-SD-41-1'-3'	CHLL-SD-41-1'-3' DUP
Sample Date					7/11/2014	7/11/2014	7/11/2014	7/11/2014	7/11/2014	7/11/2014	7/11/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014	7/12/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 4 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft
Sample Description					SILT, Dark brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Reddish brown	SILT, Reddish brown	Field Duplicate	SILT, Reddish brown	SILT, Sandy, Reddish brown	SILT, Clayey, Reddish brown	SAND, Medium to fine grained, Tan, Wood debris at 3.7 ft	SILT, Coal fragment, Light brown	SILT, Clayey, Reddish brown; SAND, Poorly sorted, Tan, pebbles at 3 ft	Field Duplicate
Organics - SVOCs (ug/kg) (continued)																	
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	<1100 U	--	--	--	--	--	--	--	--	--	<930 U	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	<1100 U	--	--	--	--	--	--	--	--	--	<930 U	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	<2200 U	--	--	--	--	--	--	--	--	--	<1900 U	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	<2200 U	--	--	--	--	--	--	--	--	--	<1900 U	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	<2200 U	--	--	--	--	--	--	--	--	--	<1900 U	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	<2200 U	--	--	--	--	--	--	--	--	--	<1900 U	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	<1100 U	--	--	--	--	--	--	--	--	--	<930 U	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	<2200 U	--	--	--	--	--	--	--	--	--	<1900 U	--	--
FLUORANTHENE	206-44-0	423	423	2,230	<1100 U	--	--	--	--	--	--	--	--	--	<930 U	--	--
FLUORENE	86-73-7	77.4	77.4	536	<1100 U	--	--	--	--	--	--	--	--	--	<930 U	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	<2200 U	--	--	--	--	--	--	--	--	--	<1900 U	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	<1100 U	--	--	--	--	--	--	--	--	--	<930 U	--	--
PHENANTHRENE	85-01-8	204	204	1,170	<1100 U	--	--	--	--	--	--	--	--	--	<930 U	--	--
PYRENE	129-00-0	195	195	1,520	<1100 U	--	--	--	--	--	--	--	--	--	<930 U	--	--
Organics - VOCs																	
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area											
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD42			CHLL-SD45			CHLL-SD46				CHLL-SD47	
Field Sample ID					CHLL-SD-42-0"-6"	CHLL-SD-42-1'-3'	CHLL-SD-42-3'-3.7'	CHLL-SD-45-0"-6"	CHLL-SD-45-1'-3'	CHLL-SD-45 3-3.4'	CHLL-SD 46-0"-6"	CHLL-SD 46-1'-3'	CHLL-SD 46-1'-3' DUP	CHLL-SD 46-3'-4.5'	CHLL-SD 47-0"-6"	CHLL-SD 47-1'-2'
Sample Date					7/12/2014	7/12/2014	7/12/2014	7/11/2014	7/11/2014	7/11/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 3.7 ft	0 - 0.5 ft	1 - 3 ft	3 - 3.4 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 4.5 ft	0 - 0.5 ft	1 - 2 ft
Sample Description					SILT, Sandy, Reddish brown	SAND, Medium to fine grained, Tan	SAND, Medium to fine grained, Tan	SILT, Sandy, Dark brown	SILT, Sandy, Reddish brown	SAND, Poorly sorted, Light brown to tan	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	Field Duplicate	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--	--	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	--	--
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1242	53469-21-9	NA	NA	NA	<330 U	<130 U	<120 U	<440 UJ	<330 U	<120 U	<470 U	<380 U	<380 U	<360 U	<500 U	<380 U
AROCLOR-1248	12672-29-6				<330 U	<130 U	<120 U	<440 UJ	<330 U	<120 U	<470 U	<380 U	<380 U	<360 U	<500 U	<380 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<330 U	<130 U	<120 U	180 J	<330 U	<120 U	<470 U	<380 U	<380 U	<360 U	<500 U	<380 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<330 U	<130 U	<120 U	260 J	<330 U	<120 U	<470 U	<380 U	<380 U	<360 U	<500 U	<380 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<330 U	<130 U	<120 U	<440 UJ	<330 U	<120 U	<470 U	<380 U	<380 U	<360 U	<500 U	<380 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	440 J	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area											
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD42			CHLL-SD45			CHLL-SD46				CHLL-SD47	
Field Sample ID					CHLL-SD-42-0"-6"	CHLL-SD-42-1'-3'	CHLL-SD-42-3'-3.7'	CHLL-SD-45-0"-6"	CHLL-SD-45-1'-3'	CHLL-SD-45 3-3.4'	CHLL-SD 46-0"-6"	CHLL-SD 46-1'-3'	CHLL-SD 46-1'-3' DUP	CHLL-SD 46-3'-4.5'	CHLL-SD 47-0"-6"	CHLL-SD 47-1'-2'
Sample Date					7/12/2014	7/12/2014	7/12/2014	7/11/2014	7/11/2014	7/11/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 3.7 ft	0 - 0.5 ft	1 - 3 ft	3 - 3.4 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 4.5 ft	0 - 0.5 ft	1 - 2 ft
Sample Description					SILT, Sandy, Reddish brown	SAND, Medium to fine grained, Tan	SAND, Medium to fine grained, Tan	SILT, Sandy, Dark brown	SILT, Sandy, Reddish brown	SAND, Poorly sorted, Light brown to tan	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	Field Duplicate	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown
Organics - SVOCs (ug/kg) (continued)																
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs																
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area													
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD48			CHLL-SD49				CHLL-SD50			CHLL-SD51		
Field Sample ID					CHLL-SD 48-0"-6"	CHLL-SD 48-1'-3'	CHLL-SD 48-3'-5'	CHLL-SD 49-0"-6"	CHLL-SD49-1'-3'	CHLL-SD49-3'-4.5'	CHLL-SD49-3'-4.5' DUP	CHLL-SD 50-0"-6"	CHLL-SD 50-1'-3'	CHLL-SD 50-3'-5'	CHLL-SD 51-0"-6"	CHLL-SD 51-1'-3'	CHLL-SD 51-3'-5'
Sample Date					7/8/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 4.5 ft	3 - 4.5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft
Sample Description					SILT, Dark brown; SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Dark brown; SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	Field Duplicate	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown to dark brown
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--	--	--	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	--	--	--
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																	
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																	
AROCLOR-1242	53469-21-9	NA	NA	NA	<440 U	<370 U	<320 U	<490 U	<340 U	<440 U	<420 U	<190 U	<190 U	<180 U	<190 U	<180 U	<200 U
AROCLOR-1248	12672-29-6				<440 U	<370 U	<320 U	<490 U	<340 U	<440 U	<420 U	<190 U	<190 U	<180 U	<190 U	<180 U	<200 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<440 U	<370 U	<320 U	<490 U	<340 U	<440 U	<420 U	<190 U	<190 U	<180 U	<190 U	<180 U	<200 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<440 U	<370 U	<320 U	<490 U	<340 U	<440 U	<420 U	<190 U	<190 U	<180 U	<190 U	<180 U	<200 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<440 U	<370 U	<320 U	<490 U	<340 U	<440 U	<420 U	<190 U	<190 U	<180 U	<190 U	<180 U	<200 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																	
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area													
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD48			CHLL-SD49				CHLL-SD50			CHLL-SD51		
Field Sample ID					CHLL-SD 48-0"-6"	CHLL-SD 48-1'-3'	CHLL-SD 48-3'-5'	CHLL-SD 49-0"-6"	CHLL-SD49-1'-3'	CHLL-SD49-3'-4.5'	CHLL-SD49-3'-4.5' DUP	CHLL-SD 50-0"-6"	CHLL-SD 50-1'-3'	CHLL-SD 50-3'-5'	CHLL-SD 51-0"-6"	CHLL-SD 51-1'-3'	CHLL-SD 51-3'-5'
Sample Date					7/8/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014	7/8/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014	6/14/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 4.5 ft	3 - 4.5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft
Sample Description					SILT, Dark brown; SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Dark brown; SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	Field Duplicate	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown to dark brown
Organics - SVOCs (ug/kg) (continued)																	
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs																	
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area										Hubbell Slag Dump and Beach Area	
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD52			CHLL-SD61	CHLL-SD63		CHLL-SD64				CHLL-SD65	
Field Sample ID					CHLL-SD52-0"-6"	CHLL-SD52-1'-3'	CHLL-SD-52-3'-4'	CHLL-SD61-0"-6"	CHLL-SD63 0"-6"	CHLL-SD63 1'-3'	CHLL-SD64 0-6"	CHLL-SD64 1'-3'	CHLL-SD64 1'-3' DUP	CHLL-SD64 3-3.4'	CHLL-SD 65-0"-6"	CHLL-SD 65-.75'-1'
Sample Date					7/9/2014	7/9/2014	7/9/2014	7/15/2014	7/15/2014	7/15/2014	7/15/2014	7/15/2014	7/15/2014	7/15/2014	6/14/2014	6/14/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 4 ft	0 - 0.5 ft	0 - 0.5 ft	1 - 3 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 3.4 ft	0 - 0.5 ft	0.75 - 1 ft
Sample Description					SILT, Clayey, Brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Dark brown; SAND, Poorly sorted, Reddish brown, Slag fragments	SILT, Dark brown to reddish brown	SILT, Clayey, Reddish brown; SAND, Silty, Poorly sorted, Reddish brown	SILT, Sandy, Clayey, Reddish brown	SILT, Sandy, Clayey, Reddish brown; SAND, Coarse to medium grained, Slag fragments	Field Duplicate	SILT, Clayey, Reddish brown	SILT, Reddish brown	SAND, Silty, Wood debris, Dark brown
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--	--	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	--	--
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1242	53469-21-9	NA	NA	NA	2500 J	<390 U	<330 U	<260 U	620 J	<310 U	310 J	<300 U	<290 U	<350 U	<210 U	<1000 U
AROCLOR-1248	12672-29-6				<2500 UJ	<390 U	<330 U	<260 U	<750 UJ	<310 U	<500 UJ	<300 U	<290 U	<350 U	<210 U	<1000 U
AROCLOR-1254	11097-69-1	NA	NA	NA	850 J	<390 U	<330 U	<260 U	810 J	<310 U	370 J	<300 U	<290 U	<350 U	<210 U	<200 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<430 UJ	<390 U	<330 U	<260 U	<750 UJ	<310 U	<500 UJ	<300 U	<290 U	<350 U	<210 U	<200 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<430 UJ	<390 U	<330 U	<260 U	<750 UJ	<310 U	<500 UJ	<300 U	<290 U	<350 U	<210 U	<200 U
TOTAL PCBS	TPCB	59.8	59.8	676	3350 J	ND	ND	ND	1430 J	ND	680 J	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area										Hubbell Slag Dump and Beach Area	
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD52			CHLL-SD61	CHLL-SD63		CHLL-SD64				CHLL-SD65	
Field Sample ID					CHLL-SD52-0"-6"	CHLL-SD52-1'-3'	CHLL-SD-52-3'-4'	CHLL-SD61-0"-6"	CHLL-SD63 0"-6"	CHLL-SD63 1'-3'	CHLL-SD64 0-6"	CHLL-SD64 1'-3'	CHLL-SD64 1'-3' DUP	CHLL-SD64 3-3.4'	CHLL-SD 65-0"-6"	CHLL-SD 65-.75'-1'
Sample Date					7/9/2014	7/9/2014	7/9/2014	7/15/2014	7/15/2014	7/15/2014	7/15/2014	7/15/2014	7/15/2014	7/15/2014	6/14/2014	6/14/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 4 ft	0 - 0.5 ft	0 - 0.5 ft	1 - 3 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 3.4 ft	0 - 0.5 ft	0.75 - 1 ft
Sample Description					SILT, Clayey, Brown	SILT, Clayey, Reddish brown	SILT, Clayey, Reddish brown	SILT, Dark brown; SAND, Poorly sorted, Reddish brown, Slag fragments	SILT, Dark brown to reddish brown	SILT, Clayey, Reddish brown; SAND, Silty, Poorly sorted, Reddish brown	SILT, Sandy, Clayey, Reddish brown	SILT, Sandy, Clayey, Reddish brown; SAND, Coarse to medium grained, Slag fragments	Field Duplicate	SILT, Clayey, Reddish brown	SILT, Reddish brown	SAND, Silty, Wood debris, Dark brown
Organics - SVOCs (ug/kg) (continued)																
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs																
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Slag Dump and Beach Area								Hubbell Processing Area			
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD66		CHLL-SD67		CHLL-SD69		CHLL-SD70		CHLL-SD86			
Field Sample ID					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'	CHLL-SD 70-0-6"	CHLL-SD 70-1'-3'	CHLL-SD-86-0-6"	CHLL-SD-86-1-3'	CHLL-SD-86-1-3' dup	CHLL-SD-86-3-5'
Sample Date					6/14/2014	6/14/2014	7/8/2014	7/8/2014	7/9/2014	7/9/2014	6/14/2014	6/14/2014	6/1/2015	6/1/2015	6/1/2015	6/1/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 1.5 ft	1 - 3 ft	1 - 3 ft	0 - 0.5 ft	1 - 2.5 ft	0 - 0.5 ft	1 - 3 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 5 ft
Sample Description					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	SAND, dark brown	SAND, Medium to fine grained, Reddish brown; SILT, clayey, Reddish brown	SILT, Dark brown	SILT, Reddish-Brown, Clayey, ~2.8' tan to rusty brown silty fine grained sand seam less than 1" thick	Field Duplicate	SILT, Reddish-Brown, Clayey
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	NA	NA	NA	11000	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	<0.6 U	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	<5.0 U	--	--	--	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	42	--	--	--	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	<2.0 U	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	<0.2 U	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	290	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	<0.09 U	--	--	--	--	--	--	--	--	--	--	--
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	140	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	0.0001	NA	NA	<0.17 U	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1242	53469-21-9	NA	NA	NA	<170 U	<220 U	<270 U	<280 U	<390 U	<340 U	<250 U	<140 U	<740 U	<410 U	<400 U	<350 U
AROCLOR-1248	12672-29-6				<170 U	<220 U	<270 U	<280 U	<390 U	<340 U	<250 U	<140 U	<740 U	<410 U	<400 U	<350 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<170 U	<220 U	<270 U	<280 U	<390 U	<340 U	<250 U	<140 U	<740 U	<410 U	<400 U	<350 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<170 U	<220 U	<270 U	<280 U	<390 U	<340 U	<250 U	<140 U	<740 U	<410 U	<400 U	<350 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<170 U	<220 U	<270 U	<280 U	<390 U	<340 U	<250 U	<140 U	<740 U	<410 U	<400 U	<350 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	<870 UJ	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	<350 UJ	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	<350 UJ	--	--	--	--	--	--	--	--	--	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Slag Dump and Beach Area								Hubbell Processing Area			
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD66		CHLL-SD67		CHLL-SD69		CHLL-SD70		CHLL-SD86			
Field Sample ID					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'	CHLL-SD 70-0-6"	CHLL-SD 70-1'-3'	CHLL-SD-86-0-6"	CHLL-SD-86-1-3'	CHLL-SD-86-1-3' dup	CHLL-SD-86-3-5'
Sample Date					6/14/2014	6/14/2014	7/8/2014	7/8/2014	7/9/2014	7/9/2014	6/14/2014	6/14/2014	6/1/2015	6/1/2015	6/1/2015	6/1/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 1.5 ft	1 - 3 ft	1 - 3 ft	0 - 0.5 ft	1 - 2.5 ft	0 - 0.5 ft	1 - 3 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 5 ft
Sample Description					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	SAND, dark brown	SAND, Medium to fine grained, Reddish brown; SILT, clayey, Reddish brown	SILT, Dark brown	SILT, Reddish-Brown, Clayey, ~2.8' tan to rusty brown silty fine grained sand seam less than 1" thick	Field Duplicate	SILT, Reddish-Brown, Clayey
Organics - SVOCs (ug/kg) (continued)																
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	<350 UJ	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	<350 UJ	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	<690 UJ	--	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	<690 UJ	--	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	<690 UJ	--	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	<690 UJ	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	<350 UJ	--	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	<690 UJ	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	<350 UJ	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	77.4	77.4	536	<350 UJ	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	<690 UJ	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	<350 UJ	--	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	204	204	1,170	<350 UJ	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	<350 UJ	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs																
all VOCs		NA	NA	NA	<350 UJ	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area										
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD87				CHLL-SD88			CHLL-SD89			
Field Sample ID					CHLL-SD-87-0-6"	CHLL-SD-87-1-3'	CHLL-SD-87-1-3' dup	CHLL-SD-87-3-5'	CHLL-SD-88-0-6"	CHLL-SD-88-1-3'	CHLL-SD-88-3-5'	CHLL-SD-89-0-6"	CHLL-SD-89-0.7'-0.9'	CHLL-SD-89-1'-3'	CHLL-SD-89-3'-5'
Sample Date					6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	0.7 - 0.9 ft	1 - 3 ft	3 - 5 ft
Sample Description					SILT, Dark brown	SILT, Reddish-Brown, Clayey	Field Duplicate	SILT, Reddish-Brown, Clayey	SILT, Dark brown	SILT, Reddish-Brown, Clayey	SILT, Reddish-Brown, Clayey	SILT, Dark brown	SILT, Reddish-Brown, Clayey. To 0.7 ft, SILT, Black	SILT, Reddish-Brown, Clayey	SILT, Reddish-Brown, Clayey
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	1.9	1.0 J	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--	32	28	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	120	75	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	<2.0 U	<2.0 U	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	1.4	0.7	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	96	95	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	55	63	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--	2900	1800	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	59000	58000	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--	180	100	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	1700	1200	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	0.4	0.2	--	--
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	1.7	2.4	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	110	130	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	<2.0 U	<2.0 U	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	3.8	2.2	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	150	150	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	320	290	--	--
Inorganics - Cyanide (mg/kg)															
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)															
AROCLOR-1242	53469-21-9	NA	NA	NA	<560 U	<400 U	<400 U	<370 U	<750 U	<440 U	<350 U	<760 UJ	<500 U	<460 U	<400 U
AROCLOR-1248	12672-29-6				<560 U	<400 U	<400 U	<370 U	<750 U	<440 U	<350 U	<760 UJ	<500 U	<460 U	<400 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<560 U	<400 U	<400 U	<370 U	<750 U	<440 U	<350 U	270 J	<500 U	<460 U	<400 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<560 U	<400 U	<400 U	<370 U	<750 U	<440 U	<350 U	<760 UJ	<500 U	<460 U	<400 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<560 U	<400 U	<400 U	<370 U	<750 U	<440 U	<350 U	<760 UJ	<500 U	<460 U	<400 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	ND	270 J	ND	ND	ND
Organics - SVOCs (ug/kg)															
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	--	<4700 U	<3200 U	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	--	<1900 U	<1300 U	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	--	<1900 U	<1300 U	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area										
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD87				CHLL-SD88			CHLL-SD89			
Field Sample ID					CHLL-SD-87-0-6"	CHLL-SD-87-1-3'	CHLL-SD-87-1-3' dup	CHLL-SD-87-3-5'	CHLL-SD-88-0-6"	CHLL-SD-88-1-3'	CHLL-SD-88-3-5'	CHLL-SD-89-0-6"	CHLL-SD-89-0.7'-0.9'	CHLL-SD-89-1'-3'	CHLL-SD-89-3'-5'
Sample Date					6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	0.7 - 0.9 ft	1 - 3 ft	3 - 5 ft
Sample Description					SILT, Dark brown	SILT, Reddish-Brown, Clayey	Field Duplicate	SILT, Reddish-Brown, Clayey	SILT, Dark brown	SILT, Reddish-Brown, Clayey	SILT, Reddish-Brown, Clayey	SILT, Dark brown	SILT, Reddish-Brown, Clayey. To 0.7 ft, SILT, Black	SILT, Reddish-Brown, Clayey	SILT, Reddish-Brown, Clayey
Organics - SVOCs (ug/kg) (continued)															
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	--	<1900 U	<1300 U	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	--	<1900 U	<1300 U	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	--	<3800 U	<2500 U	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	--	<3800 U	<2500 U	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	--	<3800 U	<2500 U	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	--	<3800 U	<2500 U	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	--	<1900 U	<1300 U	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	--	<3800 U	<2500 U	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	<1900 U	<1300 U	--	--
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	--	<1900 U	<1300 U	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	--	<3800 U	<2500 U	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	--	<1900 U	<1300 U	--	--
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	--	<1900 U	<1300 U	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	<1900 U	<1300 U	--	--
Organics - VOCs															
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area											Hubbell Slag Dump and Beach Area
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD90				CHLL-SD91			CHLL-SD95				CHLL-SD70
Field Sample ID					CHLL-SD-90-0-6"	CHLL-SD-90-1-3'	CHLL-SD-90-3'-5'	CHLL-SD-90-3'-5' dup	CHLL-SD-91-0-6"	CHLL-SD-91-1'-3'	CHLL-SD-91-3'-5'	CHLL-SD-95-0-6"	CHLL-SD-95-1-3'	CHLL-SD-95-1-3' dup	CHLL-SD-95-3-5'	CHLL-SD 70-3-'4.5'
Sample Date					6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	7/11/2015	7/11/2015	7/11/2015	7/11/2015	6/14/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 5 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 5 ft	3 - 4.5 ft
Sample Description					SILT, Dark brown	SILT, Reddish-Brown, Clayey	SILT, Reddish-Brown, Clayey	Field Duplicate	SILT, Reddish-Brown, Clayey	SILT, Reddish-Brown, Clayey	SILT, Reddish-Brown, Clayey, stained dark black stringer at 3.5'	SILT, dark brown, wet, soft, black streaking visible	CLAY, dark brown with purple hue, wet, soft, black streaking visible	Field Duplicate	CLAY, dark brown with purple hue, wet, soft, black streaking visible	SAND, Poorly sorted, Reddish brown; SILT, clayey, Reddish brown
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	27000	31000	--	26000	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	1.9	<0.3 U	--	<0.3 U	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--	49	19	--	6.1	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	220	75	--	83	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	1.7	1.3	--	1.2	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	1.5	<0.2 U	--	<0.2 U	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	94	110	--	61	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	44	65	--	37	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--	3100	1800	--	1600	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	47000	52000	--	47000	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--	250	19	--	8.5	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	15	14	--	13	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	22000	36000	--	32000	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	2000	930	--	630	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	0.5	0.3	--	0.6	--
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	99	140	--	85	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	<0.2 U	<0.2 U	--	<0.2 U	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	4.9	6.5	--	6.1	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	350	310	--	170	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	0.63	<0.20 U	--	<0.18 U	--
Organics - PCBs (ug/kg)																
AROCLOR-1242	53469-21-9	NA	NA	NA	<450 UJ	<410 U	<370 U	<370 U	<400 UJ	<420 U	<360 U	<1100 U	<390 U	<390 U	<360 U	<140 U
AROCLOR-1248	12672-29-6				<450 UJ	<410 U	<370 U	<370 U	<400 UJ	<420 U	<360 U	<1100 U	<390 U	<390 U	<360 U	<140 U
AROCLOR-1254	11097-69-1	NA	NA	NA	190 J	<410 U	<370 U	<370 U	160 J	<420 U	<360 U	<1100 U	<390 U	<390 U	<360 U	<140 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<450 UJ	<410 U	<370 U	<370 U	<400 UJ	<420 U	<360 U	<1100 U	<390 U	<390 U	<360 U	<140 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<450 UJ	<410 U	<370 U	<370 U	<400 UJ	<420 U	<360 U	<1100 U	<390 U	<390 U	<360 U	<140 U
TOTAL PCBS	TPCB	59.8	59.8	676	190 J	ND	ND	ND	160 J	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	--	<6900 U	<2500 U	<2400 U	<2200 U	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	--	<2800 U	<990 U	<970 U	<890 U	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	--	<2800 U	<990 U	<970 U	<890 U	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area											Hubbell Slag Dump and Beach Area
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD90				CHLL-SD91			CHLL-SD95				CHLL-SD70
Field Sample ID					CHLL-SD-90-0-6"	CHLL-SD-90-1-3'	CHLL-SD-90-3'-5'	CHLL-SD-90-3'-5' dup	CHLL-SD-91-0-6"	CHLL-SD-91-1'-3'	CHLL-SD-91-3'-5'	CHLL-SD-95-0-6"	CHLL-SD-95-1-3'	CHLL-SD-95-1-3' dup	CHLL-SD-95-3-5'	CHLL-SD 70-3-'4.5'
Sample Date					6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	7/11/2015	7/11/2015	7/11/2015	7/11/2015	6/14/2014
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 5 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 5 ft	3 - 4.5 ft
Sample Description					SILT, Dark brown	SILT, Reddish-Brown, Clayey	SILT, Reddish-Brown, Clayey	Field Duplicate	SILT, Reddish-Brown, Clayey	SILT, Reddish-Brown, Clayey	SILT, Reddish-Brown, Clayey, stained dark black stringer at 3.5'	SILT, dark brown, wet, soft, black streaking visible	CLAY, dark brown with purple hue, wet, soft, black streaking visible	Field Duplicate	CLAY, dark brown with purple hue, wet, soft, black streaking visible	SAND, Poorly sorted, Reddish brown; SILT, clayey, Reddish brown
Organics - SVOCs (ug/kg) (continued)																
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	--	<2800 U	<990 U	<970 U	<890 U	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	--	<2800 U	<990 U	<970 U	<890 U	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	--	<5500 U	<2000 U	<1900 U	<1800 U	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	--	<5500 U	<2000 U	<1900 U	<1800 U	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	--	<5500 U	<2000 U	<1900 U	<1800 U	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	--	<5500 U	<2000 U	<1900 U	<1800 U	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	--	<2800 U	<990 U	<970 U	<890 U	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	--	<5500 U	<2000 U	<1900 U	<1800 U	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	<2800 U	<990 U	<970 U	<890 U	--
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	--	<2800 U	<990 U	<970 U	<890 U	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	--	<5500 U	<2000 U	<1900 U	<1800 U	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	--	<2800 U	<990 U	<970 U	<890 U	--
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	--	<2800 U	<990 U	<970 U	<890 U	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	<2800 U	<990 U	<970 U	<890 U	--
Organics - VOCs																
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Slag Dump and Beach Area						Hubbell Processing Area			
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD97			CHLL-SD98			CHLL-SD99		CHLL-SD103	CHLL-SD104
Field Sample ID					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	CHLL-SD-99-0"-6"	CHLL-SD-99-1'-2.5'	CHLL-SD-103-0-2"	CHLL-SD-104-0-2"
Sample Date					6/2/2015	6/2/2015	6/2/2015	7/8/2015	7/8/2015	7/8/2015	7/9/2015	7/9/2015	8/20/2015	8/20/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3.25 ft	1 - 3.25 ft	0 - 0.5 ft	1 - 2.5 ft	0 - 0.167 ft	0 - 0.167 ft
Sample Description					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	SAND, Dark brown with purple hue, wet, loose, medium to coarse, angular	SAND, Dark brown with purple hue, wet, loose, medium to coarse, angular to 1 ft; SILT WITH SAND, dark brown to purple-brown, wet, soft, angular to 1.5 ft; SILT WITH CLAY, dark brown to purple brown, wet, soft, black streaking.	Surface Sediment	Surface Sediment
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	37000	28000	12000	15000
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	8.5	0.6	19	27
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	44	28	91	120
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	250	72 J	190 J	530 J
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	1.6	<2.0 U	<2.0 U	<2.0 U
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	9	0.3	3.4	13
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	320 J	120 J	210	310
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	28 J	50 J	7.9	12
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	11000	4300	16000	25000
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	64000	47000	30000 J	55000 J
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	820	39 J	1400	2200
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	14	16	5.2	6.3
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	26000	34000	5700	14000
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	640 J	810 J	320	550
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	0.4	0.4	<0.06 U	0.5
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	63	100	27	77
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	<0.4 U	<2.0 U	2.6	3.4
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	12	8.1	28	14
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	1000	450	1200	2900
Inorganics - Cyanide (mg/kg)														
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	<0.12 U	<0.13 U
Organics - PCBs (ug/kg)														
AROCLOR-1242	53469-21-9	NA	NA	NA	<640 U	<420 U	<390 U	<260 U	<260 U	<250 U	<300 UJ	<350 U	<250 U	<250 UJ
AROCLOR-1248	12672-29-6				<640 U	<420 U	<390 U	<260 U	<260 U	<250 U	290 J	<350 U	<370 U	<250 UJ
AROCLOR-1254	11097-69-1	NA	NA	NA	<640 U	<420 U	<390 U	<260 U	<260 U	<250 U	340 J	<350 U	1600	330 J
AROCLOR-1260	11096-82-5	NA	NA	NA	<640 U	<420 U	<390 U	<260 U	<260 U	<250 U	<300 UJ	<350 U	<250 U	<250 UJ
AROCLOR-1262	37324-23-5	NA	NA	NA	<640 U	<420 U	<390 U	<260 U	<260 U	<250 U	<300 UJ	<350 U	<250 U	210 J
TOTAL PCBS	TPCB	59.8	59.8	676	ND	ND	ND	ND	ND	ND	630 J	ND	1600	540 J
Organics - SVOCs (ug/kg)														
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	<9400 U	<2200 U	<1600 U	<1600 U
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	<3800 U	<880 U	<620 U	<640 U
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	<3800 U	<880 U	<620 U	<640 U

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Slag Dump and Beach Area						Hubbell Processing Area			
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD97			CHLL-SD98			CHLL-SD99		CHLL-SD103	CHLL-SD104
Field Sample ID					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	CHLL-SD-99-0"-6"	CHLL-SD-99-1'-2.5'	CHLL-SD-103-0-2"	CHLL-SD-104-0-2"
Sample Date					6/2/2015	6/2/2015	6/2/2015	7/8/2015	7/8/2015	7/8/2015	7/9/2015	7/9/2015	8/20/2015	8/20/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	3 - 5 ft	0 - 0.5 ft	1 - 3.25 ft	1 - 3.25 ft	0 - 0.5 ft	1 - 2.5 ft	0 - 0.167 ft	0 - 0.167 ft
Sample Description					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	SAND, Dark brown with purple hue, wet, loose, medium to coarse, angular	SAND, Dark brown with purple hue, wet, loose, medium to coarse, angular to 1 ft; SILT WITH SAND, dark brown to purple-brown, wet, soft, angular to 1.5 ft; SILT WITH CLAY, dark brown to purple brown, wet, soft, black streaking.	Surface Sediment	Surface Sediment
Organics - SVOCs (ug/kg) (continued)														
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	<3800 U	<880 U	<620 U	<640 U
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	<3800 U	<880 U	<620 U	<640 U
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	<7500 U	<1800 U	<1200 U	<1300 U
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	<7500 U	<1800 U	<1200 U	<1300 U
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	<7500 U	<1800 U	<1200 U	<1300 U
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	<7500 U	<1800 U	<1200 U	<1300 U
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	<3800 U	<880 U	<620 U	<640 U
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	<7500 U	<1800 U	<1200 U	<1300 U
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	<3800 U	<880 U	<620 U	<640 U
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	<3800 U	<880 U	<620 U	<640 U
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	<7500 U	<1800 U	<1200 U	<1300 U
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	<3800 U	<880 U	<620 U	<640 U
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	<3800 U	<880 U	<620 U	<640 U
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	<3800 U	<880 U	<620 U	<640 U
Organics - VOCs														
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	ND	ND

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area										Hubbell Slag Dump and Beach Area	
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD110			CHLL-SD111				CHLL-SD112			CHLL-SD113	
Field Sample ID					CHLL-SD 110-0-6"	CHLL-SD 110-1-3'	CHLL-SD 110-3-3.5'	CHLL-SD 111-0-6"	CHLL-SD 111-0-6" FD	CHLL-SD 111-1-3'	CHLL-SD 111-3-3.83	CHLL-SD 112-0-6"	CHLL-SD 112-1-3'	CHLL-SD 112-3-3.92'	CHLL-SD 113-0-10"	CHLL-SD 113-0-10" FD
Sample Date					8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017
Sample Interval (bgs)					0-0.5 ft	1-3 ft	3-3.5 ft	0-0.5 ft	0-0.5 ft	1-3 ft	3-3.83 ft	0-0.5 ft	1-3 ft	3-3.92 ft	0-0.83 ft	0-0.83 ft
Sample Description					SILTY CLAY, blackish brown, soft, loose	SILTY CLAY, reddish-brown, soft, loose	SILTY CLAY, reddish-brown, soft, loose	SILTY CLAY, blackish brown, soft, loose, some coal pieces	Field Duplidate	SILTY CLAY, reddish brown, soft, loose, some coal pieces	SAND, brown - red, medium grained, well sorted, firm	SILTY CLAY, dark brown to red, loose, soft	SILTY CLAY, reddish brown, soft, some wood debris and large gravel	SAND, brown, medium to coarse grain, firm; ORGANIC, black - brown organic material; SAND, brown, medium grained, firm, wet	SAND and GRAVEL, red and black, coarse grains, some fines, angular	Field Duplicate
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--	--	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	--	--
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1242	53469-21-9	NA	NA	NA	<530 U	<390 U	<390 U	<390 U	<360 U	<320 U	<130 U	<360 U	<350 U	<360 U	<120 U	<130 U
AROCLOR-1248	12672-29-6				<530 U	<390 U	<390 U	<390 U	<360 U	<320 U	<130 U	<360 U	<350 U	<360 U	<120 U	<130 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<530 U	<390 U	<390 U	<390 U	<360 U	<320 U	<130 U	<360 U	<350 U	<360 U	<120 U	<130 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<530 U	<390 U	<390 U	<390 U	<360 U	<320 U	<130 U	<360 U	<350 U	<360 U	<120 U	<130 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<530 U	<390 U	<390 U	<390 U	<360 U	<320 U	<130 U	<360 U	<350 U	<360 U	<120 U	<130 U
TOTAL PCBS	TPCB	59.8	59.8	676	<0 U	<0 U	<0 U	<0 U	<0 U	<0 U	<0 U	<0 U	<0 U	<0 U	<0 U	<0 U
Organics - SVOCs (ug/kg)																
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area										Hubbell Slag Dump and Beach Area	
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD110			CHLL-SD111				CHLL-SD112			CHLL-SD113	
Field Sample ID					CHLL-SD 110-0-6"	CHLL-SD 110-1-3'	CHLL-SD 110-3-3.5'	CHLL-SD 111-0-6"	CHLL-SD 111-0-6" FD	CHLL-SD 111-1-3'	CHLL-SD 111-3-3.83	CHLL-SD 112-0-6"	CHLL-SD 112-1-3'	CHLL-SD 112-3-3.92'	CHLL-SD 113-0-10"	CHLL-SD 113-0-10" FD
Sample Date					8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017	8/19/2017
Sample Interval (bgs)					0-0.5 ft	1-3 ft	3-3.5 ft	0-0.5 ft	0-0.5 ft	1-3 ft	3-3.83 ft	0-0.5 ft	1-3 ft	3-3.92 ft	0-0.83 ft	0-0.83 ft
Sample Description					SILTY CLAY, blackish brown, soft, loose	SILTY CLAY, reddish-brown, soft, loose	SILTY CLAY, reddish-brown, soft, loose	SILTY CLAY, blackish brown, soft, loose, some coal pieces	Field Duplidate	SILTY CLAY, reddish brown, soft, loose, some coal pieces	SAND, brown - red, medium grained, well sorted, firm	SILTY CLAY, dark brown to red, loose, soft	SILTY CLAY, reddish brown, soft, some wood debris and large gravel	SAND, brown, medium to coarse grain, firm; ORGANIC, black - brown organic material; SAND, brown, medium grained, firm, wet	SAND and GRAVEL, red and black, coarse grains, some fines, angular	Field Duplicate
Organics - SVOCs (ug/kg) (continued)																
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs																
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Slag Dump and Beach Area	Hubbell Processing Area		Hubbell Slag Dump and Beach Area			Hubbell Processing Area						
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD114	SD-04	SD-05	TL07-05			TL07-06			TL07-07			
Field Sample ID					CHLL-SD 114-0-10"	SD-04	SD-05	TL07-05 0-6	TL07-05 0-6 D	TL07-05 6-22	TL07-06 0-6	TL07-06 6-36	TL07-06 36-72	TL07-07 0-6	TL07-07 6-36	TL07-07 36-72	TL07-07 36-72 D
Sample Date					8/19/2017	10/12/2011	10/12/2011	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007
Sample Interval (bgs)					0-0.83 ft	0 - 3 in	0 - 3 in	0 - 6 in	0 - 6 in	6 - 22 in	0 - 6 in	6 - 36 in	36 - 72 in	0 - 6 in	6 - 36 in	36 - 72 in	36 - 72 in
Sample Description					SAND and GRAVEL, red and black, coarse grains, angular	--	--	--	--	--	--	--	--	--	--	--	Field Duplicate
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	NA	NA	NA	--	13800	9540	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	2.3 J	9.7 J	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	27.3 J-	96.6 J-	19	22	18	32	15	3.1	40	13	2.7	4.0
BARIUM	7440-39-3	NA	NA	NA	--	69.2	114	200	190	340	96	50	87	94	58	71	81
BERYLLIUM	7440-41-7	NA	NA	NA	--	1.6	1.2 J	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	3.2	2.8	1.2	1.1	<0.2 U	2.4	0.25	<0.2 U	1.3	0.23	<0.2 U	<0.2 U
CALCIUM	7440-70-2	NA	NA	NA	--	5820	10900	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	33.8	60.2	220	200	500	98	64	74	96	92	42	51
COBALT	7440-48-4	50	NA	NA	--	14.8 J	11.7 J	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	2340	14800	3800	3300	3400	4000	2700	3000	4300	2900	1900	2700
IRON	7439-89-6	NA	NA	NA	--	45300	33700	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	223	963	190	180	33	160	19	8.7	320	34	7.9	7.8
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	7120	6040	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	233	285	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	0.19 J	0.28 J	0.37	1.2	0.11	0.39	0.46	0.33	0.21	0.43	0.13	0.19
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	42.1	50.5	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	<3.5 U	<3.5 U	0.6	0.42	<0.2 U	<0.2 U	0.2	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
SILVER	7440-22-4	0.5	NA	NA	--	1.7 J	4.2	3.1	3.4	5.6	10	3.9	2.4	6.4	4.3	2.0	3.0
SODIUM	7440-23-5	NA	NA	NA	--	567 J	1420 J	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	52.6	52.8	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	210	2170	340	330	260	430	190	220	670	240	120	160
Inorganics - Cyanide (mg/kg)																	
CYANIDE	57-12-5	0.0001	NA	NA	--	<0.5 UJ	0.57 J	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																	
AROCLOR-1242	53469-21-9	NA	NA	NA	<12000 U	<130 UJ	<110 UJ	<220 U	<240 U	<170 U	<200 U	<190 U	<170 U	<230 U	<200 U	<150 U	<160 U
AROCLOR-1248	12672-29-6				<12000 U	<130 UJ	<110 UJ	<220 U	<240 U	<170 U	<200 U	<190 U	<170 U	<230 U	<200 U	<150 U	<160 U
AROCLOR-1254	11097-69-1	NA	NA	NA	74000	<130 UJ	480 J	230	290	<170 U	130	<190 U	<170 U	320	<200 U	<150 U	<160 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<12000 U	92 J	410 J	<220 U	<240 U	<170 U	<200 U	<190 U	<170 U	<230 U	<200 U	<150 U	<160 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<12000 U	<130 UJ	<110 UJ	<220 U	<240 U	<170 U	<200 U	<190 U	<170 U	<230 U	<200 U	<150 U	<160 U
TOTAL PCBS	TPCB	59.8	59.8	676	74,000	92	890	230	290	ND	130	ND	ND	320	ND	ND	ND
Organics - SVOCs (ug/kg)																	
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	340 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	<170 UJ	700 J	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	3900 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	780 J	<170 UJ	--	--	--	--	--	--	--	--	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Slag Dump and Beach Area	Hubbell Processing Area		Hubbell Slag Dump and Beach Area			Hubbell Processing Area						
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SD114	SD-04	SD-05	TL07-05			TL07-06			TL07-07			
Field Sample ID					CHLL-SD 114-0-10"	SD-04	SD-05	TL07-05 0-6	TL07-05 0-6 D	TL07-05 6-22	TL07-06 0-6	TL07-06 6-36	TL07-06 36-72	TL07-07 0-6	TL07-07 6-36	TL07-07 36-72	TL07-07 36-72 D
Sample Date					8/19/2017	10/12/2011	10/12/2011	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007
Sample Interval (bgs)					0-0.83 ft	0 - 3 in	0 - 3 in	0 - 6 in	0 - 6 in	6 - 22 in	0 - 6 in	6 - 36 in	36 - 72 in	0 - 6 in	6 - 36 in	36 - 72 in	36 - 72 in
Sample Description					SAND and GRAVEL, red and black, coarse grains, angular	--	--	--	--	--	--	--	--	--	--	--	Field Duplicate
Organics - SVOCs (ug/kg) (continued)																	
ACETOPHENONE	98-86-2	NA	NA	NA	--	<170 UJ	300 J	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	3800 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	11000 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	8800 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	9500 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	4300 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	9100 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	660 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	11000 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	1400 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	43000 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	77.4	77.4	536	--	1500 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	4100 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	1400 J	400 J	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	204	204	1,170	--	11000 J	630 J	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	30000 J	<170 UJ	--	--	--	--	--	--	--	--	--	--
Organics - VOCs																	
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area									Hubbell Slag Dump and Beach Area		
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL07-08			TL07-09			TL07-10			TL07-11		
Field Sample ID					TL07-08 0-6	TL07-08 6-36	TL07-08 36-72	TL07-09 0-6	TL07-09 6-36	TL07-09 36-72	TL07-10 0-6	TL07-10 6-36	TL07-10 36-72	TL07-11 0-6	TL07-11 6-36	TL07-11 36-72
Sample Date					8/7/2007	8/7/2007	8/7/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007
Sample Interval (bgs)					0 - 6 in	6 - 36 in	36 - 72 in	0 - 6 in	6 - 36 in	36 - 72 in	0 - 6 in	6 - 36 in	36 - 72 in	0 - 6 in	6 - 36 in	36 - 72 in
Sample Description					--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	47	18	4.0	38	12	3.3	23	7.7	4.9	20	16	3.6
BARIUM	7440-39-3	NA	NA	NA	110	70	86	83	47	85	80	74	140	110	83	180
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	0.93	<0.2 U	<0.2 U	0.52	<0.2 U	<0.2 U	0.66	0.34	0.37	0.34	0.21	<0.2 U
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	97	77	48	79	90	77	85	84	57	180	130	180
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	4800	3500	2600	6300	3800	3400	3400	2600	2100	2800	1800	2400
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	350	55	9.7	160	21	10	100	39	14	85	31	12
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	0.19	0.35	0.2	0.29	0.39	0.31	0.44	0.32	0.28	0.14	0.22	0.3
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	0.46	0.2	<0.2 U	<0.2 U
SILVER	7440-22-4	0.5	NA	NA	5.6	4.2	2.9	6.6	3.2	2.5	4.7	2.7	2.2	2.2	6.1	2.4
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	930	270	150	570	200	210	260	220	180	400	260	180
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1242	53469-21-9	NA	NA	NA	<220 U	<180 U	<150 U	<240 U	<170 U	<170 U	<180 U	<170 U	<240 U	<220 U	<200 U	<170 U
AROCLOR-1248	12672-29-6				<220 U	<180 U	<150 U	<240 U	<170 U	<170 U	<180 U	<170 U	<240 U	<220 U	<200 U	<170 U
AROCLOR-1254	11097-69-1	NA	NA	NA	210	<180 U	<150 U	<240 U	<170 U	<170 U	<180 U	<170 U	<240 U	<220 U	<200 U	<170 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<220 U	<180 U	<150 U	<240 U	<170 U	<170 U	<180 U	<170 U	<240 U	<220 U	<200 U	<170 U
AROCLOR-1262	37324-23-5	NA	NA	NA	110	<180 U	<150 U	<240 U	<170 U	<170 U	<180 U	<170 U	<240 U	<220 U	<200 U	<170 U
TOTAL PCBS	TPCB	59.8	59.8	676	320	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area									Hubbell Slag Dump and Beach Area		
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL07-08			TL07-09			TL07-10			TL07-11		
Field Sample ID					TL07-08 0-6	TL07-08 6-36	TL07-08 36-72	TL07-09 0-6	TL07-09 6-36	TL07-09 36-72	TL07-10 0-6	TL07-10 6-36	TL07-10 36-72	TL07-11 0-6	TL07-11 6-36	TL07-11 36-72
Sample Date					8/7/2007	8/7/2007	8/7/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007
Sample Interval (bgs)					0 - 6 in	6 - 36 in	36 - 72 in	0 - 6 in	6 - 36 in	36 - 72 in	0 - 6 in	6 - 36 in	36 - 72 in	0 - 6 in	6 - 36 in	36 - 72 in
Sample Description					--	--	--	--	--	--	--	--	--	--	--	--
Organics - SVOCs (ug/kg) (continued)																
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs																
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area											Hubbell Slag Dump and Beach Area		
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL07-12			TL07-14			TL07-17					TL07-18	TL07-19	
Field Sample ID					TL07-12 0-6	TL07-12 6-36	TL07-12 36-71	TL07-14 0-6	TL07-14 6-35	TL07-14 35-49	TL07-17 P	TL07-17 0-6	TL07-17 6-36	TL07-17 6-36 D	TL07-17 36-72	TL07-18	TL07-19	TL07-19D
Sample Date					8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007
Sample Interval (bgs)					0 - 6 in	6 - 36 in	36 - 71 in	0 - 6 in	6 - 35 in	35 - 49 in	0 - 2 in	0 - 6 in	6 - 36 in	6 - 36 in	36 - 72 in	0 - 2 in	0 - 2 in	0 - 2 in
Sample Description					--	--	--	--	--	--	--	--	--	Field Duplicate	--	--	--	--
Inorganics - Metals (mg/kg)																		
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	93	11	1.3	12	3.5	2.7	150	37	18	17	3.4	32	38	40
BARIUM	7440-39-3	NA	NA	NA	73	66	26	100	48	38	110	61	53	52	58	82	160	160
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	3.6	<0.2 U	<0.2 U	0.46	<0.2 U	<0.2 U	1.9	0.72	<0.2 U	<0.2 U	<0.2 U	11	1.0	1.0
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	73	59	8.3	25	21	19	64	73	69	66	48	77	61	60
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	7600	4200	90	3800	8000	9800	4400	3200	3100	3200	3000	2500	2200	2400
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	280	24	2.2	47	9.9	7.1	430	170	21	19	6.8	520	180	190
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	0.19	0.29	<0.05 U	<0.05 U	<0.05 U	<0.05 U	0.57	0.17	0.38	0.4	0.23	0.23	0.39	0.45
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	<0.2 U	<0.2 U	<0.2 U	0.45	<0.2 U	<0.2 U	0.78	0.2	<0.2 U	<0.2 U	<0.2 U	<0.2 U	0.82	0.89
SILVER	7440-22-4	0.5	NA	NA	6.3	3.4	0.17	2.0	7.3	7.9	6.8	4.3	4.7	4.9	1.9	2.5	3.9	4.0
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	860	220	17	140	100	97	340	460	230	210	170	430	270	290
Inorganics - Cyanide (mg/kg)																		
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																		
AROCLOR-1242	53469-21-9	NA	NA	NA	<240 U	<170 U	<130 U	<220 U	<130 U	<140 U	<450 U	<250 U	<190 U	<190 U	<170 U	<290 U	<520 U	<500 U
AROCLOR-1248	12672-29-6				<240 U	<170 U	<130 U	<220 U	<130 U	<140 U	<450 U	<250 U	<190 U	<190 U	<170 U	<290 U	<520 U	<500 U
AROCLOR-1254	11097-69-1	NA	NA	NA	510	<170 U	<130 U	<220 U	<130 U	<140 U	1100	160	<190 U	<190 U	<170 U	<290 U	<520 U	<500 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<240 U	<170 U	<130 U	<220 U	<130 U	<140 U	500	<250 U	<190 U	<190 U	<170 U	<290 U	<520 U	<500 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<240 U	<170 U	<130 U	<220 U	<130 U	<140 U	500	<250 U	<190 U	<190 U	<170 U	<290 U	<520 U	<500 U
TOTAL PCBS	TPCB	59.8	59.8	676	510	ND	ND	ND	ND	ND	1100	160	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																		
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area											Hubbell Slag Dump and Beach Area		
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL07-12			TL07-14			TL07-17					TL07-18	TL07-19	
Field Sample ID					TL07-12 0-6	TL07-12 6-36	TL07-12 36-71	TL07-14 0-6	TL07-14 6-35	TL07-14 35-49	TL07-17 P	TL07-17 0-6	TL07-17 6-36	TL07-17 6-36 D	TL07-17 36-72	TL07-18	TL07-19	TL07-19D
Sample Date					8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/8/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007
Sample Interval (bgs)					0 - 6 in	6 - 36 in	36 - 71 in	0 - 6 in	6 - 35 in	35 - 49 in	0 - 2 in	0 - 6 in	6 - 36 in	6 - 36 in	36 - 72 in	0 - 2 in	0 - 2 in	0 - 2 in
Sample Description					--	--	--	--	--	--	--	--	--	Field Duplicate	--	--	--	--
Organics - SVOCs (ug/kg) (continued)																		
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs																		
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Slag Dump and Beach Area	Hubbell Processing Area												
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL07-20	TL07-21	TL07-22	TL07-23		TL07-24	TL07-25	TL07-26	TL07-27	TL07-34	TL07-35		TL07-36
Field Sample ID					TL07-20	TL07-21	TL07-22	TL07-23	TL07-23 D	TL07-24	TL07-25	TL07-26	TL07-27	TL07-34	TL07-35	TL07-35D	TL07-36
Sample Date					8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007
Sample Interval (bgs)					0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in
Sample Description					--	--	--	--	Field Duplicate	--	--	--	--	--	--	Field Duplicate	--
Inorganics - Metals (mg/kg)																	
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	39	59	310	70	79	47	42	40	30	13	14	16	19
BARIUM	7440-39-3	NA	NA	NA	170	150	210	160	160	140	220	170	95	78	100	110	130
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	1.1	1.8	1.8	1.1	1.4	1.3	1.0	1.2	0.77	0.25	0.39	0.39	0.47
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	110	89	57	52	53	56	45	46	41	17	23	25	27
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	2300	3200	2500	3800	3900	2200	1800	1700	1600	1200	1200	1300	2200
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	160	250	550	240	260	180	120	120	120	38	47	50	71
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	0.5	0.48	0.6	0.54	0.6	0.48	0.55	0.49	0.39	0.11	0.2	0.22	0.31
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	0.81	0.76	0.93	0.89	0.89	0.96	0.98	0.85	0.94	0.23	0.43	0.4	0.35
SILVER	7440-22-4	0.5	NA	NA	4.7	5.1	6.4	5.2	5.5	5.0	4.3	4.5	3.2	1.2	1.7	1.7	2.4
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	260	270	270	210	240	240	200	200	150	68	96	100	120
Inorganics - Cyanide (mg/kg)																	
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																	
AROCLOR-1242	53469-21-9	NA	NA	NA	<510 U	<530 U	<680 U	<720 U	<660 U	<650 U	<760 U	<690 U	<760 U	<210 U	<340 U	<360 U	<400 U
AROCLOR-1248	12672-29-6				<510 U	<530 U	<680 U	<720 U	<660 U	<650 U	<760 U	<690 U	<760 U	<210 U	<340 U	<360 U	<400 U
AROCLOR-1254	11097-69-1	NA	NA	NA	<510 U	340	450	620	730	<650 U	<760 U	<690 U	<760 U	<210 U	<340 U	<360 U	<400 U
AROCLOR-1260	11096-82-5	NA	NA	NA	<510 U	<530 U	<680 U	<720 U	<660 U	<650 U	<760 U	<690 U	<760 U	<210 U	<340 U	<360 U	<400 U
AROCLOR-1262	37324-23-5	NA	NA	NA	<510 U	<530 U	<680 U	<720 U	<660 U	<650 U	<760 U	<690 U	<760 U	<210 U	<340 U	<360 U	<400 U
TOTAL PCBS	TPCB	59.8	59.8	676	ND	340	450	620	730	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																	
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Slag Dump and Beach Area	Hubbell Processing Area											
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL07-20	TL07-21	TL07-22	TL07-23		TL07-24	TL07-25	TL07-26	TL07-27	TL07-34	TL07-35		TL07-36
Field Sample ID					TL07-20	TL07-21	TL07-22	TL07-23	TL07-23 D	TL07-24	TL07-25	TL07-26	TL07-27	TL07-34	TL07-35	TL07-35D	TL07-36
Sample Date					8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007	8/9/2007
Sample Interval (bgs)					0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in	0 - 2 in
Sample Description					--	--	--	--	Field Duplicate	--	--	--	--	--	--	Field Duplicate	--
Organics - SVOCs (ug/kg) (continued)																	
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs																	
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area					Hubbell Slag Dump and Beach Area	Hubbell Processing Area							
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL08-029	TL08-037	TL08-052	TL08-053	TL08-056	TL08-073	TL08-074	TL08-075	TL08-076	TL08-077	TL08-078	TL08-08	TL08-108	TL08-137
Field Sample ID					TL08-029	TL08-037	TL08-052	TL08-053	TL08-056	TL08-073	TL08-074	TL08-075	TL08-076	TL08-077	TL08-078	TL08-08	TL08-108	TL08-137
Sample Date					8/26/2008	8/27/2008	8/27/2008	8/26/2008	8/26/2008	8/28/2008	8/28/2008	8/28/2008	8/28/2008	8/28/2008	8/28/2008	8/26/2008	8/26/2008	8/27/2008
Sample Interval (bgs)					0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft
Sample Description					--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)																		
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	0.174	0.18	1.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MOLYBDENUM	7439-98-7	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																		
CYANIDE	57-12-5	0.0001	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																		
AROCLOR-1242	53469-21-9	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
AROCLOR-1248	12672-29-6				--	--	--	--	--	--	--	--	--	--	--	--	--	--
AROCLOR-1254	11097-69-1	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
AROCLOR-1260	11096-82-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
AROCLOR-1262	37324-23-5	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL PCBS	TPCB	59.8	59.8	676	<140 UJ	<44 U	<110 UJ	<26 U	<58 U	ND	<150 UJ	90 J	26 J	<130 UJ	<89 UJ	<140 UJ	<120 UJ	<39 U
Organics - SVOCs (ug/kg)																		
1,1'-BIPHENYL	92-52-4	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	20.2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	6.71	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5.87	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area					Hubbell Slag Dump and Beach Area	Hubbell Processing Area							
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL08-029	TL08-037	TL08-052	TL08-053	TL08-056	TL08-073	TL08-074	TL08-075	TL08-076	TL08-077	TL08-078	TL08-08	TL08-108	TL08-137
Field Sample ID					TL08-029	TL08-037	TL08-052	TL08-053	TL08-056	TL08-073	TL08-074	TL08-075	TL08-076	TL08-077	TL08-078	TL08-08	TL08-108	TL08-137
Sample Date					8/26/2008	8/27/2008	8/27/2008	8/26/2008	8/26/2008	8/28/2008	8/28/2008	8/28/2008	8/28/2008	8/28/2008	8/28/2008	8/26/2008	8/26/2008	8/27/2008
Sample Interval (bgs)					0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft
Sample Description					--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - SVOCs (ug/kg) (continued)																		
ACETOPHENONE	98-86-2	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	57.2	57.2	845	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	150	150	1,450	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	10,400	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	170	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	240	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	166	166	1,290	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	33	33.0	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	423	423	2,230	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	77.4	77.4	536	--	--	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	200	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	176	176	561	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	204	204	1,170	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	195	195	1,520	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs																		
all VOCs		NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-10
Sample Analytical Summary - Sediment
Hubbell Processing Area 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 exceeded applicable criteria. Color presented is the criteria with the highest value that was exceeded:

EPA Region 5 RCRA ESLs dated August 22, 2003
TECs from MacDonald *et al.* 2000
PECs from MacDonald *et al.* 2000

Evaluation based on MDEQ Criteria at time of Project completion.

Samples described in this evaluation may actually refer to stamp sands or to other mining waste from historic mining and reclamation processes conducted in the area.

-- = Not analyzed/Not Reported

bgs = Below ground surface

ft = Feet

in = Inches

mg/kg = Milligrams per kilogram.

ug/kg = Micrograms per kilogram

RCRA = Resource Conservation and Recovery Act

ESL = Ecological Screening Level

TEC = Threshold Effect Concentration

PEC = Probable Effect Concentration

PCBs = Polychlorindated biphenyls

SVOC = Semi-volatile organic compound

VOC = Volatile organic compound

Criteria Footnotes:

NA = A criterion or value is not available

Laboratory Footnotes:

J = Estimated result

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

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

TABLE 9-11
Sample Analytical Summary - Submerged Drum Contents
Hubbell Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area					Hubbell Processing Area												
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHLL-SDM01	CHLL-SDM02			CHLL-SDM03	CHLL-SDM04	CHLL-SDM05	CHLL-SDM06	CHLL-SDM07	CHLL-SDM08	CHLL-SDM09	CHLL-SDM10	CHLL-SDM11	CHLL-SDM12
Field Sample ID					CHLL-SDM01	CHLL-SDM02	CHLL-SDM02 Cloth	CHLL-SDM02-Cloth/Drum Content Mixture	CHLL-SDM03	CHLL-SDM04	CHLL-SDM05	CHLL-SDM06	CHLL-SDM07	CHLL-SDM08	CHLL-SDM09	CHLL-SDM10	CHLL-SDM11	CHLL-SDM12
Sample Date					6/7/2017	6/7/2017	6/7/2017	6/7/2017	8/15/2017	8/15/2017	8/15/2017	8/15/2017	8/15/2017	8/15/2017	8/16/2017	8/16/2017	8/16/2017	8/16/2017
Sample Description					Dark brown sediment with yellow material	Brown sediment with green, orange, white material	Dark brown, burlap-like fabric material	Brown sediment with burlap-like fabric	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics - Metals (mg/kg)																		
ARSENIC	7440-38-2	9.79	9.79	33.0	110	140	--	560	490	540	230	560	260	750	78	170	160	290
CADMIUM	7440-43-9	0.99	0.99	4.98	14	8.4	--	7.4	5.9	41	3.9	5.1	7.6	13	8.7	14	5.3	45
CHROMIUM	7440-47-3	43.4	43.4	111	430	760	--	110	180	120	<200 U	62	100	140	160	320	280	230
COPPER	7440-50-8	31.6	31.6	149	20,000	6,600	--	21,000	11,000	19,000	4,500	4,500	8,100	14,000	17,000	13,000	16,000	27,000
LEAD	7439-92-1	35.8	35.8	128	1,000	400	--	2,400	2,300	1,900	2,900	3,300	7,100	6,000	920	910	870	4,800
MERCURY	7439-97-6	0.174	0.18	1.06	0.4	<0.08 U	--	1.1	0.3	12	0.4	0.7	0.7	1.2	0.7	0.5	0.3	0.6
NICKEL	7440-02-0	22.7	22.7	48.6	62	170	--	82	280	120	180	55	130	120	110	92	73	120
SILVER	7440-22-4	0.5	NA	NA	12	3.2	--	14	13	20	12	7.1	18	24	23	12	15	43
ZINC	7440-66-6	121	121	459	1,400	670	--	760	910	1,700	430	350	1,100	1,700	1,300	1,100	1,300	2,200
Organics - PCBs (ug/kg)																		
AROCLOR-1242	53469-21-9	NA	NA	NA	<550 U	<160 U	<1500 U	<1300 U	<470 U	<3800 U	430 J	500 J	<1600 U	<1300 U	8,000 J	730 J	630 J	1,000 J
AROCLOR-1248	12672-29-6	NA	NA	NA	540 J	<160 U	1,500 J	<1300 U	<470 U	3,600 J	<430 U	<530 U	1,500 J	1,300 J	<8200 U	<730 U	<660 U	<1000 U
AROCLOR-1254	11097-69-1	NA	NA	NA	580 J	150 J	940 J	3,100 J	1,100 J	5,600 J	970 J	1,000 J	2,000 J	2,100 J	9,400 J	890 J	500 J	1,200 J
AROCLOR-1260	11096-82-5	NA	NA	NA	<240 U	<160 U	<1100 U	<4000 U	510 J	<4200 U	430 J	660 J	<790 U	<500 U	<2700 U	<250 U	<310 U	260 J
AROCLOR-1262	37324-23-5	NA	NA	NA	<240 U	<160 U	<1100 U	3,900 J	<520 U	4,100 J	<430 U	<670 U	790 J	490 J	<2700 U	<250 U	<310 U	<270 U
TOTAL PCBS	TPCB	59.8	59.8	676	1,120 J	150 J	2,440 J	7,000 J	1,610 J	13,300 J	1,830 J	2,160 J	4,290 J	3,890 J	17,400 J	1,620 J	1,130 J	2,460 J
Organics - SVOCs (ug/kg)																		
BENZO(A)ANTHRACENE	56-55-3	108	108	1,050	<480 U	<320 U	<5400 U	<3700 U	<1200 UJ	1,200	<1100 U	<1800 U	<1600 U	<2300 U	<1300 U	<960 U	<1600 U	<1000 U
CHRYSENE	218-01-9	166	166	1,290	<480 U	<320 U	6,700	<3700 U	<1200 UJ	1,300	<1100 U	<1800 U	<1600 U	<2300 U	<1300 U	<960 U	<1600 U	<1000 U
FLUORANTHENE	206-44-0	423	423	2,230	<480 U	<320 U	7,600	<3700 U	<1200 UJ	3,800	<1100 U	<1800 U	<1600 U	<2300 U	<1300 U	<960 U	<1600 U	<1000 U
PHENANTHRENE	85-01-8	204	204	1,170	<480 U	<320 U	6,900	<3700 U	<1200 UJ	2,700	<1100 U	<1800 U	<1600 U	<2300 U	<1300 U	<960 U	<1600 U	<1000 U
PYRENE	129-00-0	195	195	1,520	<480 UJ	<320 UJ	<5400 UJ	<3700 UJ	<1200 UJ	2,800	<1100 U	<1800 U	<1600 U	<2300 U	<1300 U	<960 U	<1600 U	<1000 U
Tentatively Identified Compounds																		
BENZOIC ACID	NA	NA	NA	NA	--	--	14,000 J	10,000 J	--	--	--	--	--	--	--	--	--	--
CYCLOOCTACOSANE	NA	NA	NA	NA	2,600 J	--	--	--	--	--	--	--	--	--	--	--	--	--
DOCOSANE	NA	NA	NA	NA	--	--	28,000 J	--	--	--	--	--	--	--	--	--	--	--
EICOSANE	NA	NA	NA	NA	--	--	47,000 J	--	--	--	--	--	--	--	--	--	--	--
HENEICOSANE	NA	NA	NA	NA	--	--	76,000 J	--	--	--	--	--	--	--	--	--	--	--
HEPTACOSANE	NA	NA	NA	NA	--	--	17,000 J	--	--	--	--	--	--	--	--	--	--	--
HEPTACOSANOL	NA	NA	NA	NA	5,200 J	--	--	--	--	--	--	--	--	--	--	--	--	--
IODO-DOCOSANE	NA	NA	NA	NA	--	--	54,000 J	--	--	--	--	--	--	--	--	--	--	--
IODO-DOTRIACONTANE ISOMER	NA	NA	NA	NA	--	--	17,000 J	--	--	--	--	--	--	--	--	--	--	--
METHYLHEXACOSANE ISOMER	NA	NA	NA	NA	--	--	17,000 J	--	--	--	--	--	--	--	--	--	--	--
METHYL-OCTADECANE ISOMER	NA	NA	NA	NA	--	--	15,000 J	--	--	--	--	--	--	--	--	--	--	--
NONADECANE	NA	NA	NA	NA	--	--	28,000 J	--	--	--	--	--	--	--	--	--	--	--
TETRACOSANE	NA	NA	NA	NA	--	--	43,000 J	--	--	--	--	--	--	--	--	--	--	--
TETRAMETHYL-HEXADECANE ISOMER	NA	NA	NA	NA	--	--	23,000 J	--	--	--	--	--	--	--	--	--	--	--
TETRAMETHYL-PENTADECANE	NA	NA	NA	NA	--	--	23,000 J	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 9-11
Sample Analytical Summary - Submerged Drum Contents
Hubbell Processing 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 exceeded applicable criteria. Color presented is the criteria with the highest value that was exceeded:

EPA Region 5 RCRA ESLs dated August 22, 2003

TECs from MacDonald *et al.* 2000

PECs from MacDonald *et al.* 2000

Evaluation based on MDEQ Criteria at time of Project completion.

Samples described in this evaluation may actually refer to stamp sands or to other mining waste from historic mining and reclamation processes conducted in the area.

-- = Not analyzed/Not Reported

mg/kg = Milligrams per kilogram.

ug/kg = Micrograms per kilogram

RCRA = Resource Conservation and Recovery Act

ESL = Ecological Screening Level

TEC = Threshold Effect Concentration

PEC = Probable Effect Concentration

PCBs = Polychlorindated biphenyls

SVOC = Semi-volatile organic compound

Criteria Footnotes:

NA = A criterion or value is not available

Laboratory Footnotes:

J = Estimated result

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

TABLE 9-12
Sample Analytical Summary - Surface Water
Hubbell Processing Area & Hubbell Slag Dump and Beach Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Geographic Area						Hubbell Processing Area				Hubbell Slag Dump and Beach Area		Hubbell Processing Area					Hubbell Slag Dump and Beach Area
Station Name	CAS Number	EPA Region 5 Ecological Screening Level (ESL)	Rule 57 HCV Drink	Rule 57 HNV Drink	Rule 57 WV	CHLL-SW05	CHLL-SW06		CHLL-SW07	CHLL-SW08	CHLL-SW09	CHLL-SW10	CHLL-SW11	CHLL-SW12	SW-04	SW-05	SPMD Site #4
Field Sample ID						CHLL-SW05-41.8-42.8'	CHLL-SW06-75.6-76.6'	CHLL-SW06-75.6-76.6'- DUP	CHLL-SW07-70.2-71.2'	CHLL-SW08-6.5-7.5'	CHLL-SW-09-4.25-5.25'	CHLL-SW-10-4.08-5.08'	CHLL-SW-11-44.5-45.5'	CHLL-SW12	SW-04	SW-05	SPMD Site #4
Sample Date						6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/2/2015	7/8/2015	7/8/2015	7/9/2015	8/20/2015	10/12/2011	10/12/2011	11/18/2005
Sample Interval (bgs)						41.8 - 42.8 ft	75.6 - 76.6 ft	75.6 - 76.6 ft	70.2 - 71.2 ft	6.5 - 7.5 ft	4.25 - 5.25 ft	4.08 - 5.08 ft	44.5-45.5 ft	--	0 - 6 in	0 - 6 in	3 - 3 ft
Inorganics - Metals (ug/l)																	
ALUMINUM	7429-90-5	NA	NA	NA	NA	--	--	--	--	--	--	--	--	9600	8.5 J	--	--
ANTIMONY	7440-36-0	80	NA	1.7	NA	--	--	--	--	--	--	--	--	49	<60 U	--	--
ARSENIC	7440-38-2	148	10	10	NA	--	--	--	--	--	--	--	--	300	<10 U	--	--
BARIUM	7440-39-3	220	NA	1,900	NA	--	--	--	--	--	--	--	--	1900	27.3 J	--	--
BORON	7440-42-8	NA	NA	NA	NA	--	--	--	--	--	--	--	--	190	--	--	--
CADMIUM	7440-43-9	0.15	NA	2.5	NA	--	--	--	--	--	--	--	--	18	--	--	--
CHROMIUM	7440-47-3	42	NA	120	NA	--	--	--	--	--	--	--	--	97	--	--	--
COBALT	7440-48-4	24	NA	ID	NA	--	--	--	--	--	--	--	--	8.6	--	--	--
COPPER	7440-50-8	1.58	NA	470	NA	--	--	--	--	--	--	--	--	130000	--	--	--
IRON	7439-89-6	NA	NA	NA	NA	--	--	--	--	--	--	--	--	22000	--	--	--
LEAD	7439-92-1	1.17	NA	14	NA	--	--	--	--	--	--	--	--	5700	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	NA	--	--	--	--	--	--	--	--	8400	--	--	--
MANGANESE	7439-96-5	NA	NA	1,300	NA	--	--	--	--	--	--	--	--	400	--	--	--
MERCURY	7439-97-6	0.0013	NA	0.0018	0.0013	--	--	--	--	--	--	--	--	2.0	--	--	--
NICKEL	7440-02-0	28.9	NA	2,600	NA	--	--	--	--	--	--	--	--	80	--	--	--
SILVER	7440-22-4	0.12	NA	130	NA	--	--	--	--	--	--	--	--	32	--	--	--
ZINC	7440-66-6	65.7	NA	3,300	NA	--	--	--	--	--	--	--	--	6400	--	--	--
Organics - PCBs (ug/l)																	
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.11 U	<0.10 U	<0.10 U	1.0 J	<1 U	<1 U	--
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.11 U	<0.10 U	<0.10 U	1.3 J	<1 U	<1 U	--
TOTAL PCBS (Aroclors)	TPCB	0.00012	0.000026	NLS	0.00012	ND	ND	ND	ND	ND	ND	ND	ND	2.3 J	ND	ND	--
TOTAL PCBS (Congeners)	--	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	150
Organics - SVOCs (ug/l)																	
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	0.3	25	120	NA	--	--	--	--	--	--	--	--	--	3.5 J	<5 UJ	--
Other SVOCs						--	--	--	--	--	--	--	ND	ND	ND	ND	--
Organics - VOCs (ug/l)																	
TOLUENE	108-88-3	253	NA	5600	NA	--	--	--	--	--	--	--	--	<1.0 U	<5 U	0.12 J	--
Field Parameters																	
Conductivity (mS/cm)		NA	NA	NA	NA	--	--	--	--	--	0.3	146.7	122.8	--	--	--	--
DO (%)		NA	NA	NA	NA	--	--	--	--	--	7.19	6.71	9.03	--	--	--	--
pH		NA	NA	NA	NA	--	--	--	--	--	8.41	8.28	7.82	--	--	--	--
Temperature (°C)		NA	NA	NA	NA	--	--	--	--	--	21.8	21.9	14.5	--	--	--	--
Turbidity (NTU)		NA	NA	NA	NA	--	--	--	--	--	4.3	3.9	10.3	--	--	--	--

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 exceeded 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

Evaluation based on MDEQ Criteria at time of Project completion.

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

Laboratory Footnotes:

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

Criteria Footnotes:

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

APPENDIX A

DEQ-GSU SURVEY LINES AND BATHYMETRY MAPS

LEGEND

Minor Contour Interval = 1ft

Major Contour Interval = 5ft

N
W E
S

DATUM - NAD83
PROJECTION: MICHIGAN GEOREF
NORTHING AND EASTING COORDINATES (IN METERS) ARE IN CORNERS OF MAP

AERIAL PHOTO SOURCE: MIS PUBLIC IMAGERY BEST AVAILABLE MOSAIC

0 0.02 0.04 Miles

1 in = 0.017 miles

0 50 100 150 200 Feet

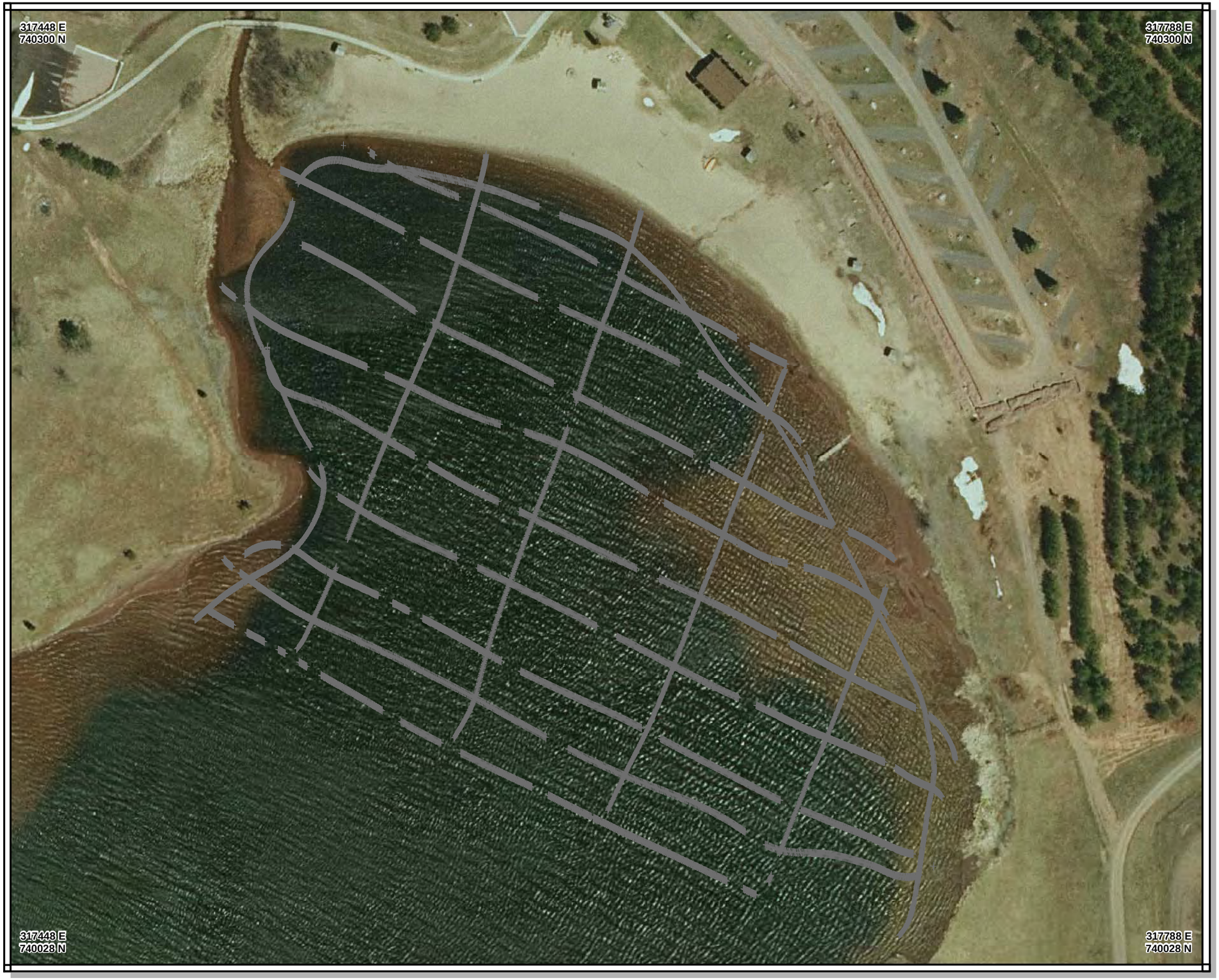
1 inch = 90 feet

Abandoned Mining Wastes Torch Lake

ERNIE ID 39000098
TORCH LAKE TOWNSHIP, HOUGHTON COUNTY
T55N R32W SECTION 6

LAKE LINDEN BATHYMETRY MAP

GEOLOGIST **Brian Eustice** Geological Services Unit		**CREATION DATE** **July 2017**
Remediation and Redevelopment Division	DEQ	**FIGURE 1**



LEGEND

Bathymetry Survey Lines

N
W E
S

DATUM - NAD83
PROJECTION: MICHIGAN GEOREF
NORTHING AND EASTING COORDINATES (IN METERS) ARE IN CORNERS OF MAP

AERIAL PHOTO SOURCE: MIS PUBLIC IMAGERY BEST AVAILABLE MOSAIC

0 0.02 0.04 Miles

1 in = 0.017 miles

0 50 100 150 200 Feet

1 inch = 90 feet

Abandoned Mining Wastes Torch Lake

ERNIE ID 39000098
TORCH LAKE TOWNSHIP, HOUGHTON COUNTY
T55N R32W SECTION 6

LAKE LINDEN BATHYMETRY SURVEY LINES

GEOLOGIST **Brian Eustice** Geological Services Unit		**CREATION DATE** **July 2017**
Remediation and Redevelopment Division	DEQ	**FIGURE 2**

APPENDIX B

LAKE LINDEN RECREATION AREA 2017 PHOTOGRAPHIC LOG

Photo 1: View looking southwest at Lake Linden Recreation Area (LLRA). Photo taken on 6/6/2017

Photo 2: GSU conducting bathymetry survey at LLRA. Photo taken on 6/6/2017.

Photo 3: Sampling setup at CHLL-SD106. Photo taken on 6/6/2017.

Photo 4: Arrow identifying marker for CHLL-SD105, view looking southwest. Photo taken on 6/6/2017

APPENDIX C

SEDIMENT CORE LOGS – LAKE LINDEN RECREATION AREA

Remediation and Redevelopment Division

BOREHOLE LOG

BORING/WELL: CHLL-SD105

SITE: Abandon Mining Wastes Torch Lake

COUNTY: Houghton
TOWNSHIP: Torch Lake
TOWN: 55N
RANGE: 32W
SECTION: 6
LOCATION DESCRIPTION: Lake Linden Recreation Area

DATE: June 6, 2017
DRILLER: B. Lower
GEOLOGIST: B. Eustice
DRILL METHOD: Post Ponder/Direct Push
TOTAL DEPTH: 6' in 3.2' of water
ERNIE ID# 31000098

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE TYPE	SAMPLE ID	NOTES	Water Quality Meter
		Lake Bottom	0				
		SAND coarse grain, trace fines and gravel, reddish brown, frim, wet.			CHLL-SD105 0-1'		
					CHLL-SD105 1-3' and FD		
					CHLL-SD105 3-6'		
			5				

VERTICAL DATUM:
GRD. ELEVATION:
T.O.C.:
S.W.L.:
CASING:
SCREEN:
WELL DEPTH:
COMPLETION NOTES:

LATITUDE: 47.189118545
LONGITUDE: -88.406282602
PROJECTION: MiGeoRef
NORTHING: 740259.756
EASTING: 317557.033

Remediation and Redevelopment Division

BOREHOLE LOG

BORING/WELL: CHLL-SD106

SITE: Abandon Mining Wastes Torch Lake

COUNTY: Houghton
TOWNSHIP: Torch Lake
TOWN: 55N
RANGE: 32W
SECTION: 6
LOCATION DESCRIPTION: Lake Linden Recreation Area

DATE: June 6, 2017
DRILLER: B. Lower
GEOLOGIST: B. Eustice
DRILL METHOD: Vibracore
TOTAL DEPTH: 5' in 13.2' of water
ERNIE ID# 31000098

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE TYPE	SAMPLE ID	NOTES	Water Quality Meter
		Lake Bottom	0				
		SILT dark brown, trace organics, cohesive, non-plastic			CHLL-SD106 0-1'		
		SILT reddish brown, trace gravel and organics, soft, cohesive, non-plastic			CHLL-SD106 1-3'		
		CLAY red-brown mottled, firm, cohesive, slightly plastic			CHLL-SD106 3-5'		
		SAND coarse grain	5				
		E.O.B.					

VERTICAL DATUM:
GRD. ELEVATION:
T.O.C.:
S.W.L.:
CASING:
SCREEN:
WELL DEPTH:
COMPLETION NOTES:

LATITUDE: 47.189026379
LONGITUDE: -88.406419064
PROJECTION: MiGeoRef
NORTHING: 740249.834
EASTING: 317546.385

DEQ Remediation and Redevelopment Division

BOREHOLE LOG

BORING/WELL: CHLL-SD107

SITE: Abandon Mining Wastes Torch Lake

COUNTY: Houghton
TOWNSHIP: Torch Lake
TOWN: 55N
RANGE: 32W
SECTION: 6
LOCATION DESCRIPTION: Lake Linden Recreation Area

DATE: June 6, 2017
DRILLER: B. Lower
GEOLOGIST: B. Eustice
DRILL METHOD: Post Pounder/Direct Push
TOTAL DEPTH: 6' in 1.9' of water
ERNIE ID# 31000098

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE TYPE	SAMPLE ID	NOTES	Water Quality Meter
		Lake Bottom	0				
		SAND reddish brown, organics (wood debris), dark brown streaks			CHLL-SD107 0-1'		
					CHLL-SD107 1-3'		
		SAND reddish brown, trace to few organics			CHLL-SD107 3-6'		
			5				
		E.O.B.					

VERTICAL DATUM:
GRD. ELEVATION:
T.O.C.:
S.W.L.:
CASING:
SCREEN:
WELL DEPTH:
COMPLETION NOTES:

LATITUDE: 47.188951010
LONGITUDE: -88.406709060
PROJECTION: MiGeoRef
NORTHING: 740242.145
EASTING: 317524.160

Remediation and Redevelopment Division

BOREHOLE LOG

BORING/WELL: CHLL-SD108

SITE: Abandon Mining Wastes Torch Lake

COUNTY: Houghton
TOWNSHIP: Torch Lake
TOWN: 55N
RANGE: 32W
SECTION: 6
LOCATION DESCRIPTION: Lake Linden Recreation Area

DATE: June 6, 2017
DRILLER: B. Lower
GEOLOGIST: B. Eustice
DRILL METHOD: Vibracore
TOTAL DEPTH: 4.5' in 13.2' of water
ERNIE ID# 31000098

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE TYPE	SAMPLE ID	NOTES	Water Quality Meter
		Lake Bottom	0				
		SILTY CLAY dark brown,orange streaking, organics, soft, wet			CHLL-SD108 0-1' and FD		
		SILTY CLAY reddish brown, organics, soft, noncohesive, non-plastic					
		SILTY CLAY reddish brown, stiff, plastic, cohesive			CHLL-SD108 1-3'		
		SILTY CLAY reddish brown,soft, plastic, cohesive			CHLL-SD108 3-4'		
		No recovery					
		E.O.B.	5				

VERTICAL DATUM:
GRD. ELEVATION:
T.O.C.:
S.W.L.:
CASING:
SCREEN:
WELL DEPTH:
COMPLETION NOTES:

LATITUDE: 47.188796330
LONGITUDE: -88.406548338
PROJECTION: MiGeoRef
NORTHING: 740224.578
EASTING: 317535.812

Remediation and Redevelopment Division

BOREHOLE LOG

BORING/WELL: CHLL-SD109

SITE: Abandon Mining Wastes Torch Lake

COUNTY: Houghton
TOWNSHIP: Torch Lake
TOWN: 55N
RANGE: 32W
SECTION: 6
LOCATION DESCRIPTION: Lake Linden Recreation Area

DATE: June 6, 2017
DRILLER: B. Lower
GEOLOGIST: B. Eustice
DRILL METHOD: Post Pounder/Direct Push
TOTAL DEPTH: 6.3' in 8' of water
ERNIE ID# 31000098

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE TYPE	SAMPLE ID	NOTES	Water Quality Meter
		Lake Bottom	0				
		SAND medium to coarse grain, reddish brown, firm			CHLL-SD109 0-1'		
		SAND coarse grain, brown, some small gravel, firm			CHLL-SD109 1-3'		
		SAND coarse grain, reddish brown, some small to large gravel	5		CHLL-SD109 3-6'		
		SAND coarse grain, reddish brown, some gravel, organics and waste debris (plastics)					
		E.O.B.					

VERTICAL DATUM:
GRD. ELEVATION:
T.O.C.:
S.W.L.:
CASING:
SCREEN:
WELL DEPTH:
COMPLETION NOTES:

LATITUDE: 47.188905275
LONGITUDE: -88.406789640
PROJECTION: MiGeoRef
NORTHING: 740237.240
EASTING: 317517.910

APPENDIX D

WASTE AND DEBRIS PILE SUMMARY

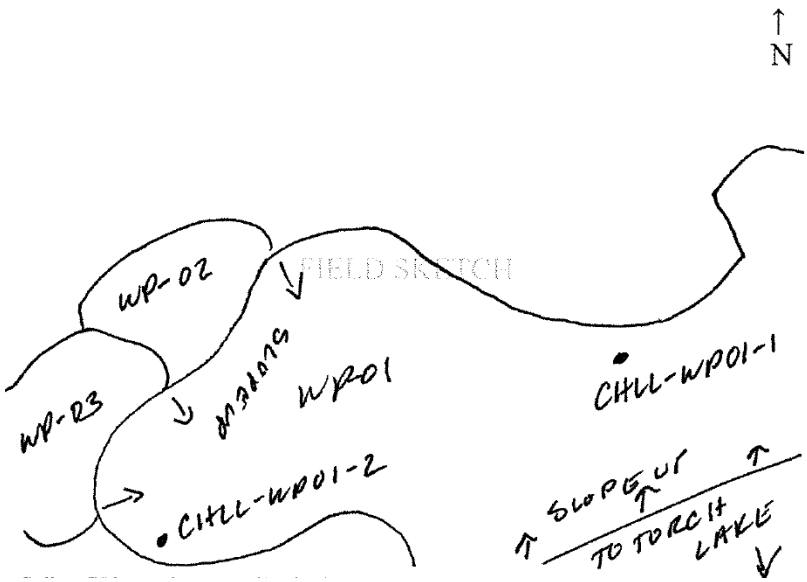
TABLE 2
WASTE AND DEBRIS PILE DEPOSITIONAL HISTORY
Mineral Building Property
Hubbell, Houghton County, Michigan

Waste Pile Identification	Pile Description	General Category				Aerial Photograph Year (X = Waste/Debris Pile Clearly Present)														Notes
						C&H Ownership		UOP and Subsequent Owners				Silver Shores Enterprises Ownership (Purchases in 1997 & 2000)								
		Mining Era Waste and Debris	Construction and Demolition	Road Work	Woody	1955 (PMA)	1964 (USFS)	1975 (USGS)	1983 (NHAP)	1986 (USDA)	1992 (NAPP)	1998 (USGS/DOQQ) (Google™ earth)	2005 (USDA/NAIP)	2006 (USDA/NAIP) (Google™ earth)	2009 (USDA/NAIP)	2010 (USDA/NAIP)	2012 (USDA/NAIP)	2013 (Google™ earth)	2014 (Google™ earth)	
Mineral Building Property																				
WP-01	Soil, slag, concrete, wastes, and building materials. Appears "industrial".	X	X									X	X	X	X	X	X	X	X	EPA installed cap along shoreline in 2000.
WP-02	Fire brick, metal, wood, concrete, and older appearing debris mixed with soil	X	X										X	X	X	X	X	X	X	
WP-03	Concrete slabs		X									X	X	X	X	X	X	X	X	
WP-04	Refractory	X											X	X	X	X	X	X	X	
WP-05	Soil, rusted metal, wood, and corrugated paper	X	X										X	X	X	X	X	X	X	
WP-06	Soil and clay pipe pieces		X											X	X	X	X	X	X	
WP-07	Large concrete pieces (footers and base supports)		X							X	X	X	X	X	X	X	X	X	X	
WP-08	Wood, steel, and circuit board debris	X	X									X	X	X	X	X	X	X	X	
WP-09	Soil, rusted metal, fiberglass cloth, and charred wood	X	X									X	X	X	X	X	X	X	X	
WP-10	Brick, much of which has a partial black coating, along with concrete, metal, and wood pieces	X	X									X	X	X	X	X	X	X	X	
WP-12	Asphalt and concrete			X													X	X	X	
WP-13	Gravel, asphalt, and concrete			X									X	X	X	X	X	X	X	
WP-14	Milled asphalt			X									X	X	X	X	X	X	X	
WP-15	Burnt wood, metal, and miscellaneous surface debris		X		X								X	X	X	X	X	X	X	
WP-16	Logs and wood timbers				X								X	X	X	X	X	X	X	
WP-17	Concrete pieces, wood, bricks, slag, and metal mixed with soil	X	X										X	X	X	X	X	X	X	
WP-18	Mostly slag with some soil and gravel	X															X	X	X	
WP-19	Wood, stumps, and soil				X								X	X	X	X	X	X	X	
WP-20	Slag and gravel	X															X	X	X	
WP-21	Primarily asphalt with at least one area of gravel, soil, and concrete			X									X	X	X	X	X	X	X	
WP-22	Mostly soil and stamp sand with concrete pieces and some steel	X	X										X	X	X	X	X	X	X	
WP-23	Soil, concrete, roofing, metal, and other industrial debris	X	X							X	X	X	X	X	X	X	X	X	X	
WP-24	Slag, gravel, wood, concrete, clay pipe pieces, cable, and wire	X	X													X	X	X	X	
WP-25	Concrete slabs		X													X	X	X	X	
WP-26	Asphalt pieces			X										X	X	X	X	X	X	
WP-27	Fire brick, slag, steel, and concrete pieces	X	X							X	X	X	X	X	X	X	X	X	X	
WP-28	Concrete, wood, metal, soil, fire brick, and transite pieces	X	X							X	X	X	X	X	X	X	X	X	X	
WP-29	Soil, stamp sand, concrete bases, and steel pieces		X											X	X	X	X	X	X	
WP-30	Gravel, soil, concrete, and asphalt pieces		X										X	X	X	X	X	X	X	
WP-31	Soil with metal and wood pieces		X										X	X	X	X	X	X	X	
WP-32	Primarily coal, slag, and concrete refractory	X	X								X	X	X	X	X	X	X	X	X	
WP-33	Limestone										X	X	X	X	X	X	X	X	X	
WP-45	Refractory	X	X										X	X	X	X	X	X	X	
WP-46	Concrete pieces		X										X	X	X	X	X	X	X	
WP-48	Waste pile residual, primarily fine to medium grained sand with some wood and metal debris, and deteriorated corrugated cardboard	X									X	X	X	X	X	X	X			
Stack Debris	Concrete, brick, refractory, some with black coating	X	X									X	X	X	X	X	X	X	X	Stacks standing in 1992 aerial photograph.

APPENDIX E

TARGETED INSPECTION FORMS

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA - MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM



Collect GPS coordinates and/or field measurements to document targeted feature(s).

See attached photolog.

Representative photograph of sample location and/or targeted feature.

Inspection Date: 8/21/2017 *Feature Identification/Name:* Area southeast of Mineral Building, WP-01

Study Area: Hubbell Processing Area Property Identification Number: 014-307-001-75

OBSERVATIONS *(Including description and sketch)* Inspector/Sampler: A. Miller/J. Chrestensen

Circle the appropriate answer;

Potential Physical Hazard: ☐Yes ☒No Potential Chemical Hazard: ☒Yes ☐No

Capped Area: ☐Yes ☒No Residual Process Material: ☐Yes ☒No Abandoned Container: ☐Yes ☒No

Stressed Vegetation: ☐Yes ☒No Visible Staining: ☒Yes ☐No Building Materials: ☐Yes ☒No

Describe Targeted Feature:

WP-01 is comprised of soil, slag, concrete debris and other building materials. WP-01-1 was collected from a test pit excavation area on the north side of the pile near WP-06 based on visible staining which appeared black and oily and included blue crystalline material. WP-01-2 was collected on the southwest end of the pile and included light brown medium grained soil material.

Sampling Activities *(Sample Description, Sample Time, Requested Analyses)*:

CHLL-WP01-1 – collected at 1300
CHLL-WP01-2 – collected at 1320

Potential Exposure Pathways *(Ingestion, Inhalation, Direct Contact)*:

Soil material may be susceptible to wind and water erosion. The site is secured by a gated, locked entrance.

Other Relevant Below and Above Ground Features *(Conduit, Drainage Swales, Culverts)*:

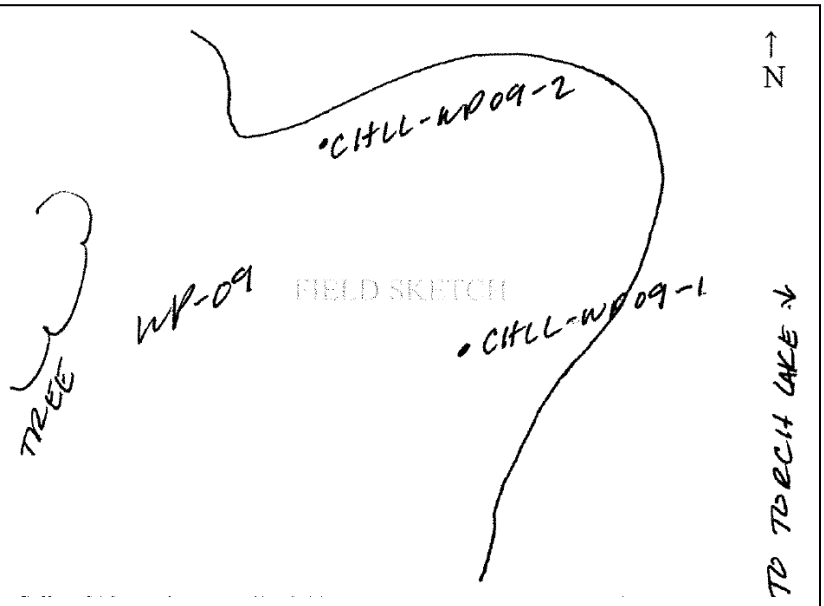
Water drains from the waste pile area towards Torch Lake to the southeast.

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA - MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM

Photo 1: CHLL-WP01-1

Photo 2: CHLL-WP01-2

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA - MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM



Collect GPS coordinates and/or field measurements to document targeted feature(s).

See attached photolog.

Representative photograph of sample location and/or targeted feature.

Inspection Date: 8/21/2017 *Feature Identification/Name:* Area southeast of Mineral Building, WP-09

Study Area: Hubbell Processing Area Property Identification Number: 014-307-001-75

OBSERVATIONS *(Including description and sketch)* Inspector/Sampler: A. Miller/J. Chrestensen

Circle the appropriate answer;

Potential Physical Hazard: ☐Yes ☒No Potential Chemical Hazard: ☒Yes ☐No

Capped Area: ☐Yes ☒No Residual Process Material: ☐Yes ☒No Abandoned Container: ☐Yes ☒No

Stressed Vegetation: ☐Yes ☒No Visible Staining: ☒Yes ☐No Building Materials: ☒Yes ☐No

Describe Targeted Feature:

WP-09 includes soil, charred wood, metal debris, and cardboard. Samples from WP-09 were collected based on visible staining. Samples collected consisted of dark soil material. Debris found in WP-09 included copper colored wire, layered material, charred wood, deteriorated cardboard and metallic/black fabric.

Sampling Activities *(Sample Description, Sample Time, Requested Analyses)*:

CHLL-WP09-1 – collected at 1345
CHLL-WP09-2 – collected at 1350

Potential Exposure Pathways *(Ingestion, Inhalation, Direct Contact)*:

Soil may be susceptible to wind and water erosion. The site is secured by a gated, locked entrance.

Other Relevant Below and Above Ground Features *(Conduit, Drainage Swales, Culverts)*:

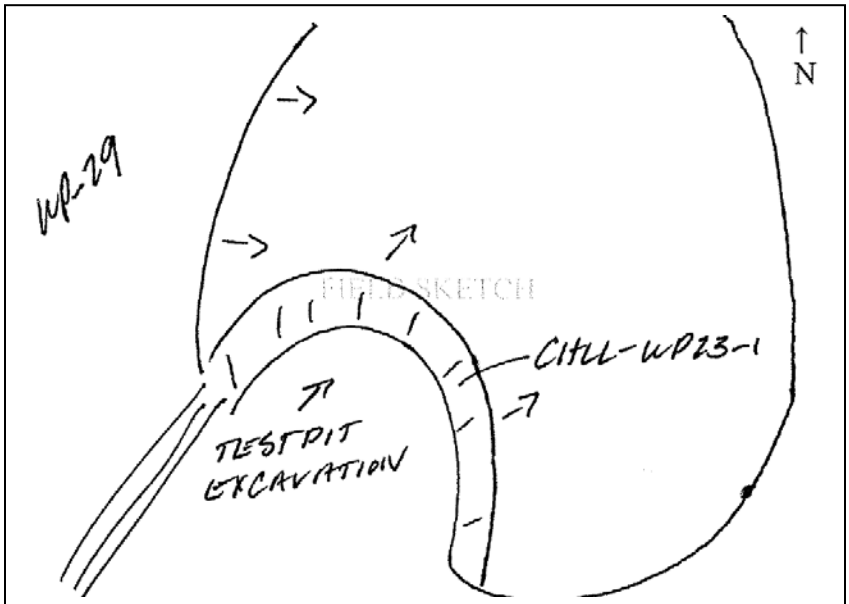
It is assumed that water drains from the waste pile area towards Torch Lake to the southeast. A capped area, located to the northeast, is adjacent to a drainage channel that also outlets into Torch Lake.

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA - MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM

Photo 1: CHLL-WP09-1

Photo 2: CHLL-WP09-2

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA - MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM



Collect GPS coordinates and/or field measurements to document targeted feature(s).

CHLL-WP23-1
Representative photograph of sample location and/or targeted feature.

Inspection Date: 8/21/2017 *Feature Identification/Name:* Area southeast of Mineral Building, WP-23

Study Area: Hubbell Processing Area Property Identification Number: 014-307-001-75

OBSERVATIONS *(Including description and sketch)* Inspector/Sampler: A. Miller/J. Chrestensen

Circle the appropriate answer;

Potential Physical Hazard: ☐Yes ☒No Potential Chemical Hazard: ☒Yes ☐No

Capped Area: ☐Yes ☒No Residual Process Material: ☐Yes ☒No Abandoned Container: ☐Yes ☒No

Stressed Vegetation: ☐Yes ☒No Visible Staining: ☒Yes ☐No Building Materials: ☒Yes ☐No

Describe Targeted Feature:

Visible staining was observed in the test pit excavation area of WP-23 where CHLL-WP23-1 was collected. WP-23 included soil, concrete, roofing and other industrial debris mixed throughout. Suspect asbestos containing materials (ACM) were observed.

Sampling Activities *(Sample Description, Sample Time, Requested Analyses)*:

CHLL-WP23-1 – collected at 1435

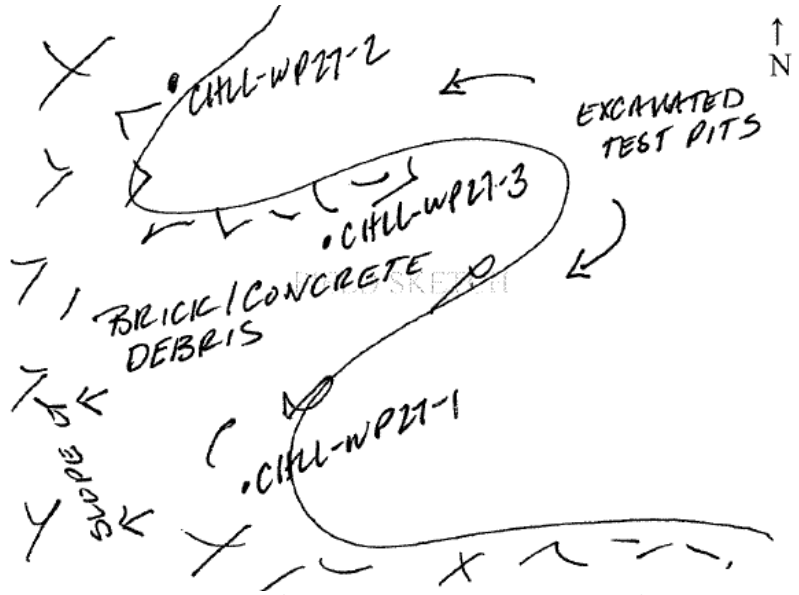
Potential Exposure Pathways *(Ingestion, Inhalation, Direct Contact)*:

Soil material is fine grained and may be susceptible to wind and water erosion. TSI, fibrous material and fibrous drywall are in poor condition and noted as friable. Friable material may also be susceptible to wind and water erosion. The site is secured by a gated, locked entrance.

Other Relevant Below and Above Ground Features *(Conduit, Drainage Swales, Culverts)*:

It is assumed that water drains from the waste pile area towards Torch Lake to the southeast.

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM



Collect GPS coordinates and/or field measurements to document targeted feature(s).

CHLL-WP27-1
See attached photolog.
Representative photograph of sample location and/or targeted feature.

Inspection Date: 8/21/2017 *Feature Identification/Name:* Area southeast of Mineral Building, WP-27

Study Area: Hubbell Processing Area Property Identification Number: 014-307-001-75

OBSERVATIONS *(Including description and sketch)* Inspector/Sampler: A. Miller/J. Chrestensen

Circle the appropriate answer;

Potential Physical Hazard: ☐Yes ☒No Potential Chemical Hazard: ☒Yes ☐No

Capped Area: ☐Yes ☒No Residual Process Material: ☐Yes ☒No Abandoned Container: ☒Yes ☐No

Stressed Vegetation: ☐Yes ☒No Visible Staining: ☒Yes ☐No Building Materials: ☒Yes ☐No

Describe Targeted Feature:
WP-27 is located southeast of the Mineral Building and includes soil, fire bricks, slag and other building and metal debris. CHLL-WP27-1 was collected after test pit excavation, near an abandoned crushed drum and included white, orange and black large grained material, mixed with brown soil and brick debris. CHLL-WP27-2 was also collected after test pit excavation, near an abandoned crush drum and included saturated, orange granular material mixed with brown soil, brick debris, and bits of felt roofing. CHLL-WP27-3 consisted of light brown medium grained soil, collected from the southeast portion of the pile. Suspect asbestos containing materials (ACM) were observed mix with the debris.

Sampling Activities *(Sample Description, Sample Time, Requested Analyses)*:
CHLL-WP27-1 – collected at 1500
CHLL-WP27-2 – collected at 1520
CHLL-WP27-3 – collected at 1523

Potential Exposure Pathways *(Ingestion, Inhalation, Direct Contact)*:
Soil material may be susceptible to wind and water erosion. The site is secured by a gated, locked entrance.

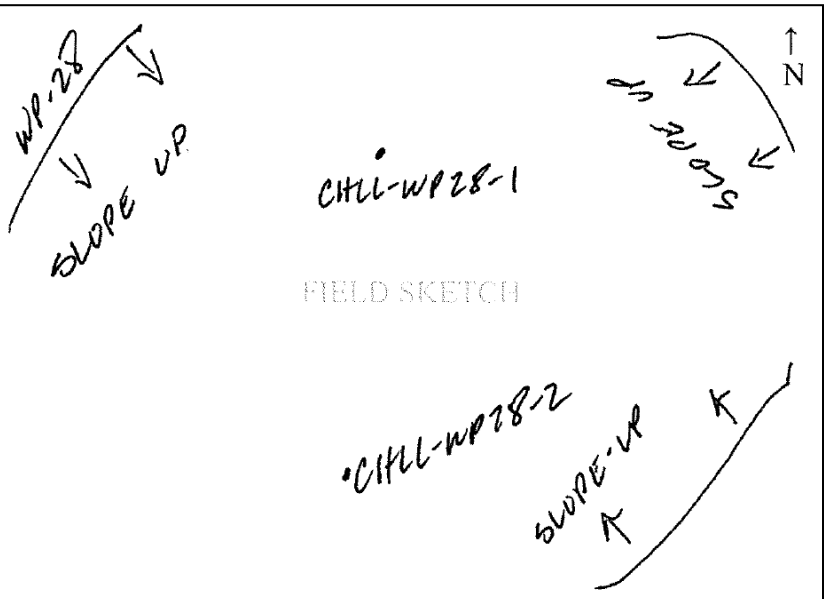
Other Relevant Below and Above Ground Features *(Conduit, Drainage Swales, Culverts)*:
It is assumed that water drains from the waste pile area towards Torch Lake to the southeast.

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM

Photo 1: CHLL-WP27-2

Photo 2: CHLL-WP27-3

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM



Collect GPS coordinates and/or field measurements to document targeted feature(s).

See attached photolog.

Representative photograph of sample location and/or targeted feature.

Inspection Date: 8/21/2017 *Feature Identification/Name:* Area southeast of Mineral Building, WP-28

Study Area: Hubbell Processing Area Property Identification Number: 014-307-001-75

OBSERVATIONS *(Including description and sketch)* Inspector/Sampler: A. Miller/J. Chrestensen

Circle the appropriate answer;

Potential Physical Hazard: ☐Yes ☒No Potential Chemical Hazard: ☒Yes ☐No

Capped Area: ☐Yes ☒No Residual Process Material: ☐Yes ☒No Abandoned Container: ☐Yes ☒No

Stressed Vegetation: ☐Yes ☒No Visible Staining: ☒Yes ☐No Building Materials: ☒Yes ☐No

Describe Targeted Feature:

WP-28 is located southeast of the Mineral Building and includes soil, ceramic insulators, metal, wood, rock and concrete debris, building materials and other industrial debris. Suspect asbestos containing materials (ACM) were observed mix with the debris.

Sampling Activities *(Sample Description, Sample Time, Requested Analyses)*:

CHLL-WP28-1 – collected at 1550
CHLL-WP28-2 – collected at 1605

Potential Exposure Pathways *(Ingestion, Inhalation, Direct Contact)*:

Soil material is fine grained and may be susceptible to wind and water erosion. The site is secured by a gated, locked entrance.

Other Relevant Below and Above Ground Features *(Conduit, Drainage Swales, Culverts)*:

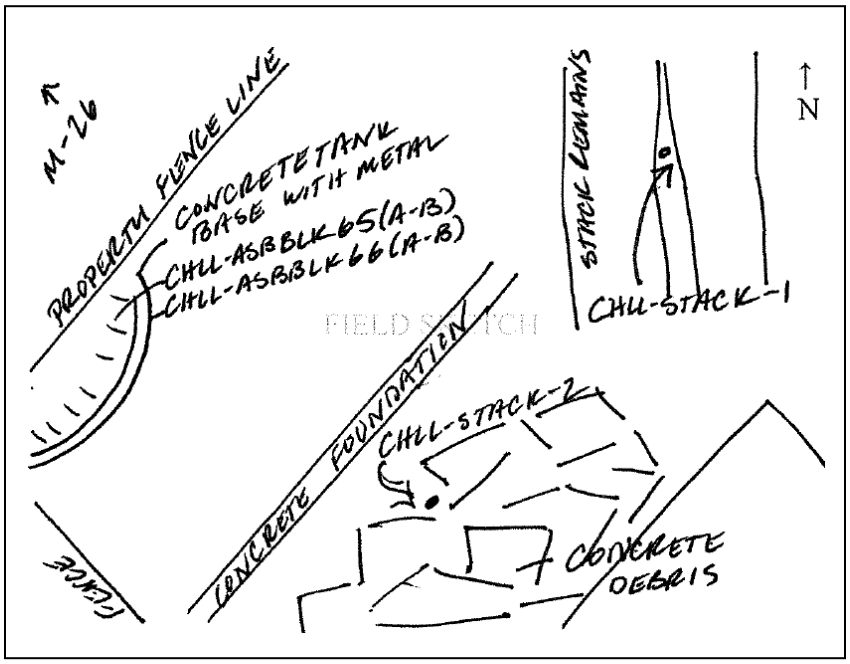
It is assumed that water drains from the waste pile area towards Torch Lake to the southeast.

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM

Photo 1: CHLL-WP28-1

Photo 2: CHLL-WP28-2

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA - MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM



CHLL_STACK-1
See attached Photolog.
Representative photograph of sample location and/or targeted feature.

Inspection Date: 10/23/2017 *Feature Identification/Name:* Area south of Mineral Building, Stack Debris Pile

Study Area: Hubbell Processing Area Property Identification Number: 014-307-001-75

OBSERVATIONS *(Including description and sketch)* Inspector/Sampler: A. Miller/J. Chrestensen

Circle the appropriate answer;

Potential Physical Hazard: ☒Yes ☐No Potential Chemical Hazard: ☒Yes ☐No

Capped Area: ☐Yes ☒No Residual Process Material: ☐Yes ☒No Abandoned Container: ☐Yes ☒No

Stressed Vegetation: ☐Yes ☒No Visible Staining: ☐Yes ☒No Building Materials: ☒Yes ☐No

Describe Targeted Feature:
The area located at the south end of the property is characterized by the Stack Debris Pile. Remains of concrete stacks, fire bricks, additional concrete foundation concrete and other debris litter the area. The mastic and felt mastic material is located on the foundational remains of a tank base near the southwestern corner of the property fence line. The area is littered with building debris, leaf litter, and fine soil material, only allowing for a visual estimate of approximately 15-20 square feet of observed suspect asbestos containing material (ACM) each.

Sampling Activities *(Sample Description, Sample Time, Requested Analyses)*:
CHLL-STACK-1 – collected at 1440
CHLL-STACK-2 – collected at 1515
CHLL-ASBBLK65(A-B)-102317 (black mastic) – collected at 1525
CHLL-ASBBLK66(A-B)-102317 (black felt mastic) – collected at 1530

Potential Exposure Pathways *(Ingestion, Inhalation, Direct Contact)*:
Soil material is fine grained and may be susceptible to wind and water erosion and the surrounding area is concrete, which may allow for runoff. Suspect ACM is in fair condition. Black felt mastic was noted as friable and may be susceptible to wind and water erosion. The site is secured by a gated, locked entrance.

Other Relevant Below and Above Ground Features *(Conduit, Drainage Swales, Culverts)*:
It is assumed that water drains from the area across the adjacent property towards Torch Lake to the southeast.

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA - MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM

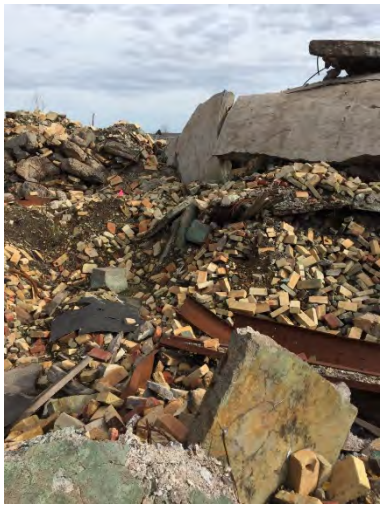


Photo 1: CHLL-STACK-2

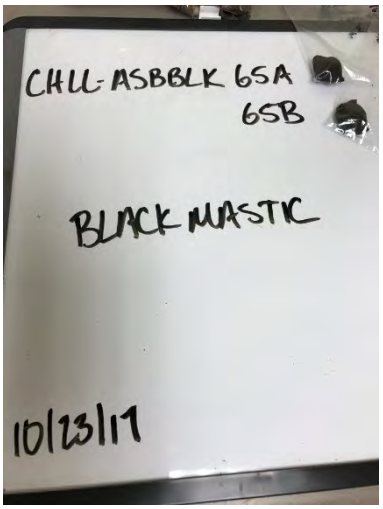
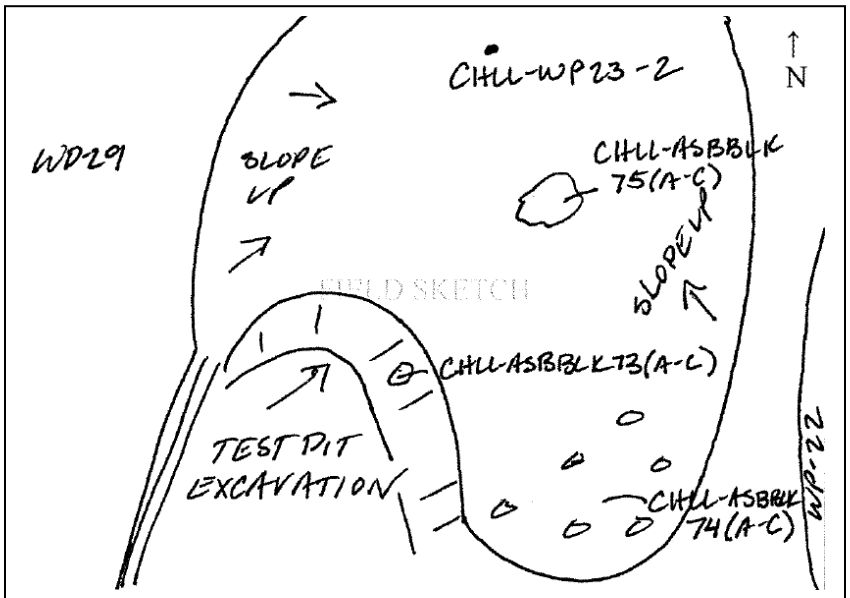


Photo 2: CHLL-ASBBLK65(A-B)-102317

Photo 3: CHLL-ASBBLK66(A-B)-102317

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA - MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM



Collect GPS coordinates and/or field measurements to document targeted feature(s).

CHLL-WP23-2
See attached photolog.
Representative photograph of sample location and/or targeted feature.

Inspection Date: 10/23/2017 *Feature Identification/Name:* Area southeast of Mineral Building, WP-23

Study Area: Hubbell Processing Area Property Identification Number: 014-307-001-75

OBSERVATIONS *(Including description and sketch)* Inspector/Sampler: A. Miller/J. Chrestensen

Circle the appropriate answer;

Potential Physical Hazard: ☐Yes ☒No Potential Chemical Hazard: ☒Yes ☐No

Capped Area: ☐Yes ☒No Residual Process Material: ☐Yes ☒No Abandoned Container: ☐Yes ☒No

Stressed Vegetation: ☐Yes ☒No Visible Staining: ☐Yes ☒No Building Materials: ☒Yes ☐No

Describe Targeted Feature:
Suspect asbestos containing materials (ACM) are observed on WP-23, southeast of the Mineral Building mixed with other debris including soil, bricks and other unidentifiable items. Visual estimates of material quantities are between 10-20 square feet per item sampled; however, materials were only observed and sampled in accessible portions of the pile.

Sampling Activities *(Sample Description, Sample Time, Requested Analyses)*:
CHLL-WP23-2 – collected at 1740
CHLL-ASBBLK73(A-C)-102317 (white fibrous material with green) – collected at 1615
CHLL-ASBBLK74(A-C)-102317 (white fibrous drywall) – collected at 1620
CHLL-ASBBLK75(A-C)-102317 (brown TSI) – collected 1635

Potential Exposure Pathways *(Ingestion, Inhalation, Direct Contact)*:
Soil material is fine grained and may be susceptible to wind and water erosion. TSI, fibrous material and fibrous drywall are in poor condition and noted as friable. Friable material may also be susceptible to wind and water erosion. The site is secured by a gated, locked entrance.

Other Relevant Below and Above Ground Features *(Conduit, Drainage Swales, Culverts)*:
Standing water is observed northwest of the waste pile. It is assumed that water drains from the waste pile area towards Torch Lake to the southeast.

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA - MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM

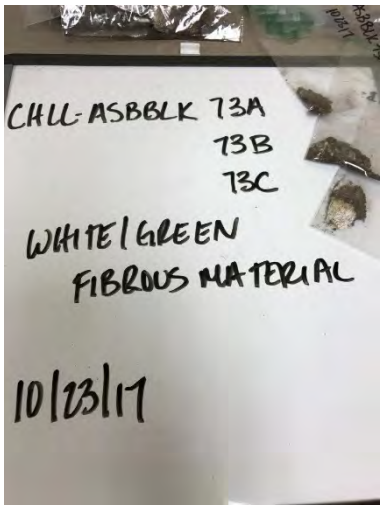


Photo 1: CHLL-ASBBLK73(A-C)-102317

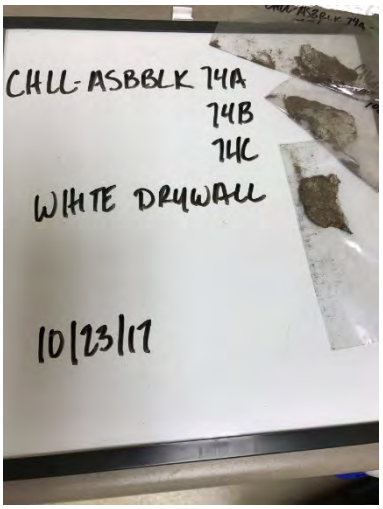


Photo 2: CHLL-ASBBLK74(A-C)-102317

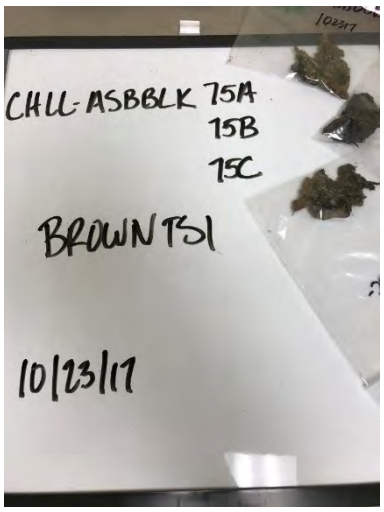
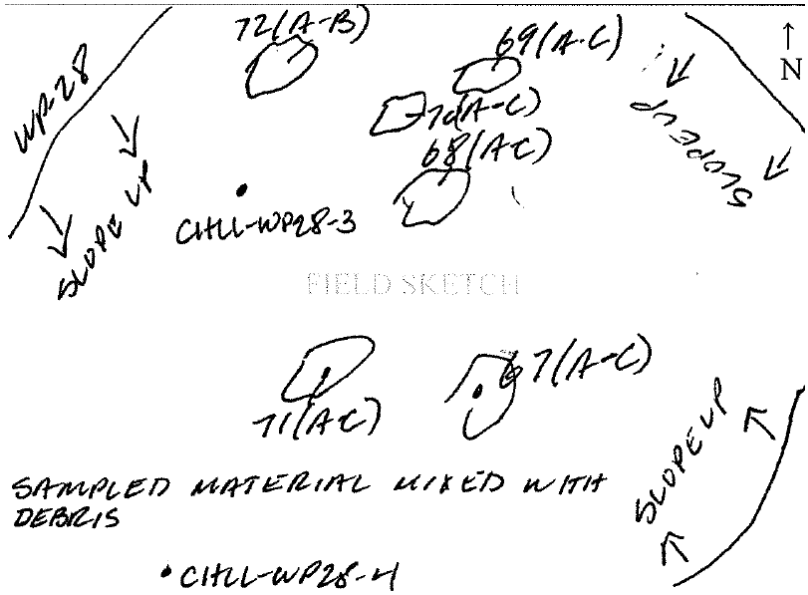


Photo 3: CHLL-ASBBLK75(A-C)-102317

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM



Collect GPS coordinates and/or field measurements to document targeted feature(s).

CHLL-WP28-3
See attached photolog.
Representative photograph of sample location and/or targeted feature.

Inspection Date: 10/23/2017 *Feature Identification/Name:* Area southeast of Mineral Building, WP-28

Study Area: Hubbell Processing Area Property Identification Number: 014-307-001-75

OBSERVATIONS *(Including description and sketch)* Inspector/Sampler: A. Miller/J. Chrestensen

Circle the appropriate answer;

Potential Physical Hazard: ☐Yes ☒No Potential Chemical Hazard: ☒Yes ☐No

Capped Area: ☐Yes ☒No Residual Process Material: ☐Yes ☒No Abandoned Container: ☐Yes ☒No

Stressed Vegetation: ☐Yes ☒No Visible Staining: ☐Yes ☒No Building Materials: ☒Yes ☐No

Describe Targeted Feature:
WP-28 is located southeast of the Mineral Building. Suspect asbestos containing materials (ACM) are observed mixed with other debris including soil, ceramic insulators, metal, wood, rock and concrete debris, building materials and other industrial debris. Visual estimates of material quantities are between 5-25 square feet per item sampled; however, materials were only observed and sampled in accessible portions of the pile.

Sampling Activities *(Sample Description, Sample Time, Requested Analyses)*:
CHLL-WP28-3 – collected at 1640
CHLL-WP28-4 – collected at 1650
CHLL-ASBBLK67(A-C)-102317 (gray TSI) – collected at 1540
CHLL-ASBBLK68(A-C)-102317 (gray/blue TSI) – collected at 1545
CHLL-ASBBLK69(A-C)-102317 (white TSI) – collected 1550
CHLL-ASBBLK70(A-C)-102317 (white paper gasket) – collected at 1555
CHLL-ASBBLK71(A-C)-102317 (gray/white fibers) – collected at 1600
CHLL-ASBBLK72(A-B)-102317 (felt roofing) – collected at 1610

Potential Exposure Pathways *(Ingestion, Inhalation, Direct Contact)*:
Soil material is fine grained and may be susceptible to wind and water erosion. TSI, gasket, fibrous material and felt roofing is in poor condition and noted as friable and may also be susceptible to wind and water erosion. The site is secured by a gated, locked entrance.

Other Relevant Below and Above Ground Features *(Conduit, Drainage Swales, Culverts)*:
Standing water is observed northwest of the waste pile. It is assumed that water drains from the waste pile area towards Torch Lake to the southeast.

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM

Photo 1: CHLL-WP28-3

Photo 2: CHLL-WP28-4

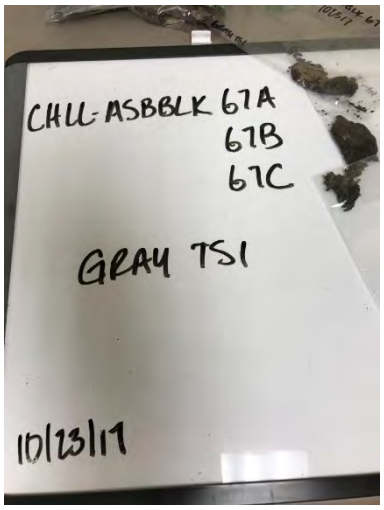


Photo 3: CHLL-ASBBLK67(A-C)-102317

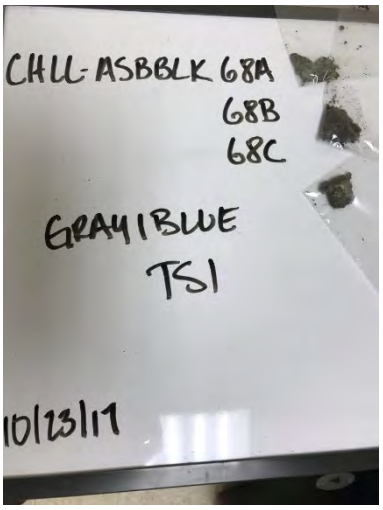


Photo 4: CHLL-ASBBLK68(A-C)-102317

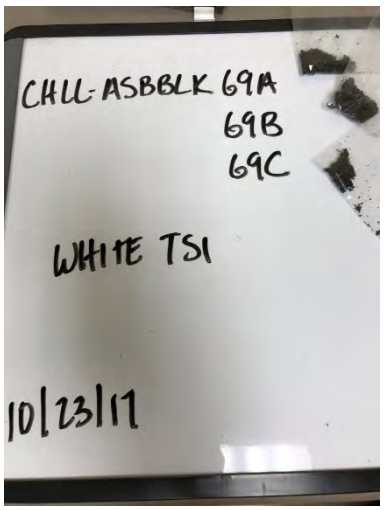


Photo 5: CHLL-ASBBLK69(A-C)-102317

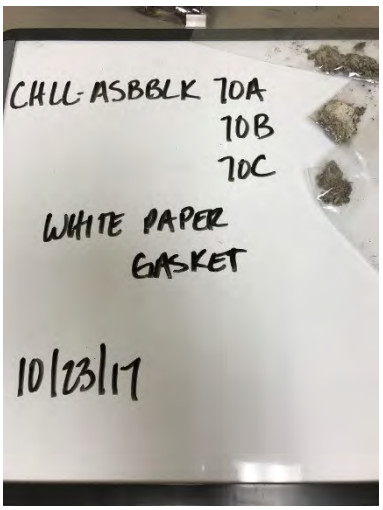


Photo 6: CHLL-ASBBLK70(A-C)-102317

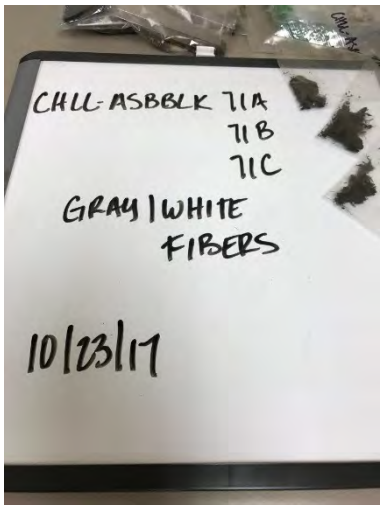


Photo 7: CHLL-ASBBLK71(A-C)-102317

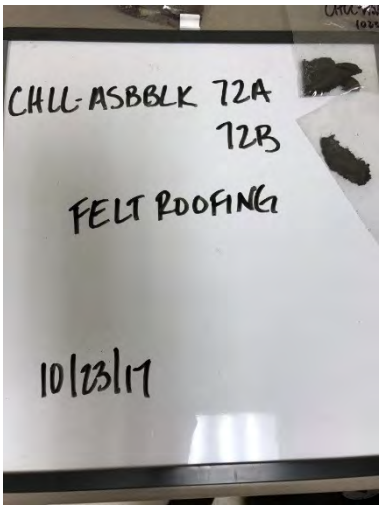
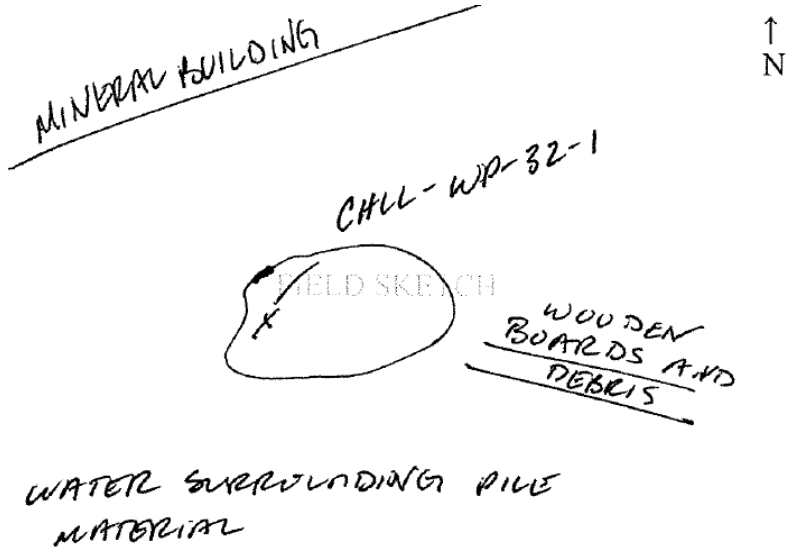


Photo 8: CHLL-ASBBLK72(A-B)-102317

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM



Collect GPS coordinates and/or field measurements to document targeted feature(s).

CHLL-WP32-1
Representative photograph of sample location and/or targeted feature.

Inspection Date: 10/23/2017 *Feature Identification/Name:* Area southeast of Mineral Building, WP-32

Study Area: Hubbell Processing Area Property Identification Number: 014-307-001-75

OBSERVATIONS *(Including description and sketch)* Inspector/Sampler: A. Miller/J. Chrestensen

Circle the appropriate answer;

Potential Physical Hazard: ☐Yes ☒No Potential Chemical Hazard: ☒Yes ☐No

Capped Area: ☐Yes ☒No Residual Process Material: ☐Yes ☒No Abandoned Container: ☐Yes ☒No

Stressed Vegetation: ☐Yes ☒No Visible Staining: ☐Yes ☒No Building Materials: ☐Yes ☒No

Describe Targeted Feature:

WP-32 is comprised of primarily coal, slag and concrete refractory materials and is located to the southeast of the Mineral Building. At the time of sampling, the WP was surrounded by water approximately 2 inches deep. Sample CHLL-WP-32-1 consisted of a white crystalline material.

Sampling Activities *(Sample Description, Sample Time, Requested Analyses)*:

CHLL-WP32-1 – collected at 1330

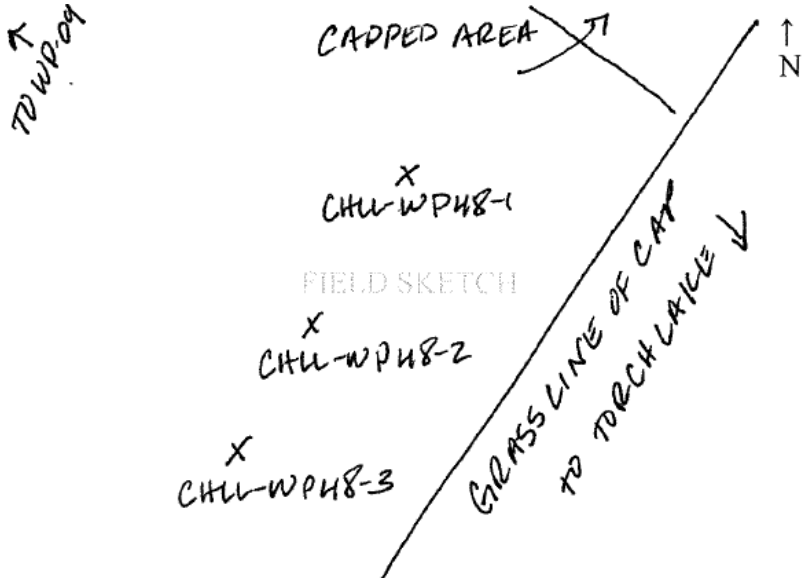
Potential Exposure Pathways *(Ingestion, Inhalation, Direct Contact)*:

Soil material within the pile may be susceptible to wind and water erosion. WP-32 is surrounded by pooling water. The site is secured by a gated, locked entrance.

Other Relevant Below and Above Ground Features *(Conduit, Drainage Swales, Culverts)*:

Water drains from the waste pile area towards Torch Lake to the southeast.

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM



Collect GPS coordinates and/or field measurements to document targeted feature(s).

CHLL-WP48-1
See attached photolog.
Representative photograph of sample location and/or targeted feature.

Inspection Date: 10/23/2017 *Feature Identification/Name:* Area southeast of Mineral Building, WP-48

Study Area: Hubbell Processing Area Property Identification Number: 014-307-001-75

OBSERVATIONS *(Including description and sketch)* Inspector/Sampler: A. Keranen/J. Binkley

Circle the appropriate answer;

Potential Physical Hazard: ☐Yes ☒No Potential Chemical Hazard: ☒Yes ☐No

Capped Area: ☐Yes ☒No Residual Process Material: ☐Yes ☒No Abandoned Container: ☐Yes ☒No

Stressed Vegetation: ☐Yes ☒No Visible Staining: ☐Yes ☒No Building Materials: ☐Yes ☒No

Describe Targeted Feature:

WP-48 is comprised of the relatively flat, sandy area southeast of WP-09, toward the grassy capped area along Torch Lake. In portions of the area, wood and metal debris, and deteriorated corrugated cardboard are found.

Sampling Activities *(Sample Description, Sample Time, Requested Analyses)*:

CHLL-WP48-1 – collected at 1535
CHLL-WP48-2 – collected at 1630
CHLL-WP48-3 – collected at 1635

Potential Exposure Pathways *(Ingestion, Inhalation, Direct Contact)*:

Soil material is fine to medium grained and may be susceptible to wind and water erosion. The site is secured by a gated, locked entrance.

Other Relevant Below and Above Ground Features *(Conduit, Drainage Swales, Culverts)*:

Water drains from the waste pile area towards Torch Lake to the southeast. Capped portions of the property are located to the north, which is adjacent to a drainage channel that outlets to the lake, and to the east along Torch Lake.

ABANDONED MINING WASTES TORCH LAKE NON-SUPERFUND SITE
HUBBELL PROCESSING AREA MINERAL BUILDING WASTE PILES
TARGETED INSPECTION FORM

Photo 1: CHLL-WP48-2

Photo 2: CHLL-WP48-3

APPENDIX F

HUBBELL PROCESSING AREA 2017 PHOTOGRAPHIC LOG

Photo 1: View looking northeast to shoreline near drum sampling locations. Photo taken on 6/7/2017.

Photo 2: Arrows identifying markers for approximate drum locations, view looking northeast. Photo taken on 6/7/2017.

Photo 3: Autonomous underwater vehicle (AUV) shown with open sampling scoop. Photo taken 6/7/2017.

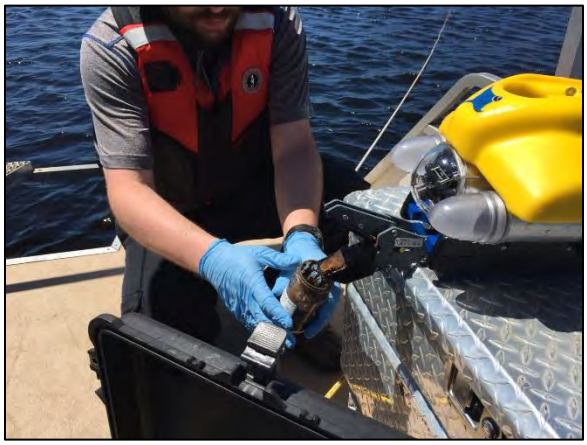


Photo 4: Collecting sample CHLI-SDM01. Photo taken on 6/7/2017.

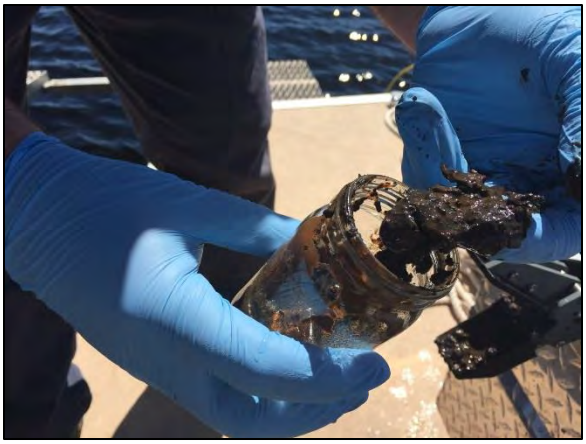


Photo 5: Portion of sample CHLL-SDM02. Photo taken on 6/7/2017.

Photo 6: Burlap material sampled as CHLL-SDM02-Cloth. Photo taken on 6/7/2017.

Photo 7: Suspect asbestos containing material (thermal system insulation). Photo taken on 8/21/2017.

Photo 8: Waste pile WP-48 sampling locations (pink flags). Photo taken on 10/23/2017.

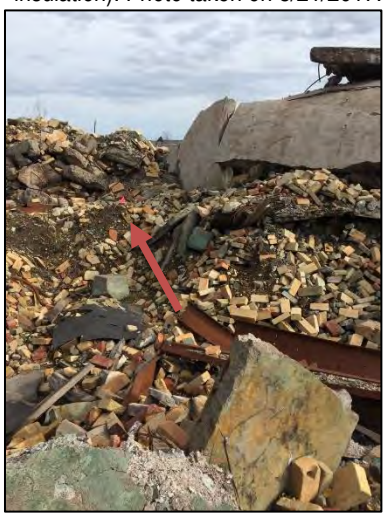


Photo 9: Sampling location CHLL-Stack-2 (pink flag). Photo taken on 10/23/2017.

Photo 10: Sampling location CHLL-ASBBLK73 of white with green fibrous material. Photo taken on 10/23/2017.

Photo 11: Sampling location CHLL-WP28-4. Photo taken on 10/23/2017.

Photo 12: Rope gasket sampled as CHLL-ASBBLK76 in waste pile WP-27. Photo taken on 10/23/2017.

APPENDIX G

UNDERWATER VIDEOS

APPENDIX G

UNDERWATER VIDEOS

PROVIDED ON CD AS SEPARATE FILES

APPENDIX H

SEDIMENT CORE LOGS – HUBBELL PROCESSING AREA

DEQ Remediation and Redevelopment Division

BOREHOLE LOG

BORING/WELL: CHLL-SD110

SITE: Abandoned Mining Wastes Torch Lake

COUNTY: Houghton
TOWNSHIP: Torch Lake
TOWN: 55N
RANGE: 32W
SECTION: 7
LOCATION DESCRIPTION: CHLL Hubble Processing Area

DATE: 8/19/17
DRILLER: B. Lower
GEOLOGIST: B. Eustice
DRILL METHOD: Vibracore
TOTAL DEPTH: 3.5' in 46.2' of water
ERNIE ID# 31000098

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE TYPE	SAMPLE ID	NOTES	Water Quality Meter
		Lake Bottom	0				
		SILTY CLAY blackish brown, soft, loose.			CHLL-SD110 0-6"		
		SILTY CLAY reddish brown, soft, loose.					
					CHLL-SD110 1-3'		
					CHLL-SD110 3-3.5'		
		E.O.B.					
			5				

VERTICAL DATUM:
GRD. ELEVATION:
T.O.C.:
S.W.L.:
CASING:
SCREEN:
WELL DEPTH:
COMPLETION NOTES:

LATITUDE: 47.178091695
LONGITUDE: -88.416273226
PROJECTION: MiGeoRef
NORTHING: 739058.033
EASTING: 316762.778

Remediation and Redevelopment Division

BOREHOLE LOG

BORING/WELL: CHLL-SD111

SITE: Abandoned Mining Wastes Torch Lake

COUNTY: Houghton
TOWNSHIP: Torch Lake
TOWN: 55N
RANGE: 32W
SECTION: 7
LOCATION DESCRIPTION: CHLL Hubble Processing Area

DATE: 8/19/17
DRILLER: B. Lower
GEOLOGIST: B. Eustice
DRILL METHOD: Vibracore
TOTAL DEPTH: 5.75' in 33.8' of water
ERNIE ID# 31000098

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE TYPE	SAMPLE ID	NOTES	Water Quality Meter
		Lake Bottom	0				
		SILTY CLAY blackish brown, soft, loose, some coal pieces.			CHLL-SD111 0-6" and FD		
		SILTY CLAY reddish brown, soft loose, some coal pieces.					
					CHLL-SD111 1-3'		
		SAND brown - red, medium grain, well sorted, firm.			CHLL-SD111 3-3.83'		
		No Recovery	5				
		E.O.B.					

VERTICAL DATUM:
GRD. ELEVATION:
T.O.C.:
S.W.L.:
CASING:
SCREEN:
WELL DEPTH:
COMPLETION NOTES:

LATITUDE: 47.177745582
LONGITUDE: -88.417545767
PROJECTION: MiGeoRef
NORTHING: 739022.550
EASTING: 316665.208

Remediation and Redevelopment Division

BOREHOLE LOG

BORING/WELL: CHLL-SD112

SITE: Abandoned Mining Wastes Torch Lake

COUNTY: Houghton
TOWNSHIP: Torch Lake
TOWN: 55N
RANGE: 32W
SECTION: 7
LOCATION DESCRIPTION: CHLL Hubble Processing Area

DATE: 8/19/17
DRILLER: B. Lower
GEOLOGIST: B. Eustice
DRILL METHOD: Vibracore
TOTAL DEPTH: 4.67' in 34.6' of water
ERNIE ID# 31000098

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE TYPE	SAMPLE ID	NOTES	Water Quality Meter
		Lake Bottom	0				
		SILTY CLAY dark brown to red, loose, soft.			CHLL-SD112 0-6"		
		SILTY CLAY reddish brown, soft, some wood debris and large gravel.			CHLL-SD112 1-3'		
		SAND brown, medium to coarse grain, firm.			CHLL-SD112 3-3.92'		
		ORGANIC black - brown organic material.					
		SAND brown, medium grain, firm, wet.					
		No recovery					
		E.O.B.	5				

VERTICAL DATUM:
GRD. ELEVATION:
T.O.C.:
S.W.L.:
CASING:
SCREEN:
WELL DEPTH:
COMPLETION NOTES:

LATITUDE: 47.177236181
LONGITUDE: -88.418132582
PROJECTION: MiGeoRef
NORTHING: 738967.330
EASTING: 316619.018

DEQ Remediation and Redevelopment Division

BOREHOLE LOG

BORING/WELL: CHLL-SD113

SITE: Abandoned Mining Wastes Torch Lake

COUNTY: Houghton
TOWNSHIP: Torch Lake
TOWN: 55N
RANGE: 32W
SECTION: 7
LOCATION DESCRIPTION: CHLL Hubble Processing Area

DATE: 8/19/17
DRILLER: B. Lower
GEOLOGIST: B. Eustice
DRILL METHOD: Vibracore
TOTAL DEPTH: 0.83' in 28.1' of water
ERNIE ID# 31000098

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE TYPE	SAMPLE ID	NOTES	Water Quality Meter
		Lake Bottom	0				
		SAND and GRAVEL red and black, coarse grains, some fines, angular.			CHLL-SD113 0-10" and FD		
		E.O.B.	5				

VERTICAL DATUM:
GRD. ELEVATION:
T.O.C.:
S.W.L.:
CASING:
SCREEN:
WELL DEPTH:
COMPLETION NOTES:

LATITUDE: 47.173168624
LONGITUDE: -88.423741839
PROJECTION: MiGeoRef
NORTHING: 738528.571
EASTING: 316180.202

DEQ Remediation and Redevelopment Division

BOREHOLE LOG

BORING/WELL: CHLL-SD114

SITE: Abandoned Mining Wastes Torch Lake

COUNTY: Houghton
TOWNSHIP: Torch Lake
TOWN: 55N
RANGE: 32W
SECTION: 7
LOCATION DESCRIPTION: CHLL Hubble Processing Area

DATE: 8/19/17
DRILLER: B. Lower
GEOLOGIST: B. Eustice
DRILL METHOD: Vibracore
TOTAL DEPTH: 0.83' in 33.5' of water
ERNIE ID# 31000098

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE TYPE	SAMPLE ID	NOTES	Water Quality Meter
		Lake Bottom	0				
		SAND and GRAVEL red and black, coarse grain, angular.			CHLL-SD114 0-10"		
		E.O.B.					
			5				

VERTICAL DATUM:
GRD. ELEVATION:
T.O.C.:
S.W.L.:
CASING:
SCREEN:
WELL DEPTH:
COMPLETION NOTES:

LATITUDE: 47.178091695
LONGITUDE: -88.416273226
PROJECTION: MiGeoRef
NORTHING: 739058.033
EASTING: 316762.778