SITE INVESTIGATION REPORT
FOR
ABANDONED MINING WASTES TORCH LAKE
NON-SUPERFUND SITE
CALUMET AND HECLA – TAMARACK CITY OPERATIONS
HOUGHTON COUNTY, MICHIGAN

SITE IDENTIFICATION NO. 31000098

Prepared for:

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
Remediation and Redevelopment Division
55195 US Highway 41
Calumet, Michigan 49913

Prepared by:

WESTON SOLUTIONS OF MICHIGAN, INC.
P.O. Box 577
Houghton, MI 49931

March 2016

Work Order No. 20177.001.001.0010

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EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) has prepared this Site Investigation (SI) Report to provide a comprehensive summary of investigative activities completed at the Abandoned Mining Wastes – Torch Lake non-Superfund Site (Project) in Houghton County, Michigan. This SI Report has been prepared in accordance with the *Scope of Work, Schedule, and Budget Estimate - Abandoned Mining Wastes – Torch Lake non-Superfund Site, Calumet and Hecla (C&H) Lake Linden Operations Geographic Area, Houghton County Michigan, December 16, 2013* and the subsequent *Scope of Work, Schedule, and Budget Estimate for Modification 1 and 4 (August 2014 and February 2015)* prepared by WESTON in response to a request from the Michigan Department of Environmental Quality (MDEQ), Remediation and Redevelopment Division (RRD), under the Indefinite Scope, Indefinite Delivery (ISID) Professional Services contract between WESTON and the MDEQ (Contract No. 00477).

The Project is characterized by the risks posed by chemical containers and residues historically discarded in or near Torch Lake. These concerns are distinct and separate from the risks historically addressed under the U.S. Environmental Protection Agency's (EPA's) Superfund program. According to the RRD Superfund Section (RRD SFS), the EPA defines the Torch Lake Superfund Site as the upper six inches of stamp sand and slag in certain areas of Houghton County and any soil cap and vegetative cover applied to such areas.

The remaining concerns at Torch Lake and the surrounding areas identified by the MDEQ include known or suspected impacts to groundwater, surface water, sediments, and upland media that were not addressed under the Superfund program. Environmental impacts that were evaluated as part of the SI were assessed under the guidance of the following objectives:

- Investigate and document unidentified, significant in-lake and/or terrestrial sources of contamination including polychlorinated biphenyls (PCBs);
- Investigate and document uncharacterized waste deposits, including more than 750 uncharacterized drums, reportedly, on the lake bottom;
- Investigate and document bulk disposal areas, including stamp sand deposits, slag dumps, and landfills; and,

- Investigate and document industrial ruins including coal storage areas, underground storage tanks (USTs), asbestos containing materials (ACM), and any other waste materials identified in future investigations.

Taking into account the specific objectives outlined above, the principal goal of the Project was to support a comprehensive management approach that will guide MDEQ's decision making process in addressing potential human health and environmental risks present in the C&H Tamarack City Operations Area (CHTC). The primary focus of the Project is to ascertain the source, nature, and extent of contaminants (including PCBs) in all affected environmental media (soil, groundwater, surface water, and sediments), residual process materials, and waste materials.

The CHTC consists of approximately 110 acres of land extending approximately two miles along the shoreline of Torch Lake. The CHTC also incorporates over 187 different parcels with multiple property owners. The CHTC was divided into three smaller study areas based on the historical industrial operations in each area. The investigative areas and their respective former industrial sites are summarized as follows:

- Ahmeek Mill Processing Area
  - Osceola Township Park; and,
  - Ahmeek Stamp Mill Complex.
- Tamarack Processing Area
  - Tamarack Reclamation Plant Complex;
  - Tamarack Stamp Mill Complex; and,
  - Osceola Stamp Mill Complex.
- Tamarack Sands Area
  - Historic Municipal Dump (Trail Asbestos/Sands).

This SI Report has been developed to assimilate information from multiple data sources into a logical and thorough narrative focused on the central portion of Torch Lake, defined in the document as CHTC. The findings presented herein were developed using the conclusions derived from archival research, historical investigation and response activities, and the investigation of data gaps or known or suspected impacts to groundwater, surface water, sediments, and upland media in and around Torch Lake.

Due to the sizeable nature of the CHTC, this SI Report has been organized to present organizational and procedural steps that were common to multiple areas of investigation in the first four sections of the document. Following these discussions that are broadly applicable to the Project as a whole, this SI Report transitions to a presentation of detailed findings specific to individual study areas within the CHTC. The "Detailed Findings Reports" are presented as stand-alone sections, complete with summary tables and figures and conclusions and recommendations that can be detached from the main document. The SI Report then closes with a comprehensive summary of conclusions and recommendations for the CHTC as a whole, compiling the information presented in the individual reports. The following provides a brief overview of the SI Report's organization.

Section 1 of this SI Report defines the overall objectives and the organizational structure of the Project. **Section 2** provides Project background information and its significance as it relates to each of the study areas included in the CHTC. **Section 3** provides a summary of the stepwise approach used to evaluate historical operational and analytical data, and its incorporation into the field procedures and sample collection activities prescribed in the Sampling and Analysis Plan for the Project. **Section 4** includes a summary of the relevant exposure criteria and pathways used to evaluate the analytical findings from the investigation of each study area. A detailed findings report, including figures and tables for the individual study areas as follows:

- **Section 5** Ahmeek Mill Processing Area
- **Section 6** Tamarack Processing Area
- **Section 7** Tamarack Sands Area
- **Section 8** Torch Lake

Section 9 includes a summary of conclusions and recommendations that are gleaned from the individual detailed findings reports with an emphasis on impacts to the CHTC as a whole. **Section 10** includes references utilized in the development of this SI Report.

The submittal of the CHTC SI Report marks a significant milestone in the assessment of environmental impairments within Torch Lake and industrial areas along the shoreline caused by historical mining and industrial operations not addressed under the EPA Superfund Program that are limiting the recovery of the Torch Lake ecosystem and reuse of former industrial areas.

The Project provided a comprehensive evaluation of the terrestrial and Torch Lake portions of the study area. By copy of this SI report, the Project findings have been provided to the other

governmental stakeholders responsible for implementation and monitoring EPA's remedy for the Torch Lake Superfund Site so they can determine if 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 stakeholders include various EPA programs, health agencies, other MDEQ divisions, and the Torch Lake Public Advisory Council.

Specific next Project steps include:

- Identify remedial alternatives and mitigate concerns related to human health and/or the environment in areas not previously addressed by EPA including, but not limited to:
  - Ahmeek Mill Processing Area - asbestos containing building materials in a demolition debris pile.
  - Throughout the study area – miscellaneous abandoned containers.
  - Tamarack Sands Area – potential seep areas from upland waste deposits
- Continue assessment of areas not previously addressed by the EPA in the Quincy Mining Company Mason Operations Area.
- 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.
- Continue to provide new study data to governmental stakeholders responsible for implementation and monitoring EPA's remedy for the terrestrial and lake portion of the Torch Lake Superfund Site.
- Continue to provide new study data to 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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LIST OF ABBREVIATIONS AND ACRONYMS

µg/L	microgram per liter
ACM	Asbestos Containing Material
ACBM	Asbestos Containing Building Material
AMSL	Above Mean Sea Level
ASTM	ASTM International
AUV	Autonomous Underwater Vehicle
bgs	Below Ground Surface
BUI	Beneficial Use Impairment
C&H	Calumet and Hecla
CARB	California Air Resource Board
CFR	Code of Federal Regulation
CHLL	C&H Lake Linden Operations Area
CHTC	C&H Tamarack City Operations Area
COC	Contaminant of Concern
DCC	Direct Contact Criteria
DO	Dissolved Oxygen
DWC	Drinking Water Criteria
EDD	Electronic Data Deliverable
EPA	U.S. Environmental Protection Agency
ESL	Ecological Screening Level
Ft	Feet
GIS	Geographic Information System
GLNPO	Great Lakes National Program Office
GPS	Global Positioning System
GSIPC	Groundwater/Surface Water Interface Protection Criteria
GSU	Geological Services Unit
HEM	Hexane Extractable Material
ID	Identification
IDW	Investigative-Derived Waste
In	Inches
ISID	Indefinite Scope Indefinite Delivery
KW	kilowatt
MDCH	Michigan Department of Community Health
MDEQ	Michigan Department of Environmental Quality
MDHHS	Michigan Department of Health and Human Services

MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
mg/kg	milligram per kilogram
Michigan Tech	Michigan Technological University
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MTRI	Michigan Tech Research Institute
NESHAP	National Emission Standards for Hazardous Air Pollutants
NREPA	Natural Resources and Environmental Protection Act
ORP	Oxidation-Reduction Potential
OU	Operable Unit
PA	Public Act
PCB	Polychlorinated Biphenyl
PEC	Probable Effect Concentration
PID	Photoionization Detector
PLM	Polarized Light Microscopy
PNA	polynuclear aromatic hydrocarbon
PPE	Personal Protective Equipment
ppm	Parts Per Million
PSIC	Particulate Soil Inhalation Criteria
QA	Quality Assurance
QC	Quality Control
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
ROV	Remotely Operated Vehicle
RPM	Residual Process Materials
RRD	Remediation and Redevelopment Division
RRD SFS	RRD Superfund Section
SACM	Suspect Asbestos Containing Material
SAP	Sampling and Analysis Plan
SCS	Soil Conservation Service
SFS	Superfund Section
SI	Site Investigation
SOO	Statement of Objectives
SOP	Standard Operating Procedure
SPMD	Semi-Permeable Membrane Device
SVOC	Semi-Volatile Organic Compound
TEC	Threshold Effect Concentration
USC	United States Code

USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
UST	Underground Storage Tank
VOC	Volatile Organic Compound
VSIC	Volatile Soil Inhalation Criteria
WESTON®	Weston Solutions of Michigan, Inc.
XRF	X-ray Fluorescence

1. INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) has prepared this Site Investigation (SI) Report to provide a comprehensive summary of investigative activities completed at the Abandoned Mining Wastes – Torch Lake non-Superfund Site (Project) in Houghton County, Michigan.

This SI Report has been prepared in accordance with the *Scope of Work, Schedule, and Budget Estimate - Abandoned Mining Wastes – Torch Lake non-Superfund Site, Calumet and Hecla (C&H) Lake Linden Operations Geographic Area, Houghton County Michigan, December 16, 2013* and the subsequent *Scope of Work, Schedule, and Budget Estimate for Modification 1 and 4 (August 2014 and February 2015)* prepared by WESTON in response to a request from the Michigan Department of Environmental Quality (MDEQ), Remediation and Redevelopment Division (RRD), under the Indefinite Scope, Indefinite Delivery (ISID) Professional Services contract between WESTON and the MDEQ (Contract No. 00477).

This SI Report has been developed to assimilate information from multiple data sources into a logical and thorough narrative focused on the central portion of Torch Lake, defined in the document as the Calumet and Hecla Tamarack City Operations Area (CHTC). The findings presented herein were developed using the conclusions derived from archival research, historical investigation and response activities, and the investigation of data gaps or known or suspected impacts to groundwater, surface water, sediments, and upland media in and around Torch Lake.

Due to the sizeable nature of the CHTC, this SI Report has been organized to present organizational and procedural steps that were common to multiple areas of investigation in the first four sections of the document. Following these discussions that are broadly applicable to the project as a whole, the SI Report transitions to a presentation of detailed findings specific to individual study areas within the CHTC. The "Detailed Findings Reports" are presented as standalone sections, complete with summary tables and figures that summarize analytical results and conclusions and recommendations specific to each study area that can be detached from the main document. The SI Report then closes with a comprehensive summary of conclusions and recommendations for the CHTC as a whole, compiling the information presented in the individual reports. The following provides a brief overview of the SI Report's organization.

Section 1 of this SI Report defines the overall objectives and the organizational structure of the project. **Section 2** provides Project background information and its significance as it relates to each of the study areas included in the CHTC. **Section 3** provides a summary of the stepwise approach used to evaluate historical operational and analytical data, and its incorporation into the field procedures and sample collection activities prescribed in the Sampling and Analysis Plan for the project. **Section 4** includes a summary of the relevant exposure criteria and pathways used to evaluate the analytical findings from the investigation of each study area. **Section 5** through **Section 8** include detailed finding reports for each of the study areas included in the CHTC. The detailed finding reports, including figures and tables summarizing analytical results and are summarized as follows by their respective study area:

- **Section 5** – Ahmeek Mill Processing Area;
- **Section 6** – Tamarack Processing Area;
- **Section 7** – Tamarack Sands Area; and,
- **Section 8** – Torch Lake.

Section 9 includes a summary of conclusions and recommendations that are gleaned from the individual detailed findings reports with an emphasis on impacts to the CHTC as a whole. **Section 10** includes references utilized in the development of this SI Report.

1.1 PROBLEM DEFINITION

The Project is characterized by the risks posed by chemical containers and residues historically discarded in or near Torch Lake. These concerns are distinct and separate from the risks historically addressed under the U.S. Environmental Protection Agency's (EPA's) Superfund program. The RRD SFS has stated that the EPA defines the Torch Lake Superfund Site as the upper six inches (in.) of stamp sand and slag in certain areas of Houghton County and any soil cap and vegetative cover applied to such areas.

The remaining concerns at Torch Lake and the surrounding areas identified by the MDEQ include known or suspected impacts to groundwater, surface water, sediments, and upland media that were not addressed under the Superfund program. Environmental impacts that were evaluated as part of the SI were assessed under the guidance of the following objectives:

- Investigate and document unidentified, significant in-lake and/or terrestrial sources of contamination including polychlorinated biphenyls (PCBs);
- Investigate and document uncharacterized waste deposits, including more than 750 on the lake bottom as reported in the *Final Drum Removal Report Torch Lake Drum Removal, Houghton County, Michigan March 24, 1992* prepared by Geraghty & Miller, Inc.;
- Investigate and document bulk disposal areas, including stamp sand deposits, slag dumps, and landfills; and,
- Investigate and document industrial ruins including coal storage areas, underground storage tanks (USTs), asbestos containing materials (ACM), and any other waste materials identified in future investigations.

The risks posed to environmental media, sediment in particular, by the aforementioned waste deposits and continuing sources of contamination contribute to the limited recovery of the Torch Lake ecosystem. As such, the investigation was largely driven by documented observations of drum and/or other debris locations in the lake, supported by documented historic operations and detected PCB concentrations in upland areas.

Taking into account the specific objectives outlined above, the principal goal of the Project was to support a comprehensive management approach that will guide MDEQ's decision making process in addressing potential human health and environmental risks present in the CHTC. The primary focus of the project is to ascertain the source, nature, and extent of contaminants (including PCBs) in all affected environmental media (soil, groundwater, surface water, and sediments) within Torch Lake, including former C&H-operated industrial areas along the shoreline, summarized as follows:

- Ahmeek Stamp Mill Complex;
- Osceola Township Park;
- Tamarack Reclamation Plant Complex;
- Tamarack Stamp Mill Complex;
- Osceola Stamp Mill; and,
- Historic Municipal Dump.

1.2 PROJECT ORGANIZATION

Performance of the proposed work required that both the Project team and the Project structure were focused and deliberate. The phased approach of the work required that data was processed and reported in a timely manner, between team members, to facilitate the next phase of work. The

following subsections describe the Project team and the Project structure, as it relates to management and implementation.

1.2.1 Project Team

The Project was developed and implemented by the MDEQ, building on the existing partnerships and stakeholder engagement in the local community. Similarly, the MDEQ also sought to develop a collaborative management approach that included staff and resources from Michigan Technological University (Michigan Tech). Field activities were completed by the MDEQ Geological Services Unit (GSU) and WESTON. Analytical services were provided by the MDEQ's Environmental Laboratory or approved laboratories within the Contract Laboratory program.

1.2.2 Project Structure

The Project includes properties remote from Torch Lake proper, such as the Centennial Mine, a 270 acre operation just north of Calumet, the Michigan Smelter, operations in Freda and Redridge, the Tamarack City industrial ruins, Mason - Quincy Mill and leach plant, and other areas congruent with the Torch Lake Superfund Site where response actions have generally been limited to the application of soil cap and vegetative cover or eliminating the area from further consideration.

The vast distribution of these former mining operations throughout the region (spanning multiple townships, villages and cities in Houghton County along the Portage Canal, Lake Superior, Slaughterhouse Creek, and Torch Lake) required that operational areas of the mining companies be divided into geographic areas. Dividing the regional operations into smaller manageable geographic areas allowed for prioritization of the proposed investigative approach, while also establishing a phased process for assessing environmental concerns regionally.

The CHTC depicted on **Figure 1-1**, is centralized around the company's copper mining and processing operations in the vicinity of Tamarack City, Michigan. The CHTC is further subdivided into smaller study areas that were established based on historical industrial operations. The following study areas were created within the CHTC:

- Ahmeek Mill Processing Area;
- Tamarack Processing Area; and,
- Tamarack Sands Area.

The aforementioned study areas that comprise the CHTC are depicted on **Figure 1-2** and described further in **Section 2**.

2. PROJECT DESCRIPTION

Hard rock mining operations were prevalent throughout Houghton and Keweenaw Counties for nearly a century, primarily spanning an era between the mid-1800's and the mid-1900's. As mining activities declined in the region, a majority of the mine holdings, including surface and underground operations were abandoned, scrapped, and remnants otherwise left in-place. The following subsections summarize both the operational and investigative history within the CHTC while also presenting the underlying rationale for the performance of the investigative activities.

2.1 SITE BACKGROUND

This Section provides an overview of the historical industrial operations, the local topography, geology, and hydrogeology, and past investigations and response actions in the CHTC.

2.1.1 Site History

C&H generally operated in the region between 1867 and 1956 erecting and operating various industrial facilities including, but not limited to copper ore processing facilities such as stamp mills, smelters, reprocessing, flotation, and leaching plants, and laboratories. C&H's operational success in the region also afforded the company the financial capabilities to purchase and operate other area copper ore recovery and processing ventures throughout the early to mid-1900's. In addition to recovering and processing copper ore, C&H also reprocessed and smelted scrap metals from surplus World War II equipment, cables, and munitions, which included both PCB- and lead-containing materials. Consistent with past industrial practices, mining and plant operation wastes were used as fill material along the shoreline of Torch Lake. The company also used portions of the CHTC for the direct disposal of plant wastes. A primary component of these wastes includes tailings, or stamp sands that are a byproduct of the mineral processing activities conducted at the stamp mills. Stamp sands can generally be described as pulverized, "sand-sized", source-rock that was considered a waste material as copper ore was retained for processing. The stamp sands were generally discharged to Torch Lake via a launder or sluice. The most significant stamp sand deposit within the CHTC is located within Torch Lake, known as the Tamarack Sands Area. Wastes were also reportedly buried in the Tamarack Stamp Sands.

2.1.2 Topography and Local Geology

The CHTC is located along the west shore of Torch Lake in Tamarack City and Osceola Township, in Houghton County, Michigan. The shoreline in this area was historically characterized by industrial operations that included large-scale dock and shipping facilities. As stated previously waste materials, such as stamp sand, were also deposited along the shoreline, dramatically changing the natural shoreline and lake bottom of Torch Lake.

At a mean elevation of approximately 602 feet (ft) Above Mean Sea Level (AMSL) at the shoreline of Torch Lake, the land rises vertically to the west/northwest from the shoreline to an approximate elevation of 630 ft AMSL along Highway M-26. The vicinity of Highway M-26 is generally characterized by the village of Tamarack City which features residential and commercial developments that are generally built up along the toe of the hillside and extending toward Torch Lake. Beyond this centrally developed areas, the grade continues to increase towards the west/northwest, away from the lake, reaching elevations up to 1,200 ft AMSL along Highway U.S. 41. Numerous residential properties are scattered across the hillside along rural roads that connect the upper and lower highways, but also in small clusters of homes that generally developed as employee housing around historic mining locations. The villages of Lake Linden and Hubbell are located north of the CHTC, where elevations generally remain below 700 ft AMSL, representative of the Trap Rock River Valley.

CHTC is located within the Lake Superior Basin and the Keweenaw Peninsula Watershed. There are small creeks and streams that discharge to Torch Lake within the CHTC, the largest of which is the Dover Creek.

According to the *Soil Survey of Houghton County Area, Michigan* issued in October 1991 by the United States Department of Agriculture (USDA) – Soil Conservation Service (SCS), the near surface geology in the CHTC generally consists of soils that have been covered by fill in upland areas in the vicinity of Highway M-26. Closer to the shore of Torch Lake, areas of stamp stand and similar wastes are more predominant.

- For soils in the developed areas of the CHTC the USDA generally describes the soils as being in "…areas that have been covered with fill. In some areas the upper one to two feet of the original soil material has been removed for use as topsoil. The texture ranges from sand to clay loam. In most areas the soils are somewhat excessively drained to moderately

well drained, but in some areas they are somewhat poorly drained or poorly drained. Many of these areas are old copper mill sites and contain numerous foundations and abandoned railroad grades."

- Along the shoreline in areas where wastes and stamps sands have been deposited the USDA generally describes the soils as "…waste material from past copper mining. The material consists of sand-sized waste material from copper stamping mills. Most of the sand was deposited in Torch Lake, Portage Lake, and Lake Superior by pipeline and formed delta-like deposits. Individual areas of this unit are oval or irregular in shape and range from 5 to 100 acres in size. This unit is poorly suited to most uses. It is very susceptible to wind erosion."

Underlying these near surface soils are native soils described in the *Draft Site Inspection Report for C&H Tamarack Operations, Hubbell, Michigan, 49934 - March 2013* prepared by the MDEQ-RRD, Superfund Section, Pre-remedial Group, Site Evaluation Unit (Pre-remedial Group) as "ground moraine with coarse-textured, reddish brown, sandy loam, glacial till. The deposits vary in composition and thickness and do not appear to be laterally extensive over the CHTC. The deposits range in thickness from approximately 11 to 50 ft below the ground surface (bgs), but have been observed in thicker deposits with interbedded clay, silt, and gravel units. The bedrock geology underlying the glacial deposits in the area is comprised of Jacobsville Sandstone."

2.1.3 Local Hydrogeology

The *Draft Site Inspection Report for C&H Tamarack Operations, Hubbell, Michigan, 49934 - March 2013* prepared by the MDEQ-RRD SFS, Pre-remedial Group states that drinking water within a four-mile radius of the CHTC is obtained entirely from groundwater sources. A radial search completed by the Pre-remedial Group utilized 2000 census data to estimate that approximately 1,400 people receive their potable water from private residential wells. Similarly, the search concluded that approximately 2,100 people obtain potable water from municipal wells that service the communities of Lake Linden, Hubbell, Tamarack City, and Mason. Please note that the search results are not a detailed representation of every potential groundwater receptor in the CHTC.

The report stated that municipal water service is generally limited to residential properties located along Highway M-26 in the villages of Lake Linden, Hubbell, Tamarack City, and Mason. The report estimates that approximately 1,100 people in these communities receive municipal water that is provided by several different sources, including the following:

- The Village of Lake Linden operates three public water supply wells located within the village;
- Michigan American Water Company which operates public water supply wells located outside of the 4-mile search radius; and,
- Osceola Township which operates public water supply wells located in Dollar Bay.

Please note that the report did not include a comprehensive assessment of water service in the CHTC. The Pre-remedial group concluded that, based on geological composition, that the shallow glacial aquifers and bedrock aquifers in the region were likely interconnected. As noted in the preceding subsection, Dover Creek and several other small streams drain to Torch Lake in the CHTC. Torch Lake drains to Portage Lake and the Keweenaw Waterway connecting the inland lake to Lake Superior. The Pre-remedial Group noted that the nearest known surface water intakes used for public drinking water supplies are located approximately 11 miles south of the Portage Lake connection to Lake Superior, making these public drinking water supplies approximately 25 miles south of the Project.

2.1.4 Overview of Regulatory Investigations and Response Actions

The Project area, including the lands and waterways throughout the Keweenaw Peninsula that were the location of copper milling and beneficiation activities beginning in circa 1868 were collectively identified by the EPA as the Torch Lake Superfund Site in 1986. Through a series of studies EPA concluded the Torch Lake Site posed actual or threatened releases of hazardous substances that may present an imminent and substantial endangerment to public health, welfare, or the environment. Given the complexity of the region wide issue, the EPA's 1992 Record of Decision (ROD) divided the Torch Lake Site into three Operable Units (OUs):

- **OU 1** includes surface tailings, drums, and slag pile/beach on the western shore of Torch Lake. These tailing piles include stamp sands in Lake Linden, Hubbell/Tamarack City, and Mason, while a slag pile/beach is located in Hubbell;
- **OU 2** includes groundwater, surface water, submerged tailings and sediments in Torch Lake, Portage Lake, the Portage Canal, and other water bodies; and,
- **OU 3** includes tailings and slag deposits located in the north entry of Lake Superior, Michigan Smelter, Quincy Smelter, Calumet Lake, Isle-Royale, Boston Pond, and Grosse-Point.

Ultimately the OU 1 and OU 3 remedy selected and implemented by the EPA required that stamp sands, tailings and slag piles be covered with soil and vegetation, and that use restrictions are put in place to protect the covered materials' long-term integrity. Through these measures it was concluded that the following Remedial Actions Objectives (RAO) would be met:

- Reduce or minimize potential future risks to human health associated with the inhalation of airborne contaminants from the tailings and/or slag;
- Reduce or minimize potential future risks to human health associated with direct contact with and/or the ingestion of the tailings and/or the slag;
- Reduce or minimize the release of contaminants in tailings to the groundwater through leaching; and,
- Reduce or minimize the release of contaminants in tailings to the surface water and sediment by soil erosion and/or air deposition.

The EPA selected a "No Action" remedy in their 1994 ROD for OU 2. To meet the RAO, the remedy selected for OU 2 took into consideration and relied upon:

- The reduction of stamp sand loading to surface water bodies expected as a result of the remedial action taken at OU 1 and OU 3;
- Ongoing natural sedimentation and detoxification such as that which is occurring in other surface water bodies in the area;
- Institutional programs and practices controlling potential future exposure to site-affected groundwater which are administered at the county and state level; and,
- The long-term monitoring and the five year review process monitoring requirements of the remedy selected for OU 1 and OU 3 under the 1992 ROD.

The Project area is located within the Torch Lake Superfund Site footprint; however, the properties identified for assessment were generally not included in the Torch Lake Superfund Site OU1, nor were remedies in place to mitigate environmental conditions on the properties. The only properties included in the SI that underwent previous remedial activities by the EPA are the capped portions of the Ahmeek Mill Processing Area and the Tamarack Sands Area. OU2, for which EPA selected a no-action alternative, includes groundwater, surface water, submerged tailings (stamp sands), and sediment that were also investigated.

Historically, numerous environmental investigations and response activities have been completed within the CHTC by state and federal agencies as well as private parties. The investigations were conducted on and along the shoreline of Torch Lake with various purposes, often specific to a particular property or investigative focus. Although often referenced in individual reports, a comprehensive approach consolidating the findings of these investigations had not been completed to date.

The data and information derived from these investigations were assimilated and compiled by the MDEQ and summarized by WESTON in a document entitled *Compilation and Interpretation of Key Historic Studies Abandoned Mining Wastes – Torch Lake non-Superfund Site – C&H Tamarack City Operations Area* dated March 2015 and discussed further in **Section 3**. The findings of these investigations and the conclusions derived from the performance of each assessment were selected to assist in the identification of historic areas of contamination or data gaps requiring further assessment.

Response actions completed in the CHTC include the aforementioned capping activities completed by the EPA. "The stabilization and covering of contaminated mine tailings and slag material in areas of Torch Lake or surrounding water bodies also included the recording of institutional controls, the natural recovery of area water bodies, and long-term monitoring of area water bodies and groundwater (EPA, 2008)." Unless otherwise "delisted", these capped areas of the Torch Lake Superfund Site remain under the management and monitoring of the EPA. The MDEQ has taken responsibility for operation and maintenance activities in those areas were remedial actions have been implemented and subsequently delisted.

In addition to the remedial activities implemented as part of the Torch Lake Superfund Site, the EPA also performed a site assessment and subsequent removal action to mitigate potential public health risks related to ACM identified at the Ahmeek Stamp Mill Complex. In August 2014, the EPA Emergency Response Branch removal action resulted in the collection and disposal of 4 cubic yards (yd^3) of friable asbestos material. At the completion of the removal action, backfill was placed in the areas of former debris piles and around the concrete pillars on the Ahmeek Stamp Mill property.

During the fall of 2015, MDEQ undertook an emergency interim response to cap asbestos containing building material (ACBM) observed on and along a trail in the Tamarack Sands Area. The informal trail is a former railroad grade right of way that is owned by the Michigan Department of Transportation (MDOT).

Investigations in the Ahmeek Mill Processing Area, Tamarack Processing Area, and Tamarack Sands Area have determined that elevated levels of metals in surficial soils, and in some cases, asbestos; lead and arsenic in sludges; polynuclear aromatic hydrocarbons (PNAs) and PCBs in waste materials; volatile organic compounds (VOCs) venting into Torch Lake from contaminated groundwater; and metals in groundwater. Further, the findings of the MDEQ SI and other investigations confirm that significant quantities of waste are present at terrestrial and offshore locations in and around Torch Lake. Analytical results also indicate that shallow and subsurface soils, groundwater, and sediments have become contaminated with heavy metals, especially arsenic, chromium, copper, and lead.

2.2 SITE LOCATION AND DESCRIPTION

The CHTC consists of approximately 110 acres of land extending approximately three miles along the shoreline of Torch Lake. The Project area also incorporates over 187 different parcels with multiple property owners. Building on the organization of the Preliminary Assessment completed by the MDEQ in November 2012, the CHTC was divided into three smaller study areas based on the historical industrial operations in each area. For consistency, WESTON has expanded upon the study area identification established by the MDEQ, while focusing on the identified industrial sites defined in the Statement of Objectives (SOO) prepared by the MDEQ.

The investigative areas and their respective former industrial sites are summarized as follows:

- Ahmeek Mill Processing Area
  - Osceola Township Park; and,
  - Ahmeek Stamp Mill Complex.
- Tamarack Processing Area
  - Tamarack Reclamation Plant Complex;
  - Tamarack Stamp Mill Complex; and,
  - Osceola Stamp Mill Complex.

- Tamarack Sands Area
  - Historic Municipal Dump (Trail Asbestos/Sands).

The study areas defined above are depicted on **Figure 1-2**. The following subsections provide additional detail related to the study areas identified above.

2.2.1 Ahmeek Mill Processing Area

The Ahmeek Mill Processing Area is the northern-most study area in the CHTC, located adjacent to and directly south of the Hubbell Beach and Slag Dump study area located in the C&H Lake Linden Operations Area (CHLL). The Ahmeek Mill Processing Area essentially includes the Ahmeek Stamp Mill Complex and lands adjacent to the former industrial facility that were potentially negatively impacted by the former industrial operations. The Ahmeek Stamp Mill Complex was comprised of the following primary facilities that supported the processing of ore from the Ahmeek Mine located in Keweenaw County:

- Ahmeek Stamp Mill;
- Ahmeek Pump House;
- Ahmeek Power House; and,
- Ahmeek Boiler Houses.

The general locations of these former structures are depicted on **Figure 2-1**.

As documented by Michigan Tech, the Ahmeek Stamp Mill was constructed in 1909 by the Ahmeek Mining Company. The mill processed ore from the Ahmeek Mining Company's mines as well as other smaller mines that did not have their own stamping facilities. The mill was supported by a power house and boiler house. A mixed pressure 2,000 kilowatt (KW) turbine was installed at the mill in 1916 to capture and utilized excess steam generated by the mill.

In 1923 the Ahmeek Mining Company's holdings, as well as other smaller mining companies, were consolidated with C&H forming the C&H Consolidated Mining Company. In 1930 the existing boiler house and power house at the Ahmeek Stamp Mill Complex were demolished and new facilities were constructed and brought on line in 1931. By 1938 the Ahmeek Stamp Mill housed eight stamps that could process 900 tons of material per day. By 1941 the Ahmeek Boiler House was providing steam

to the Tamarack Reclamation Complex and by 1947 the Ahmeek Power House had become a central component in C&H's power generation in the region.

The Ahmeek Stamp Mill Complex continued to operate and between 1958 and 1968, and was reportedly recovering copper from slag, tailings, and brick in addition to processing ore from the mines. The Ahmeek Stamp Mill Complex discontinued operation in 1969 when C&H's holdings were sold to Universal Oil Products.

The areas of interest are generally bound to the north by 6th Street and to the west by Highway M-26. The study area then extends west toward Torch Lake to include stamp sand deposits along the lake shore and Gull Island, which is also comprised of stamp sands. Properties within the Ahmeek Mill Processing Area are both municipally and privately owned. The Osceola Township Park is located within the footprint of the former Ahmeek Stamp Mill Complex.

As summarized in **Section 2.1**, the EPA performed a site assessment and subsequent removal action at the Ahmeek Stamp Mill Complex in 2014. Since the completion of those activities, the MDEQ documented a suspect panel-like material labeled "Asbestos" in the brush across the street from the basketball court and the Osceola Township Park. The observation of the panel-like suspect asbestos containing material (SACM) confirms that disposal practices at the end of mining era operations created the potential for waste distribution along the shoreline of Torch Lake, and in particular, the vicinity of the former stamp mill.

The Ahmeek Mill Processing Area is generally characterized as being a former industrial area. The industrial footprint of the stamp mill complex, including the locations of former buildings is depicted on **Figure 2-1**. Refer to **Appendix A** for an historical account prepared by Michigan Tech, pertaining to the Ahmeek Mill Processing Area, specifically the Ahmeek Stamp Mill Complex.

2.2.2 Tamarack Processing Area

The Tamarack Processing Area is located on the west side of Highway M-26, southwest of the Ahmeek Mill Processing Area. Similar to the Ahmeek Mill Processing Area, the Tamarack Processing Area was initially developed as the location for several stamp mills for smaller mining companies in the region. The Tamarack Mill was located centrally in the study area and was the northern-most stamp mill within the study area. The Tamarack Mill was constructed in 1887 by the Tamarack Mining

Company. The Tamarack Mining Company constructed a second stamp mill, the Tamarack No.2, directly to the south of the existing mill in 1898. After 1917, the Tamarack No.2 mill was renamed the Lake Milling, Smelting, and Refining Company No.2 Mill. Approximately 300 feet south of the Tamarack No.2, was the Osceola Stamp Mill that was constructed by the Osceola Mining Company in 1899. Between 1906 and 1910, C&H had purchased controlling interests in the Tamarack and Osceola Mining Companies and over time consolidated their operations and transitioned to a focus on reclamation. The Tamarack Stamp Mill was closed in 1919 and demolished and scrapped in 1920. The Tamarack No.2 continued operation until 1930 and was demolished and scrapped in 1947. The Osceola Stamp Mill was closed in 1921 and the mill and associated boiler house were scrapped in 1941.

As C&H's operational focus shifted towards reclamation, the Tamarack Reclamation Complex was built in 1920 with the majority of the facilities becoming operational by 1925. The Tamarack Reclamation Complex was constructed to the north of the Tamarack Mill and was comprised of the following primary facilities:

- Tamarack Regrinding Plant;
- Tamarack Electric Substation;
- Tamarack Flotation Plant;
- Tamarack Leaching Plant; and,
- Tamarack Classifying Plant.

The general locations of these former structures are depicted on **Figure 2-2**.

The Tamarack Reclamation Complex reprocessed stamp sands originally deposited in Torch Lake by the Ahmeek Stamp Mill and the older mills described in the preceding paragraphs. The recovered stamp sands were reground, classified/sorted, and leached via chemical processes to recover residual copper that remained in the previously discarded stamp sands. In 1945 C&H expanded operations at the Tamarack Reclamation Complex by establishing Lake Chemical Company which would focus on the development of copper chemicals, such as agricultural amendments and insecticides. In 1947 the Tamarack No.2 mill was renovated to establish a warehouse to increase storage capacity for copper chemicals produced at Lake Chemical Company as well surplus machinery and electrical equipment. Lake Chemical Company's operations continued into the 1960's and reportedly closed in 1968 when Tamarack Reclamation Complex closed.

The areas of interest are generally bound to the west by North Amygdaloid Street and to the east by Highway M-26. The study area is generally characterized by residential properties in the north with the focus of the Sampling and Analysis Plan (SAP) being placed on the former industrialized areas south of Tamarack Hill Road. Properties within the Tamarack Processing Area are generally privately owned.

The Tamarack Processing Area is generally characterized as being a former industrial area. The industrial footprint of the stamp mills and the reclamation complex, including the locations of former buildings, is depicted on **Figure 2-2**. Refer to **Appendix A** for Michigan Tech's historical account of the Tamarack Processing Area.

2.2.3 Tamarack Sands Area

The Tamarack Sands Area is located south of the Ahmeek Mill Processing Area and east of the Tamarack Processing Area along the shoreline of Torch Lake. The area is generally accessible to vehicular and pedestrian traffic. The area was capped as part of the EPA's Torch Lake Superfund remedial action; however, reports related to the existence of a historic municipal dump resulted in the inclusion of the area in the planned investigation as described in the SAP. Further, the capped stamp sands are wastes associated with the industrial operations in the Ahmeek Mill and Tamarack Processing Areas. Since salvage and disposal operations during the decommissioning of the industrial facilities are not well documented there was also reason to investigate, as part of this Project, the potential for contaminant sources to be deposited with the stamp sands.

The Tamarack Sands Area is bound to the west by Highway M-26 and to the east by Torch Lake. The Tamarack Sands Area is both municipally and privately owned and is generally characterized as in-lake waste deposits. The location of the Tamarack Sands Area is depicted on **Figure 2-3**, respectively. **Appendix A** contains Michigan Tech's historical account of the Tamarack Sands Area.

2.2.4 Torch Lake

The study areas described in the preceding subsections are all located along the shoreline of Torch Lake. Each of these former industrial operations relied on the waters of Torch Lake for shipping, process water, and waste discharge. In addition, the communities established around these industrial facilities also used the lake for similar purposes, historically discharging sewage and other wastes into the lake.

Historically, containers, drums, and building materials have been identified in Torch Lake. Some of these items were characterized and recovered as part of previous removal actions; however, many areas of similar waste deposits remain submerged or partially submerged along the shoreline of the lake. In addition, the abandoned or vacant state of the properties in several locations make Torch Lake susceptible to the erosion or discharge of contaminated environmental media emanating from properties along the shoreline.

Numerous investigations have been completed in Torch Lake in order to evaluate sediment and water quality within the lake. PCBs have been detected in sediment and surface water in the lake and have resulted in the placement of the following beneficial use impairments (BUIs):

- **Restrictions on fish and wildlife consumption** - When contaminant levels in fish or wildlife populations exceed current standards, objectives or guidelines, or public health advisories are in effect for human consumption of fish and wildlife.
- **Degradation of benthos** - When the benthic macroinvertebrate community structure significantly diverges from un-impacted control sites of comparable physical and chemical characteristics. In addition, this use will be considered impaired when toxicity (as defined by relevant, field-validated bioassays with appropriate quality assurance/quality controls) of sediment associated contaminants at a site is significantly higher than controls.

Despite the effectiveness of these prior investigations in identifying sediment contamination, the investigations were not focused on identifying and characterizing the sources of contamination. As such, the goals of the SI were to verify the presence of these abandoned containers and wastes on the bottom of the lake and to more fully characterize the nature and extent of these likely contaminant sources. The evaluation of potential PCB sources and areas of PCB contamination in and around Torch Lake were an integral component of the SI that will support the long-term protection and rehabilitation of the lake.

3. FIELD PROCEDURES AND SAMPLE COLLECTION

The field procedures and sample collection activities that were implemented in the CHTC were used to evaluate the presence of contaminated environmental media in the study areas described in **Section 2**. This Section describes the phased approach for reviewing and assessing each area and the subsequent field sampling and laboratory analysis that followed.

3.1 PLANNING AND COORDINATION

The assessment and investigation of each study area in the CHTC included several research oriented steps that served as the foundation for the *Draft Sampling and Analysis Plan for the Abandoned Mining Wastes Torch Lake Non-Superfund Site, Tamarack City Operations Area, Houghton County, Michigan* (SAP) prepared by WESTON in April 2015. The following subsections describe the research, mapping, and testing procedures that were utilized during SAP development to ensure that the investigative activities were not redundant and focused on the goals and objectives established by the MDEQ.

3.1.1 Historical Research and Data Compilation

The implementation of the investigative portion of the SI was closely linked to the collaborative efforts of the Project team, described in **Section 1**. The historical archive research and mapping completed by Michigan Tech was critical to the development of the SAP since the findings specifically identified the location of facilities and operational areas that were historically utilized by C&H. The following provides a summary of the activities completed by Michigan Tech and the associated research and documentation that was used to support SAP development:

- Identification of potential sources of contaminants of concern (COCs), including PCBs, through the evaluation of waste streams from industrial buildings and processes including, but not limited to, chemicals used in reclamation processes; chemicals produced as byproducts of copper processing; process sludges; process slag; and leaching reagents.
- Investigation of archives related to building function, production processes, chemical processes, and waste streams by building location.
- Production of building narratives for buildings within the geographic Area that include details related to operational periods, production activities, operational processes, building use, and information on chemicals, metals, and wastes used in or generated at the facility.

- Completion of mapping activities based on collected archival data and field inspections noting the location of foundations and building remnants.

The findings of the archival research including the elements summarized above were compiled by Carol A. MacLennan, Professor of Anthropology in the Michigan Tech Social Sciences Department with the support of graduate students in the Industrial Archaeology Graduate Program, including Emma Schwaiger, John Baeten, Dan Schneider, and Brendan Pelto. The Michigan Tech Research Institute (MTRI) supported these efforts by geospatially referencing data sources for visualization in a Geographic Information System (GIS).

A summary of the historical findings reported by Michigan Tech is presented on **Table 3-1**. A detailed summary report and supplemental information including building narratives, maps, and documentation is included in **Appendix A**.

3.1.2 Data Compilation Technical Memorandum

As outlined in **Section 2**, the comprehensive nature of the SI entailed not only a historical operational perspective, but also required that the results of previous investigative activities be incorporated. The evaluation and interpretation of analytical results and findings from previous key investigations was completed to create a baseline understanding of conditions in the CHTC and Torch Lake. The incorporation of these findings into the sampling program minimized redundancies in data collection, but also created a more comprehensive approach for assessing potential environmental impacts.

The following is a summary of the key documents summarized in the *Compilation and Interpretation of Key Historic Studies Abandoned Mining Wastes – Torch Lake non-Superfund Site – C&H Tamarack City Operations Area* dated March 2015:

- *Baseline Environmental Assessment of Tamarack Stamp Mill in Osceola Township, Portions of Section 13, T55N, R33W, Osceola Township, Houghton County, Michigan – November 2001***.** Prepared by U.P. Engineers and Architects, Inc.
- *Brownfield Redevelopment Assessment Report for Tamarack City Stamp Mill, M-26 Highway, Hubbell, Michigan – December 2002.* Prepared by the MDEQ-RRD, Superfund Section, Pre-remedial Group, Site Evaluation Unit (Pre-remedial Group).

- *Draft Technical Memorandum for Tamarack City Stamp Mill Site Analytical Data Review and Evaluation – March 2005.* Prepared by WESTON.

- *Final Report, PCB Study Using Semipermeable Membrane Devices in Torch Lake, Houghton County – March 2006*. Prepared by the Great Lakes Environmental Center.

- *Summary Report for the Torch Lake Area Assessment, Torch Lake NPL Site and Surrounding Areas, Keweenaw Peninsula, Michigan – December 2007*. Prepared by WESTON.

- *PCB Concentrations in Walleye Collected from Torch Lake (Houghton County) and Lake Superior - June 2008*. Prepared by the MDEQ Water Bureau.

- *Aroclor Sediment Investigation, Torch Lake Area of Concern, Houghton County, Michigan – June 2009*. Prepared by the EPA Great Lakes National Program Office (GLNPO).

- *Draft Site Inspection Report for C&H Tamarack Operations, Hubbell, Michigan 49934 – March 2013.* Prepared by the MDEQ-RRD, Superfund Section, Pre-remedial Group.

- *Tamarack Area Facilities, Task 3 – Phase 2 Report, Historical Archive Research and Mapping from Hubbell Beach through Tamarack City, C&H Historic Properties of Torch Lake – October 2014.* Prepared by Michigan Tech.

- *Removal Action Letter Report, Tamarack Stamp Mill, Osceola Township, Houghton County, Michigan – October 2014.* Prepared by Oneida Total Integrated Enterprises, Inc.

- Correspondence, narratives, and analytical results from other studies including the following:

  - During a preliminary walk-through of the Ahmeek Mill Processing Area the MDEQ observed a panel in the brush across the street from the basketball court and the Osceola Township Park. The panel was labeled as asbestos.

  - While conducting interviews during the preparation of their historical documentation, Michigan Tech received an account of an alleged historical municipal dump located in the northern portion of the Tamarack Sands Area. Additional inquiry determined that the "Old Tamarack City Dump is lake ward of Spruce Street between 2nd and 3rd Street in Tamarack City. Reportedly, evidence related to dumping in the area is easily identifiable and may include suspect asbestos containing material (SACM)."

- Post development of the Key Historic Studies document, MDEQ provided a letter dated 5 February 1987 from Michigan Tech to the Michigan Department of Natural Resources (MDNR). This letter was prepared by a Michigan Tech Research Associate to document some alleged barrel dumping activities in the Project area.

In support of developing a comprehensive approach for evaluating risks, the analytical results from the investigations summarized above were compiled and compared to the same regulatory criteria.

Consistent with this approach, the same regulatory criteria were used to evaluate the analytical results collected during the SI. The regulatory criteria utilized for evaluating analytical results from surface soil, subsurface soil, groundwater, sediment, surface water, building materials, and waste deposits are discussed in detail in **Section 4**.

The analytical results from these key investigations were used to characterize the study areas of the CHTC and contributed to the horizontal and vertical placement of the proposed sampling locations presented in the SAP. Consequently, the review and evaluation of the summarized reports resulted in the preparation of a SAP1 that built upon existing analytical results and focuses on potential risks posed to human health and ecological receptors. In addition, the SI was also guided by the documented observations of drum and/or other debris locations in the lake as well as consideration related to historic operations and detected PCB concentrations.

3.1.3 Offshore Mapping and Procedural Testing

During 2007 and 2012 the analytical results from surface water and sediment samples indicated that contaminants emanating from documented contamination on land may be impacting the nearshore aquatic environment of Torch Lake. In addition, historical investigations in the lake have documented the presence of submerged drums, containers, and waste deposits on the bottom of Torch Lake. The visual confirmation of the underwater targets was a key component to the Project, distinguishing it from previous investigations by eliminating the concept of "blind" sampling and focusing sample locations on specific waste deposits.

Evaluation of these underwater features as part of the SI required the use of advanced technological methods to identify specific targets for sample collection. Completion of these tasks again, relied upon the collaborative efforts of the Project team to conduct underwater mapping and video surveillance of the lake bottom.

In 2014 and 2015 the MDEQ GSU conducted a side scan sonar survey of the lake bottom in the CHTC using a tow fish and interpreted the results, identifying areas where targets were most likely to be present. The intent of the assessment was to collect qualitative data that can be used to develop a plan for more traditional investigation, sampling, and assessment of potential offshore

contaminant sources. The side scan sonar images generated by the MDEQ GSU are included in **Appendix B**.

The next step of the investigation included visual confirmation of the targets that were identified through the interpretation of the side-scan sonar imagery. The MDEQ GSU deployed their ROV at select locations to investigate and provide visual evidence of potential drum locations and similar anomalous underwater features. Underwater photographs and videos obtained from the ROV are included in **Appendix C**.

3.1.4 Sampling and Analysis Plan Development

The development of the SAP for the CHTC was focused on ensuring that it considered relevant historic operational and investigative findings. Identification of buildings and facility operations provided an understanding of potential chemicals and waste streams that may have been used or disposed of on a given property. For example, PCBs are often regarded as an oil or fluid used in electrical generating facilities, but PCBs were also used for their fire retardant properties in electrical cables.

With an understanding of the historical operations, the findings of previous terrestrial and offshore analytical data were evaluated. Data was assessed with regard to the historical operations, but also to evaluate whether concentrations of specific COCs were present. If identified, the horizontal and vertical distribution was then evaluated. The evaluation considered whether additional data was needed to further delineate the extent of contamination or evaluate whether a potential source of contamination was contributing to the detection of contaminants. Similarly, the lack of analytical data in a given study area was also considered to determine if data gaps were present.

The risks posed to environmental media, sediment in particular, by these waste deposits and continuing sources of contamination contribute to the limited recovery of the Torch Lake ecosystem. As such, the investigation was largely driven by documented observations of drum and/or other debris locations in the lake as well as consideration related to historic operations and detected PCB concentrations in terrestrial portions of the CHTC. The prevailing contaminants of concern in the CHTC generally include organic and inorganic contaminants in surface and subsurface soils, groundwater, sediment, and surface water. In addition, observed waste deposits and building materials

were suspected to contain asbestos in addition to organic and inorganic contaminants. As a result, the SAP identified key analytes in environmental media for assessment during the SI. Although PCBs were prescribed for analysis in all environmental media, the selection of remaining analytes were subject to field observations and the judgment of the field teams collecting the samples. The following provides a summary of the target analytes defined in the SAP with respect to the investigated environmental media:

Surface Soils/Waste Deposits (0 to 6 inches (in.) bgs)

- Inorganic COCs (Metals and Cyanide) by SW-846 including 3000 Series, 7000 Series 6010, and ASTM International (ASTM) D 7511-09 Analyses;
- VOCs by SW-846 Method 5035A;
- PCBs by SW-846 Method 8082A; and,
- Semi-volatile organic compounds (SVOCs) by SW-846 Method 8310.
- Asbestos by Polarizing Light Microscopy (PLM) – California Air Resource Board (CARB) 435 – 1,000 point count – analytical sensitivity 0.1%.

Subsurface Soils (Greater than (>) 6 in. bgs)

- Inorganic COCs (Metals and Cyanide) by SW-846 including 3000 Series, 7000 Series 6010, and ASTM D 7511-09 Analyses;
- VOCs by SW-846 Method 5035A;
- PCBs by SW-846 Method 8082A; and,
- SVOCs by SW-846 Method 8310.
- Oil and Grease by SW-846 Method 1664A.

Groundwater

- Inorganic COCs (Metals) by SW-846 including 3000 Series Analysis 7000 Series and 6010;
- VOCs by SW-846 Method 5035A;
- PCBs by SW-846 Method 8082A;
- Chloride by SW-846 Method 300.1;

- Sulfate by SW-846 Method 325; and,
- SVOCs by SW-846 Method 8310.

Sediment

- Inorganic COCs (Metals and Cyanide) by SW-846 including 3000 Series, 7000 Series 6010, and ASTM D 7511-09 Analyses;
- VOCs by SW-846 Method 5035A;
- PCBs by SW-846 Method 8082A; and,
- SVOCs by SW-846 Method 8310.

Drums, Containers, Building Materials, and Waste Deposits

- Inorganic COCs (Metals and Cyanide) by SW-846 including 3000 Series, 7000 Series 6010, and ASTM D 7511-09 Analyses;
- VOCs by SW-846 Method 5035A;
- PCBs by SW-846 Method 8082A;
- SVOCs by SW-846 Method 8310; and,
- Bulk Asbestos by PLM Method 600/R-93/116.

Inorganic COCs were selected for analysis based on an assessment of historical exceedances of applicable regulatory criteria. Twenty three inorganic COCs and cyanide were initially selected for analyses. The following provides a list of the selected inorganic analytes evaluated during the SI:

- Aluminum;
- Antimony,
- Arsenic;
- Barium;
- Beryllium;
- Cadmium;
- Chromium (Total);
- Cobalt;
- Copper;
- Cyanide;
- Iron;
- Lead;
- Manganese;
- Mercury;
- Nickel;
- Selenium;
- Silver;
- Lithium;
- Magnesium;
- Thallium;
- Titanium; and,
- Zinc.

The species of chromium, trivalent versus hexavalent, was assessed and determined for environmental media during previous investigations in the area. The *Public Health Assessment for Evaluation of Inhalation of Airborne Stamp sands in the Torch Lake Superfund Site and*

Surrounding Area (Michigan Department of Community Health (MDCH), 2014 noted that "one would not expect the hexavalent chromium form to occur in stamp sands because the trivalent chromium is typically the predominant form of chromium in the environment." Therefore samples analyzed during the SI were not further assessed for hexavalent chromium and regulatory criteria for trivalent chromium were utilized in the subsequent evaluation of data (both historical and current) derived from the CHTC.

3.2 FIELD PROCEDURES AND SAMPLE COLLECTION

Similar to SAP development, the implementation of field activities in the CHTC were conducted in several terrestrial and offshore phases to ensure that sufficient data was available to adequately characterize the potential human health and environmental risks present in each study area. Field sampling activities were generally completed during four 2015 mobilizations.

The following subsections summarize the procedures and methodologies used during the SI.

3.2.1 Potential Physical and Health Hazard Inventory

The evaluation of each study area in the CHTC included a physical inspection of the properties within the area. Field inspections were conducted on properties where written access was granted to the MDEQ. In the cases where access was not requested based on historic operational and investigative findings, property conditions were evaluated from a neighboring property or public right of way where access was permitted. The inspections included the locating and inventory of historical structures and artifacts associated with the former mining era operations within each study area. In addition, each study area was also inspected for potential physical and health hazards. Such hazards may include potentially abandoned drums and containers, suspect asbestos containing materials (SACM), stained or oily soils, and similar observed environmental conditions. Potential physical hazards, including waste deposits, metal debris, and similar conditions were also recorded in areas accessed.

The effort included the development of two field inspection check lists that incorporated photographic documentation and written descriptions of identified features. Reconnaissance activities were completed at all of the properties in the CHTC. A Reconnaissance Log was used to document the general characteristics of the property including the inventory and documentation of

mining era features for each property. The form was also used to document potential physical and health hazards identified on the property that warranted further inspection or sampling to adequately characterize potential risks. Completed Reconnaissance Logs are included in **Appendix D**.

The findings of the reconnaissance activities were used to facilitate the next phase of inspection. Targeted inspections included revisiting documented hazards and collecting samples to better characterize the perceived risks documented during reconnaissance. The following provides a summary of the various media that was sampled during the targeted inspection activities:

- Documented abandoned containers were not opened and sampled due to health and safety considerations; however, exposed contents or surface soils adjacent to the containers were sampled.
- Documented SACM was sampled by a licensed asbestos inspector in the State of Michigan. Sampled media included asphaltic roofing material, fibrous materials, paper-like materials, transite, and cementitious plaster-like material. A total of 34 bulk asbestos samples were collected from the CHTC.
- Documented waste materials on the ground surface were sampled.

Each of the sampled perceived hazards listed above was located with a GPS unit with sub-meter accuracy and photographed. Sample identification and time of collection and a description of the sampled material were documented on a Targeted Inspection Form. Completed Targeted Inspection Forms are included in **Appendix E**. A summary of the samples collected during the targeted inspection, including their descriptions, requested analyses, and other relevant information is included on **Table 3-2**.

Findings specific to individual study areas within the CHTC are included in the "Detailed Findings Reports" in **Section 5** through **Section 8** of this SI Report.

3.2.2 Surface Soil and Waste Deposit Sampling

Proposed surface soil sampling locations were predetermined in the SAP based on the evaluations and assessments presented in **Section 3.1**. Based on these findings it was prescribed in the SAP that all surface soil and waste deposit samples be analyzed for PCBs with a select subset analyzed for the following target analytes:

- VOCs;
- SVOCs;
- Inorganic COCs; and,
- Asbestos.

Grab soil sample were collected from proposed surface soil (0-6 in.) sampling locations. In sampling areas where waste deposits or historical surface soils were capped or covered in accordance with the EPA ROD for OU2 in the Ahmeek Mill Processing Area and Tamarack Sands Area, surface soil samples were collected from directly beneath the cover media. These conditions were encountered in EPA-capped areas, but also in areas that have been redeveloped or improved such as the beach areas, public parks, and private property. The following provides a summary of the sampling procedures used during the SI.

- Rocks and organic matter (including grasses, shallow vegetation roots, and leaves) were removed from the surface of each location before a surface soil sample was collected.

- Hand tools and direct-push boring techniques were used to collect soil samples from each sampling location. Grab surface soil samples were collected from the 0 to 6 inch interval of the extracted soil core.

- Soil samples were transferred directly into laboratory-provided sample jars. Sample jars were then labeled and placed in a cooler on ice for transportation to the analytical laboratory under chain of custody.

- Surface soil and waste material sampling utilized the following nomenclature:

  – SS – Generally describes as hand-tool collected surface soil sample;
  – SB – Generally describes as direct-push boring collected surface soil sample; and,
  – DM – Describes a waste material, soil, or residual process material sample collected in proximity to a drum.

Surface soil samples were collected from all of the study areas. A total of 38 surface soil samples (SS or SB designation), including quality assurance (QA)/quality control (QC) samples, were collected from the CHTC. Four waste material, soil, or residual process material sample collected in proximity to a drum material samples (DM designation) were also collected. Each of the sample locations were located with a GPS unit with sub-meter accuracy and a description of the sampled material was documented on a field log. Completed targeted inspection logs documenting waste material samples are included in **Appendix E**. A photographic log, documenting sample collection activities, is included in **Appendix F**. Completed boring logs are included in **Appendix G**. A

summary of the samples collected during the targeted inspection, including their descriptions, requested analyses, and other relevant information is included on **Table 3-2**.

Sampling locations, analytical results, and findings specific to individual study areas within the CHTC are included in the detailed findings reports in **Section 5** through **Section 8** of this SI Report.

3.2.3 Subsurface Soil Sampling

Proposed subsurface soil sampling locations were predetermined in the SAP based on the evaluations and assessments presented in **Section 3.1**. Based on these findings it was prescribed in the SAP that all subsurface soil samples be analyzed for PCBs with a select subset analyzed for the following target analytes:

- VOCs;
- SVOCs;
- Inorganic COCs; and,
- Oil and Grease.

The MDEQ's GSU utilized a track-mounted direct-push drill rig to retrieve continuous soil cores from the subsurface. Borings were advanced into the groundwater table. Subsurface soil samples collected for laboratory analysis were selected based on field screening results and visual or olfactory indication that contamination may be present. The soil borings were logged and screened with a photoionization detector (PID). Subsurface soil samples were collected from the vadose zone and select borings were chosen for the collection of groundwater samples based on field observations. A stainless steel slotted screen was advanced into the boring and groundwater samples were collected using disposable plastic tubing and a peristaltic pump. The following provides a summary of the sampling procedures used during the SI:

- Prior to advancement of soil borings, Michigan's one-call system was notified of the schedule work in accordance with *Public Act 174, Miss Dig Underground Facility Damage Prevention and Safety Act.*
- The lithology for each boring was classified by the field geologist in accordance with the Unified Soil Classification System (USCS) and recorded on the field log.
- Borings were advanced using a 5-foot long, 1.5-inch diameter Macro-Core sampler to collect continuous soil samples at all borings using a motor-driven hydraulic hammer to the desired depth.

- Soil samples were transferred directly into laboratory-provided sample jars. Sample jars were then labeled and placed in a cooler on ice for transportation to the analytical laboratory under chain of custody.

- Subsurface soil samples were named with an SB descriptor in the sample name.

Subsurface soil samples were collected from all of the study areas. A total of 68 subsurface soil samples (SB designation), including QA/QC samples, were collected from the CHTC. Each of the sample locations were located with a GPS unit with sub-meter accuracy and a description of the sampled material was documented on a field log. A photographic log, documenting sample collection activities, is included in **Appendix F**. Completed boring logs are included in **Appendix G**. A summary of the samples collected during the investigation, including their descriptions, requested analyses, and other relevant information is included on **Table 3-2**.

Sampling locations, analytical results, and findings specific to individual study areas within the CHTC are included in the detailed findings reports in **Section 5** through **Section 8** of this SI Report.

3.2.4 Groundwater Sampling

Certain soil boring locations were selected to include the installation of a temporary groundwater sampling point. Groundwater samples were collected utilizing a Screen-Point-16 stainless steel screen reusable sampling rod. Based on the historical findings, or lack thereof, it was prescribed in the SAP that all groundwater samples be analyzed for PCBs with a select subset analyzed for the following target analytes:

- VOCs;
- SVOCs;
- Chloride;
- Sulfate; and,
- Inorganic COCs.

The following provides a summary of the sampling procedures used during the SI:

- The downhole sampling tools were advanced into the water-bearing zone in the boring and the outer rod was withdrawn to expose the internal stainless steel screen.

- A low-flow peristaltic pump with disposable Teflon tubing was used to collect a grab groundwater sample from the screened sample interval.

- Field parameters for dissolved oxygen, pH, oxidation reduction potential (ORP), conductivity, temperature, and turbidity were measured with a water-quality monitoring instrument equipped with a flow-through cell at the time of groundwater sample collection.
- Groundwater samples were pumped directly into laboratory-provided sample jars. Sample jars were then labeled and placed in a cooler on ice for transportation to the analytical laboratory under chain of custody.
- Groundwater samples were named with a GW descriptor in the sample name.

Groundwater samples were collected from all of the study areas. A total of 34 groundwater samples (MW/GW designation), including QA/QC samples, were collected from the CHTC. Each of the sample locations were located with a GPS unit with sub-meter accuracy and a description of the sample interval documented on a field log. A photographic log documenting sample collection activities is included in **Appendix F**. GSU-completed boring logs documenting the temporary well screen interval are included in **Appendix G**. A summary of the samples collected during the investigation, including their descriptions, requested analyses, and other relevant information is included on **Table 3-2**.

Sampling locations, analytical results, and findings specific to individual study areas within the CHTC are included in the detailed findings reports in **Section 5** through **Section 8** of this SI Report.

3.2.5 Sediment Sampling

Select sediment sampling locations were predetermined in the SAP based on the evaluations and assessments presented in **Section 3.1**. Based on these findings it was prescribed in the SAP that all sediment samples be analyzed for PCBs with a select subset analyzed for the following target analytes:

- SVOCs; and,
- Inorganic COCs.

Other sediment sampling locations presented in the SAP were subject to change based on the findings of the underwater surveillance. These locations would be moved with the intent of collecting material from the interior of submerged containers or from identified waste deposits based on GSU underwater imagery targeting, a key element of the SI distinguishing it from previous investigations. Traditional vibracore sampling techniques were used to collect all of the

sediment samples from the CHTC. The following provides a summary of the sampling procedures used during the SI:

- Sediment samples were collected utilizing the MDEQ GSU's vibracore sampler. Polycarbonate tubing was advanced into the sediment using the vibrating drive head.
- The extracted sample core was opened, the sediment column logged, samples were collected using the prescribed intervals in the SAP or visual observations, including physical characteristics and staining, or olfactory evidence of contamination within the sediment sample core.
- The lithology for each sediment core was classified by the field geologist in accordance with the USCS and recorded on the field log.
- Sediment samples were transferred directly into laboratory-provided sample jars. Sample jars were then labeled and placed in a cooler on ice for transportation to the analytical laboratory under chain of custody. Offshore samples were maintained separately from terrestrial samples.
- Sediment samples were named with an SD descriptor in the sample name.

Sediment samples were collected from Torch Lake, off shore of all of the study areas. A total of 50 sediment samples (SD designation), including QA/QC samples, were collected from the CHTC. Each of the sample locations were located with a GPS unit with sub-meter accuracy and a description of the sample core was documented on a field log. A photographic log, documenting sample collection activities, is included in **Appendix F**. Completed sediment logs are included in **Appendix G**. A summary of the samples collected during the SI, including their descriptions, requested analyses, and other relevant information is included on **Table 3-2**.

Sampling locations, analytical results, and findings specific to individual study areas within the CHTC are included in the detailed findings reports in **Section 5** through **Section 8** of this SI Report.

3.2.6 Decontamination Procedures and Management of Investigative Derived Wastes

Investigative-derived wastes (IDW) include the byproducts of the field activities, including excess sample media, spent sampling supplies, and expendable personal protective equipment (PPE). The following paragraphs describe the procedures used during the SI to manage IDW and decontaminate equipment used during the investigation.

During implementation of the terrestrial investigation soil cuttings, purge water, and decontamination water were generated. Soil cuttings, following logging, screening, and sampling were returned to the boring by the MDEQ. For locations where groundwater samples were collected, the soil cuttings were temporarily staged until all samples were collected and the sampling equipment was extracted from the boring. Excess groundwater generated during sample collection was discharged to the ground surface by the MDEQ. Following groundwater sampling, the boring was backfilled with the staged soil cuttings. Expendable groundwater sampling materials were containerized in a trash bag for disposal as non-hazardous municipal solid waste by the MDEQ at the end of the project phase. Reusable equipment, including the stainless steel sampling screen, was decontaminated between boring locations using steam-cleaning methods. Decontamination water generated through washing and rinsing was discharged to the ground surface in the vicinity of the sampling locations. Spray bottles of wash and rinse water were used to minimize the volume of decontamination fluids generated by the soil boring and well installation activities.

Implementation of the offshore sampling activities resulted in the generation of similar waste streams. Spent polycarbonate tubing used in the collection of vibracore sediment samples, spent sampling supplies, and PPE were temporarily staged on the sampling vessel until the vessel returned to the dock. Upon returning to shore, the staged waste was transferred to a dumpster by the MDEQ for disposal. Excess sediment, debris, and surface water generated as a result of the sampling activities were returned to the lake in the vicinity of the sample location by the MDEQ.

Reusable equipment was decontaminated on board the sampling vessel using an alconox wash and rinse. Spray bottles of wash and rinse water were used to minimize the volume of decontamination fluids generated during the sediment sampling activities. Decontamination water generated through washing and rinsing was discharged to the lake in the vicinity of the sample location.

3.2.7 Sample Handling, Tracking, and Custody Procedures

All samples were identified, handled, shipped, tracked, and maintained under chain of custody as prescribed in the SAP. The following paragraphs summarize the sample management and tracking activities utilized during implementation of the SI.

Samples collected during the SI were given a unique sample identification (ID) number that was project- and location- specific. A record of sample ID numbers was kept with the field records and recorded on chain-of-custody forms. Sample labels using the nomenclature defined in the SAP, were affixed to sample containers. After labeling, each sample was placed in a cooler with ice for transportation to the specified laboratory. Field documentation, including sampling forms, maps, and field logs were maintained in a field binder maintained by MDEQ and WESTON field personnel.

The field team used laboratory-provided sample custody forms to maintain and document sample integrity during sample collection, transportation, and storage. The chain of custody forms were used to document samples collected and the analyses requested. Chain of custody procedures documented the possession of individual samples from the time of collection in the field to the time of acceptance at the laboratory. Copies of the chain of custody records and the air bills (as needed) were retained and placed in the MDEQ project file.

Laboratory chain-of-custody began with sample receipt and continues until samples are discarded. Sample coolers were generally hand delivered to the laboratory where a designated sample custodian received the incoming samples. The laboratory sample custodian recorded pertinent information associated with the samples, including the person(s) delivering the samples, the date and time received, and sample condition at the time of receipt (sealed, unsealed, or broken container; temperature; and other relevant remarks).

Investigative samples were delivered by a courier or shipped under chain of custody to the laboratories listed in the table below.

Matrix	Laboratory Name	Laboratory Address	Laboratory Contact Name	Laboratory Phone Number
Surface Soil Subsurface Soil Groundwater Waste Materials	MDEQ Environmental Laboratory	3350 N. Martin Luther King Blvd. Lansing, MI 48906-2933	MDEQ Laboratory Services Section – Kirby Shane	(517) 335-9800
Bulk Asbestos and Asbestos in Soil Oil and Grease	TestAmerica, Inc.	4101 Shuffel Street Northwest North Canton, OH 44720	MDEQ Laboratory Services Section – Kris Brooks	(330) 497-9396

The MDEQ Environmental Laboratory does not perform oil and grease or asbestos. As a result, the samples were shipped under chain of custody and managed by the MDEQ Environmental Laboratory to a contract laboratory under the Contract Laboratory program.

3.2.8 QA/QC

All samples were collected and analyzed using the field and laboratory quality control procedures prescribed in the SAP. The following paragraphs summarize the field and laboratory quality control procedures utilized during implementation of the SI.

QC samples were collected to evaluate the field sampling methods and the overall reproducibility of the laboratory analytical results. Field duplicate samples were collected, processed, stored, packaged, and analyzed by the same methods as the investigative samples. QC for analytical procedures were performed in accordance with the laboratories standard operating procedures (SOP).

Matrix spike/matrix spike duplicate (MS/MSD) samples were not collected during the implementation of field activities. Alternatively, MS/MSD were selected by the laboratory and "batched". As such, MS/MSD samples were not necessarily derived from investigative samples from the Project, but may have come from another sample set at the laboratory. MS/MSD results were reported with investigative sample results.

The MDEQ Environmental Laboratory and their contracted laboratories provided analytical results in electronic data deliverable (EDD) and report formats, with QA/QC data included (case narrative, investigated data results summary, and QC sample summary results). Laboratory-generated data was imported to the Project database for mapping, reporting, and archival activities. Laboratory analytical reports are included in **Appendix I**.

4. EXPOSURE ASSESSMENT

This Section presents the human health and ecological exposure criteria that are applicable to the CHTC. The discussions included in the following subsections will assist in framing the results presented in the detailed findings reports included in **Section 5** through **Section 8** with respect to the current land use and the anticipated future land use within each study area.

4.1 MDEQ FACILITY DEFINITION

As defined in Section 20101(1) (s) of Part 201 of Michigan's Natural Resources and Environmental Protection Act (NREPA), being Public Act (PA) 451 of 1994, as amended, a "Facility" means any area, place, parcel or parcels of property, or portion of a parcel of property where a hazardous substance in excess of the concentrations that satisfy the cleanup criteria for unrestricted residential use has been released, deposited, disposed of, or otherwise comes to be located. Facility does not include any area, place, parcel or parcels of property, or portion of a parcel of property where any of the following conditions are satisfied:

(i) Response activities have been completed under this part or the comprehensive environmental response, compensation, and liability act, 42 United States Code (USC) 9601 to 9675, that satisfy the cleanup criteria for unrestricted residential use.

(ii) Corrective action has been completed under the resource conservation and recovery act, 42 USC 6901 to 6992k, part 111, or part 213 that satisfies the cleanup criteria for unrestricted residential use.

(iii) Site-specific criteria that have been approved by the department for application at the area, place, parcel of property, or portion of a parcel of property are met or satisfied and hazardous substances at the area, place, or property that are not addressed by site-specific criteria satisfy the cleanup criteria for unrestricted residential use.

(iv) Hazardous substances in concentrations above unrestricted residential cleanup criteria are present due only to the placement, storage, or use of beneficial use by-products or inert materials at the area, place, or property in compliance with part 115.

(v) The property has been lawfully split, subdivided, or divided from a facility and does not contain hazardous substances in excess of concentrations that satisfy the cleanup criteria for unrestricted residential use.

(vi) Natural attenuation or other natural processes have reduced concentrations of hazardous substances to levels at or below the cleanup criteria for unrestricted residential use.

Note that in Section 20101(1)(x) of Part 201, hazardous substance does not include by definition stamp sands, which are defined as "finely grained crushed rock resulting from mining, milling, or smelting of copper ore and includes native substances contained within the crushed rock and any ancillary material associated with the crushed rock." Section 20101c goes on to further state that "Property onto which stamp sands have been deposited is not subject to regulation under this part unless the property otherwise contains hazardous substances in excess of concentrations that satisfy the cleanup criteria for unrestricted residential use."

From a terrestrial standpoint, chemical concentrations detected in soil and groundwater in each of the investigated study areas exceed residential exposure criteria for one or more COC. Further, analytical results from residual process materials and surface waste deposits also exceed residential exposure criteria in one study area. Analytical results and their implications on facility status are described further in the detailed findings reports included in **Section 5** through **Section 8** of this SI Report, which documents each of the study areas as being a facility. It should be noted however, that each of the study areas are comprised of multiple land parcels and owners and investigative activities, both historical and current, were not conducted on every parcel within a given study area.

4.2 APPLICABLE EXPOSURE CRITERIA

In support of developing a comprehensive approach for evaluating risks, the analytical results from previous investigations and this SI were compiled and compared to the following regulatory screening criteria:

- Part 201 of Michigan's NREPA, being PA 451 of 1994, as amended Residential and Non-Residential Cleanup Criteria for Response Activity (December 30, 2013).

  - Surface Soil;
  - Subsurface Soil;
  - Waste Materials;
  - Residual Process Materials; and,
  - Groundwater.

- EPA, Resource Conservation and Recovery Act (RCRA), Identification and Listing of Hazardous Waste Criteria (40 Code of Federal Regulations, Part 261, Subpart C).

  - Abandoned Containers; and,
  - Waste Materials.

- EPA, National Emission Standards for Hazardous Air Pollutants (NESHAP).

  - SACM.

- EPA, Region 5, RCRA, Ecological Screening Levels (August 2003).

  - Sediment; and,
  - Surface Water.

- MDEQ – Rule 57 Water Quality Values, Surface Water Assessment Section (February 2014).

  - Surface Water.

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

  - Sediment.

The regulatory screening criteria summarized above may be applicable to all or select study areas in the CHTC. A limiting factor in the assessment of the applicability of these criteria may include, but not be limited to, specific environmental media (as noted above), current and anticipated future land use categories, and relevant exposure pathways for human and ecological receptors. Assessment of these factors requires that the analytical results of the SI and the respective geological and hydrogeological characteristics of the Project area be evaluated to determine generally which exposure pathways, risks, and conditions are relevant and applicable. The following subsections present the criteria assessment rationale and applicability determinations for identified exposure pathways in the CHTC.

4.2.1 Non-Evaluated Exposure Pathways

The following exposure pathway was not evaluated at the CHTC:

- Risks to aesthetic characteristics of the affected media.

Although contaminated media has the potential to have impacts on aesthetics, this pathway was not assessed because assessment of potential risks to flora, fauna, the food chain, and aesthetics was beyond the scope of the evaluation. The comprehensive evaluation presented in this SI is aimed at determining if a release has occurred in a given study area and whether or not human health and ecological risks are posed by any such release as they relate to current land use within the study area.

4.2.2 Non-Applicable Exposure Pathways

The following exposure pathways are not applicable at the CHTC:

- Risks due to free-phase liquids.

Free-phase liquids, released to the environment, have not been identified in any of the study areas.

4.2.3 Relevant Exposure Pathways Where Applicable Criteria Are Not Exceeded

The following exposure pathways are relevant at the CHTC, but the maximum detected contaminant concentrations do not exceed applicable exposure criteria:

- Risks posed by hazardous substances in groundwater that may result in the volatilization of contaminants to indoor air in both residential and nonresidential settings.
- Risks posed by hazardous substances in groundwater that may result in flammable or explosive contaminants to be present in both residential and nonresidential settings.
- Risks posed by hazardous substances in soil that may result in the volatilization of contaminants to indoor air in both residential and nonresidential settings.

4.2.4 Relevant Exposure Pathways Where Criteria Are Exceeded, But Pathway Is Incomplete

The following exposure pathways are relevant at the CHTC, but the exposure pathway is currently incomplete:

- Risks posed by hazardous substances in debris piles.

  - The composition of debris piles were presumed to be uniform during the SI; however additional investigation could determine that additional buried hazards are present. While this exposure pathway is currently incomplete, it could become complete in the future.

- Risks posed by hazardous substances inside buildings or former building substrates.

- Risks posed by hazardous substances that are covered or capped with soil and or a vegetative cover.

  - Multiple properties in the study areas feature capped and vegetated areas along the shoreline of Torch Lake. These properties include vacant, residential, and industrial or commercial properties that may or may not have been included in previous remedial actions in the area. Land use on these properties varies, but may include private beaches, residential yards, or remain undeveloped. Risks may be present in these areas where cap material has covered potential hazardous materials.

4.2.5 Relevant Exposure Pathways Where Applicable Criteria Are Exceeded and Pathway is Complete

The following exposure pathways are relevant at the CHTC and the exposure pathways are complete:

- 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 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 soil that may result in the volatilization of contaminants to ambient air in both residential and nonresidential settings.

- Risks posed by hazardous substances in groundwater and the potential for that groundwater to be used as a drinking water source in both residential and nonresidential settings.

- Risks posed by hazardous substances in groundwater and the potential for that groundwater to vent to surface water.

- 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.

Although relevant, the MDEQ drinking water/surface water pathway criteria exceedances for metals are excluded from the soil and groundwater evaluation in the detailed findings reports included in **Section 5** through **Section 7**. The rationale for this exclusion is twofold:

- The Project investigation and anticipated response actions are being undertaken pursuant to Part 201 of Michigan's NREPA, being PA 451 of 1994, as amended. The concentrations of metals in excess of the MDEQ drinking water/surface water pathway criteria are ubiquitous in the study area and are predominantly the result of the presence of stamp sands. Stamp sands are not defined as a hazardous substance nor are subject to regulation under Part 201 unless the property otherwise contains hazardous substances in excess of concentrations that satisfy the cleanup criteria for unrestricted residential use; and,

- The study area is part of OU2 for which the EPA ROD remedy called for No Action. The EPA's ROD OU 2 includes groundwater, surface water, submerged tailings and sediments in Torch Lake, Portage Lake, the Portage Canal, and other area water bodies. Note that EPA's No Action determination relies on the following to mitigate the effects of stamp sand to the extent practicable:

  – The reduction of stamp sand loading to surface water bodies expected as a result of the remedial action taken at OU 1 and OU 3.

  – Ongoing natural sedimentation and detoxification.

  – Institutional programs and practices controlling potential future exposure to site-affected drinking water which were intended to be administered at the county and state level.

  – The long-term monitoring and the five year review process monitoring requirements of the remedy selected for OU 1 and OU 3 under the 1992 ROD.

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

4.2.6 Relevant Cleanup Criteria for Hazardous Substances in Contaminated Environmental Media Not Accounted for by Other Rules

To assure that hazardous substances in contaminated environmental media do not pose unacceptable risks not accounted for by other rules in Part 201, the concentration of a hazardous substance in a given environmental medium shall meet cleanup criteria based on sound scientific

principles and determined by the MDEQ to be necessary to protect the public health, safety, and welfare and the environment.

The following, not accounted for by other rules in this part, are relevant at the CHTC:

- Risks posed by physical hazards.
- 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 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.

4.3 CONCEPTUAL SITE MODEL

The applicable regulatory criteria and the relevant exposure pathways assessed in the preceding subsections indicate that COCs are present in various environmental media in the CHTC. COCs have been identified in surface and vadose zone soils, groundwater, surface water, sediment, residual process materials, wastes, and abandoned containers that have the potential to affect human and ecological receptors, as well as recreational users or consumers of the natural resources of Torch Lake. Further, the potential for particulate migration and dispersion through the air poses additional risks.

The current and foreseeable land use in the CHTC includes both residential and non-residential; however, historical documentation indicates that this area was highly industrialized through the first half of the 1900's. The extent of these operations included both terrestrial and offshore operations that included the discharge of wastes and debris to Torch Lake. The eventual end of mining era operations and the generally undocumented transition of these properties to residential use likely resulted in the redistribution of surface soils and potentially contaminants along the lakeshore. Further, underwater mining era equipment, structures, and abandoned containers have been visually documented in the nearshore environment. Physical hazards are also posed by residual mining era related conditions.

Conceptual Site Models developed for the CHTC have been developed to graphically present the relevant exposure pathways summarized in **Section 4.2** and their relationship to the distribution of

contaminants in the nearshore (terrestrial and offshore) environment. The cross-sectional representation on **Figure 4-1** depicts these relationships under both a residential and recreational land use scenario. The cross-sectional representation on **Figure 4-2** depicts these relationships under a nonresidential land use scenario. The cross-sectional representation on **Figure 4-3** depicts these relationships from a longitudinal perspective, looking from offshore, at the various land uses and receptors located in the CHTC.

5. DETAILED FINDINGS REPORT – AHMEEK MILL PROCESSING AREA

This Section summarizes the results and the subsequent findings derived from implementation of the sampling and analysis plan (SAP) in the Ahmeek Mill Processing Area. The narrative follows the systematic investigative approach outlined in **Section 3**, while providing specific details about the study area and the potential human health and ecological risks associated with the historical mining operations in the area.

5.1 SITE INSPECTION AND INVESTIGATION RESULTS

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

5.1.1 Site Inspection

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

On 27 May 2015, a field team comprised of Weston Solutions of Michigan, Inc. (WESTON®) and Michigan Department of Environmental Quality (MDEQ) personnel performed reconnaissance activities at the majority of the properties in the Ahmeek Mill Processing Area. In the cases where access was not requested based on historic operational and investigative findings, property conditions were evaluated from a neighboring property or public right of way where access was permitted.

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

Ahmeek Mill Processing Area – Reconnaissance Summary	
Potential Chemical or Physical Hazards	**Recorded Observations**
Suspect Asbestos Containing Material (SACM)	Multiple pieces of SACM including transite, weathered rope gasket, and panel-like material labeled "Asbestos" in the debris pile within the brush across the street from the basketball court and the Osceola Township Park.
Residual Process Materials (RPM)	Portions of the Ahmeek Mill Processing Area is a stamp sand deposit created during mining era operations. The stamp sand deposit, a residual process material, was capped as part of previous remedial actions completed by the U.S. Environmental Protection Agency (EPA).
Potentially Abandoned Containers	No mining era containers were observed during the inspection of the properties.
Soil Staining/Stressed Vegetation	No barren or stressed areas of the ground surface were documented on the inspected properties, but mining era artifacts and foundations were observed.
Potential Polychlorinated Biphenyl (PCB) or Mercury Containing Equipment	No potential PCB or mercury containing equipment was observed on the inspected properties.
Other: Household Waste and Structural Voids	Small mounds and rubble piles where debris including cable, piping, asphalt, and concrete; and partially buried concrete piping were observed in the area. Voids were noted where it appears soil has settled into the subsurface near the mill ruins.

Significant hazards were identified during the reconnaissance activities. As discussed in **Section 2.1**, the stamp sand deposits and ruins of the former Ahmeek Stamp Mill Complex have been addressed under previous cleanup and removal actions undertaken in the area. However, the observed asbestos containing material (ACM) within the brush across the street from the Osceola Township Park is exposed to weathering and potential migration via storm water runoff and wind dispersion. The voids noted where it appears soil has settled into the subsurface near the mill ruins pose a potential physical hazard due to slip, trip, and fall concerns.

Field logs documenting reconnaissance observations are included in **Appendix D** of the Site Investigation (SI) Report.

5.1.1.1 Targeted Inspection

The qualitative assessment of the reconnaissance findings in the Ahmeek Mill Processing Area warranted the performance of targeted inspection activities. On 29 June 2015 a WESTON field team conducted targeted inspection activities at the Ahmeek Mill Processing Area that included the collection of bulk material samples. The following subsection summarizes the findings of these sampling efforts.

5.1.1.1.1 Bulk Material Sampling

Based on the SACM hazards noted during the reconnaissance activities a limited asbestos survey was conducted as part of the SI to identify suspect potentially friable asbestos containing materials. The asbestos survey was limited to SACMs in open areas of the properties, including the outside of buildings, within debris piles, and atop the foundations and floors 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 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 29 June 2015, a total of five bulk samples were collected from three different SACMs. ACM identified on properties within the Ahmeek Mill Processing Area are summarized as follows:

- Grayish-white transite board (CHTC-ASBBLK13A, CHTC-ASBBLK13B, and CHTC-ASBBLK13C) that are damaged and friable, located on the surface of a debris pile within the brush across the street from the basketball court and the Osceola Township Park;
- Asbestos labeled sheeting (CHTC-ASBBLK12A) that is damaged and friable, located on the surface of a debris pile within the brush across the street from the basketball court and the Osceola Township Park; and,

- Brownish-yellow, weathered rope gasket material (CHTC-ASBBLK14A) that is damaged and friable, located on the surface of a debris pile within the brush across the street from the basketball court and the Osceola Township Park.

The samples were analyzed in accordance with EPA Method 600/R-93/116, "Method for the Determination of Asbestos in Bulk Building Materials" using Polarized Light Microscopy (PLM). This laboratory analytical method identifies the presence and estimated concentration of asbestos fibers in sampled building materials. The location of bulk asbestos sampling locations collected during the targeted inspection activities are depicted on **Figure 5-1a**. A detailed summary of bulk asbestos sample analytical results collected from the Ahmeek Mill Processing Area during the targeted inspection are provided in **Table 5-1**. Bulk asbestos sample analytical results are depicted on **Figure 5-2**.

5.1.2 Site Investigation

The SI at the Ahmeek Mill Processing Area was developed based on a variety of data and information as outlined in **Section 3**. In addition to the historical accounts and documentation, current land use and potential exposure pathways were also taken into consideration when selecting the sampling locations specific to the Ahmeek Mill Processing Area. The following subsections present the outcomes of investigative activities completed in the area by summarizing the laboratory analytical results and characterizing their impacts on the environmental media in which they were detected.

5.1.2.1 Terrestrial Investigation

Intrusive investigation activities in the Ahmeek Mill Processing Area were generally guided by the findings of historical research and field observations. From a historical standpoint, the area made up the Ahmeek Stamp Mill Complex. The Ahmeek Stamp Mill Complex was generally comprised of stamp mill and supporting facilities including a power house, boiler house, and pump house. The stamp mill and supporting facilities were constructed to process ore from the Ahmeek Mine located in Keweenaw County.

Inorganic contaminants of concern (COCs) in the study area were generally well understood, particularly in areas where previous investigations and remedial actions have been completed.

Only limited data related to the COCs on the properties surrounding the stamp mill complex was available. Previous investigative activities on these properties did not fully characterize contaminants in soil and groundwater, specifically as they relate to PCBs. The following subsections present a summary of the field observations and analytical results derived from the terrestrial sampling activities.

5.1.2.1.1 Field Observations – Soil and Groundwater

Borings in the Ahmeek Mill Processing Area were advanced to depths between 4 and 20 feet (ft) below the ground surface (bgs). Boring locations are depicted on **Figure 5-1a** and **Figure 5-1b**. Soil observations documented on field logs indicate that the subsurface is primarily comprised of top soil underlain by medium grained sands, ranging from brown to gray to reddish brown in color with sand and gravel noted at one location (CHTC-SB11). Two boring locations (CHTC-SB04 and CHTC-SB05) indicated the presence of the EPA installed cap. In addition, fill was present beneath the top soil in boring CHTC-SB07 and CHTC-SB12 was comprised of fill material from the ground surface to 7 ft bgs.

During groundwater sampling, temporary well points were generally established at 5 ft intervals ranging from 6 ft to 11 ft bgs and 15 ft to 20 ft bgs. Saturated soil conditions were generally encountered between depths of 4 ft and 15 ft bgs. Groundwater quality parameters, including temperature, conductivity, dissolved oxygen (DO) and pH, measured at the time of sample collection were generally considered normal.

5.1.2.1.2 Soil Sampling Results

Terrestrial investigation activities were completed in the Ahmeek Mill Processing Area between 16 and 18 May 2015. During the mobilization a total of 33 soil samples including 2 duplicate soil samples were collected from 15 boring locations. Soil boring locations are depicted on **Figure 5-1a** and **Figure 5-1b**. Investigative methodologies and soil sampling techniques were conducted using the procedures outlined in **Section 3**.

Soil sampling locations included 14 shallow soil samples, generally ranging from 0 to 6 inches (in.) in depth. The investigation also included the collection of 19 subsurface soil samples ranging

from 0.5 ft to 11 ft in depth. All samples were analyzed for PCBs. Select samples were also analyzed for other COCs including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and asbestos. The selection of analytical parameters was generally based upon potential environmental impacts associated with mining era operations in the vicinity of the sampling location or field observations.

The shallow and subsurface soil analytical results for the Ahmeek Mill Processing Area SI did not contain any COCs at concentrations at or above applicable regulatory criteria. Historic soil analytical and X-ray fluorescence (XRF) soil screening results for samples from the Osceola Township Park and ruins of the former Ahmeek Stamp Mill Complex did indicate the presence of COCs at concentrations at or above applicable regulatory criteria. As discussed in **Section 2.1**, those areas have reportedly been addressed under previous cleanup and removal actions undertaken in the area.

A detailed summary of soil analytical results collected from the Ahmeek Mill Processing Area are provided in **Table 5-2**. XRF soil screening results from the Ahmeek Mill Processing Area are depicted on **Figure 5-3a** and **Figure 5-3b**. Soil analytical results from the Ahmeek Mill Processing Area are depicted on **Figure 5-4**. Soil boring logs are included in **Appendix G** of this SI Report.

5.1.2.1.3 Groundwater Sampling Results

During the installation of soil borings in the Ahmeek Mill Processing Area 11 temporary groundwater sampling locations were established to characterize groundwater in the area. The monitoring wells were installed and sampled using the methodologies presented in **Section 3**. The screened intervals in the groundwater sampling locations were established between 6 ft and 15 ft bgs. A total of 12 groundwater samples including one duplicate sample were collected from the Ahmeek Mill Processing Area. Temporary groundwater sampling locations are depicted on **Figure 5-1a** and **Figure 5-1b**.

All groundwater samples were analyzed for PCBs. Select samples were also analyzed for other COCs including VOCs, SVOCs, pesticides, and inorganic contaminants. No COCs were detected at concentrations above applicable regulatory criteria.

A detailed summary of groundwater analytical results collected from the Ahmeek Mill Processing Area are provided in **Table 5-3**. Groundwater analytical results from the Ahmeek Mill Processing Area are depicted on **Figure 5-5**. Soil boring logs are included in **Appendix G** of this SI Report.

5.1.2.2 Offshore Investigation

Similar to the terrestrial investigation, the proposed offshore investigation activities for the Ahmeek Mill Processing Area were also guided by several factors. First, historical analytical data was evaluated to determine if adequate characterization data was available in the study area to assess the overall sediment and surface water quality in the nearshore environment. In addition, underwater surveillance of the area, as described in **Section 3**, was used to locate and assess potential offshore waste deposits. Lastly, field observations, both terrestrial and offshore, were used to position sampling locations.

Offshore sediment samples were collected from the Ahmeek Mill Processing Area. The following subsections present a summary of the analytical results derived from offshore sampling activities in the Ahmeek Mill Processing Area.

5.1.2.2.1 Sediment Sampling Results

Offshore investigation activities were completed in the Ahmeek Mill Processing Area between 7 and 12 July 2015. A total of 15 sediment samples including one duplicate sediment sample were collected from five sampling locations. Sediment sampling locations are depicted on **Figure 5-1a**. Investigative methodologies and sediment sampling techniques were conducted using the procedures outlined in **Section 3**.

Sediment sampling locations included five surficial sediment samples, ranging from 0 to 6 in. in depth. The investigation also included the collection of ten deeper sediment samples ranging from 1 ft to 4.66 ft in depth. All samples were analyzed for PCBs. A subset of sediment samples were selected for inorganic, SVOCs, and cyanide analyses.

The analytical results for sediment samples collected during the SI identified multiple inorganic COCs at concentrations that exceeded applicable regulatory criteria. Total PCBs were not detected in any of the sediment samples collected from the Ahmeek Mill Processing Area.

A detailed summary of sediment analytical results collected from the Ahmeek Mill Processing Area are provided in **Table 5-4**. Sediment analytical results from the Ahmeek Mill Processing Area are depicted on **Figure 5-6**. Sediment core logs are included in **Appendix H** of this SI Report.

5.2 NATURE AND EXTENT OF CONTAMINATION

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

- MDEQ Cleanup Criteria Requirements for Response Activity;
- EPA Ecological Screening Levels (ESLs); and,
- Sediment Quality Guidelines, Threshold Effect Concentrations (TECs) and Probable Effect Concentrations (PECs), MacDonald, et al, 2000.

5.2.1 Comprehensive Exposure Assessment

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

- Risks due to hazardous substances when considering acute toxic effects, physical hazards, and other hazards not accounted for in the development of generic cleanup regulatory criteria.
- Risks posed by hazardous substances in debris piles.
- Risks posed by hazardous substances that are covered or capped with soil and or a vegetative cover.
- Risks posed by hazardous substances in sediments that have the potential to have toxic effects on aquatic biota and/or enter the food chain.

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

- The Project investigation and anticipated response actions are being undertaken pursuant to Part 201 of Michigan's Natural Resources and Environmental Protection Act (NREPA), being Public Act (PA) 451 of 1994, as amended. The concentrations of metals in excess of the MDEQ drinking water/surface water pathway criteria are ubiquitous in the study area and are predominantly the result of the presence of stamp sands. Stamp sands are not defined as a hazardous substance nor are subject to regulation under Part 201 unless the property otherwise contains hazardous substances in excess of concentrations that satisfy the cleanup criteria for unrestricted residential use; and,

- The study area is part of Operable Unit (OU) 2 for which the EPA Record of Decision (ROD) remedy called for No Action. The EPA's ROD OU 2 includes groundwater, surface water, submerged tailings and sediments in Torch Lake, Portage Lake, the Portage Canal, and other area water bodies. Note that EPA's No Action determination relies on the following to mitigate the effects of stamp sand to the extent practicable:

  – The reduction of stamp sand loading to surface water bodies expected as a result of the remedial action taken at OU 1 and OU 3.

  – Ongoing natural sedimentation and detoxification.

  – Institutional programs and practices controlling potential future exposure to site-affected drinking water which were intended to be administered at the county and state level.

  – The long-term monitoring and the five year review process monitoring requirements of the remedy selected for OU 1 and OU 3 under the 1992 ROD.

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

5.2.1.1 Building Materials Containers, and Wastes

During the targeted inspection activities completed in the Ahmeek Mill Processing Area, three different ACMs were identified in samples collected from damaged and friable building materials.

The following tables provide an aggregate summary of the sample locations with respect to the total number of samples and how they compare to applicable regulatory criteria. The tables are based solely on the total number of samples, inclusive of historical samples, collected from the Ahmeek Mill Processing Area. They list only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion. Bulk asbestos samples were compared to applicable National Emissions Standard for Hazardous Air Pollutants (NESHAP) standards.

Building Materials, Containers, and Wastes Analytical Result Summary	Analytical Summary			Particulate Soil Inhalation Criteria
	Total Number of Samples	Detected Analytes	Total Exceedances	
Asbestos (Bulk)	5	5	5	**5**
COCs exceeding applicable regulatory criteria in one or more sample				Asbestos

5.2.1.2 Soil Exposure Pathway Assessment

Soil analytical results from the Ahmeek Mill Processing Area SI did not include COC concentrations in soil that were at or above concentrations that trigger a "Facility" designation as defined in Section 20101(1) (s) of the NREPA. However, historic soil analytical results for samples from the Osceola Township Park and ruins of the former Ahmeek Stamp Mill Complex did indicate the presence of COCs at concentrations at or above applicable regulatory criteria.

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

Soil Analytical Result Summary Table				Cleanup Criteria Requirements for Response Activity – Residential								
	Analytical Summary			Groundwater Protection		Indoor Air	Ambient Air (Y) (C)				Contact	Csat
	Total Number of Samples	Detected Analytes	Total Exceedances	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinite Source Volatile Soil Inhalation Criteria (VSIC)	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels
Inorganics	40	752	20	0	0	0	0	0	0	**1**	**13**	0
Cyanide	35	25	11	0	**11**	0	0	0	0	0	0	0
VOCs	7	0	0	0	0	0	0	0	0	0	0	0
SVOCs	43	303	21	0	**6**	0	0	0	0	0	**7**	0
Asbestos	8	0	0	0	0	0	0	0	0	0	0	0
Total PCBs	65	0	0	0	0	0	0	0	0	0	0	0
Pesticides	32	21	0	0	0	0	0	0	0	0	0	
COCs exceeding applicable regulatory criteria in one or more samples				Arsenic, Copper, Cyanide, Lead, Benzo(a)Pyrene, Carbazole, Fluoranthene, Naphthalene, Phenanthrene								

Soil Analytical Result Summary Table				Cleanup Criteria Requirements for Response Activity – Nonresidential								
	Analytical Summary			Groundwater Protection		Indoor Air	Ambient Air (Y) (C)				Contact	Csat
	Total Number of Samples	Detected Analytes	Total Exceedances	Nonresidential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinite Source Volatile Soil Inhalation Criteria (VSIC)	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels
Inorganics	40	752	8	0	0	0	0	0	0	**1**	**6**	0
Cyanide	35	25	11	0	**11**	0	0	0	0	0	0	0
VOCs	7	0	0	0	0	0	0	0	0	0	0	0
SVOCs	43	303	15	0	**6**	0	0	0	0	0	**1**	0
Asbestos	8	0	0	0	0	0	0	0	0	0	0	0
Total PCBs	65	0	0	0	0	0	0	0	0	0	0	0
Pesticides	32	21	0	0	0	0	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				Arsenic, Copper, Cyanide, Lead, Carbazole, Benzo(a)pyrene, Fluoranthene, Naphthalene, Phenanthrene								

5.2.1.3 Groundwater Exposure Pathway Assessment

Groundwater analytical results from the Ahmeek Mill Processing Area did not include COC concentrations in groundwater that were at or above concentrations that trigger a Facility designation as defined in Section 20101(1) (s) of the NREPA.

Similar to the preceding soil tables, the following table provides summary of the aforementioned sample locations with respect to the total number of samples and how they compare to the applicable MDEQ's Cleanup Criteria for Response Activity under both Residential and Nonresidential exposure scenarios.

Groundwater Analytical Result Summary Table	Analytical Summary			**Cleanup Criteria Requirements for Response Activity – Residential and Nonresidential**						
	Total Number of Samples	Total Number of Detected Analytes	Total Exceedances	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Levels
Inorganics	8	116	0	0	0	0	0	0	0	0
Cyanide	7	1	0	0	0	0	0	0	0	0
VOCs	17	3	0	0	0	0	0	0	0	0
SVOCs	18	0	0	0	0	0	0	0	0	0
Total PCBs	18	0	0	0	0	0	0	0	0	0
Pesticides	6	0	0	0	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				None						

5.2.1.4 Sediment Exposure Pathway Assessment

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

Sediment Analytical Result Summary	Analytical Summary			EPA, Region 5, Resource Conservation and Recovery Act	Consensus Based Sediment Quality Guidelines	
	Total Number of Samples	Detected Analytes	Total Exceedances	Ecological Screening Levels	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)
Inorganics	6	92	19	**6**	**6**	**6**
Cyanide	6	0	0	0	0	0
VOCs	0	0	0	0	0	0
SVOCs	6	0	0	0	0	0
Total PCBs	23	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				Chromium, Copper, Nickel, Silver		

5.2.2 Extent of Contamination

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

5.2.2.1 Building Materials, Containers, and Wastes Extent of Contamination

Asbestos analytical results for various building materials, including but, not limited to transite, sheeting, and rope gasket material indicate ACM are present in the Ahmeek Mill Processing Area. These materials are in a debris pile within the brush across the street from the Osceola Township Park and are subject to migration via wind and water erosion. Asbestos concentrations in five bulk material samples contained asbestos fibers at concentrations greater than 1 percent (%). The

damaged and friable nature of these materials pose a potential risk to human health as it relates to the inhalation pathway. Although, asbestos fibers were not detected in a limited number of soil samples collected from the study area, the exposed nature of these material, makes them subject to further degradation that could potentially impact surface soils in the Ahmeek Mill Processing Area.

The identified risks summarized in the preceding paragraph, poses potential threats to human and ecological receptors and are a significant factor when evaluating the extent of contamination in the Ahmeek Mill Processing Area.

5.2.2.2 Soil Extent of Contamination

The shallow and subsurface soil analytical results for the Ahmeek Mill Processing Area SI did not contain any COCs at concentrations at or above applicable regulatory criteria. Historic soil analytical and XRF soil screening results for samples from the Osceola Township Park and ruins of the former Ahmeek Stamp Mill Complex did indicate the presence of COCs at concentrations at or above applicable regulatory criteria including Particulate Soil Inhalation Criteria (PSIC) and Direct Contact Criteria (DCC) in both of the residential and nonresidential exposure scenarios for inorganic and SVOC contaminants, and Groundwater Surface Water Interface Protection Criteria (GSIPC) for cyanide and SVOCs. As discussed in **Section 2.1**, those areas have reportedly been addressed under previous cleanup and removal actions undertaken in the area.

All samples were collected from surface and subsurface soil intervals generally located within 500 ft to 1,000 ft of the shoreline of Torch Lake. The samples were collected from the Osceola Township Park and ruins of the former Ahmeek Stamp Mill Complex.

Soils with elevated levels of inorganic COCs are ubiquitous in the area, which becomes a limiting factor when evaluating potential exposure pathways. In the case of the Ahmeek Mill Processing Area, elevated concentrations of inorganic, cyanide, and SVOCs contaminants potentially include exposure risks related to inhalation and dermal contact pathways, which must be a consideration when evaluating land use, property accessibility, and the extent of contamination in surface and near surface soils. As discussed in **Section 2.1**, those areas have reportedly been addressed under previous cleanup and removal actions undertaken in the area.

The remaining exposure risks are generally related to the leaching of contaminants to groundwater and their potential impacts on surface water. These risks pose a long-term threat to the overall environmental health of the watershed, the widespread distribution of inorganic COCs throughout the region limit determinations related to the extent of contamination in the Ahmeek Mill Processing Area. Nevertheless, risks posed to groundwater and surface water are significant and are a factor when evaluating the extent of soil contamination in the Ahmeek Mill Processing Area.

5.2.2.3 Groundwater Extent of Contamination

Groundwater analytical results indicated that no COCs were detected at concentrations above applicable regulatory criteria. The temporary groundwater sampling locations were established in a zone roughly 40 ft to 1,100 ft to the shoreline of Torch Lake at depths of approximately 6 ft to 15 ft bgs.

The potential risks associated with groundwater as a drinking water source as well as it's connectivity to nearby surface water bodies should be a consideration in determinations related to the extent of contamination in the Ahmeek Mill Processing Area.

5.2.2.4 Sediment Extent of Contamination

Sediment analytical results exceeded ESLs, TEC, and PEC for inorganic contaminants. Sediment samples were generally collected from a zone within 105 ft to 2,275 ft of the shoreline of Torch Lake.

The potential risks associated with inorganic constituents, though prevalent in the region, should be considered when evaluating the extent of sediment contamination in the Ahmeek Mill Processing Area.

5.3 CONCLUSIONS AND RECOMMENDATIONS

The analytical results and interpretation summarized in the preceding subsections document human health and ecological risks that are present in the Ahmeek Mill Processing Area. The following subsections provide a synopsis of these findings and a recommended path forward for mitigating these risks in the Ahmeek Mill Processing Area.

5.3.1 Conclusions

Environmental impacts in the Ahmeek Mill Processing Area are generally characterized by detections of organic and inorganic contaminants in soil and sediment; repercussions of mining era operations in the region. Although, specific sources of these contaminants may not be fully understood, historical research related to the operations, closing, and eventual abandonment/scrapping of mining company operations provided substantive evidence for assessing specific operational areas and selecting target analytes anticipated to be present within the study area. The findings of these investigative activities are summarized as follows:

- Asbestos analytical results for various building materials, including but not limited to transite, sheeting, and rope gasket material indicate ACM are present in the Ahmeek Mill Processing Area. These materials are in a debris pile within the brush across the street from the Osceola Township Park and are subject to migration via wind and water erosion. Asbestos concentrations in five bulk material samples contained asbestos fibers at concentrations greater than 1 %. The damaged and friable nature of these materials pose a potential risk to human health as it relates to the inhalation pathway. Although, asbestos fibers were not detected in a limited number of soil samples collected from the study area, the exposed nature of these material, makes them subject to further degradation that could potentially impact surface soils in the Ahmeek Mill Processing Area.

- The shallow and subsurface soil analytical results for the Ahmeek Mill Processing Area SI did not contain any COCs at concentrations at or above applicable regulatory criteria.

- Historic soil analytical and XRF soil screening results for samples from the Osceola Township Park and ruins of the former Ahmeek Stamp Mill Complex did indicate the presence of COCs at concentrations at or above applicable regulatory criteria including PSIC and DCC in both of the residential and nonresidential exposure scenarios for inorganic and SVOC contaminants, and GSIPC for cyanide and SVOCs. Those areas have reportedly been addressed under previous cleanup and removal actions undertaken in the area and provided the remedies are maintained properly risk to these contaminants apparently would be minimized.

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

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

Ahmeek Mill Processing Area – Media, Criteria, Potential Receptor Summary															
Media	Soil			Groundwater			Air		Sediment	Surface Water		Building Materials, Asbestos, and Abandoned Containers			
Criteria / Potential Receptor	Drinking Water Protection	Groundwater Surface Water Interface	Direct Contact	Drinking Water Protection	Groundwater Surface Water Interface	Flammability and Explosivity	Volatilization	Particulate Inhalation	Ecological	Ecological	Human Health	Particulate Inhalation	Flammability and Explosivity	Environmental	Human Health
Residential Human		✓	✓					✓				✓			✓
Nonresidential Human		✓	✓					✓				✓			✓
Water Column Organism									✓						
Benthic Organism									✓						
COCs exceeding applicable regulatory criteria in one or more sample				Arsenic, Chromium, Copper, Cyanide, Lead, Nickel, Silver, Naphthalene, Fluoranthene, Phenanthrene, Asbestos, Benzo(a)pyrene, Carbazole												

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

- Significant in-lake and terrestrial sources of contamination are present in the form of inorganic COCs, cyanide, SVOCs, and asbestos in the study area. With the exception of the ACM in a debris pile within the brush across the street from the Osceola Township Park, the terrestrial COCs have reportedly been addressed under previous cleanup and removal actions undertaken in the area and provided the remedies are maintained properly risk to these contaminants apparently would be minimized;

- No in-lake or terrestrial uncharacterized waste deposits were identified in the study area; and,

- Industrial ruins, including buildings, foundations, and building floors associated with the mill ruins are present. Voids noted where it appears soil has settled into the subsurface near the mill ruins pose a potential physical hazard due to slip, trip, and fall concerns. Mining era ACM in building debris were observed in the study area. Small mounds and rubble piles where debris including cable, piping, asphalt, and concrete; and partially buried concrete piping were also observed in the area.

5.3.2 Recommendations

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

To that end, actions have been taken through the implementation of remedial measures, such as the placement of a soil and vegetative cap on portions of the study area to address these environmental issues.

Given current land use consideration, the uncontrolled nature of the identified ACM across the street from the Osceola Township Park merits immediate 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.

Based on the results of the SI and to ensure compliance with regulatory statutes, human health and ecological risks should minimally be qualitatively evaluated with property-specific data to determine if risks to the public health, safety, or welfare or to the environment are likely within the study area. The performance of a risk assessment on select properties or groups of properties, based on current and anticipated future land-use will help identify remedial goals for properties where potential human health and ecological hazards have been identified. Assessment based on current and future land-use contributes to the beneficial and safe re-use and potential redevelopment of any given property by clarifying applicability of regulatory statutes, as traditional property zoning (residential versus nonresidential) is generally undefined in the study area.

MDEQ should continue to provide new study data to the RRD Superfund Section (SFS), which is responsible for monitoring EPA's remedy for the terrestrial and lake portion of the Torch Lake Superfund Site. RRD SFS should evaluate whether any remedy modifications are necessary. The EPA and RRD SFS should verify that administrative controls for areas that have been previously

remediated by the EPA have been employed to ensure that the selected remedy is performing as designed and those institutional controls, where required, have been recorded and are being enforced.

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

SECTION 5

DETAILED FINDINGS REPORT – AHMEEK MILL PROCESSING AREA TABLES

TABLE 5-1
Sample Analytical Summary - Bulk Asbestos
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Sample Location	Field Sample ID	Sample Date	Asbestos	Note
CHTC-ASBBLK12A	CHTC-ASBBLK12A-062915	6/29/2015	95 %	chrysotile
CHTC-ASBBLK13A	CHTC-ASBBLK13A-062915	6/29/2015	20 %	chrysotile
CHTC-ASBBLK13B	CHTC-ASBBLK13B-062915	6/29/2015	20 %	chrysotile
CHTC-ASBBLK13C	CHTC-ASBBLK13C-062915	6/29/2015	20 %	chrysotile
CHTC-ASBBLK14A	CHTC-ASBBLK14A-062915	6/29/2015	90 %	chrysotile

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	1 (Stack)	2 (Concrete Floor)	3 (Door Jam)	4 (Track Turn)	5 (SS Pile)	CHTC-SB01	
Field Sample ID									Stack	Concrete Floor	Door Jam	Track Turn	SS Pile	CHTC-SB-01-0-6"	CHTC-SB-01-6"-7'
Sample Date:									10/19/2001	10/19/2001	10/19/2001	10/19/2001	10/19/2001	5/16/2015	5/16/2015
Sample Interval (bgs):									0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0.5 ft	0.5 - 7 ft
Sample Description:									--	--	--	--	--	TOPSOIL	SAND, Medium grained, Light Brown to 1.75 ft; SILTY SAND, Fine grained, Reddish brown to 7 ft; SAND, Fine grained, Reddish brown to 8 ft
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	**470**	**86**	**210**	**48**	**3.8**	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**150**	**270**	**190**	**92**	**11**	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	**0.14**	**1.4**	**0.72**	**0.61**	**0.28**	--	--
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)	**49**	**47**	**31**	**140**	**38**	--	--
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	**180**	**2600**	**240000**	**35000**	**1200**	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**22**	**1900**	**700**	**430**	**11**	--	--
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)	<0.1 U	**1.1**	**0.16**	**0.25**	<0.1 U	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**6.4**	**59**	**48**	**69**	**40**	--	--
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	**37**	**3.0**	**1.7**	**0.71**	**0.5**	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	<0.5 U	**0.92**	**38**	**7.5**	<0.5 U	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	--	--	--	--	--	--	--
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	**3.6**	**750**	**410**	**210**	**82**	--	--
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)															
									--	--	ND	--	--	ND	ND
Organics - SVOCs (ug/kg)															
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	<330 U	**630**	<1320 U	<330 U	<330 U	--	--
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	<330 U	<330 U	<1320 U	<330 U	<330 U	--	--
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	<330 U	<330 U	**2400**	<330 U	<330 U	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	<330 U	**670**	<1320 U	<330 U	<330 U	--	--
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<330 U	**5100**	**5100**	**1800**	<330 U	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<330 U	**7000**	**9600**	**2900**	<330 U	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	<330 U	**8000**	**12000**	**4600**	<330 U	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	<330 U	**2800**	**5400**	**1600**	<330 U	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<330 U	**7200**	**12000**	**4000**	<330 U	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	<1320 U	--	--	--	--
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	--	--	<1320 U	--	--	--	--

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	1 (Stack)	2 (Concrete Floor)	3 (Door Jam)	4 (Track Turn)	5 (SS Pile)	CHTC-SB01	
Field Sample ID									Stack	Concrete Floor	Door Jam	Track Turn	SS Pile	CHTC-SB-01-0-6"	CHTC-SB-01-6"-7'
Sample Date:									10/19/2001	10/19/2001	10/19/2001	10/19/2001	10/19/2001	5/16/2015	5/16/2015
Sample Interval (bgs):									0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0 ft	0 - 0.5 ft	0.5 - 7 ft
Sample Description:									--	--	--	--	--	TOPSOIL	SAND, Medium grained, Light Brown to 1.75 ft; SILTY SAND, Fine grained, Reddish brown to 7 ft; SAND, Fine grained, Reddish brown to 8 ft
Organics - SVOCs (ug/kg) - continued															
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	--	--	**2500**	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	<330 U	**5300**	**8400**	**2500**	<330 U	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<330 U	<330 U	<1320 U	<330 U	<330 U	--	--
DIBENZOFURAN	132-64-9	ID	1,700	6.7E+06	ID	ID	2.9E+06	ID	--	--	<1320 U	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	<1320 U	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	<330 U	**8300**	**15000**	**4000**	<330 U	--	--
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<330 U	<330 U	<1320 U	<330 U	<330 U	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<330 U	**3000**	**5700**	**1500**	<330 U	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<330 U	**450**	<1320 U	<330 U	<330 U	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	5,200,000	<330 U	**2600**	**10000**	**2500**	<330 U	--	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	<330 U	**10000**	**18000**	**5100**	<330 U	--	--
Organics - VOCs (ug/kg)															
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--	--
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	--	--	--	--	--	--	--
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	--	--	--	--	--	--	--
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	--	--	--	--	--	--	--
Asbestos															
ASBESTOS									--	--	--	--	--	--	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB02		CHTC-SB03		CHTC-SB04	
Field Sample ID									CHTC-SB-02-0-6''	CHTC-SB-02-6''-10'	CHTC-SB-03-0-6''	CHTC-SB-03-6''-7'	CHTC-SB-04-12''-5'	CHTC-SB-04-6''-12''
Sample Date:									5/16/2015	5/16/2015	5/17/2015	5/17/2015	5/17/2015	5/17/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 10 ft	0 - 0.5 ft	0.5 - 7 ft	1 - 5 ft	0.5 - 1 ft
Sample Description:									TOPSOIL	SAND, Fine to medium grained, Brown to 9 ft; SAND, Fine grained, Brown to 11 ft; SAND, Fine to medium grained, Brown to 12 ft	TOPSOIL	SAND AND GRAVEL, Medium grained, Brown to 2 ft; SAND, Medium grained, Light brown to 6 ft; SAND, Coarse to medium grained, Brown to 8 ft	CLAY cap to 1.5 ft	SAND, Stamp sand, Medium grained, Gray
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	--	--	--	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	--	--	--	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	--	--	--	--	--	--
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)														
									ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	<600 U	--	--	<560 U	--
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	<240 U	--	--	<220 U	--
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	<240 U	--	--	<220 U	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	<240 U	--	--	<220 U	--
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<240 U	--	--	<220 U	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	<480 U	--	--	<450 U	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<480 U	--	--	<450 U	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	<480 U	--	--	<450 U	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	<480 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)	--	--	--	--	--	--
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	--	--	--	--	--	--

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB02		CHTC-SB03		CHTC-SB04	
Field Sample ID									CHTC-SB-02-0-6''	CHTC-SB-02-6''-10'	CHTC-SB-03-0-6''	CHTC-SB-03-6''-7'	CHTC-SB-04-12''-5'	CHTC-SB-04-6''-12''
Sample Date:									5/16/2015	5/16/2015	5/17/2015	5/17/2015	5/17/2015	5/17/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 10 ft	0 - 0.5 ft	0.5 - 7 ft	1 - 5 ft	0.5 - 1 ft
Sample Description:									TOPSOIL	SAND, Fine to medium grained, Brown to 9 ft; SAND, Fine grained, Brown to 11 ft; SAND, Fine to medium grained, Brown to 12 ft	TOPSOIL	SAND AND GRAVEL, Medium grained, Brown to 2 ft; SAND, Medium grained, Light brown to 6 ft; SAND, Coarse to medium grained, Brown to 8 ft	CLAY cap to 1.5 ft	SAND, Stamp sand, Medium grained, Gray
Organics - SVOCs (ug/kg) - continued														
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	<240 U	--	--	<220 U	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	<480 U	--	--	<450 U	--
DIBENZOFURAN	132-64-9	ID	1,700	6.7E+06	ID	ID	2.9E+06	ID	--	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	<240 U	--	--	<220 U	--
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	<240 U	--	--	<220 U	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<480 U	--	--	<450 U	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<240 U	--	--	<220 U	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	5,200,000	--	<240 U	--	--	<220 U	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	<240 U	--	--	<220 U	--
Organics - VOCs (ug/kg)														
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	--	--	--	--	--	--
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	--	--	--	--	--	--
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	--	--	--	--	--	--
Asbestos														
ASBESTOS									--	--	ND	--	--	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB05			CHTC-SB06		CHTC-SB07	
Field Sample ID									CHTC-SB-05-3-9''	CHTC-SB-05-9''-5' DUP	CHTC-SB-05-9''-5'	CHTC-SB-06-0-6''	CHTC-SB-06-6''-4'	CHTC-SB-07-0-6''	CHTC-SB-07-6''-4'
Sample Date:									5/17/2015	5/17/2015	5/17/2015	5/17/2015	5/17/2015	5/18/2015	5/18/2015
Sample Interval (bgs):									0.25 - 0.75 ft	0.75 - 5 ft	0.75 - 5 ft	0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0.5 - 4 ft
Sample Description:									CLAY cap to 0.25 ft; SAND, Stamp sand, Medium grained, Gray to 0.75 ft	SAND, Stamp sand, Medium grained, Gray	Field Duplicate	TOPSOIL	SAND, Fine grained, Brown to 0.75 ft; SAND, Stamp sand, Medium grained, Gray	TOPSOIL	FILL, Sand and gravel and debris
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	--	--	--	--	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	--	--	--	--	--	--	--
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)															
									ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)															
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	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	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	--	--	--	--	--
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	--	--	--	--	--	--	--

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB05			CHTC-SB06		CHTC-SB07	
Field Sample ID									CHTC-SB-05-3-9''	CHTC-SB-05-9''-5' DUP	CHTC-SB-05-9''-5'	CHTC-SB-06-0-6''	CHTC-SB-06-6''-4'	CHTC-SB-07-0-6''	CHTC-SB-07-6''-4'
Sample Date:									5/17/2015	5/17/2015	5/17/2015	5/17/2015	5/17/2015	5/18/2015	5/18/2015
Sample Interval (bgs):									0.25 - 0.75 ft	0.75 - 5 ft	0.75 - 5 ft	0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0.5 - 4 ft
Sample Description:									CLAY cap to 0.25 ft; SAND, Stamp sand, Medium grained, Gray to 0.75 ft	SAND, Stamp sand, Medium grained, Gray	Field Duplicate	TOPSOIL	SAND, Fine grained, Brown to 0.75 ft; SAND, Stamp sand, Medium grained, Gray	TOPSOIL	FILL, Sand and gravel and debris
Organics - SVOCs (ug/kg) - continued															
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	--	--	--	--	--	--	--
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	6.7E+06	ID	ID	2.9E+06	ID	--	--	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	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)															
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--	--
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	--	--	--	--	--	--	--
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	--	--	--	--	--	--	--
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	--	--	--	--	--	--	--
Asbestos															
ASBESTOS									ND	--	--	--	--	ND	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB08		CHTC-SB09		CHTC-SB10		
Field Sample ID									CHTC-SB-08-0-6''	CHTC-SB-08-6''-4'	CHTC-SB-09-0-6''	CHTC-SB-09-6''-4'	CHTC-SB-10-0-6''	CHTC-SB-10-6''-4'	CHTC-SB-10-6''-4' DUP
Sample Date:									5/18/2015	5/18/2015	5/18/2015	5/18/2015	5/18/2015	5/18/2015	5/18/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0.5 - 4 ft	0.5 - 4 ft
Sample Description:									TOPSOIL	SAND, Fine grained, Brown to 3 ft; SAND, Fine grained, Gray to 5 ft	SAND with GRAVEL, Medium grained, Reddish Brown to 4 ft	SILTY SAND, Fine grained, Brown to 4.75 ft; SAND, Coarse to medium grained, Brown to 5 ft	TOPSOIL	SAND, Fine to medium grained, Brown to 3 ft; SAND with GRAVEL, Fine grained, Reddish Brown to 5 ft	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)	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	--	--	--	--	--	--	--
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)															
									ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)															
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	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	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	--	--	--	--
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	--	--	--	--	--
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	--	--	--	--	--	--	--

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB08		CHTC-SB09		CHTC-SB10		
Field Sample ID									CHTC-SB-08-0-6''	CHTC-SB-08-6''-4'	CHTC-SB-09-0-6''	CHTC-SB-09-6''-4'	CHTC-SB-10-0-6''	CHTC-SB-10-6''-4'	CHTC-SB-10-6''-4' DUP
Sample Date:									5/18/2015	5/18/2015	5/18/2015	5/18/2015	5/18/2015	5/18/2015	5/18/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0.5 - 4 ft	0.5 - 4 ft
Sample Description:									TOPSOIL	SAND, Fine grained, Brown to 3 ft; SAND, Fine grained, Gray to 5 ft	SAND with GRAVEL, Medium grained, Reddish Brown to 4 ft	SILTY SAND, Fine grained, Brown to 4.75 ft; SAND, Coarse to medium grained, Brown to 5 ft	TOPSOIL	SAND, Fine to medium grained, Brown to 3 ft; SAND with GRAVEL, Fine grained, Reddish Brown to 5 ft	Field Duplicate
Organics - SVOCs (ug/kg) - continued															
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	--	--	--	--	--	--	--
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	6.7E+06	ID	ID	2.9E+06	ID	--	--	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	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)															
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--	--
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	--	--	--	--	--	--	--
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	--	--	--	--	--	--	--
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	--	--	--	--	--	--	--
Asbestos															
ASBESTOS									ND	--	ND	--	ND	--	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB11		CHTC-SB12		CHTC-SB13	
Field Sample ID									CHTC-SB-11-0-6''	CHTC-SB-11-6''-7'	CHTC-SB-12-0-6''	CHTC-SB-12-6''-11'	CHTC-SB-13-0-6''	CHTC-SB-13-6''-9'
Sample Date:									5/17/2015	5/17/2015	5/17/2015	5/17/2015	5/17/2015	5/17/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 7 ft	0 - 0.5 ft	0.5 - 11 ft	0 - 0.5 ft	0.5 - 9 ft
Sample Description:									TOPSOIL	SAND AND GRAVEL, Medium grained, Dark gray to 1 ft; SAND, Fine grained, Brown to 5 ft; SAND, Medium grained, Brown to 9 ft	FILL, Sand and gravel, Gray to 7 ft	SAND, Fine grained, Brown to 9 ft; SILTY SAND, Fine grained, Brown to 11 ft; SAND, Medium to fine grained, Brown to 13 ft	SAND, Fine grained, Light brown to 1 ft	SAND, Fine grained, Gray to 5 ft; SAND, Medium grained, Brown to 12 ft
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	--	--	--	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	--	--	--	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	--	--	--	--	--	--
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)														
									ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	<580 U	--	<710 U	--	<610 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	<230 U	--	<280 U	--	<250 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	<230 U	--	<280 U	--	<250 U
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	<230 U	--	<280 U	--	<250 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	**460**	--	<280 U	--	<250 U
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	<460 U	--	<570 U	--	<490 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<460 U	--	<570 U	--	<490 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	<460 U	--	<570 U	--	<490 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	<460 U	--	<570 U	--	<490 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	--	--	--	--
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	--	--	--	--	--	--

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB11		CHTC-SB12		CHTC-SB13	
Field Sample ID									CHTC-SB-11-0-6''	CHTC-SB-11-6''-7'	CHTC-SB-12-0-6''	CHTC-SB-12-6''-11'	CHTC-SB-13-0-6''	CHTC-SB-13-6''-9'
Sample Date:									5/17/2015	5/17/2015	5/17/2015	5/17/2015	5/17/2015	5/17/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 7 ft	0 - 0.5 ft	0.5 - 11 ft	0 - 0.5 ft	0.5 - 9 ft
Sample Description:									TOPSOIL	SAND AND GRAVEL, Medium grained, Dark gray to 1 ft; SAND, Fine grained, Brown to 5 ft; SAND, Medium grained, Brown to 9 ft	FILL, Sand and gravel, Gray to 7 ft	SAND, Fine grained, Brown to 9 ft; SILTY SAND, Fine grained, Brown to 11 ft; SAND, Medium to fine grained, Brown to 13 ft	SAND, Fine grained, Light brown to 1 ft	SAND, Fine grained, Gray to 5 ft; SAND, Medium grained, Brown to 12 ft
Organics - SVOCs (ug/kg) - continued														
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	--	--	--	--	--	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	--	--	--	--	--	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	**490**	--	<280 U	--	<250 U
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	<460 U	--	<570 U	--	<490 U
DIBENZOFURAN	132-64-9	ID	1,700	6.7E+06	ID	ID	2.9E+06	ID	--	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	**770**	--	<280 U	--	<250 U
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	<230 U	--	<280 U	--	<250 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<460 U	--	<570 U	--	<490 U
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<230 U	--	<280 U	--	<250 U
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	5,200,000	--	**230**	--	<280 U	--	<250 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	**1200**	--	<280 U	--	<250 U
Organics - VOCs (ug/kg)														
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	--	--	--	--	--	--
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	--	--	--	--	--	--
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	--	--	--	--	--	--
Asbestos														
ASBESTOS									ND	--	--	--	--	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB14		CHTC-SB44		SB-1 (2002 BFRA)	SB-10 (2002 BFRA)	SB-2 (2002 BFRA)
Field Sample ID									CHTC-SB-14-0-6''	CHTC-SB-14-6''-7'	CHTC-SB-44-0-6''	CHTC-SB-44-6''-4'	SB-1	SB-10	SB-2
Sample Date:									5/18/2015	5/18/2015	5/17/2015	5/17/2015	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 7 ft	0 - 0.5 ft	0.5 - 4 ft	1 - 3.17 ft	1 - 2.58 ft	0.5 - 2.5 ft
Sample Description:									TOPSOIL	SAND, Medium to fine grained, Brown to 3 ft; SILTY SAND, Fine grained, Brown to 5 ft; SAND, Medium grained, brown to 7 ft	TOPSOIL	SAND, Fine grained, Brown to 0.75 ft; SAND, Stamp sand, Medium grained, Gray to 4 ft	--	--	--
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	**4960**	**6100**	**6300**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	<0.49 UJ	<0.51 UJ	<0.61 UJ
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	--	--	--	**0.85 J**	**0.88 J**	**1.8 J**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	**27.7**	**26.2**	**38.5**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	**0.31**	**0.39**	**0.53**
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	**0.25**	**0.24**	**0.29**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	**1620**	**1840**	**3780**
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	--	--	--	--	**8.5**	**9.2**	**14.6**
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	**5.3**	**5.4**	**6.2**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	**32.3 J**	**33.9 J**	**165 J**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	**11300 J**	**8670 J**	**9480 J**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	--	--	--	**1.4 J**	**1.4 J**	**37.3 J**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	**3030**	**3320**	**4080**
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	**286**	**204**	**149**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	<0.05 U	<0.05 U	**0.25**
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	**11**	**11.5**	**13.9**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	**567**	**756**	**1020**
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	**0.64**	**0.7 J**	**0.67**
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	<0.11 U	<0.12 U	<0.14 U
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	**125 J**	**52.1 J**	**143 J**
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	--	--	--	--	<0.49 U	<0.51 U	<0.61 U
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	**29.4**	**25.5**	**35.4**
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	**20.7 J**	**19.7 J**	**36.9 J**
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)	--	--	--	--	<0.03 U	**0.04**	<0.04 U
Organics - PCBs (ug/kg)															
									ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)															
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	<660 U	<380 U	<410 U	<550 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	--	--	<260 U	<380 U	<410 U	<550 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	--	--	<260 U	<380 U	<410 U	<550 U
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	--	--	<260 U	<380 U	<410 U	<550 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	<380 U	<410 UJ	**110 J**
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	<260 U	<380 U	<410 U	**66 J**
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	<380 U	<410 U	**65 J**
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	<530 U	<380 U	<410 U	<550 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	--	--	<530 U	<380 U	<410 U	<550 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	<530 U	<380 U	<410 U	**63 J**
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	--	--	--	<380 U	<410 U	<550 U
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	--	--	--	--	<380 U	<410 U	<550 U

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB14		CHTC-SB44		SB-1 (2002 BFRA)	SB-10 (2002 BFRA)	SB-2 (2002 BFRA)
Field Sample ID									CHTC-SB-14-0-6''	CHTC-SB-14-6''-7'	CHTC-SB-44-0-6''	CHTC-SB-44-6''-4'	SB-1	SB-10	SB-2
Sample Date:									5/18/2015	5/18/2015	5/17/2015	5/17/2015	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 7 ft	0 - 0.5 ft	0.5 - 4 ft	1 - 3.17 ft	1 - 2.58 ft	0.5 - 2.5 ft
Sample Description:									TOPSOIL	SAND, Medium to fine grained, Brown to 3 ft; SILTY SAND, Fine grained, Brown to 5 ft; SAND, Medium grained, brown to 7 ft	TOPSOIL	SAND, Fine grained, Brown to 0.75 ft; SAND, Stamp sand, Medium grained, Gray to 4 ft	--	--	--
Organics - SVOCs (ug/kg) - continued															
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	--	--	--	--	<380 U	<410 U	**56 J**
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	--	--	--	--	<380 U	<410 U	<550 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	--	--	<260 U	<380 U	<410 U	**71 J**
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	<530 U	<380 U	<410 U	<550 U
DIBENZOFURAN	132-64-9	ID	1,700	6.7E+06	ID	ID	2.9E+06	ID	--	--	--	--	<380 U	<410 U	<550 U
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	<380 U	<410 U	<550 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	<260 U	<380 U	<410 U	**150 J**
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	--	--	<260 U	<380 U	<410 U	<550 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	<530 U	<380 U	<410 U	<550 U
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	<260 U	<380 U	<410 U	<550 U
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	5,200,000	--	--	--	<260 U	<380 U	<410 U	**80 J**
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	<260 U	<380 U	<410 U	**120 J**
Organics - VOCs (ug/kg)															
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	<3.8 U	<4.1 U	<5.6 U
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	<3.8 U	**4.2**	<5.6 U
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	<1.9 U	**100**	**62**
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	--	--	--	--	<1.9 U	<2.1 U	<2.9 U
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	<1.9 U	**3.6**	<2.9 U
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	<1.9 U	**6.1**	<2.9 U
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	<3.8 U	<4.1 U	<5.6 U
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	<1.9 U	**100**	**68**
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	--	--	--	--	<1.9 U	**46**	**46**
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	--	--	--	--	<1.9 U	<2.1 U	<29 U
Asbestos															
ASBESTOS									ND	--	--	--	--	--	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SB-3 (2002 BFRA)	SB-4 (2002 BFRA)	SB-5 (2002 BFRA)	SB-6 (2002 BFRA)	SB-7 (2002 BFRA)	SB-8 (2002 BFRA)	SB-9 (2002 BFRA)
Field Sample ID									SB-3	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9
Sample Date:									6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 2.5 ft	0 - 2.5 ft	1 - 3 ft	0 - 2.33 ft	0 - 2 ft	1 - 3 ft	1 - 2.5 ft
Sample Description:									--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**9710**	**4830**	**7560**	**7230**	**2980**	**6690**	**5050**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<0.47 UJ	<0.5 UJ	<0.65 UJ	<0.61 UJ	<0.49 UJ	<0.64 UJ	<0.5 UJ
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**4.4 J**	**2.3 J**	**1.6 J**	**1.7 J**	<0.44 UJ	**1.8 J**	**1.4 J**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**13.3**	**39.2**	**31.8**	**30.4**	**13.9**	**31.6**	**14.3**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	**0.38**	**0.4**	**0.61**	**0.51**	**0.24 J**	**0.56**	**0.28 J**
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	**0.34**	**0.29**	**0.23**	**0.3**	**0.1**	**0.19**	**0.19**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**25900**	**17300**	**3450**	**6350**	**580**	**2600**	**1110**
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)	**22.2**	**8.5**	**18.2**	**16.8**	**4.7**	**16.2**	**8.0**
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**15.6**	**3.9**	**7.6**	**7.7**	**1.9**	**6.6**	**5.4**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**3600 J**	**1390 J**	**69.8 J**	**435 J**	**19.8 J**	**60.1 J**	**173 J**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**13300 J**	**7620 J**	**7010 J**	**8760 J**	**4020 J**	**7390 J**	**7570 J**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**17.4 J**	**5 J**	**2.6 J**	**16.3 J**	**1.3 J**	**2.4 J**	**3.8 J**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	**13400**	**2810**	**4520**	**4760**	**1120**	**3920**	**3380**
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**297**	**176**	**120**	**173**	**85.1**	**117**	**94.3**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	<0.05 U	<0.05 U	<0.07 U	**0.1**	<0.05 U	<0.07 U	<0.06 U
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**26.7**	**9.8**	**17.1**	**18.5**	**5.4**	**14.5**	**13.1**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	**440**	**399**	**1260**	**1070**	**433**	**1150**	**432**
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<0.45 U	<0.48 U	<0.62 U	**0.66**	<0.47 U	<0.61 U	<0.48 U
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**1.9**	**0.18**	<0.15 U	<0.14 U	<0.11 U	<0.15 U	<0.11 U
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	**37.7 J**	**133 J**	**104 J**	**86.4 J**	**56.5 J**	<45.8 U	<36 U
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	**4.6**	<0.5 U	<0.65 U	<0.61 U	<0.49 U	<0.64 U	<0.5 U
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	**39.6**	**26.2**	**44.9**	**37.7**	**16.8**	**37.8**	**28.2**
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**67 J**	**71.8 J**	**32 J**	**33.5 J**	**10.7 J**	**29.1 J**	**19.9 J**
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)	**0.06**	**0.11**	<0.04 U	<0.04 U	**0.05**	<0.04 U	<0.03 U
Organics - PCBs (ug/kg)															
									--	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)															
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 UJ
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	<400 U	**330 J**	<4300 U	<2400 U	**270 J**	<400 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SB-3 (2002 BFRA)	SB-4 (2002 BFRA)	SB-5 (2002 BFRA)	SB-6 (2002 BFRA)	SB-7 (2002 BFRA)	SB-8 (2002 BFRA)	SB-9 (2002 BFRA)
Field Sample ID									SB-3	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9
Sample Date:									6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 2.5 ft	0 - 2.5 ft	1 - 3 ft	0 - 2.33 ft	0 - 2 ft	1 - 3 ft	1 - 2.5 ft
Sample Description:									--	--	--	--	--	--	--
Organics - SVOCs (ug/kg) - continued															
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
DIBENZOFURAN	132-64-9	ID	1,700	6.7E+06	ID	ID	2.9E+06	ID	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	**52 J**	<490 U	<4300 U	<2400 U	<430 U	<400 U
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	5,200,000	--	<400 U	<490 U	<4300 U	<2400 U	<430 U	<400 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	**43 J**	<490 U	<4300 U	<2400 U	<430 U	<400 U
Organics - VOCs (ug/kg)															
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	<4.1 U	<4.9 U	<4.4 U	<4.8 U	<4.2 U	<4 U
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	<4.1 U	<4.9 U	<4.4 U	<4.8 U	<4.2 U	<4 U
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	--	<2.1 U	<2.5 U	<2.3 U	<2.5 U	<2.2 U	**37**
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	--	<2.1 U	<2.5 U	<2.3 U	<2.5 U	<2.2 U	<2 U
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	--	<2.1 U	<2.5 U	<2.3 U	<2.5 U	<2.2 U	<2 U
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	--	<2.1 U	<2.5 U	<2.3 U	<2.5 U	<2.2 U	**2.2**
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	<4.1 U	<4.9 U	<4.4 U	<4.8 U	<4.2 U	<4 U
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	--	<2.1 U	<2.5 U	<2.3 U	<2.5 U	<2.2 U	**38**
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	--	<2.1 U	<2.5 U	<2.3 U	<2.5 U	<2.2 U	**23**
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	--	<2.1 U	<2.5 U	<2.3 U	<2.5 U	<2.2 U	<2 U
Asbestos															
ASBESTOS									--	--	--	--	--	--	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-1 (2002 BFRA)	SS-2 (2002 BFRA)	SS-3 (2002 BFRA)	SS-4 (2002 BFRA)	SS-5 (2002 BFRA)	SS-6 (2002 BFRA)	SS-7 (2002 BFRA)
Field Sample ID									SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7
Sample Date:									6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.58 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.42 ft	0 - 0.5 ft
Sample Description:									--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	6450	5450	6080	11900	6620	5360	6230
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	0.53 J	0.84 J	<0.42 UJ	0.38 J	0.58 J	<0.34 UJ	<0.36 UJ
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	76.6	4.7	4.4	2.3	61	5.2	10.1
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	166	38.9	51.5	153	48.1	35.3	66.6
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	0.81 J	0.52 J	0.62 J	0.34 J	0.53 J	0.43 J	0.64 J
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	0.57 J	0.09 J	0.11 J	<0.06 U	0.17 J	<0.06 U	0.1 J
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	8970	6210	5210	19900	5830	3770	7540
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)	26.5	14.7	12.6	40.5	17.8	12.4	13.3
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	9.2	7.5	8.3	18.1	11.4	7.2	8.2
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	1170 J	1190 J	681 J	1070 J	15700 J	1710 J	3290 J
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	22800	10900	10600	16800	22700	9720	14800
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	865 J	122 J	116 J	578 J	85.3 J	82 J	76.7 J
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	6180	4990	5670	17200	7500	4990	5280
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	310 J	209 J	213 J	408 J	363 J	138 J	265 J
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	0.23	0.28	0.17	0.07	0.64	0.07	0.18
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	25.1	17.2	19.9	31.6	26.4	14.6	18
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	780 J	423 J	367 J	116 J	190 J	328 J	539 J
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	6.8	0.59	1.4	<0.45 U	1.6	0.92	1.7
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	0.8 J	0.26 J	0.25 J	0.5 J	3.2	0.62 J	0.92
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	390	159	166	153	103	100	143
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	R	R	R	R	R	R	R
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	30.1	27.1	25.8	44.9	30.4	26.4	28.1
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	360	92.8	95.6	195	145	75	115
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)	0.23	0.1	0.12	<0.03 U	0.31	0.1	0.21
Organics - PCBs (ug/kg)															
									ND	ND	--	ND	ND	ND	ND
Organics - SVOCs (ug/kg)															
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	<4000 U	650 J	--	<650 U	470 J	90 J	93 J
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	<4000 U	850 J	--	<650 U	<1800 U	<720 U	<370 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	<4000 U	<3700 U	--	<650 U	<1800 U	<720 U	<370 U
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	660 J	2400 J	--	<650 U	<1800 U	<720 U	<370 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	<4000 U	<3700 U	--	<650 U	<1800 U	<720 U	43 J
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	3700 J	4300	--	340 J	810 J	260 J	250 J
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	3600 J	3600 J	--	400 J	730 J	230 J	220 J
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	3100 J	3100 J	--	370 J	700 J	270 J	290 J
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	2800 J	2200 J	--	360 J	580 J	170 J	76 J
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	3400 J	3300 J	--	530 J	820 J	240 J	230 J
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	<4000 U	<3700 U	--	<650 U	<1800 U	<720 U	<370 U
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	<4000 U	<3700 U	--	<650 U	<1800 U	<720 U	<370 U

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-1 (2002 BFRA)	SS-2 (2002 BFRA)	SS-3 (2002 BFRA)	SS-4 (2002 BFRA)	SS-5 (2002 BFRA)	SS-6 (2002 BFRA)	SS-7 (2002 BFRA)
Field Sample ID									SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7
Sample Date:									6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.58 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.42 ft	0 - 0.5 ft
Sample Description:									--	--	--	--	--	--	--
Organics - SVOCs (ug/kg) - continued															
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	<4000 U	<3700 U	--	<650 U	<1800 U	<720 U	<370 U
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	**710 J**	**1400 J**	--	**86 J**	<1800 U	<720 U	<370 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	**3700 J**	**4000**	--	**450 J**	**920 J**	**290 J**	**300 J**
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	**890 J**	**940 J**	--	**92 J**	**260 J**	**80 J**	<370 U
DIBENZOFURAN	132-64-9	ID	1,700	6.7E+06	ID	ID	2.9E+06	ID	<4000 U	**850 J**	--	<650 U	<1800 U	<720 U	<370 U
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	<4000 U	<3700 U	--	<650 U	<1800 U	<720 U	<370 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	**7000**	**9000**	--	**670**	**1300 J**	**460 J**	**430**
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<4000 U	**1300 J**	--	<650 U	<1800 U	<720 U	<370 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	**2700 J**	**2300 J**	--	**350 J**	**550 J**	**190 J**	**96 J**
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<4000 U	**1300 J**	--	<650 U	**250 J**	<720 U	**60 J**
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	5,200,000	**2800 J**	**9000**	--	**410 J**	**990 J**	**230 J**	**210 J**
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	**6300**	**7800**	--	**630 J**	**1400 J**	**430 J**	**400**
Organics - VOCs (ug/kg)															
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	**5.6**	<3.7 U	--	<3.3 U	<3.5 U	<3.6 U	<3.7 U
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	<4 U	<3.7 U	--	<3.3 U	<3.5 U	<3.6 U	<3.7 U
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	<2.1 U	<1.9 U	--	<1.7 U	<1.8 U	<1.9 U	<1.9 U
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	**12**	<1.9 U	--	<1.7 U	<1.8 U	<1.9 U	<1.9 U
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	<2.1 U	<1.9 U	--	<1.7 U	<1.8 U	<1.9 U	<1.9 U
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	<2.1 U	<1.9 U	--	<1.7 U	<1.8 U	<1.9 U	<1.9 U
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	<4 U	<3.7 U	--	<3.3 U	**4.3**	<3.6 U	<3.7 U
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	<2.1 U	<1.9 U	--	<1.7 U	<1.8 U	<1.9 U	<1.9 U
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	<2.1 U	<1.9 U	--	<1.7 U	<1.8 U	<1.9 U	<1.9 U
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	<2.1 U	<1.9 U	--	<1.7 U	<1.8 U	<1.9 U	<1.9 U
Asbestos															
ASBESTOS									--	--	--	--	--	--	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-8 (2002 BFRA)	SS-9 (2002 BFRA)	SS-10 (2002 BFRA)	SS-11 (2002 BFRA)	SS-12 (2002 BFRA)	SS-13 (2002 BFRA)	SS-14 (2002 BFRA)
Field Sample ID									SS-8	SS-9	SS-10	SS-11	SS-12	SS-13	SS-14
Sample Date:									6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 0.42 ft	0 - 0.25 ft	0 - 0.33 ft	0 - 0.42 ft	0 - 0.25 ft	0 - 0.33 ft	0 - 0.42 ft
Sample Description:									--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**5920**	**8480**	**6020**	**7410**	**10400**	**9640**	**7980**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	**0.37 J**	**0.87 J**	<0.32 UJ	<0.33 UJ	**0.36 J**	**2.8 J**	**0.48 J**
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**15**	**14.2**	**3.1**	**3.3**	**6.2**	**16**	**4.1**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**50.4**	**69.1**	**28**	**36.5**	**31.4**	**157**	**39.6**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	**0.58 J**	**0.49 J**	**0.34 J**	**0.4 J**	**0.4 J**	**0.52 J**	**0.54 J**
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	**0.17 J**	**0.14 J**	<0.06 U	<0.06 U	<0.06 U	<0.07 U	<0.06 U
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**4180**	**14400**	**6910**	**6560**	**16200**	**27800**	**6200**
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)	**16.5**	**54.4**	**14.2**	**24.3**	**25**	**88.8**	**17.2**
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**8.9**	**13.8**	**7.7**	**9.4**	**17.9**	**18.5**	**10.2**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**2060 J**	**8940 J**	**1280 J**	**620 J**	**3340 J**	**9290 J**	**719 J**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**15700**	**25500**	**9490**	**11400**	**14300**	**132000**	**10800**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**104 J**	**192 J**	**82.7 J**	**69.1 J**	**55.9 J**	**878 J**	**41.4 J**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	**5080**	**9090**	**6550**	**6850**	**12700**	**11400**	**7780**
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**190 J**	**350 J**	**179 J**	**218 J**	**315 J**	**1020 J**	**222 J**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	**0.31**	**0.17**	**0.07**	<0.05 U	**0.08**	**0.22**	**0.07**
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**20.1**	**71.6**	**17.9**	**21.2**	**30.2**	**73.6**	**20.6**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	**366 J**	**260 J**	**174 J**	**314 J**	**87.3 J**	**145 J**	**283 J**
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	**1.8**	**1.0**	<0.45 U	**0.59**	**0.48**	**2.4**	**1.3**
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**0.66**	**3.3**	**0.39**	**0.31**	**0.89**	**2.4**	**0.35**
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	**85.9**	**220**	**170**	**246**	**136**	**118**	**182**
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	R	R	R	R	R	R	R
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	**28.4**	**45.3**	**26**	**31.8**	**52.2**	**48.6**	**33.2**
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**117**	**159**	**61.4**	**95.2**	**96.5**	**372**	**94.4**
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)	**0.1**	**0.15**	**0.07**	**0.1**	**0.05**	**0.09**	**0.09**
Organics - PCBs (ug/kg)															
									ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)															
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	**180 J**	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	<730 U	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	<730 U	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	**79 J**	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	<730 U	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	**580 J**	**2600 J**	**960 J**	**190 J**	**140 J**	**190 J**	**460 J**
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	**450 J**	**2400 J**	**900 J**	<1700 U	**210 J**	**260 J**	**490 J**
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	**650 J**	**3300 J**	**800 J**	**240 J**	**260 J**	**270 J**	**490 J**
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	**150 J**	**1100 J**	**730 J**	<1700 U	**200 J**	**250 J**	<3500 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	**470 J**	**3000 J**	**840 J**	<1700 U	**300 J**	**290 J**	**420 J**
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	<730 U	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	<730 U	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-8 (2002 BFRA)	SS-9 (2002 BFRA)	SS-10 (2002 BFRA)	SS-11 (2002 BFRA)	SS-12 (2002 BFRA)	SS-13 (2002 BFRA)	SS-14 (2002 BFRA)
Field Sample ID									SS-8	SS-9	SS-10	SS-11	SS-12	SS-13	SS-14
Sample Date:									6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 0.42 ft	0 - 0.25 ft	0 - 0.33 ft	0 - 0.42 ft	0 - 0.25 ft	0 - 0.33 ft	0 - 0.42 ft
Sample Description:									--	--	--	--	--	--	--
Organics - SVOCs (ug/kg) - continued															
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	<730 U	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	**81 J**	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	**700 J**	**3000 J**	**940 J**	**200 J**	**280 J**	**310 J**	**550 J**
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	**85 J**	**590 J**	<3500 U	<1700 U	**76 J**	<1800 U	<3500 U
DIBENZOFURAN	132-64-9	ID	1,700	6.7E+06	ID	ID	2.9E+06	ID	<730 U	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	<730 U	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	**1100**	**3900**	**1700 J**	**310 J**	**290 J**	**360 J**	**970 J**
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<730 U	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	**210 J**	**1600 J**	**630 J**	<1700 U	**230 J**	**280 J**	<3500 U
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	**100 J**	<3500 U	<3500 U	<1700 U	<730 U	<1800 U	<3500 U
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	5,200,000	**570 J**	**900 J**	**530 J**	<1700 U	**190 J**	**240 J**	**590 J**
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	**970**	**3500**	**1600 J**	**310 J**	**330 J**	**350 J**	**890 J**
Organics - VOCs (ug/kg)															
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	<3.7 U	<3.5 U	<3.5 U	**5.3**	<3.6 U	<3.7 U	<7.1 U
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	<3.7 U	<3.5 U	<3.5 U	**7.7**	<3.6 U	<3.7 U	<7.1 U
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	<1.9 U	<1.8 U	<1.8 U	**6.5**	<1.9 U	<1.9 U	<3.7 U
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	<1.9 U	<1.8 U	<1.8 U	<1.8 U	<1.9 U	<1.9 U	<3.7 U
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	<1.9 U	<1.8 U	<1.8 U	<1.8 U	<1.9 U	<1.9 U	<3.7 U
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	<1.9 U	<1.8 U	<1.8 U	<1.8 U	<1.9 U	<1.9 U	<3.7 U
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	<3.7 U	<3.5 U	<3.5 U	<3.4 U	<3.6 U	<3.7 U	<7.1 U
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	<1.9 U	<1.8 U	<1.8 U	**6.8**	<1.9 U	<1.9 U	<3.7 U
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	<1.9 U	<1.8 U	<1.8 U	<1.8 U	<1.9 U	<1.9 U	<3.7 U
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	<1.9 U	<1.8 U	<1.8 U	**2.2**	<1.9 U	<1.9 U	<3.7 U
Asbestos															
ASBESTOS									--	--	--	--	--	--	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-15 (2002 BFRA)	SS-16 (2002 BFRA)	SS-17 (2002 BFRA)	SS-18 (2002 BFRA)	SS-19 (2002 BFRA)	SS-20 (2002 BFRA)	SS-21 (2002 BFRA)
Field Sample ID									SS-15	SS-16	SS-17	SS-18	SS-19	SS-20	SS-21
Sample Date:									6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 0.42 ft	0 - 0.25 ft	0 - 0.42 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.42 ft	0 - 0.5 ft
Sample Description:									--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**6870**	**5800**	**8890**	**9080**	**5630**	**6830**	**6490**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<0.35 UJ	<0.34 UJ	<0.36 UJ	**1.3 J**	**0.41 J**	<0.34 UJ	<0.47 UJ
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**5.0**	**2.4**	**15.4**	**11.8**	**4.9**	**3.8**	**2.3 J**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**27.6**	**42.4**	**125**	**123**	**81.3**	**44.5**	**34.5**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	**0.35 J**	**0.3 J**	**1.1**	**0.51 J**	**0.4 J**	**0.28 J**	**0.33**
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	<0.07 U	<0.06 U	<0.07 U	<0.07 U	**0.4 J**	**0.1 J**	**0.29**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**6780**	**6530**	**6950**	**15000**	**6140**	**7670**	**5420**
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)	**21.4**	**13.5**	**21.6**	**47.8**	**13.6**	**14.8**	**8.2**
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**8.8**	**6.4**	**9.3**	**14.6**	**7.6**	**7.4**	**5.8**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**596 J**	**478 J**	**1020 J**	**4980 J**	**878 J**	**789 J**	**856 J**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**23300**	**8440**	**18700**	**58400**	**8850**	**9960**	**9330 J**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**34.4 J**	**38.6 J**	**115 J**	**197 J**	**209 J**	**51.7 J**	**17.5 J**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	**6470**	**4780**	**4910**	**9070**	**5350**	**6050**	**5280**
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**259 J**	**176 J**	**222 J**	**895 J**	**211 J**	**211 J**	**269**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	<0.06 U	<0.05 U	**0.13**	**0.39**	**0.1**	**0.11**	**0.1**
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**17.8**	**15**	**18.5**	**47.6**	**14.5**	**14.7**	**15.8**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	**297 J**	**386 J**	**666 J**	**294 J**	**243 J**	**299 J**	**583**
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	**1.6**	<0.46 U	**2.6**	**1.7**	**1.2**	**0.83**	<0.44 U
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**0.37**	**0.21**	**0.22**	**1.1**	**0.43**	**0.22**	**0.26**
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	**388**	**279**	**474**	**338**	**151**	**273**	**103 J**
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	R	R	R	R	R	R	<0.47 U
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	**35.1**	**27.5**	**37.9**	**42.8**	**25.6**	**27.2**	**15.5**
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**53.9**	**60.3**	**110**	**185**	**165**	**63**	**47.4 J**
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)	**0.34**	**0.07**	**0.24**	**0.12**	**0.22**	**0.13**	<0.03 U
Organics - PCBs (ug/kg)															
									ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)															
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	<2000 U	<1800 U	**110 J**	**250 J**	<730 U	**110 J**	**170 J**
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	<2000 U	<1800 U	<790 U	**810 J**	<730 U	<700 U	<350 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	<2000 U	<1800 U	<790 U	<1800 U	<730 U	<700 U	<350 U
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	<2000 U	<1800 U	**90 J**	**1600 J**	<730 U	<700 U	<350 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	<2000 U	<1800 U	<790 U	<1800 U	<730 U	<700 U	<350 U
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	**420 J**	**360 J**	**390 J**	**4500**	**320 J**	**270 J**	<350 U
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	**360 J**	**330 J**	**390 J**	**4100**	**300 J**	**230 J**	**36 J**
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	**360 J**	**380 J**	**420 J**	**4200**	**290 J**	**270 J**	**36 J**
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	**230 J**	**180 J**	**220 J**	**1800**	**180 J**	**130 J**	<350 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	**360 J**	**270 J**	**360 J**	**3400**	**340 J**	**220 J**	<350 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	<2000 U	<1800 U	<790 U	<1800 U	<730 U	<700 U	<350 U
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	<2000 U	<1800 U	<790 U	<1800 U	<730 U	**72 J**	<350 U

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-15 (2002 BFRA)	SS-16 (2002 BFRA)	SS-17 (2002 BFRA)	SS-18 (2002 BFRA)	SS-19 (2002 BFRA)	SS-20 (2002 BFRA)	SS-21 (2002 BFRA)
Field Sample ID									SS-15	SS-16	SS-17	SS-18	SS-19	SS-20	SS-21
Sample Date:									6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 0.42 ft	0 - 0.25 ft	0 - 0.42 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.42 ft	0 - 0.5 ft
Sample Description:									--	--	--	--	--	--	--
Organics - SVOCs (ug/kg) - continued															
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	<2000 U	<1800 U	<790 U	<1800 U	<730 U	<700 U	**42 J**
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	<2000 U	<1800 U	**84 J**	**770 J**	<730 U	<700 U	<350 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	**480 J**	**390 J**	**480 J**	**5100**	**360 J**	**300 J**	**52 J**
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<2000 U	<1800 U	**81 J**	<1800 U	**82 J**	<700 U	<350 U
DIBENZOFURAN	132-64-9	ID	1,700	6.7E+06	ID	ID	2.9E+06	ID	<2000 U	<1800 U	<790 U	**390 J**	<730 U	<700 U	**48 J**
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	<2000 U	<1800 U	<790 U	<1800 U	<730 U	<700 U	<350 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	**960 J**	**650 J**	**850**	**9800**	**600 J**	**600 J**	**52 J**
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<2000 U	<1800 U	<790 U	**760 J**	<730 U	<700 U	<350 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	**210 J**	**200 J**	**220 J**	**2000**	**180 J**	**130 J**	<350 U
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<2000 U	<1800 U	<790 U	**300 J**	<730 U	**79 J**	**100 J**
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	5,200,000	**470 J**	**290 J**	**650 J**	**7400**	**190 J**	**300 J**	**140 J**
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	**800 J**	**620 J**	**780 J**	**8700**	**590 J**	**510 J**	**52 J**
Organics - VOCs (ug/kg)															
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	<4 U	<3.5 U	<3.9 U	<3.6 U	<3.7 U	<3.5 U	<3.5 U
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	<4 U	<3.5 U	<3.9 U	<3.6 U	<3.7 U	<3.5 U	<3.5 U
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	<2.1 U	<1.8 U	<2 U	<1.9 U	<1.9 U	<1.8 U	<1.8 U
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	<2.1 U	<1.8 U	<2 U	<1.9 U	<1.9 U	<1.8 U	<1.8 U
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	<2.1 U	<1.8 U	<2 U	<1.9 U	<1.9 U	<1.8 U	<1.8 U
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	<2.1 U	<1.8 U	<2 U	<1.9 U	<1.9 U	<1.8 U	<1.8 U
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	<4 U	<3.5 U	<3.9 U	<3.6 U	<3.7 U	<3.5 U	<3.5 U
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	<2.1 U	<1.8 U	<2 U	<1.9 U	<1.9 U	<1.8 U	<1.8 U
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	<2.1 U	<1.8 U	<2 U	<1.9 U	<1.9 U	<1.8 U	<1.8 U
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	<2.1 U	<1.8 U	<2 U	<1.9 U	<1.9 U	<1.8 U	<1.8 U
Asbestos															
ASBESTOS									--	--	--	--	--	--	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-22 (2002 BFRA)	SS-23 (2002 BFRA)	SS-24 (2002 BFRA)	SS-25 (2002 BFRA)
Field Sample ID									SS-22	SS-23	SS-24	SS-25
Sample Date:									6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.25 ft	0 - 0.33 ft	0 - 0.5 ft
Sample Description:									--	--	--	--
Inorganics - Metals (mg/kg)												
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**4180**	**7320**	**6910**	**10400**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<0.45 UJ	<0.48 UJ	<0.46 UJ	<0.48 UJ
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**0.81 J**	**2.2 J**	**2.8 J**	**2.4 J**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**21.3**	**49.5**	**31.3**	**59.7**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	**0.28**	**0.51**	**0.36**	**0.68**
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	**0.16**	**0.28**	**0.39**	**0.33**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**2220**	**32700**	**11900**	**42100**
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	**8.0**	**15.1**	**17.9**	**12.5**
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**4.8**	**7.2**	**9.1**	**9.7**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**242 J**	**1380 J**	**1240 J**	**1450 J**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**5330 J**	**12400 J**	**16500 J**	**11200 J**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**12.3 J**	**24.7 J**	**81.4 J**	**70 J**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	**2890**	**5830**	**6480**	**7790**
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**110**	**299**	**248**	**672**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	**0.06**	<0.05 U	**0.11**	<0.05 U
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**11**	**17.9**	**22.2**	**26.9**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	**539**	**716**	**522**	**596**
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<0.43 U	<0.46 U	**0.69**	<0.46 U
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**0.12**	**0.22**	**0.3**	**0.27**
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	**57.4 J**	**55.9 J**	<33.1 U	**192 J**
THALLIUM	7440-28-0	2.3	1.4 (X)	13,000	35	2.3	5,900	130	<0.45 U	**1.1 J**	**1.5 J**	**1.8 J**
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	**18.2**	**23.1**	**25.9**	**21.5**
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**25.5 J**	**37.6 J**	**57.4 J**	**45 J**
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)	<0.03 U	**0.06**	<0.03 U	**0.03**
Organics - PCBs (ug/kg)												
									ND	ND	ND	--
Organics - SVOCs (ug/kg)												
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	<1700 U	<360 U	**320 J**	--
ACENAPHTHENE	83-32-9	300,000	8,700	1.4E+10	4.1E+07	880,000	6.2E+09	1.3E+08	<1700 U	<360 U	<1800 U	--
ACENAPHTHYLENE	208-96-8	5,900	ID	2.3E+09	1,600,000	17,000	1E+09	5,200,000	<1700 U	<360 U	<1800 U	--
ANTHRACENE	120-12-7	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08	<1700 U	<360 U	<1800 U	--
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	<1700 U	<360 UJ	<1800 U	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<1700 U	**93 J**	<1800 U	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<1700 U	**76 J**	<1800 U	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	<1700 U	**88 J**	<1800 U	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)	<1700 U	**45 J**	<1800 U	--
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<1700 U	**90 J**	<1800 U	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7E+08	2,800,000	NLL	8.9E+08	1.2E+07 (C)	<1700 U	**2000 J**	<1800 U	--
BUTYL BENZYL PHTHALATE	85-68-7	2,200,000 (C)	13,000 (X)	4.7E+10	3.6E+07 (C)	5,000,000 (C)	2.1E+10	1.2E+08 (C)	<1700 U	<360 UJ	<1800 U	--

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-22 (2002 BFRA)	SS-23 (2002 BFRA)	SS-24 (2002 BFRA)	SS-25 (2002 BFRA)
Field Sample ID									SS-22	SS-23	SS-24	SS-25
Sample Date:									6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.25 ft	0 - 0.33 ft	0 - 0.5 ft
Sample Description:									--	--	--	--
Organics - SVOCs (ug/kg) - continued												
CAPROLACTAM	105-60-2	120,000	NA	6.7E+08	5.3E+07 (DD)	340,000	2.9E+08	3.1E+08 (DD)	<1700 U	<360 U	<1800 U	--
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2.4E+06	<1700 U	<360 U	<1800 U	--
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	<1700 U	**95 J**	**190 J**	--
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<1700 U	<360 U	<1800 U	--
DIBENZOFURAN	132-64-9	ID	1,700	6.7E+06	ID	ID	2.9E+06	ID	<1700 U	<360 U	<1800 U	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	**330 J**	<360 U	<1800 U	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	<1700 U	**140 J**	<1800 U	--
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<1700 U	<360 U	<1800 U	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<1700 U	**48 J**	<1800 U	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<1700 U	<360 U	<1800 U	--
PHENANTHRENE	85-01-8	56,000	2,100	6,700,000	1.6E+06	160,000	2.9E+06	5,200,000	<1700 U	<360 U	**270 J**	--
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	<1700 U	**99 J**	<1800 U	--
Organics - VOCs (ug/kg)												
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	<3.5 U	<3.6 U	<3.7 U	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	<3.5 U	<3.6 U	<3.7 U	--
alpha-Chlordane (J)	5103-71-9	NA	NA	NA	NA	NA	NA	NA	<1.8 U	<1.8 U	<1.9 U	--
beta-BHC	319-85-7	37	ID	5.9E+06	5,400	150	NLV	25,000	<1.8 U	<1.8 U	<1.9 U	--
delta-BHC	319-86-8	NA	NA	NA	NA	NA	NA	NA	<1.8 U	<1.8 U	<1.9 U	--
Endosulfan I (J)	959-98-8	NA	NA	NA	NA	NA	NA	NA	<1.8 U	<1.8 U	<1.9 U	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	<3.5 U	<3.6 U	<3.7 U	--
gamma-Chlordane (J)	5103-74-2	NA	NA	NA	NA	NA	NA	NA	<1.8 U	<1.8 U	<1.9 U	--
Heptachlor	76-44-8	NLL	NLL	2.40E+06	5,600	NLL	3.00E+06	23,000	<1.8 U	<1.8 U	<1.9 U	--
Heptachlor epoxide	1024-57-3	NLL	NLL	1.20E+06	3,100	NLL	1.50E+06	9,500	<1.8 U	<1.8 U	<1.9 U	--
Asbestos												
ASBESTOS									--	--	--	--

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

TABLE 5-2
Sample Analytical Summary - Soil
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Soil Table Footnotes:

- MDEQ Part 201 residential and non-residential generic cleanup criteria and screening levels criteria were originally promulgated December 21, 2002 within the Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. This table reflects revisions to the criteria pursuant to the December 2010 Part 201 amendments and new criteria consistent with the provisions of R299.5706a.Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Release Date: December 30, 2013.

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

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

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

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

-- = Not analyzed/Not Reported
bgs = Below ground surface
ft = Feet
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.

(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.

(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.

(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
R = Rejected result
U = Analyte analyzed for but not detected above the reported sample reporting limit.

TABLE 5-3
Sample Analytical Summary - Groundwater
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHTC-GW01	CHTC-GW02	CHTC-GW03	CHTC-GW04	CHTC-GW05	CHTC-GW06
Field Sample ID									CHTC-GW-01-15'-20'	CHTC-GW-02 12-17'	CHTC-GW-03-10'-15'	CHTC-GW-04-11'-15'	CHTC-GW-05-11'-15'	CHTC-GW-06-10'-15'
Sample Date									5/16/2015	5/17/2015	5/18/2015	8/23/2015	8/23/2015	5/18/2015
Sample Interval (bgs)									15 - 20 ft	12 - 17 ft	10 - 15 ft	11 - 15 ft	11 - 15 ft	10 - 15 ft
Sample Description									--	--	--	--	--	--
Inorganics - Metals (ug/l)														
ALUMINUM	7429-90-5	50 (V)	50 (V)	NA	NLV	NLV	NA	ID	--	--	--	--	--	--
ANTIMONY	7440-36-0	6.0 (A)	6.0 (A)	2.0 (M,X)	NLV	NLV	NA	ID	--	--	--	--	--	--
ARSENIC	7440-38-2	10 (A)	10 (A)	10	NLV	NLV	NA	ID	--	--	--	--	--	--
BARIUM	7440-39-3	2,000 (A)	2,000 (A)	200 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--
BERYLLIUM	7440-41-7	4.0 (A)	4.0 (A)	0.36 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
CHROMIUM	7440-47-3	100 (A,H)	100 (A,H)	40 (G,H,X)	NLV	NLV	NA	ID	--	--	--	--	--	--
COBALT	7440-48-4	40	100	100	NLV	NLV	NA	ID	--	--	--	--	--	--
COPPER	7440-50-8	1,000 (E)	1,000 (E)	4.7 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--
IRON	7439-89-6	300 (E)	300 (E)	NA	NLV	NLV	NA	ID	--	--	--	--	--	--
LEAD	7439-92-1	4.0 (L)	4.0 (L)	11 (G,X)	NLV	NLV	NA	ID	--	--	--	--	--	--
MAGNESIUM	7439-95-4	400,000	1,100,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--
MANGANESE	7439-96-5	50 (E)	50 (E)	1,000 (G,X)	NLV	NLV	NA	ID	--	--	--	--	--	--
MERCURY	7439-97-6	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56	ID	--	--	--	--	--	--
NICKEL	7440-02-0	100 (A)	100 (A)	28 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
SELENIUM	7782-49-2	50 (A)	50 (A)	5.0	NLV	NLV	NA	ID	--	--	--	--	--	--
SODIUM	7440-23-5	230, 000 (HH)	350,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--
VANADIUM	7440-62-2	4.5	62	27	NLV	NLV	NA	ID	--	--	--	--	--	--
ZINC	7440-66-6	2,400	5,000 (E)	63 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--
Inorganics - Cyanide (ug/l)														
CYANIDE (P,R)	57-12-5	200 (A,P,R)	200 (A,P,R)	5.2 (P,R)	NLV	NLV	NA	ID	--	--	--	--	--	--
Organics - PCBs														
									ND	ND	ND	ND	ND	ND
Organics - SVOCs														
									ND	ND	ND	ND	ND	ND
Organics - VOCs (ug/l)														
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U
METHYLENE CHLORIDE	75-09-2	5.0 (A)	5.0 (A)	47 (X)	220,000	1,400,000	1.70E+07	ID	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U
XYLENE - TOTAL	1330-20-7 95-47-6	280 (E,I)	280 (E,I)	41 (I)	190,000 (I,S)	190,000 (I,S)	186,000 (I)	70,000 (I)	ND	ND	ND	ND	ND	ND
Organics - Pesticides														
									--	--	--	--	--	--
Field Measurements														
Conductivity (mS/cm)	NA	NA	NA	NA	NA	NA	NA	NA	**0.775**	**0.388**	**0.378**	--	--	**0.175**
pH	NA	NA	NA	NA	NA	NA	NA	NA	**6.79**	**7.63**	**7.12**	--	--	**8.54**
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	**14.8**	**14**	**8.6**	--	--	**8.9**

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

TABLE 5-3
Sample Analytical Summary - Groundwater
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHTC-GW07	CHTC-GW08	CHTC-GW09	CHTC-GW10	CHTC-GW39	
Field Sample ID									CHTC-GW-07-12-17'	CHTC-GW-08-15-20'	CHTC-GW-09-13'-17'	CHTC-GW-10-11'-16'	CHTC-GW-39-6'-11'	CHTC-GW-39-6'-11' DUP
Sample Date									5/17/2015	5/17/2015	8/23/2015	5/18/2015	5/17/2015	5/17/2015
Sample Interval (bgs)									12 - 17 ft	15 - 20 ft	13 - 17 ft	11 - 16 ft	6 - 11 ft	6 - 11 ft
Sample Description									--	--	--	--	--	Field Duplicate
Inorganics - Metals (ug/l)														
ALUMINUM	7429-90-5	50 (V)	50 (V)	NA	NLV	NLV	NA	ID	--	--	--	--	**20**	--
ANTIMONY	7440-36-0	6.0 (A)	6.0 (A)	2.0 (M,X)	NLV	NLV	NA	ID	--	--	--	--	<1.0 U	--
ARSENIC	7440-38-2	10 (A)	10 (A)	10	NLV	NLV	NA	ID	--	--	--	--	**1.1**	--
BARIUM	7440-39-3	2,000 (A)	2,000 (A)	200 (G)	NLV	NLV	NA	ID	--	--	--	--	**440**	--
BERYLLIUM	7440-41-7	4.0 (A)	4.0 (A)	0.36 (G)	NLV	NLV	NA	ID	--	--	--	--	<1.0 U	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
CHROMIUM	7440-47-3	100 (A,H)	100 (A,H)	40 (G,H,X)	NLV	NLV	NA	ID	--	--	--	--	<1.0 U	--
COBALT	7440-48-4	40	100	100	NLV	NLV	NA	ID	--	--	--	--	<5.0 U	--
COPPER	7440-50-8	1,000 (E)	1,000 (E)	4.7 (G)	NLV	NLV	NA	ID	--	--	--	--	**15**	--
IRON	7439-89-6	300 (E)	300 (E)	NA	NLV	NLV	NA	ID	--	--	--	--	**1400**	--
LEAD	7439-92-1	4.0 (L)	4.0 (L)	11 (G,X)	NLV	NLV	NA	ID	--	--	--	--	<1.0 U	--
MAGNESIUM	7439-95-4	400,000	1,100,000	NA	NLV	NLV	NA	ID	--	--	--	--	**5800**	--
MANGANESE	7439-96-5	50 (E)	50 (E)	1,000 (G,X)	NLV	NLV	NA	ID	--	--	--	--	**510**	--
MERCURY	7439-97-6	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56	ID	--	--	--	--	<0.2 U	--
NICKEL	7440-02-0	100 (A)	100 (A)	28 (G)	NLV	NLV	NA	ID	--	--	--	--	**8.0**	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
SELENIUM	7782-49-2	50 (A)	50 (A)	5.0	NLV	NLV	NA	ID	--	--	--	--	<1.0 U	--
SODIUM	7440-23-5	230, 000 (HH)	350,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--
VANADIUM	7440-62-2	4.5	62	27	NLV	NLV	NA	ID	--	--	--	--	--	--
ZINC	7440-66-6	2,400	5,000 (E)	63 (G)	NLV	NLV	NA	ID	--	--	--	--	<5.0 U	--
Inorganics - Cyanide (ug/l)														
CYANIDE (P,R)	57-12-5	200 (A,P,R)	200 (A,P,R)	5.2 (P,R)	NLV	NLV	NA	ID	--	--	--	--	--	--
Organics - PCBs														
									ND	ND	ND	ND	ND	ND
Organics - SVOCs														
									ND	ND	ND	ND	ND	ND
Organics - VOCs (ug/l)														
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U
METHYLENE CHLORIDE	75-09-2	5.0 (A)	5.0 (A)	47 (X)	220,000	1,400,000	1.70E+07	ID	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U
XYLENE - TOTAL	1330-20-7 95-47-6	280 (E,I)	280 (E,I)	41 (I)	190,000 (I,S)	190,000 (I,S)	186,000 (I)	70,000 (I)	ND	ND	ND	ND	ND	ND
Organics - Pesticides														
									--	--	--	--	--	--
Field Measurements														
Conductivity (mS/cm)	NA	NA	NA	NA	NA	NA	NA	NA	**0.204**	--	--	--	**0.397**	**0.397**
pH	NA	NA	NA	NA	NA	NA	NA	NA	**7.11**	--	--	--	**6.8**	**6.8**
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	**11.7**	--	--	--	**10.9**	**10.9**

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

TABLE 5-3
Sample Analytical Summary - Groundwater
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	TMW-1 (2002 BFRA)	TMW-2 (2002 BFRA)		TMW-3 (2002 BFRA)	TMW-4 (2002 BFRA)	TMW-5 (2002 BFRA)	TMW-6 (2002 BFRA)
Field Sample ID									TMW-1	TMW-2	TMW-2D	TMW-3	TMW-4	TMW-5	TMW-6
Sample Date									6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002	6/4/2002
Sample Interval (bgs)									unknown	unknown	unknown	unknown	unknown	unknown	unknown
Sample Description									--	--	Field Duplicate	--	--	--	--
Inorganics - Metals (ug/l)															
ALUMINUM	7429-90-5	50 (V)	50 (V)	NA	NLV	NLV	NA	ID	**600 J**	**348 J**	**447 J**	**355 J**	**813 J**	**3370 J**	**4690 J**
ANTIMONY	7440-36-0	6.0 (A)	6.0 (A)	2.0 (M,X)	NLV	NLV	NA	ID	<1.6 U	<1.6 U	<1.6 U	**2.7**	<1.6 U	<1.6 U	<1.6 U
ARSENIC	7440-38-2	10 (A)	10 (A)	10	NLV	NLV	NA	ID	<4.2 U	<4.2 U	<4.2 U	<4.2 U	<4.2 U	<4.2 U	**5.7**
BARIUM	7440-39-3	2,000 (A)	2,000 (A)	200 (G)	NLV	NLV	NA	ID	**107**	**133**	**133**	**102**	**79.6**	**155**	**257**
BERYLLIUM	7440-41-7	4.0 (A)	4.0 (A)	0.36 (G)	NLV	NLV	NA	ID	**0.23 J**	<0.2 U	<0.2 U	**0.28 J**	<0.2 U	**0.25 J**	**0.56 J**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**62100**	**56100**	**56400**	**40700**	**47200**	**34300**	**35200**
CHROMIUM	7440-47-3	100 (A,H)	100 (A,H)	40 (G,H,X)	NLV	NLV	NA	ID	**2.3**	**1.0**	**0.96**	**1.8**	**2.3**	**5.9**	**9.6**
COBALT	7440-48-4	40	100	100	NLV	NLV	NA	ID	**1.3**	<0.6 U	<0.6 U	**3.7**	<0.6 U	**2.8**	**2.5**
COPPER	7440-50-8	1,000 (E)	1,000 (E)	4.7 (G)	NLV	NLV	NA	ID	**6.0**	**21.7**	**18**	**7.8**	**6.3**	**58.6**	**358**
IRON	7439-89-6	300 (E)	300 (E)	NA	NLV	NLV	NA	ID	**1290**	**3490**	**3650**	**2520**	**984**	**2750**	**17400**
LEAD	7439-92-1	4.0 (L)	4.0 (L)	11 (G,X)	NLV	NLV	NA	ID	<1.3 U	<1.3 U	<1.3 U	<1.3 U	<1.3 U	**1.5**	**6.3**
MAGNESIUM	7439-95-4	400,000	1,100,000	NA	NLV	NLV	NA	ID	**8530**	**6410**	**6450**	**6100**	**3980**	**14500**	**11500**
MANGANESE	7439-96-5	50 (E)	50 (E)	1,000 (G,X)	NLV	NLV	NA	ID	**227**	**120**	**120**	**112**	**64.9**	**61.2**	**338**
MERCURY	7439-97-6	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56	ID	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	**0.14**
NICKEL	7440-02-0	100 (A)	100 (A)	28 (G)	NLV	NLV	NA	ID	**1.5**	**0.76**	**0.68**	**2.7**	**1.1**	**6.2**	**7.0**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	**2100 J**	**9610 J**	**9710 J**	**4180 J**	**5410 J**	**5270 J**	**4190 J**
SELENIUM	7782-49-2	50 (A)	50 (A)	5.0	NLV	NLV	NA	ID	<2.2 U	**2.8 J**	<2.2 U	<2.2 U	**2.5 J**	**5.8 J**	**2.2**
SODIUM	7440-23-5	230, 000 (HH)	350,000	NA	NLV	NLV	NA	ID	**59400**	**55900**	**56100**	**32600**	**26500**	**25300**	**13700**
VANADIUM	7440-62-2	4.5	62	27	NLV	NLV	NA	ID	**2.7 J**	**3.2**	**3.4**	**5.2**	**5.5**	**8.7**	**34.6**
ZINC	7440-66-6	2,400	5,000 (E)	63 (G)	NLV	NLV	NA	ID	**4.7**	**2.0**	**4.7**	**5.1**	**3.2**	**12**	**12.8**
Inorganics - Cyanide (ug/l)															
CYANIDE (P,R)	57-12-5	200 (A,P,R)	200 (A,P,R)	5.2 (P,R)	NLV	NLV	NA	ID	<0.6 U	<0.6 U	**0.61**	<0.6 U	<0.6 U	<0.6 U	<0.6 U
Organics - PCBs															
									ND	ND	ND	--	ND	ND	ND
Organics - SVOCs															
									ND	ND	ND	--	ND	ND	ND
Organics - VOCs (ug/l)															
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<10 U	**1.0 J**	--	--	<10 U	<10 UJ	<10 UJ
METHYLENE CHLORIDE	75-09-2	5.0 (A)	5.0 (A)	47 (X)	220,000	1,400,000	1.70E+07	ID	<10 U	<10 U	--	--	<10 U	**1.0 J**	<10 UJ
XYLENE - TOTAL	1330-20-7 95-47-6	280 (E,I)	280 (E,I)	41 (I)	190,000 (I,S)	190,000 (I,S)	186,000 (I)	70,000 (I)	ND	**1.0**	--	--	ND	ND	ND
Organics - Pesticides															
									ND	ND	ND	--	ND	ND	ND
Field Measurements															
Conductivity (mS/cm)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
pH	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--

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

TABLE 5-3
Sample Analytical Summary - Groundwater
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Groundwater Table Footnotes:

- MDEQ Part 201 residential and non-residential generic cleanup criteria and screening levels criteria were originally promulgated December 21, 2002 within the Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. This table reflects revisions to the criteria pursuant to the December 2010 Part 201 amendments and new criteria consistent with the provisions of R299.5706a.Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Release Date: December 30, 2013.

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

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

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

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

-- = Not analyzed/Not reported
bgs = Below ground surface
ft = Feet
PCBs = Polychlorinated biphenyls
SVOC = Semi-volatile organic compound
ug/l = Micrograms per liter
VOC = Volatile organic compound
°C = Degrees Celsius
mS/cm = MilliSiemens per centimeter

Groundwater Table Footnotes:

ID = Insufficient data to develop criterion.

NA = A criterion or value is not available

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

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

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

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

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

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

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

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

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

(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.

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

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

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

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

Laboratory Footnotes:

ND = Not detected

J = Estimated result

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

TABLE 5-4
Sample Analytical Summary - Sediment
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHTC-SD01		CHTC-SD02			CHTC-SD03		
Field Sample ID					CHTC - SD - 01 - 0''-6''	CHTC - SD - 01 - 1'-2.66'	CHTC - SD - 02 - 0''-6''	CHTC - SD - 02 - 1'-3'	CHTC - SD - 02 - 3'-3.33'	CHTC - SD - 03 - 0''-6''	CHTC - SD - 03 - 1'-3'	CHTC - SD - 03 - 3'-4.66'
Sample Date					7/7/2015	7/7/2015	7/7/2015	7/7/2015	7/7/2015	7/7/2015	7/7/2015	7/7/2015
Sample Interval (bgs)					0 - 0.5 ft	1 - 2.66 ft	0 - 0.5 ft	1 - 3 ft	3 - 3.33 ft	0 - 0.5 ft	1 - 3 ft	3 - 4.66 ft
Sample Description					SAND with SILT, Dark brown; wet; soft	SILT with Trace SAND, Dark brown; very wet; very soft	SAND, Dark brown, red and black; loose; wet; fine to medium sand	SAND Dark brown, red and black; firm; wet; fine to medium sand with some silt; staining visible in discrete streaks from 2-2.75'; no odor	SAND Dark brown, red and black; firm; wet; fine to medium sand with some silt; no odor	SILT with ORGANICS; Dark brown; soft; wet; silt with organics	SILT with SAND; Dark red to brown; firm; moist; silt with sand	SAND with Trace GRAVELS; Dark red to brown; soft to firm; wet; fine to medium sand with trace angular gravels
Inorganics - Metals (mg/kg)												
ALUMINUM	7429-90-5	NA	NA	NA	**18000**	--	--	--	--	**12000**	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	**2.3**	--	--	--	--	**5.4**	--	--
BARIUM	7440-39-3	NA	NA	NA	**10**	--	--	--	--	**78**	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	**0.3**	--	--	--	--	**0.7**	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	<0.2 U	--	--	--	--	**0.2**	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	**30 J**	--	--	--	--	**32 J**	--	--
COBALT	7440-48-4	50	NA	NA	**20 J**	--	--	--	--	**13 J**	--	--
COPPER	7440-50-8	31.6	31.6	149	**2000**	--	--	--	--	**1400**	--	--
IRON	7439-89-6	NA	NA	NA	**27000**	--	--	--	--	**19000**	--	--
LEAD	7439-92-1	35.8	35.8	128	**3.0**	--	--	--	--	**20**	--	--
LITHIUM	7439-93-2	NA	NA	NA	**8.7**	--	--	--	--	**6.7**	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	**20000**	--	--	--	--	**9400**	--	--
MANGANESE	7439-96-5	NA	NA	NA	**350 J**	--	--	--	--	**520 J**	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	**34**	--	--	--	--	**36**	--	--
SILVER	7440-22-4	0.5	NA	NA	**2.7**	--	--	--	--	**1.5**	--	--
ZINC	7440-66-6	121	121	459	**85**	--	--	--	--	**75**	--	--
Inorganics - Cyanide												
					ND	--	--	--	--	ND	--	--
Organics - PCBs												
					ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs												
					--	ND	--	--	--	--	ND	--

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

TABLE 5-4
Sample Analytical Summary - Sediment
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	CHTC-SD04				CHTC-SD20			TL08-010
Field Sample ID					CHTC - SD - 04 - 0''-6''	CHTC - SD - 04 - 1'-3'	CHTC - SD - 04 - 1'-3' DUP	CHTC - SD - 04 - 3'-4.25'	CHTC-SD-20-0-6''	CHTC-SD-20-1-3'	CHTC-SD-20-3-4.25'	TL08-010
Sample Date					7/8/2015	7/8/2015	7/8/2015	7/8/2015	7/12/2015	7/12/2015	7/12/2015	8/27/2008
Sample Interval (bgs)					0 - 0.5 ft	1 - 3 ft	1 - 3 ft	3 - 4.25 ft	0 - 0.5 ft	1 - 3 ft	3 - 4.25 ft	0 - 0 ft
Sample Description					SILT with Some SAND; Dark brown; wet; very soft; silt with some fine sand and organics	SAND with SILT; Dark red-brown; wet; loose; fine to medium sand with silt	Field Duplicate	SILTY CLAY; Dark brown to purple-brown; wet; soft; silty clay.	CLAY with SAND; Dark brown to black; wet; very soft; clay with fine sand.	SAND with SILT and Trace GRAVEL; Red-brown; wet; loose to medium dense; fine angular sand with silt and trace angular gravels	SAND; Dark red-brown; wet; loose to medium dense; fine angular sand	--
Inorganics - Metals (mg/kg)												
ALUMINUM	7429-90-5	NA	NA	NA	**12000**	**7700**	--	**22000**	**12000**	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	**4.8**	**2.1**	--	**2.5**	**3.7**	--	--	--
BARIUM	7440-39-3	NA	NA	NA	**86**	**73**	--	**58**	**200**	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	**0.8**	**0.9**	--	**0.6**	**1.0**	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	**0.2**	<0.2 U	--	<0.2 U	<0.2 U	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	**36 J**	**39 J**	--	**48 J**	**40**	--	--	--
COBALT	7440-48-4	50	NA	NA	**14 J**	**15 J**	--	**26 J**	**14**	--	--	--
COPPER	7440-50-8	31.6	31.6	149	**1900**	**1400**	--	**1200**	**1300**	--	--	--
IRON	7439-89-6	NA	NA	NA	**22000**	**22000**	--	**37000**	**21000**	--	--	--
LEAD	7439-92-1	35.8	35.8	128	**19**	**3.3**	--	**6.5**	**21**	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	**8.5**	**8.6**	--	**12**	**6.6**	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	**10000**	**12000**	--	**22000**	**9000**	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	**350 J**	**340 J**	--	**440 J**	**390**	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	**41**	**39**	--	**92**	**42**	--	--	--
SILVER	7440-22-4	0.5	NA	NA	**1.4**	**1.2**	--	**1.1**	**1.2**	--	--	--
ZINC	7440-66-6	121	121	459	**81**	**70**	--	**93**	**70**	--	--	--
Inorganics - Cyanide												
					ND	ND	--	ND	ND	--	--	--
Organics - PCBs												
					ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs												
					ND	ND	ND	ND	--	--	--	--

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

TABLE 5-4
Sample Analytical Summary - Sediment
Ahmeek Mill Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	EPA Region 5 Ecological Screening Level	Threshold Effect Concentration (TEC)	Probable Effect Concentration (PEC)	TL08-026	TL08-031	TL08-059	TL08-069	TL08-070	TL08-071	TL08-126
Field Sample ID					TL08-026	TL08-031	TL08-059	TL08-069	TL08-070	TL08-071	TL08-126
Sample Date					8/27/2008	8/27/2008	8/27/2008	8/28/2008	8/28/2008	8/28/2008	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
Sample Description					--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)											
ALUMINUM	7429-90-5	NA	NA	NA	--	--	--	--	--	--	--
ARSENIC	7440-38-2	9.79	9.79	33.0	--	--	--	--	--	--	--
BARIUM	7440-39-3	NA	NA	NA	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	NA	NA	NA	--	--	--	--	--	--	--
CADMIUM	7440-43-9	0.99	0.99	4.98	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	43.4	43.4	111	--	--	--	--	--	--	--
COBALT	7440-48-4	50	NA	NA	--	--	--	--	--	--	--
COPPER	7440-50-8	31.6	31.6	149	--	--	--	--	--	--	--
IRON	7439-89-6	NA	NA	NA	--	--	--	--	--	--	--
LEAD	7439-92-1	35.8	35.8	128	--	--	--	--	--	--	--
LITHIUM	7439-93-2	NA	NA	NA	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	NA	NA	--	--	--	--	--	--	--
MANGANESE	7439-96-5	NA	NA	NA	--	--	--	--	--	--	--
NICKEL	7440-02-0	22.7	22.7	48.6	--	--	--	--	--	--	--
SILVER	7440-22-4	0.5	NA	NA	--	--	--	--	--	--	--
ZINC	7440-66-6	121	121	459	--	--	--	--	--	--	--
Inorganics - Cyanide											
					--	--	--	--	--	--	--
Organics - PCBs											
					ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs											
					--	--	--	--	--	--	--

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

TABLE 5-4
Sample Analytical Summary - Sediment
Ahmeek Mill 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 goup was tested and not detected and a -- indicates not analyzed.
- **Bold** values are concentrations detected above the reporting limit.
- **Shaded values indicate analyte concentration exceed applicable criteria. Color presented is the criteria with the highest value that was exceeded:**

EPA Region 5 RCRA ESLs dated August 22, 2003

TECs from MacDonald *et al.* 2000

PECs from MacDonald *et al.* 2000

-- = Not analyzed/Not Reported

bgs = Below ground surface

ESL = Ecological Screening Level

ft = Feet

mg/kg = Milligrams per kilogram.

PCBs = Polychlorindated biphenyls

PEC = Probable Effect Concentration

RCRA = Resource Conservation and Recovery Act

SVOC = Semi-volatile organic compound

TEC = Threshold Effect Concentration

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.

SECTION 5

DETAILED FINDINGS REPORT – AHMEEK MILL PROCESSING AREA FIGURES

Image Source: MIS - Public Imagery

CHTC-SB01
CHTC-GW01
CHTC-SB02
CHTC-SD01
CHTC-SB03
CHTC-SB04
CHTC-GW02
CHTC-SB11
CHTC-GW07
CHTC-SD02
CHTC-SB05
TL08-031
CHTC-ASBBLK12A
CHTC-ASBBLK13A
CHTC-ASBBLK14A
CHTC-ASBBLK13B
CHTC-ASBBLK13C
CHTC-SB08
CHTC-GW04
CHTC-SB10
CHTC-GW06
CHTC-SB06
CHTC-SB14
CHTC-GW10
TL08-071
CHTC-SB07
CHTC-GW03
CHTC-SB44
CHTC-GW39
CHTC-SD03
TL08-070
CHTC-SD20
CHTC-SB09
CHTC-GW05
CHTC-SD04
TL08-026
TL08-126
TL08-059
TL08-010
TL08-069

Map Extent

Sampling Location Type

- Bulk Asbestos
- Soil
- Groundwater
- Sediment
- Conceptual Site and Geographic Area Boundaries

N

0 375 Ft

Coordinate System: MIGeoRef(m)

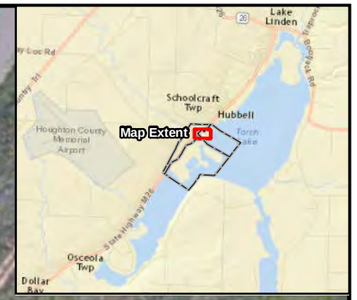
Prepared for:
Michigan Department of Environmental Quality

Prepared By:
WESTON SOLUTIONS of MICHIGAN, INC
P.O. Box 577
Houghton, MI 49931

Figure 5-1a
Sampling Location Map
Ahmeek Mill Processing Area - Ahmeek Stamp Mill Complex
Tamarack City, Houghton County, Michigan

FILE: J:\GIS_Projects\MDEQ\20177.001.001_Torch_Lake\mxd\2016_CHTC_SI_Report\Sec05\AhmeekMillFig05-1a_AM_SampleLocations_v20160301.mxd 9:01:15 AM 3/1/2016 BROWNK

Image Source: ESRI World Imagery (NAIP 2014)



SS-15
TMW-1
SS-16
SB-5
5 (SS Pile)
SS-17
SS-14
SS-18
SB-4
SS-19
SS-20
SS-11
SB-6
TMW-2
SB-3
SS-23
CHTC-SB12
CHTC-GW08
SS-13
SS-12
SS-10
SS-9
TMW-3
SB-7
SS-22
SS-24
CHTC-SB13
SB-2
CHTC-GW09
SS-21
SB-1
TMW-6
SS-2
4 (Track Turn)
3 (Door Jam)
SS-1
2 (Concrete Floor)
SS-3
SS-25
TMW-4
1 (Stack)
SS-4
SB-8
SS-8
SS-7
SB-10
SS-5
TMW-5
SB-9
SS-6

E 6th St
W 6th St
M-26
Spruce St
Myrtle St
4th St
5th
51899
51800
28303
28001
200

Notes:

Sampling Location Type

- Soil
- Groundwater
- Conceptual Site and Geographic Area Boundaries

N

0 100 Ft

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
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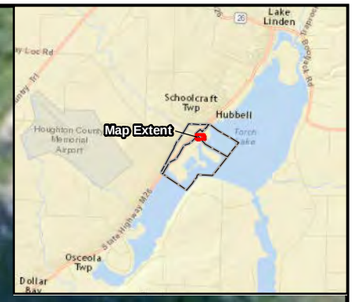
Houghton, MI 49931

Figure 5-1b
Sampling Location Map
Ahmeek Mill Processing Area - Osceola Township Park
Tamarack City, Houghton County, Michigan

FILE: J:\GIS_Projects\MDEQ\20177.001.001_Torch_Lake\mxd\2016_CHTC_SI_Report\Sec05-Ahmeek&MillFig05-1b_AM_SampleLocations_v20160301.mxd 9:02:03 AM 3/1/2016 BROWNK

Image Source: ESRI World Imagery - (NAIP 2014)



CHTC-ASBBLK14A 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	90	%	[1%]

CHTC-ASBBLK13B 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	20	%	[1%]

CHTC-ASBBLK13C 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	20	%	[1%]

CHTC-ASBBLK12A 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	95	%	[1%]

CHTC-ASBBLK13A 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	20	%	[1%]

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Conceptual Site and Geographic Area Boundaries

N

0 50 Ft

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
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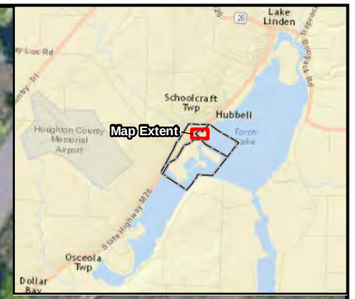
Houghton, MI 49931

Figure 5-2
Sample Analytical Result Map - Bulk Asbestos
Ahmeek Mill Processing Area
Tamarack City, Houghton County, Michigan

FILE: J:\GIS Projects\MDEQ\20177.001.001 Torch Lake\mxd\2016 CHTC SI Report\Sec05-AhmeekMillFin05-2 AMP Misc. Exceeds v20160301.mxd 9:59:59 AM 3/1/2016 BROWNK

Image Source: ESRI World Imagery (NAIP-2014)



Locations Screened for Metals - At least one exceedance of:

- Residential Direct Contact Criteria
- Residential Particulate Soil Inhalation Criteria
- Non Residential Direct Contact Criteria
- Non Residential Particulate Soil Inhalation Criteria

- Screening locations with no exceedances
- Locations are included within a different geographical area boundary
- Conceptual Site and Geographic Area Boundaries

Xray Fluorescence screening results are from surface soils unless otherwise specified.

N

0 100 Ft

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

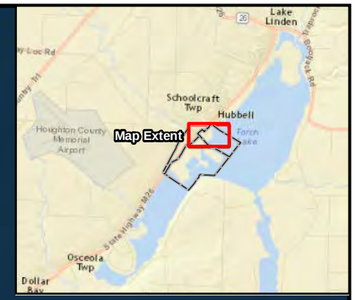
Prepared By:
WESTON SOLUTIONS of MICHIGAN, INC
P.O. Box 577
Houghton, MI 49931

Figure 5-3a

Soil Screening Results Map - Soil
Ahmeek Mill Processing Area - Osceola Township Park
Tamarack City, Houghton County, Michigan

FILE: J:\GIS_Projects\MDEQ\201177.001.001_Torch_Lake\mxd\2016_CHTC_SI_ReportSec05-AhmeekMillFig05-3a_AMP_XRF_v20160301.mxd 12:28:42 PM 3/1/2016 BROWNK

Image Source: ESRI World Imagery (NAIP 2014)



HB-2-2

HB-2-1

HUB-S1-13

Locations Screened for Metals - At least one exceedance of:

- Residential Direct Contact Criteria
- Residential Particulate Soil Inhalation Criteria
- Non Residential Direct Contact Criteria
- Non Residential Particulate Soil Inhalation Criteria

- Screening locations with no exceedances
- Locations are included within a different geographical area boundary
- Conceptual Site and Geographic Area Boundaries

Xray Fluorescence screening results are from surface soils unless otherwise specified.

N

0 250 Ft

Coordinate System: MIGeoRef(m)

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Michigan Department of Environmental Quality

Prepared By:
WESTON SOLUTIONS of MICHIGAN, INC
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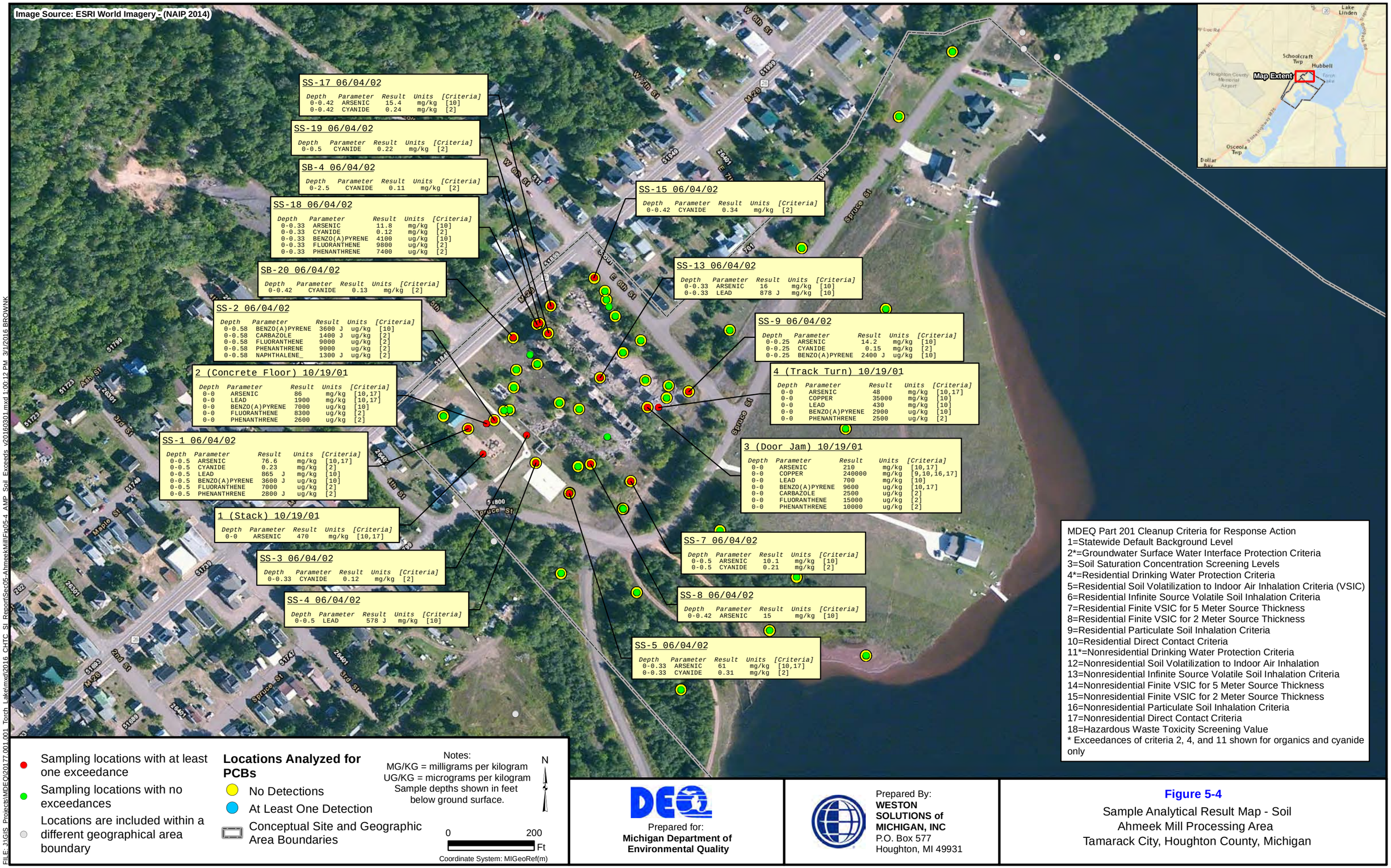
Houghton, MI 49931

Figure 5-3b

Soil Screening Results Map - Soil
Ahmeek Mill Processing Area - Ahmeek Stamp Mill Complex
Tamarack City, Houghton County, Michigan

FILE: J:\GIS_Projects\MDEQ\2017\7.001.001_Torch_Lake\mxd\2016_CHTC_St_Report\Sec05-AhmeekMillEn05-3b_AMP_XRF_v20160301.mxd 12:27:39 PM 3/1/2016 BROWNK



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
* Exceedances of criteria 2, 4, and 11 shown for organics and cyanide only

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
WESTON SOLUTIONS of MICHIGAN, INC
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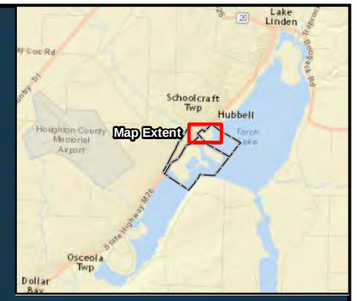
Houghton, MI 49931

Figure 5-4
Sample Analytical Result Map - Soil
Ahmeek Mill Processing Area
Tamarack City, Houghton County, Michigan

FILE: J:\GIS_Projects\MDEQ\20177.001.001_Torch_Lake\mxd\2016_CHTC_SI_Report\Sec05-AhmeekMillFig05-4_AMP_Soil_Exceeds_v20160301.mxd 1:00:12 PM 3/1/2016 BROWNK

Image Source: ESRI World Imagery - (NAIP 2014)



- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Locations are included within a different geographical area boundary

Locations Analyzed for PCBs

- No Detections
- At Least One Detection
- Conceptual Site and Geographic Area Boundaries

N

0 200 Ft

Coordinate System: MIGeoRef(m)

MDEQ Part 201 Cleanup Criteria for Response Action
1*=Residential Drinking Water Criteria
2*=Nonresidential Drinking Water Criteria
3*=Groundwater Surface Water Interface Criteria
4=Water Solubility
5=Residential Groundwater Vol to Indoor Air Inhalation
6=Nonresidential Groundwater Vol to Indoor Air Inhalation
7=Flammability and Explosivity Screening Level
* Exceedances of criteria 1, 2, and 3 are shown for organics only

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Prepared By:
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Figure 5-5
Sample Analytical Result Map - Groundwater
Ahmeek Mill Processing Area
Tamarack City, Houghton County, Michigan

FILE: J:\GIS_Projects\MDEQ\20177.001.001_Torch_Lake\mxd\2016_CHTC_SI_Report\Sec05-AhmeekMillFig05-5_AMP_GW_Exceeds_v20160301.mxd 1:19:56 PM 3/1/2016 BROWNK

Image Source: MIS - Public Imagery

CHTC-SD01 07/07/15

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	2.7	mg/kg	[1]

CHTC-SD03 07/07/15

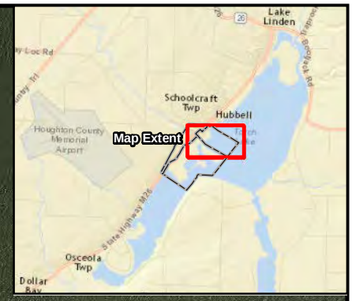
Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	1400	mg/kg	[1,2,3]
0-0.5	NICKEL	36	mg/kg	[1,2]
0-0.5	SILVER	1.5	mg/kg	[1]

CHTC-SD04 07/08/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	1900	mg/kg	[1,2,3]
0-0.5	NICKEL	41	mg/kg	[1,2]
0-0.5	SILVER	1.4	mg/kg	[1]
1-3	COPPER	1400	mg/kg	[1,2,3]
1-3	NICKEL	39	mg/kg	[1,2]
1-3	SILVER	1.2	mg/kg	[1]
3-4.25	CHROMIUM	48 J	mg/kg	[1,2]
3-4.25	COPPER	1200	mg/kg	[1,2,3]
3-4.25	NICKEL	92	mg/kg	[1,2,3]
3-4.25	SILVER	1.1	mg/kg	[1]

CHTC-SD20 07/12/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	COPPER	1300	mg/kg	[1,2,3]
0-0.5	NICKEL	42	mg/kg	[1,2]
0-0.5	SILVER	1.2	mg/kg	[1]



MDEQ Part 201 Cleanup Criteria for Response Action
1=Sediment Ecological Screening Levels
2=Threshold Effect Concentration (TEC)
3=Probable Effect Concentration (PEC)

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Locations are included within a different geographical area boundary

Locations Analyzed for PCBs

- No Detections
- At Least One Detection
- Conceptual Site and Geographic Area Boundaries

Notes:
mg/kg = milligrams per kilogram
Sample depths shown in feet below lake bed surface

N

0 350 Ft

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
WESTON SOLUTIONS of MICHIGAN, INC
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Houghton, MI 49931

Figure 5-6
Sample Analytical Result Map - Sediment
Ahmeek Mill Processing Area
Tamarack City, Houghton County, Michigan

FILE: J:\GIS_Projects\MDEQ\20177.001.001_Torch_Lake\mxd\2016_CHTC_SI_Report\Sec05-AhmeekMillFig05-6_AMP_SED_Exceeds_v20160304.mxd 10:03:47 AM 3/4/2016 BROWNK

6. DETAILED FINDINGS REPORT – TAMARACK PROCESSING AREA

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

6.1 SITE INSPECTION AND INVESTIGATION RESULTS

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

6.1.1 Site Inspection

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

On 28 May 2015, a field team comprised of Weston Solutions of Michigan, Inc. (WESTON®) and Michigan Department of Environmental Quality (MDEQ) personnel performed reconnaissance activities at the majority of the properties in the Tamarack Processing Area.

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

Tamarack Processing Area – Reconnaissance Summary	
Potential Chemical or Physical Hazards	**Recorded Observations**
Suspect Asbestos Containing Material (SACM)	Multiple pieces of SACM commingled with building debris in various sizes and quantities, including asphaltic roofing material, and transite were observed in the areas of the former Tamarack Reclamation Plant, Tamarack Mill No. 1, and Lake Stamp Mill No. 2 (Tamarack Mill No. 2) ruins.
Residual Process Materials (RPM)	No mining RPM were observed during the inspection of the properties.
Potentially Abandoned Containers	Multiple abandoned containers, generally consisting of steel intact and dilapidated drums, some suspected to be associated with mining era operations, and up to 20 used underground storage tanks (USTs) were observed in the areas of the former Tamarack Reclamation Plant, Tamarack Mill No. 1, and Lake Stamp Mill No. 2 (Tamarack Mill No. 2) ruins.
Soil Staining/Stressed Vegetation	The majority of the inspected properties inspected are sparsely or non-vegetated and in some areas covered with stamp sand. Oil stained boards/surficial soils were observed near a collapsing building annex attached to the warehouse in the area of the former Lake Stamp Mill No. 2 (Tamarack Mill No. 2).
Potential Polychlorinated Biphenyl (PCB) or Mercury Containing Equipment	Potential mercury containing lighting fixtures were observed within a collapsing building annex to the warehouse in the area of the former Lake Stamp Mill No. 2 (Tamarack Mill No. 2). Boards and surficial soils near the annex were also noted to be oil stained.
Other: Household Waste and Structural Voids	Debris, stockpiling and staging of construction materials, vehicle and equipment tires, and material piles are present throughout much of the study area. Multiple debris piles, suspected to be comprised of mining era debris, building ruins, and building materials, SACM, soil, rock, asphalt, and other wastes are located throughout the properties.

Numerous significant hazards were identified in the Tamarack Processing Area during the reconnaissance activities. Items of concern include abandoned containers, generally consisting of steel intact and dilapidated drums, some suspected to be associated with mining era operations observed in the areas of the former Tamarack Reclamation Plant, Tamarack Mill No. 1, and Lake Stamp Mill No. 2 (Tamarack Mill No. 2) ruins. Multiple pieces of damaged and friable SACM commingled with building debris in various sizes and quantities were also noted in these areas. In addition, several locations on all of the properties feature structural voids in foundations and floors at or above grade in mining era building footprints and steep hill side locations that may pose physical hazards. It should also be noted that the tiered hillside construction of the former industrial

facilities include drainage features in the form of trenches and piping outfalls that cascade storm water down the hillside, potentially exacerbating the distribution of contaminants within the study area. Field logs documenting reconnaissance observations are included in **Appendix D** of the Site Investigation (SI) Report.

6.1.1.1 Targeted Inspection

The qualitative assessment of the reconnaissance findings in the Tamarack Processing Area warranted the performance of targeted inspection activities. On 29 June 2015 a WESTON field team conducted targeted inspection activities at the Tamarack Processing Area that included the collection of bulk material samples for asbestos analysis and on 20 August 2015 a MDEQ Geological Services Unit (GSU) conducted abandoned container and surface soil sampling activities. The following subsections summarize the findings of these sampling efforts.

6.1.1.1.1 Bulk Material Sampling

Based on the SACM hazards noted during the reconnaissance activities a limited asbestos survey was conducted as part of the SI to identify suspect potentially friable asbestos containing material (ACM) in the areas of the former Tamarack Reclamation Plant, Tamarack Mill No. 1, the Lake Stamp Mill No. 2 (Tamarack Mill No. 2), and the Osceola Stamp Mill. The asbestos survey was limited to SACMs in open areas of the property, including the outside of buildings, within debris piles, and atop the foundations and floors 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 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 29 June 2015, a total of 22 bulk samples were collected from eight different SACMs. ACM identified on properties within the Tamarack Processing Area are summarized as follows:

- Light gray/grayish white transite fragments (CHTC-ASBBLK04) that are damaged and friable, located on the surface of building ruins in the area of the former Tamarack Reclamation Plant; and,

- Black asphaltic roofing material (CHTC-ASBBLK01 and CHTC-ASBBLK05) that is damaged and friable in a roofing material pile and commingled with building debris in the area of the former Tamarack Reclamation Plant.

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. The location of bulk asbestos sampling locations collected during the targeted inspection activities are depicted on **Figure 6-1a** and **Figure 6-1b**. A detailed summary of bulk asbestos sample analytical results collected from the Tamarack Processing Area during the targeted inspection are provided in **Table 6-1**. Bulk asbestos sample analytical results are depicted on **Figure 6-2**.

6.1.1.1.2 Surface Soil and Abandoned Container Sampling

In addition to the collection of bulk material samples, several samples from surface soil and drums in the Tamarack Processing Area were also collected during the targeted inspection activities. On 20 August 2015, an MDEQ GSU sampling team collected samples from the following locations to assess whether identified abandoned containers or contents thereof or oil stained soils contained contaminants of concern (COCs). The surface soil and container samples were analyzed for several COCs including PCBs, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), inorganic contaminants, and cyanide.

The following soil and waste material samples were collected during the targeted inspection in the Tamarack Processing Area:

- Surface soil/spilled material samples (CHTC-SS02 through CHTC-SS10) were collected in proximity to abandoned containers, generally consisting of steel intact and dilapidated drums. The drums were observed in the areas of the former Tamarack Reclamation Plant, Tamarack Mill No. 1, and Lake Stamp Mill No. 2 (Tamarack Mill No. 2) ruins. Surface soil samples were collected to ascertain whether COCs had migrated from the containers into surface soils.

- Surface soil sample (CHTC-SS12) was collected of oil stained soils/wood flooring observed near a collapsing building annex to the warehouse in the area of the former Lake Stamp Mill No. 2 (Tamarack Mill No. 2). The surface soil sample was collected to ascertain whether COCs were present in the oil-stained surface soils.

- Four grab samples (CHTC-DM01 through CHTC-DM04) were collected from the contents of dilapidated drums in the areas of the former Tamarack Reclamation Plant, Tamarack Mill No. 1, and Lake Stamp Mill No. 2 (Tamarack Mill No. 2) ruins. Concentrations of inorganic COCs and cyanide exceeded multiple applicable cleanup criteria.

The targeted inspection drum and surface soil sample locations are depicted on **Figure 6-1a** and **Figure 6-1b**. Investigative methodologies and soil sampling techniques were conducted using the procedures outlined in **Section 3**.

6.1.2 Site Investigation

The SI at the Tamarack Processing Area was developed based on a variety of data and information as outlined in **Section 3**. In addition to the historical accounts and documentation, current land use and potential exposure pathways were also taken into consideration when selecting the sampling locations specific to the Tamarack Processing Area. The following subsections present the outcomes of investigative activities completed in the area by summarizing the laboratory analytical results and characterizing their impacts on the environmental media in which they were detected.

6.1.2.1 Terrestrial Investigation

Intrusive investigation activities in the Tamarack Processing Area were generally guided by the findings of historical research and field observations. From a historical standpoint, the Tamarack Processing Area was initially developed as the location for several stamp mills for smaller mining companies in the region. Three stamp mills, including the Tamarack Mill No.1, the Tamarack Mill No.2, and the Osceola Stamp Mill operated in the study area. The Tamarack Stamp Mill was closed in 1919 and demolished and scrapped in 1920. The Lake Stamp Mill No. 2 (Tamarack No.2) continued operation until 1930 and was demolished and scrapped in 1947. The Osceola Stamp Mill was closed in 1921 and the mill and associated boiler house were scrapped in 1941. In addition to the stamp mills and supporting facilities, the Tamarack Reclamation Complex and Lake Chemical, which manufactured copper-based chemicals, also operated in the Tamarack Processing Area. Only limited

historical investigations have been completed in the area, therefore only limited data related to the presence of COCs was available for investigative planning purposes. The following subsections present a summary of the field observations and analytical results derived from the terrestrial sampling activities.

6.1.2.1.1 Field Observations – Soil and Groundwater

Borings in the Tamarack Processing Area were advanced to depths between 7 and 27 feet (ft) below the ground surface (bgs). Boring locations are depicted on **Figure 6-1a** and **Figure 6-1b**. Soil observations documented on field logs indicate that the subsurface is primarily comprised of top soil underlain by medium grained sands, ranging from red to reddish brown in color, fill, stamp sand, and occasionally clay and silt intervals. Seven boring locations met bedrock refusal at depths between 7 and 18 ft bgs.

During groundwater sampling, temporary well points were generally established at 5 ft intervals ranging from 8 ft and 13 ft bgs to 22 ft and 27 ft bgs. Saturated soil conditions were generally encountered between depths of 3 ft and 13 ft. Insufficient groundwater was present to collect samples at four of the locations. Groundwater quality parameters, including temperature, conductivity, dissolved oxygen (DO) and pH, measured at the time of sample collection were generally considered normal.

6.1.2.1.2 Soil Sampling Results

Terrestrial investigation activities were completed in the Tamarack Processing Area during two mobilizations. The first round of investigative work was completed between 14 and 16 May 2015 and the second was completed on 20 August 2015. Between the two mobilizations, a total of 45 soil samples including three duplicate soil samples were collected from 16 boring locations and 10 surficial soil sampling locations.

During the May 2015 mobilization 16 soil borings were advanced to characterize COCs in shallow and deep soils in the Tamarack Processing Area. Soil sampling locations included 16 shallow soil samples, generally ranging from 0 to 6 inches (in.) in depth. The investigation also included the collection of 19 subsurface soil samples, including three field duplicate samples, ranging from 0.5

ft to 17 ft in depth. During the August 2015 mobilization surface soil samples were collected from 10 locations to ascertain whether COCs had migrated from containers into surface soils or were present in oil-stained surface soil. All samples were analyzed for PCBs. Select samples were also analyzed for other COCs including VOCs, SVOCs, inorganics, cyanide, asbestos, and oil and grease. The selection of analytical parameters was generally based upon potential environmental impacts associated with mining era operations in the vicinity of the sampling location or field observations.

The surface soil, and shallow and subsurface soil analytical results for the Tamarack Processing Area contained a variety of inorganic, SVOCs, and cyanide COCs at concentrations at or above applicable regulatory criteria. PCBs were not detected in the SI samples; however, total PCBs were detected in a historic surface soil sample at concentrations at or above applicable regulatory criteria. Historic X-ray fluorescence (XRF) soil screening results for samples from the Tamarack Processing Area did indicate the presence of inorganic COCs at concentrations at or above applicable regulatory criteria.

A detailed summary of soil analytical results collected from the Tamarack Processing Area are provided in **Table 6-2**. XRF soil screening results from the Tamarack Processing Area are depicted on **Figure 6-3a** and **Figure 6-3b**. Soil analytical results from the Tamarack Processing Area are depicted on **Figure 6-4**. Soil boring logs are included in **Appendix G** of this SI Report.

6.1.2.1.3 Groundwater Sampling Results

During the installation of soil borings in the Tamarack Processing Area six temporary groundwater sampling locations were established to characterize groundwater in the area. The monitoring wells were installed and sampled using the methodologies presented in **Section 3**. The screened intervals in the groundwater sampling locations were established between 8 ft and 22 ft bgs. A total of six groundwater samples including one duplicate sample were collected from the Tamarack Processing Area. Temporary groundwater sampling locations are depicted on **Figure 6-1a** and **Figure 6-1b**.

All groundwater samples were analyzed for PCBs. Select samples were also analyzed for other COCs including VOCs, SVOCs, chloride, and sulfate. No COCs were detected at concentrations above applicable regulatory criteria.

A detailed summary of groundwater analytical results collected from the Tamarack Processing Area are provided in **Table 6-3**. Groundwater analytical results from the Tamarack Processing Area are depicted on **Figure 6-5**. Soil boring logs are included in **Appendix G** of this SI Report.

6.2 NATURE AND EXTENT OF CONTAMINATION

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

- MDEQ Cleanup Criteria Requirements for Response Activity.

6.2.1 Comprehensive Exposure Assessment

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

- Risks due to hazardous substances when considering acute toxic effects, physical hazards, and other hazards not accounted for in the development of generic cleanup regulatory criteria.
- Risks 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 inside buildings or former building substrates.
- 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.

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

- The Project investigation and anticipated response actions are being undertaken pursuant to Part 201 of Michigan's Natural Resources and Environmental Protection Act (NREPA), being Public Act (PA) 451 of 1994, as amended. The concentrations of metals in excess of the MDEQ drinking water/surface water pathway criteria are ubiquitous in the study area and are predominantly the result of the presence of stamp sands. Stamp sands are not defined as a hazardous substance nor are subject to regulation under Part 201 unless the property otherwise contains hazardous substances in excess of concentrations that satisfy the cleanup criteria for unrestricted residential use; and,

- The study area is part of Operable Unit (OU) 2 for which the EPA Record of Decision (ROD) remedy called for No Action. The EPA's ROD OU 2 includes groundwater, surface water, submerged tailings and sediments in Torch Lake, Portage Lake, the Portage Canal, and other area water bodies. Note that EPA's No Action determination relies on the following to mitigate the effects of stamp sand to the extent practicable:

  – The reduction of stamp sand loading to surface water bodies expected as a result of the remedial action taken at OU 1 and OU 3.

  – Ongoing natural sedimentation and detoxification.

  – Institutional programs and practices controlling potential future exposure to site-affected drinking water which were intended to be administered at the county and state level.

  – The long-term monitoring and the five year review process monitoring requirements of the remedy selected for OU 1 and OU 3 under the 1992 ROD.

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

6.2.1.1 Building Materials, Containers, and Wastes

During the targeted inspection activities completed in the Tamarack Processing Area, two different ACMs were identified in samples collected from damaged and friable building materials. In addition, representative samples of drum contents and historic waste samples were also analyzed to evaluate potential human health and environmental risks posed by these abandoned containers and waste.

The following tables provide an aggregate summary of the sample locations with respect to the total number of samples and how they compare to applicable regulatory criteria. The tables are based solely on the total number of samples, inclusive of historical samples, collected from the Tamarack Processing Area. They list only the number of samples for a specific analytical suite that contained one or more exceedance of a given criterion. Samples collected from drum contents and waste were compared to applicable soil criteria, while bulk asbestos samples were compared to applicable National Emissions Standard for Hazardous Air Pollutants (NESHAP) standards.

Building Materials, Containers, Residual Process Materials, and Waste Pile Soil Analytical Result Summary				**Cleanup Criteria Requirements for Response Activity – Residential**								
	Analytical Summary			Groundwater Protection		Indoor Air	Ambient Air (Y) (C)				Contact	Csat
	Total Number of Samples	Detected Analytes	Total Exceedances	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinite Source Volatile Soil Inhalation Criteria (VSIC)	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels
Inorganics	6	89	11	0	0	0	0	0	0	**1**	**5**	0
Cyanide	4	1	1	0	**1**	0	0	0	0	0	0	0
VOCs	5	4	0	0	0	0	0	0	0	0	0	0
SVOCs	6	2	0	0	0	0	0	0	0	0	0	0
Total PCBs	6	0	0	0	0	0	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more samples				Arsenic, Copper, Cyanide, Iron								

Building Materials, Containers, Residual Process Materials, and Waste Pile Soil Analytical Result Summary	Analytical Summary			Cleanup Criteria Requirements for Response Activity – Nonresidential								
				Groundwater Protection		Indoor Air	Ambient Air (Y) (C)				Contact	Csat
	Total Number of Samples	Detected Analytes	Total Exceedances	Nonresidential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinite Source Volatile Soil Inhalation Criteria (VSIC)	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels
Inorganics	6	89	8	0	0	0	0	0	0	**3**	**5**	0
Cyanide	4	1	1	0	**1**	0	0	0	0	0	0	0
VOCs	5	4	0	0	0	0	0	0	0	0	0	0
SVOCs	6	2	0	0	0	0	0	0	0	0	0	0
Total PCBs	6	0	0	0	0	0	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample	Arsenic, Copper, Cyanide, Manganese											

Building Materials, Containers, and Wastes Analytical Result Summary	Analytical Summary			Particulate Soil Inhalation Criteria
	Total Number of Samples	Detected Analytes	Total Exceedances	
Asbestos (Bulk)	22	7	7	**7**
COCs exceeding applicable regulatory criteria in one or more sample				Asbestos

6.2.1.2 Soil Exposure Pathway Assessment

Soil analytical results from the Tamarack Processing Area included COC concentrations in soil that were at or above concentrations that trigger a "Facility" designation as defined in Section 20101(1) (s) of the NREPA.

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

				Cleanup Criteria Requirements for Response Activity – Residential								
	Analytical Summary			Groundwater Protection		Indoor Air	Ambient Air (Y) (C)				Contact	Csat
Soil Analytical Result Summary Table	Total Number of Samples	Detected Analytes	Total Exceedances	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinite Source Volatile Soil Inhalation Criteria (VSIC)	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels
Inorganics	38	664	29	0	0	0	0	0	0	**1**	**15**	0
Cyanide	38	3	3	**1**	**3**	0	0	0	0	0	0	0
VOCs	42	40	0	0	0	0	0	0	0	0	0	0
SVOCs	51	272	11	0	**3**	0	0	0	0	0	**3**	0
Asbestos	5	0	0	0	0	0	0	0	0	0	0	0
Total PCBs	73	1	1	0	0	0	0	0	0	0	**1**	0
Pesticides	28	16	0	0	0	0	0	0	0	0	0	0
HEM Oil & Grease	5	1	0	0	0	0	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more samples				Arsenic, Copper, Cyanide, Lead, Benzo(a)Pyrene, Carbazole, Dibenzo(a,h)anthracene, Fluoranthene, Naphthalene, Phenanthrene, Total PCBs								

Soil Analytical Result Summary Table	Analytical Summary			Cleanup Criteria Requirements for Response Activity – Nonresidential								
				Groundwater Protection		Indoor Air	Ambient Air (Y) (C)				Contact	Csat
	Total Number of Samples	Detected Analytes	Total Exceedances	Nonresidential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Infinite Source Volatile Soil Inhalation Criteria (VSIC)	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels
Inorganics	38	664	14	0	0	0	0	0	0	**4**	**10**	0
Cyanide	38	3	3	**1**	**3**	0	0	0	0	0	0	0
VOCs	42	40	0	0	0	0	0	0	0	0	0	0
SVOCs	51	272	7	0	**3**	0	0	0	0	0	0	0
Asbestos	5	0	0	0	0	0	0	0	0	0	0	0
Total PCBs	73	2	1	0	0	0	0	0	0	0	**1**	0
Pesticides	28	16	0	0	0	0	0	0	0	0	0	0
HEM Oil & Grease	5	1	0	0	0	0	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				Arsenic, Copper, Cyanide, Lead, Carbazole, Fluoranthene, Napthalene, Phenanthrene, Total PCBs								

6.2.1.3 Groundwater Exposure Pathway Assessment

Groundwater analytical results from the Tamarack Processing Area did not include COC concentrations in groundwater that were at or above concentrations that trigger a Facility designation as defined in Section 20101(1) (s) of the NREPA.

Similar to the preceding soil tables, the following table provides summary of the aforementioned sample locations with respect to the total number of samples, inclusive of historical samples, and how they compare to the applicable MDEQ's Cleanup Criteria for Response Activity under both Residential and Nonresidential exposure scenarios.

Groundwater Analytical Result Summary Table	Analytical Summary			**Cleanup Criteria Requirements for Response Activity – Residential and Nonresidential**						
	Total Number of Samples	Total Number of Detected Analytes	Total Exceedances	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Levels
Inorganics	5	64	0	--	--	--	0	0	0	0
Cyanide	5	0	0	0	0	0	0	0	0	0
VOCs	11	1	0	0	0	0	0	0	0	0
SVOCs	11	2	0	0	0	0	0	0	0	0
Total PCBs	12	0	0	0	0	0	0	0	0	0
Pesticides	5	0	0	0	0	0	0	0	0	0
Other – Chloride/ Sulfate	2	3	0	0	0	0	0	0	0	0
COCs exceeding applicable regulatory criteria in one or more sample				None						

6.2.2 Extent of Contamination

The comparison of analytical results to applicable regulatory criteria indicates that potential human health and ecological risks are present in building materials, containers, wastes, and soil in the Tamarack Processing Area. Recalling that the goals and objectives of the SI, the following subsections describe the extent of contamination in environmental media in the study area.

6.2.2.1 Building Materials, Containers, and Wastes Extent of Contamination

Asbestos analytical results for various building materials, including but, not limited to asphaltic roofing material and transite are present in the Tamarack Processing Area. These materials are widely distributed in the area of the Tamarack Reclamation Plant and are subject to migration via wind and water erosion. Asbestos concentrations in seven bulk material samples contained asbestos fibers at concentrations greater than 1 percent (%). The damaged and friable nature of these materials pose a potential risk to human health as it relates to the inhalation pathway. Although, asbestos fibers were not detected in a limited number of soil samples collected from the study area, the exposed nature of these material, makes them subject to further degradation that could potentially impact surface soils in the Tamarack Processing Area.

The contents of three dilapidated drums that were sampled in the Tamarack Processing Area contained inorganic contaminants that exceeded Particulate Soil Inhalation Criteria (PSIC) for the non-residential scenario, and Direct Contact Criteria (DCC) in both of the residential and nonresidential exposure scenarios. One sample contained cyanide that exceeded the Groundwater Surface Water Interface Protection Criteria (GSIPC).

Samples of two historically sampled waste piles in the study area contained concentrations of inorganic contaminants that exceeded PSIC and DCC in both of the residential and nonresidential exposure scenarios.

Identified ACMs in the Tamarack Processing Area present a potential health risk, particularly as it relates to the potential for these materials to degrade and migrate via wind and water erosion. The distribution of ACM in the study area is widespread and poses exposure risks via the inhalation pathway. COCs identified in waste piles and abandoned containers pose similar exposure risks to the dermal contact and leaching to groundwater pathways.

The identified risks summarized in the preceding paragraphs, pose potential threats to human and ecological receptors and are a factor when evaluating the extent of contamination in the Tamarack Processing Area.

6.2.2.2 Soil Extent of Contamination

Tamarack Processing Area soil analytical results in a shallow soil sample from CHTC-SB18 contained a detectable concentration of oil and grease. Other shallow and subsurface soil analytical results for the Tamarack Processing Area SI did not contain any COCs at concentrations at or above applicable regulatory criteria. Historic soil analytical results for samples collected from the Tamarack Processing Area did indicate the presence of COCs at concentrations at or above applicable regulatory criteria including PSIC and DCC in both of the residential and nonresidential exposure scenarios for inorganic contaminants; and GSIPC and nonresidential DCC for SVOCs.

SI surface soil samples collected near dilapidated drums and an area of oil staining exceeded PSIC for the non-residential exposure scenario, and DCC in both of the residential and nonresidential exposure scenarios for inorganic contaminants. Surface soil samples contained contaminants that exceeded the GSIPC, and Drinking Water Protection Criteria (DWC) in both of the residential and nonresidential exposure scenarios for cyanide. Historical surface soil screening results also included measured inorganic contaminant concentrations that exceeded DCC and PSIC in both the residential and non-residential exposure scenarios throughout the study area. Total PCB concentrations in one historic surface soil sample collected from the Tamarack Processing Area exceed DCC for both the residential and nonresidential exposure scenarios.

All samples were collected from surface and subsurface soil intervals generally located within a 2,000 ft to 3,000 ft of the shoreline of Torch Lake. The samples were collected from private properties, some of which are unsecured and may be accessible by trespassers.

Soils with elevated levels of inorganic COCs are ubiquitous in the area, which becomes a limiting factor when evaluating potential exposure pathways. In the case of the Tamarack Processing Area, elevated concentrations of inorganic contaminants include exposure risks related to inhalation and dermal contact pathways, which must be a consideration when evaluating land use, property accessibility, and the extent of contamination in surface and near surface soils.

The remaining exposure risks are generally related to the leaching of contaminants to groundwater and their potential impacts on surface water. These risks pose a long-term threat to the overall environmental health of the watershed. The widespread distribution of inorganic COCs throughout

the region limit determinations related to the extent of contamination in the Tamarack Processing Area. Nevertheless, risks posed to groundwater and surface water are significant and are a factor when evaluating the extent of soil contamination in the Tamarack Processing Area.

6.2.2.3 Groundwater Extent of Contamination

Groundwater analytical results indicated that no COCs were detected at concentrations above applicable regulatory criteria. The temporary groundwater sampling locations were established in a zone roughly 2,000 ft to 3,000 ft to the shoreline of Torch Lake at depths of approximately 3 ft to 13 ft bgs.

The potential risks associated with using groundwater as a drinking water source as well as it's connectivity to nearby surface water bodies should be a consideration in determinations related to the extent of contamination in the Tamarack Processing Area.

6.3 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 Tamarack Processing Area. The following subsections provide a synopsis of these findings and a recommended path forward for mitigating these risks in the Tamarack Processing Area.

6.3.1 Conclusions

Environmental impacts in the Tamarack Processing Area are generally characterized by detections of organic and inorganic contaminants in soil; repercussions of mining era operations in the region. Although, specific sources of these contaminants may not be fully understood, historical research related to the operations, closing, and eventual abandonment/scrapping of mining company operations provided substantive evidence for assessing specific operational areas and selecting target analytes anticipated to be present within the study area. The findings of these investigative activities are summarized as follows:

- Asbestos analytical results for various building materials including, but not limited to asphaltic roofing material and transite are present in the study area. These materials are widely distributed in the area of the Tamarack Reclamation Plant and are subject to migration via wind and water erosion. Asbestos concentrations in seven bulk material samples contained asbestos fibers at concentrations greater than 1 %. The damaged and friable nature of these materials pose a potential risk to human health as it relates to the inhalation pathway. Although, asbestos fibers were not detected in a limited number of soil samples collected from the study area, the exposed nature of these material, makes them subject to further degradation that could potentially impact surface soils in the Tamarack Processing Area.

- The contents of three dilapidated drums contained inorganic contaminants that exceeded PSIC for the non-residential scenario, and DCC in both of the residential and nonresidential exposure scenarios. One sample contained cyanide that exceeded the GSIPC.

- Historically sampled waste piles contained concentrations of inorganic contaminants that exceeded PSIC and DCC in both of the residential and nonresidential exposure scenarios.

- A shallow soil sample contained a detectable concentration of oil and grease while other shallow and subsurface soil analytical results did not contain any COCs at concentrations at or above applicable regulatory criteria. Historic soil analytical results did indicate the presence of COCs at concentrations at or above applicable regulatory criteria including PSIC and DCC in both of the residential and nonresidential exposure scenarios for inorganic contaminants; and GSIPC and nonresidential DCC for SVOCs. Total PCB concentrations in one historic surface soil sample collected from the Tamarack Processing Area exceed DCC for both residential and nonresidential exposure scenarios.

- Surface soil samples collected near dilapidated drums and an area of oil staining exceeded PSIC for the non-residential scenario, and DCC in both of the residential and nonresidential exposure scenarios for inorganic contaminants. Surface soil samples contained contaminants that exceeded the GSIPC, and DWC in both of the residential and nonresidential exposure scenarios for cyanide.

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

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

Tamarack Processing Area – Media, Criteria, Potential Receptor Summary															
Media	Soil			Groundwater			Air		Sediment	Surface Water		Building Materials, Asbestos, and Abandoned Containers			
Criteria / Potential Receptor	Drinking Water Protection	Groundwater Surface Water Interface	Direct Contact	Drinking Water Protection	Groundwater Surface Water Interface	Flammability and Explosivity	Volatilization	Particulate Inhalation	Ecological	Ecological	Human Health	Particulate Inhalation	Flammability and Explosivity	Environmental	Human Health
Residential Human	✓	✓	✓					✓				✓		✓	✓
Nonresidential Human	✓	✓	✓					✓				✓		✓	✓
Water Column Organism															
Benthic Organism															
COCs exceeding applicable regulatory criteria in one or more sample	Arsenic, Copper, Cyanide, Iron, Lead, Manganese, Naphthalene, Fluoranthene, Phenanthrene, Total PCBs, Benzo(a)pyrene, Dibenzo(a,h)anthracene, Carbazole, Asbestos														

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

- Significant terrestrial sources of contamination are present in the form of inorganic COCs, cyanide, SVOCs, PCBs, and asbestos in the study area. Reconnaissance documented that the contents of abandoned containers and debris and waste piles are prevalent in the study area and contain multiple COCs that exceed applicable regulatory criteria; and,

- Industrial ruins, including buildings, foundations, and building floors are present. Mining era ACM, containers, and building materials were all observed in the study area. Multiple pieces of SACM commingled with building debris in various sizes and quantities were also noted. Several locations in the study area feature structural voids in foundations and floors at or above grade in mining era building footprints and steep hill side locations that may pose physical hazards.

6.3.2 Recommendations

The conclusions outlined in the preceding subsection establish that the Tamarack Processing Area is a Facility. Section 20107a of Part 201 of NREPA describes the duties of owners or operators of a Facility, regardless of their liability, including: prevent unacceptable exposures, prevent exacerbation, and take reasonable precautions against the foreseeable actions of third parties. Some

exceptions may apply; in any case, owners and operators of contaminated properties should become familiar with Section 20107a and the associated Rules.

To date, no documented remedial actions are known to have been completed in the study area. The identified contaminants and their uncontrolled nature merit immediate response actions to control and prevent continued migration of contaminants from the terrestrial portions of the study area. Once these uncontrolled conditions have been stabilized and exposure risks have been evaluated, long-term remedial objectives can be evaluated.

Based on the results of the SI and to ensure compliance with regulatory statutes, human health and ecological risks should minimally be qualitatively evaluated with property-specific data to determine if risks to the public health, safety, or welfare or to the environment are likely within the study area. The performance of a risk assessment on select properties or groups of properties, based on current and anticipated future land-use will help identify remedial goals for properties where potential human health and ecological hazards have been identified. Assessment based on current and future land-use contributes to the beneficial and safe re-use and potential redevelopment of any given property by clarifying applicability of regulatory statutes, as traditional property zoning (residential versus nonresidential) is generally undefined in the study area.

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

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

SECTION 6

DETAILED FINDINGS REPORT – TAMARACK PROCESSING AREA TABLES

TABLE 6-1

Sample Analytical Summary - Bulk Asbestos
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Sample Location	Field Sample ID	Sample Date	Asbestos	Note
CHTC-ASBBLK01A	**CHTC-ASBBLK01A-062915**	**6/29/2015**	**30 %**	**chrysotile**
CHTC-ASBBLK01B	CHTC-ASBBLK01B-062915	6/29/2015	ND	
CHTC-ASBBLK01C	CHTC-ASBBLK01C-062915	6/29/2015	ND	
CHTC-ASBBLK02A	CHTC-ASBBLK02A-062915	6/29/2015	ND	
CHTC-ASBBLK02B	CHTC-ASBBLK02B-062915	6/29/2015	ND	
CHTC-ASBBLK02C	CHTC-ASBBLK02C-062915	6/29/2015	ND	
CHTC-ASBBLK03A	CHTC-ASBBLK03A-062915	6/29/2015	ND	
CHTC-ASBBLK03B	CHTC-ASBBLK03B-062915	6/29/2015	ND	
CHTC-ASBBLK03C	CHTC-ASBBLK03C-062915	6/29/2015	ND	
CHTC-ASBBLK04A	**CHTC-ASBBLK04A-062915**	**6/29/2015**	**20 %**	**chrysotile**
CHTC-ASBBLK04B	**CHTC-ASBBLK04B-062915**	**6/29/2015**	**20 %**	**chrysotile**
CHTC-ASBBLK04C	**CHTC-ASBBLK04C-062915**	**6/29/2015**	**20 %**	**chrysotile**
CHTC-ASBBLK05A	**CHTC-ASBBLK05A-062915**	**6/29/2015**	**5 %**	**chrysotile**
CHTC-ASBBLK05B	**CHTC-ASBBLK05B-062915**	**6/29/2015**	**2 %**	**chrysotile**
CHTC-ASBBLK05C	**CHTC-ASBBLK05C-062915**	**6/29/2015**	**5 %**	**chrysotile**
CHTC-ASBBLK06A	CHTC-ASBBLK06A-062915	6/29/2015	ND	
CHTC-ASBBLK07A	CHTC-ASBBLK07A-062915	6/29/2015	ND	
CHTC-ASBBLK07B	CHTC-ASBBLK07B-062915	6/29/2015	ND	
CHTC-ASBBLK07C	CHTC-ASBBLK07C-062915	6/29/2015	ND	
CHTC-ASBBLK08A	CHTC-ASBBLK08A-062915	6/29/2015	ND	
CHTC-ASBBLK08B	CHTC-ASBBLK08B-062915	6/29/2015	ND	
CHTC-ASBBLK08C	CHTC-ASBBLK08C-062915	6/29/2015	ND	

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-DM01	CHTC-DM02	CHTC-DM03	CHTC-DM04	CHTC-SB16	
Field Sample ID									CHTC - DM01 - 0-6"	CHTC - DM02 - 0-6"	CHTC - DM03	CHTC - DM04	CHTC-SB-16-0-6"	CHTC-SB-16-6"-13'
Sample Date:									8/20/2015	8/20/2015	8/20/2015	8/20/2015	5/14/2015	5/14/2015
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	--	--	0 - 0.5 ft	0.5 - 13 ft
Sample Description:									Waste Sample from Degraded Abandoned Drum	Waste Sample from Degraded Abandoned Drum	Waste Sample from Degraded Abandoned Drum	Waste Sample from Degraded Abandoned Drum	TOPSOIL	CLAY, Reddish brown to 1 ft; SAND, Medium grained, Reddish brown to 13.5 ft; BEDROCK
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	<10 U	**31000**	**20000**	**12000**	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<0.3 U	**4.6**	**1.3**	**3.7**	--	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	<0.5 U	**530**	**420**	**350**	--	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	<10 U	**45**	**80**	**150**	--	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	<0.2 U	<2.0 U	<2.0 U	<2.0 U	--	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	<0.2 U	**1.5**	**2.8**	**2.8**	--	--
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)	<2.0 U	**50**	**99**	**250**	--	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	<0.5 U	**44**	**15**	**15**	--	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	<1.0 U	**27000**	**74000**	**59000**	--	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**120 J**	**93000 J**	**36000 J**	**57000 J**	--	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**250**	**30**	**74**	**260**	--	--
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)	<0.2 U	**8.7**	**8.3**	**8.1**	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	**16**	**9000**	**11000**	**9600**	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	<10 U	**480**	**390**	**720**	--	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	<0.06 U	**1.5**	**0.5**	**0.4**	--	--
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	<1.0 U	**310**	**80**	**58**	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<0.2 U	<2.0 U	<2.0 U	<2.0 U	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	<0.1 U	**34**	**36**	**39**	--	--
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	<1.0 U	**280**	**190**	**1500**	--	--
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)	<1.2 U	<0.14 U	<0.12 U	**0.26**	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<5900 U	<710 U	<580 U	<1300 U	<220 U	<110 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<5900 U	<710 U	<580 U	<1300 U	<220 U	<110 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<25000 U	<710 U	<580 U	<1300 U	<220 U	<110 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	<370000 U	<710 U	<2900 UJ	<6600 U	--	<560 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	<150000 U	<280 U	<1200 U	<2600 U	--	<220 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	<150000 U	<280 U	<1200 U	<2600 U	--	<220 U
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	<150000 U	<280 U	<1200 U	<2600 U	--	<220 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<150000 U	<280 U	<1200 U	<2600 U	--	<220 U
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<290000 U	<570 U	<2300 U	<5200 U	--	<440 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	<290000 U	<570 U	<2300 U	<5200 U	--	<440 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	<290000 U	<570 U	<2300 U	<5200 U	--	<440 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<290000 U	<570 U	<2300 U	<5200 U	--	<440 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	--	--	--	--	--	--

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-DM01	CHTC-DM02	CHTC-DM03	CHTC-DM04	CHTC-SB16	
Field Sample ID									CHTC - DM01 - 0-6"	CHTC - DM02 - 0-6"	CHTC - DM03	CHTC - DM04	CHTC-SB-16-0-6"	CHTC-SB-16-6"-13'
Sample Date:									8/20/2015	8/20/2015	8/20/2015	8/20/2015	5/14/2015	5/14/2015
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.5 ft	--	--	0 - 0.5 ft	0.5 - 13 ft
Sample Description:									Waste Sample from Degraded Abandoned Drum	Waste Sample from Degraded Abandoned Drum	Waste Sample from Degraded Abandoned Drum	Waste Sample from Degraded Abandoned Drum	TOPSOIL	CLAY, Reddish brown to 1 ft; SAND, Medium grained, Reddish brown to 13.5 ft; BEDROCK
Organics - SVOCs (ug/kg) - continued														
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)	<150000 U	<280 U	<1200 U	<2600 U	--	<220 U
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<290000 U	<570 U	<2300 U	<5200 U	--	<440 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	--	--	--	--	--	--
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	--	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	<150000 U	<280 U	<1200 U	<2600 U	--	<220 U
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<150000 U	<280 U	<1200 U	<2600 U	--	<220 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<290000 U	<570 U	<2300 U	<5200 U	--	<440 U
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<150000 U	<280 U	<1200 UJ	<2600 U	--	<220 U
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	<150000 U	<280 U	<1200 U	<2600 U	--	<220 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	<150000 U	<280 U	**1300**	<2600 U	--	<220 U
Organics - VOCs (ug/kg)														
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	<94 U	<67 UJ	<80 U	--	<61 U
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	--	<94 U	**180 J**	<80 U	--	<61 U
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	--	<94 U	**85 J**	<80 U	--	<61 U
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	<470 U	<330 UJ	<400 U	--	<310 U
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	--	<94 U	<67 UJ	<80 U	--	<61 U
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	--	<94 U	<67 UJ	<80 U	--	<61 U
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	<190 U	<130 UJ	<160 U	--	<120 U
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<470 U	<330 UJ	<400 U	--	<310 U
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	<94 U	**66 J**	<80 U	--	<61 U
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	--	<94 U	<67 UJ	<80 U	--	<61 U
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	--	<94 U	<67 UJ	<80 U	--	<61 U
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	--	ND	**66 J**	ND	--	ND
Organics - Pesticides (ug/kg)														
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	--	--	--	--	--	--
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	--	--	--	--	--	--
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	--	--	--	--	--	--
Asbestos														
									--	--	--	--	--	--
Other (mg/kg)														
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	<100 U

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB17		CHTC-SB18		CHTC-SB19	
Field Sample ID									CHTC-SB-17-0-6''	CHTC-SB-17-6''-8'	CHTC-SB-18-0-6''	CHTC-SB-18-6''-6	CHTC-SB-19-0-6''	CHTC-SB-19-6''-7'
Sample Date:									5/14/2015	5/14/2015	5/14/2015	5/14/2015	5/14/2015	5/14/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 8 ft	0 - 0.5 ft	0.5 - 6 ft	0 - 0.5 ft	0.5 - 7 ft
Sample Description:									TOPSOIL	SAND, Medium grained, Brown to 5 ft; SAND, Medium grained, Reddish brown to 12 ft; SAND, Medium grained, Brown to 14 ft	SAND, Medium grained, Brown	SAND, Medium grained, Reddish brown to 4.5 ft; SILT, Medium grained, Reddish brown to 5 ft, SAND, Medium grained, Reddish brown to 9 ft	FILL, Sand, Fine grained, Brown	FILL, Sand and gravel, Gray to 1.75 ft; SAND, Medium grained, Reddish brown, to 9 ft
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)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--
Inorganics - 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	<120 U	<110 U	<110 U	<120 U	<110 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<120 U	<120 U	<110 U	<110 U	<120 U	<110 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<120 U	<120 U	<110 U	<110 U	<120 U	<110 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	--	<590 U	--	<560 U	--	<560 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	--	<230 U	--	<220 U	--	<230 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	--	<230 U	--	<220 U	--	<230 U
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	--	<230 U	--	<220 U	--	<230 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<230 U	--	<220 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)	--	<470 U	--	<450 U	--	<450 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<470 U	--	<450 U	--	<450 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	--	<470 U	--	<450 U	--	<450 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	<470 U	--	<450 U	--	<450 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	--	--	--	--	--	--

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB17		CHTC-SB18		CHTC-SB19	
Field Sample ID									CHTC-SB-17-0-6''	CHTC-SB-17-6''-8'	CHTC-SB-18-0-6''	CHTC-SB-18-6''-6	CHTC-SB-19-0-6''	CHTC-SB-19-6''-7'
Sample Date:									5/14/2015	5/14/2015	5/14/2015	5/14/2015	5/14/2015	5/14/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 8 ft	0 - 0.5 ft	0.5 - 6 ft	0 - 0.5 ft	0.5 - 7 ft
Sample Description:									TOPSOIL	SAND, Medium grained, Brown to 5 ft; SAND, Medium grained, Reddish brown to 12 ft; SAND, Medium grained, Brown to 14 ft	SAND, Medium grained, Brown	SAND, Medium grained, Reddish brown to 4.5 ft; SILT, Medium grained, Reddish brown to 5 ft, SAND, Medium grained, Reddish brown to 9 ft	FILL, Sand, Fine grained, Brown	FILL, Sand and gravel, Gray to 1.75 ft; SAND, Medium grained, Reddish brown, to 9 ft
Organics - SVOCs (ug/kg) - continued														
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)	--	<230 U	--	<220 U	--	<230 U
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	<470 U	--	<450 U	--	<450 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	--	--	--	--	--	--
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	--	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	<230 U	--	<220 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	--	<230 U	--	<220 U	--	<230 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<470 U	--	<450 U	--	<450 U
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<230 U	--	<220 U	--	<230 U
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	--	<230 U	--	<220 U	--	<230 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	<230 U	--	<220 U	--	<230 U
Organics - VOCs (ug/kg)														
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	<67 U	--	<62 U	--	<64 U
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	--	<67 U	--	<62 U	--	<64 U
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	--	<67 U	--	<62 U	--	<64 U
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	<330 U	--	<310 U	--	<320 U
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	--	<67 U	--	<62 U	--	<64 U
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	--	<67 U	--	<62 U	--	<64 U
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	<130 U	--	<120 U	--	<130 U
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<330 U	--	<310 U	--	<320 U
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	<67 U	--	<62 U	--	<64 U
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	--	<67 U	--	<62 U	--	<64 U
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	--	<67 U	--	<62 U	--	<64 U
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	--	ND	--	ND	--	ND
Organics - Pesticides (ug/kg)														
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	--	--	--	--	--	--
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	--	--	--	--	--	--
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	--	--	--	--	--	--
Asbestos														
									ND	--	--	--	ND	--
Other (mg/kg)														
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	<120 U	--	**1800**	--	<110 U

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB20		CHTC-SB21			CHTC-SB22	
Field Sample ID									CHTC-SB-20-0-6''	CHTC-SB-20-6''-9'	CHTC-SB-21-0''-6''	CHTC-SB-21-6''-12'	CHTC-SB-21-6''-12' dup	CHTC-SB-22-0-6''	CHTC-SB-22-6''-12'
Sample Date:									5/14/2015	5/14/2015	5/15/2015	5/15/2015	5/15/2015	5/15/2015	5/15/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 9 ft	0 - 0.5 ft	0.5 - 12 ft	0.5 - 12 ft	0 - 0.5 ft	0.5 - 12 ft
Sample Description:									FILL, Sand and gravel to 4 ft	SAND, Medium to fine grained, reddish brown to 9 ft, BEDROCK	TOPSOIL	SAND, Fine grained, Brown to 0.75 ft; FILL, Sand and gravel to 11 ft; SAND, Fine grained, Brown to 11 ft; SAND, Fine grained, Reddish brown to 16 ft	Field Duplicate	FILL, Sand and gravel to 13 ft	SAND, Fine grained, Brown to 16 ft
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)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--
Inorganics - 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	<110 U	<110 U	<110 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<110 U	<110 U	<110 U	<110 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<110 U	<110 U	<110 U	<110 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)															
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	--	--	--	--	--	--	--
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	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	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	--	--	--	--	--	--	--

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB20		CHTC-SB21			CHTC-SB22	
Field Sample ID									CHTC-SB-20-0-6''	CHTC-SB-20-6''-9'	CHTC-SB-21-0''-6''	CHTC-SB-21-6''-12'	CHTC-SB-21-6''-12' dup	CHTC-SB-22-0-6''	CHTC-SB-22-6''-12'
Sample Date:									5/14/2015	5/14/2015	5/15/2015	5/15/2015	5/15/2015	5/15/2015	5/15/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 9 ft	0 - 0.5 ft	0.5 - 12 ft	0.5 - 12 ft	0 - 0.5 ft	0.5 - 12 ft
Sample Description:									FILL, Sand and gravel to 4 ft	SAND, Medium to fine grained, reddish brown to 9 ft, BEDROCK	TOPSOIL	SAND, Fine grained, Brown to 0.75 ft; FILL, Sand and gravel to 11 ft; SAND, Fine grained, Brown to 11 ft; SAND, Fine grained, Reddish brown to 16 ft	Field Duplicate	FILL, Sand and gravel to 13 ft	SAND, Fine grained, Brown to 16 ft
Organics - SVOCs (ug/kg) - continued															
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	2.9E+06	ID	--	--	--	--	--	--	--
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	--	--	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	--
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	--	--	--	--	--	--	--
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 (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	--	--	--	--	--	--	--
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	--	--	--	--	--	--	--
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	--	--	--	--	--	--	--
Organics - Pesticides (ug/kg)															
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	--	--	--	--	--	--	--
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	--	--	--	--	--	--	--
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	--	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	--	--	--	--	--	--	--
Asbestos															
									--	--	ND	--	--	--	--
Other (mg/kg)															
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	<120 U	--	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB23		CHTC-SB24		CHTC-SB25	
Field Sample ID									CHTC-SB-23-0-6''	CHTC-SB-23-6''-6'	CHTC-SB-24-0-6''	CHTC-SB-24-6''-8'	CHTC-SB-25-0-6''	CHTC-SB-25-6''-8'
Sample Date:									5/15/2015	5/15/2015	5/15/2015	5/15/2015	5/15/2015	5/15/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 6 ft	0 - 0.5 ft	0.5 - 8 ft	0 - 0.5 ft	0.5 - 8 ft
Sample Description:									SAND, Fine grained, Dark gray to 2.5 ft	SAND, Medium to fine grained, Reddish brown to 9 ft	FILL, Sand and gravel, Dark gray to 1 ft	SAND, Medium to fine grained, Dark gray to 3 ft; SAND, Medium to fine grained, Reddish brown to 9 ft	TOPSOIL to 1 ft	SAND, Fine grained, Brown to 2 ft; SAND, Fine grained, Reddish brown to 8 ft; SAND, Coarse to medium grained, Brown to 9 ft
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)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--
Inorganics - 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	<110 U	<120 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<110 U	<110 U	<120 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<110 U	<110 U	<120 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	--	<560 U	--	--	--	<580 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	--	<230 U	--	--	--	<230 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	--	<230 U	--	--	--	<230 U
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	--	<230 U	--	--	--	<230 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<230 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)	--	<450 U	--	--	--	<470 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<450 U	--	--	--	<470 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	--	<450 U	--	--	--	<470 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	<450 U	--	--	--	<470 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	--	--	--	--	--	--

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB23		CHTC-SB24		CHTC-SB25	
Field Sample ID									CHTC-SB-23-0-6''	CHTC-SB-23-6''-6'	CHTC-SB-24-0-6''	CHTC-SB-24-6''-8'	CHTC-SB-25-0-6''	CHTC-SB-25-6''-8'
Sample Date:									5/15/2015	5/15/2015	5/15/2015	5/15/2015	5/15/2015	5/15/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 6 ft	0 - 0.5 ft	0.5 - 8 ft	0 - 0.5 ft	0.5 - 8 ft
Sample Description:									SAND, Fine grained, Dark gray to 2.5 ft	SAND, Medium to fine grained, Reddish brown to 9 ft	FILL, Sand and gravel, Dark gray to 1 ft	SAND, Medium to fine grained, Dark gray to 3 ft; SAND, Medium to fine grained, Reddish brown to 9 ft	TOPSOIL to 1 ft	SAND, Fine grained, Brown to 2 ft; SAND, Fine grained, Reddish brown to 8 ft; SAND, Coarse to medium grained, Brown to 9 ft
Organics - SVOCs (ug/kg) - continued														
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)	--	<230 U	--	--	--	<230 U
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	<450 U	--	--	--	<470 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	--	--	--	--	--	--
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	--	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	<230 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	--	<230 U	--	--	--	<230 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<450 U	--	--	--	<470 U
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<230 U	--	--	--	<230 U
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	--	<230 U	--	--	--	<230 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	<230 U	--	--	--	<230 U
Organics - VOCs (ug/kg)														
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	--	--	--	--	--	--
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	--	--	--	--	--	--
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	--	--	--	--	--	--
Organics - Pesticides (ug/kg)														
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	--	--	--	--	--	--
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	--	--	--	--	--	--
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	--	--	--	--	--	--
Asbestos														
									ND	--	ND	--	--	--
Other (mg/kg)														
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB26			CHTC-SB27		CHTC-SB28	
Field Sample ID									CHTC-SB-26-0-6"	CHTC-SB-26-6"-11'	CHTC-SB-26-6"-11'-DUP	CHTC-SB-27-0-6"	CHTC-SB-27-6"-8'	CHTC-SB-28-0-6"	CHTC-SB-28-6"-12'
Sample Date:									5/15/2015	5/15/2015	5/15/2015	5/15/2015	5/15/2015	5/16/2015	5/16/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 11 ft	0.5 - 11 ft	0 - 0.5 ft	0.5 - 8 ft	0 - 0.5 ft	0.5 - 12 ft
Sample Description:									FILL, Sand and gravel to 10 ft	SAND, Medium to fine grained, Brown to 12 ft	Field Duplicate	TOPSOIL	SAND, Medium to fine grained, Gray to 1 ft; SAND, Fine grained, Reddish brown to 4 ft; SAND, Medium to fine grained, Brown to 8 ft; BEDROCK	TOPSOIL	SAND, Stamp sand, Medium to fine grained, Gray to 11 ft; SAND, Medium to fine grained, Reddish brown to 16 ft
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)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	--	--	--	--	--	--	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	--	--	--	--	--	--	--
Inorganics - 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	<680 U	<120 U	<110 U	<110 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<680 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	<680 U	<120 U	<110 U	<110 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)															
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	--	--	--	--	--	--	<530 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	--	--	--	--	--	--	<210 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	--	--	--	--	--	--	<210 U
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	--	--	--	--	--	--	<210 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	<210 U
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	--	--	--	--	--	<430 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	--	--	--	--	--	<430 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	--	--	--	--	--	--	<430 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	--	--	--	--	--	<430 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	--	--	--	--	--	--	--

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB26			CHTC-SB27		CHTC-SB28	
Field Sample ID									CHTC-SB-26-0-6"	CHTC-SB-26-6"-11'	CHTC-SB-26-6"-11'-DUP	CHTC-SB-27-0-6"	CHTC-SB-27-6"-8'	CHTC-SB-28-0-6"	CHTC-SB-28-6"-12'
Sample Date:									5/15/2015	5/15/2015	5/15/2015	5/15/2015	5/15/2015	5/16/2015	5/16/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 11 ft	0.5 - 11 ft	0 - 0.5 ft	0.5 - 8 ft	0 - 0.5 ft	0.5 - 12 ft
Sample Description:									FILL, Sand and gravel to 10 ft	SAND, Medium to fine grained, Brown to 12 ft	Field Duplicate	TOPSOIL	SAND, Medium to fine grained, Gray to 1 ft; SAND, Fine grained, Reddish brown to 4 ft; SAND, Medium to fine grained, Brown to 8 ft; BEDROCK	TOPSOIL	SAND, Stamp sand, Medium to fine grained, Gray to 11 ft; SAND, Medium to fine grained, Reddish brown to 16 ft
Organics - SVOCs (ug/kg) - continued															
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)	--	--	--	--	--	--	<210 U
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	--	--	--	--	--	<430 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	--	--	--	--	--	--	--
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	--	--	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	--	--	--	--	--	<210 U
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	--	--	--	--	--	<210 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	--	--	--	--	--	<430 U
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	<210 U
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	--	--	--	--	--	--	<210 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	--	--	--	--	--	<210 U
Organics - VOCs (ug/kg)															
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	--	--	--	--	--	--	--
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	--	--	--	--	--	--	--
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	--	--	--	--	--	--	--
Organics - Pesticides (ug/kg)															
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	--	--	--	--	--	--	--
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	--	--	--	--	--	--	--
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	--	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	--	--	--	--	--	--	--
Asbestos															
									--	--	--	--	--	--	--
Other (mg/kg)															
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB30		CHTC-SB31			CHTC-SB32		CHTC-SS02
Field Sample ID									CHTC-SB-30-0-6''	CHTC-SB-30-6''-17'	CHTC-SB-31-0''-6''	CHTC-SB-31-6''-6'	CHTC-SB-31-6''-6' DUP	CHTC-SB-32-0-6''	CHTC-SB-32-6''-3'	CHTC - SS02 - 3''-9''
Sample Date:									5/16/2015	5/16/2015	5/16/2015	5/16/2015	5/16/2015	5/16/2015	5/16/2015	8/20/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 17 ft	0 - 0.5 ft	0.5 - 6 ft	0.5 - 6 ft	0 - 0.5 ft	0.5 - 3 ft	0.25 - 0.75 ft
Sample Description:									TOPSOIL	SAND, Stamp sand, Medium to fine grained, Gray to 20 ft	FILL, Sand and gravel to 6.5 ft	FILL, Sand and gravel to 6.5 ft; BEDROCK, Sandstone, Reddish brown	Field Duplicate	FILL, Sand and gravel	SAND, Medium to fine grained, Reddish brown to 7 ft, BEDROCK	Surface Soil
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	--	--	--	--	--	--	--	**9200**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	--	--	--	--	--	--	--	**0.6**
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	--	--	--	--	--	--	--	**7.6**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	--	--	--	--	--	--	--	**81**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	--	--	--	--	--	--	--	<2.0 U
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	--	--	--	--	--	--	--	**0.6**
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)	--	--	--	--	--	--	--	<20 U
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	--	--	--	--	--	--	--	**7.4**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	--	--	--	--	--	--	--	**560**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	--	--	--	--	--	--	--	**19000 J**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	--	--	--	--	--	--	--	**99**
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)	--	--	--	--	--	--	--	**9.1**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	--	--	--	--	--	--	--	**4400**
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	--	--	--	--	--	--	--	**380**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	--	--	--	--	--	--	--	**0.2**
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	--	--	--	--	--	--	--	**20**
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	--	--	--	--	--	--	--	<2.0 U
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	--	--	--	--	--	--	--	**0.5**
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	--	--	--	--	--	--	--	**99**
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)	--	--	--	--	--	--	--	**0.42**
Organics - PCBs (ug/kg)																
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<120 U	<120 U	<110 U	<110 U	<120 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<120 U	<120 U	<110 U	<110 U	<120 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<120 U	<120 U	<110 U	<110 U	<120 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	--	<540 U	--	<580 U	<600 UJ	--	--	<3100 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	--	<210 U	--	<230 U	<240 UJ	--	--	<1200 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	--	<210 U	--	<230 U	<240 UJ	--	--	<1200 U
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	--	<210 U	--	<230 U	<240 UJ	--	--	<1200 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<210 U	--	<230 U	<240 UJ	--	--	<1200 U
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	--	<430 U	--	<470 U	<480 UJ	--	--	<2500 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	--	<430 U	--	<470 U	<480 UJ	--	--	<2500 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	--	<430 U	--	<470 U	<480 UJ	--	--	<2500 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	--	<430 U	--	<470 U	<480 UJ	--	--	<2500 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	--	--	--	--	--	--	--	--

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SB30		CHTC-SB31			CHTC-SB32		CHTC-SS02
Field Sample ID									CHTC-SB-30-0-6''	CHTC-SB-30-6''-17'	CHTC-SB-31-0''-6''	CHTC-SB-31-6''-6'	CHTC-SB-31-6''-6' DUP	CHTC-SB-32-0-6''	CHTC-SB-32-6''-3'	CHTC - SS02 - 3''-9''
Sample Date:									5/16/2015	5/16/2015	5/16/2015	5/16/2015	5/16/2015	5/16/2015	5/16/2015	8/20/2015
Sample Interval (bgs):									0 - 0.5 ft	0.5 - 17 ft	0 - 0.5 ft	0.5 - 6 ft	0.5 - 6 ft	0 - 0.5 ft	0.5 - 3 ft	0.25 - 0.75 ft
Sample Description:									TOPSOIL	SAND, Stamp sand, Medium to fine grained, Gray to 20 ft	FILL, Sand and gravel to 6.5 ft	FILL, Sand and gravel to 6.5 ft; BEDROCK, Sandstone, Reddish brown	Field Duplicate	FILL, Sand and gravel	SAND, Medium to fine grained, Reddish brown to 7 ft, BEDROCK	Surface Soil
Organics - SVOCs (ug/kg) - continued																
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)	--	<210 U	--	<230 U	<240 UJ	--	--	<1200 U
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	--	<430 U	--	<470 U	<480 UJ	--	--	<2500 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	--	--	--	--	--	--	--	--
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	--	--	--	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	--	<210 U	--	**340**	**190 J**	--	--	<1200 U
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	--	<210 U	--	<230 U	<240 UJ	--	--	<1200 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	--	<430 U	--	<470 U	<480 UJ	--	--	<2500 U
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	<210 U	--	<230 U	<240 UJ	--	--	<1200 U
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	--	<210 U	--	**240**	**210 J**	--	--	<1200 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	--	<210 U	--	**270**	<240 UJ	--	--	<1200 U
Organics - VOCs (ug/kg)																
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	**110**
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	--	--	--	--	--	--	--	**250**
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	--	--	--	--	--	--	--	<83 U
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	--	--	--	--	--	--	--	<420 U
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	--	--	--	--	--	--	--	<83 U
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	--	--	--	--	--	--	--	<83 U
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	**340**
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	--	--	--	--	--	--	--	**420**
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	**270**
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	<83 U
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	--	--	--	--	--	--	--	**230**
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	--	--	--	--	--	--	--	**610**
Organics - Pesticides (ug/kg)																
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	--	--	--	--	--	--	--	--
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	--	--	--	--	--	--	--	--
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	--	--	--	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	--	--	--	--	--	--	--	--
Asbestos																
									--	--	--	--	--	--	--	--
Other (mg/kg)																
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SS03	CHTC-SS04	CHTC-SS05	CHTC-SS06
Field Sample ID									CHTC - SS03 - 3''-9''	CHTC - SS04 - 3''-9''	CHTC - SS05 - 3''-9''	CHTC - SS06 - 3''-9''
Sample Date:									8/20/2015	8/20/2015	8/20/2015	8/20/2015
Sample Interval (bgs):									0.25 - 0.75 ft	0.25 - 0.75 ft	0.25 - 0.75 ft	0.25 - 0.75 ft
Sample Description:									Surface Soil	Surface Soil	Surface Soil	Surface Soil
Inorganics - Metals (mg/kg)												
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**4100**	**6800**	**9000**	**2600**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<0.3 U	**0.3**	**0.7**	<0.3 U
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**1.9**	**2.7**	<5.0 U	**1.4**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**39**	**35**	**63**	**28**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	**0.2**	**0.3**	<2.0 U	<0.2 U
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	<0.2 U	**0.2**	**0.3**	<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)	<20 U	<20 U	**23**	<20 U
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	<5.0 U	**8.8**	**14**	<5.0 U
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**610**	**1200**	**1900**	**570**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**10000 J**	**13000 J**	**20000 J**	**6900 J**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**140**	**98**	**410**	**68**
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)	**3.8**	**4.6**	**5.1**	**2.3**
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	**2600**	**6700**	**11000**	**1300**
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**120**	**170**	**280**	**86**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	<0.05 U	**0.07**	**0.1**	**0.1**
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**8.8**	**19**	**37**	**4.8**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<0.2 U	<0.2 U	<2.0 U	<0.2 U
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**0.3**	**0.6**	**0.7**	**0.4**
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	--	--	--	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**66**	**85**	**150**	**57**
Inorganics - Cyanide (mg/kg)												
CYANIDE	57-12-5	4.0 (P,R)	0.1 (P,R)	250 (P,R)	12 (P,R)	4.0 (P,R)	250 (P,R)	250 (P,R)	<0.11 U	<0.11 U	<0.11 U	<0.12 U
Organics - PCBs (ug/kg)												
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<120 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<120 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<110 U	<110 U	<110 U	<120 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND
Organics - SVOCs (ug/kg)												
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	<550 U	<2700 U	<5600 U	<2900 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	<220 U	<1100 U	<2200 U	<1200 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	<220 U	<1100 U	<2200 U	<1200 U
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	<220 U	<1100 U	<2200 U	<1200 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<220 U	<1100 U	<2200 U	<1200 U
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<440 U	<2200 U	<4500 U	<2300 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	<440 U	<2200 U	<4500 U	<2300 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	<440 U	<2200 U	<4500 U	<2300 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<440 U	<2200 U	<4500 U	<2300 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	--	--	--	--

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SS03	CHTC-SS04	CHTC-SS05	CHTC-SS06
Field Sample ID									CHTC - SS03 - 3''-9''	CHTC - SS04 - 3''-9''	CHTC - SS05 - 3''-9''	CHTC - SS06 - 3''-9''
Sample Date:									8/20/2015	8/20/2015	8/20/2015	8/20/2015
Sample Interval (bgs):									0.25 - 0.75 ft	0.25 - 0.75 ft	0.25 - 0.75 ft	0.25 - 0.75 ft
Sample Description:									Surface Soil	Surface Soil	Surface Soil	Surface Soil
Organics - SVOCs (ug/kg) - continued												
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	<1100 U	<2200 U	<1200 U
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<440 U	<2200 U	<4500 U	<2300 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	--	--	--	--
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	<220 U	<1100 U	<2200 U	<1200 U
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<220 U	<1100 U	<2200 U	<1200 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<440 U	<2200 U	<4500 U	<2300 U
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<220 U	<1100 U	<2200 U	<1200 U
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	<220 U	<1100 U	<2200 U	<1200 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	<220 U	<1100 U	<2200 U	<1200 U
Organics - VOCs (ug/kg)												
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	<57 U	<61 U	<97 U	<68 U
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	<57 U	**68**	<97 U	<68 U
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	<57 U	<61 U	<97 U	<68 U
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	<290 U	<310 U	<490 U	<340 U
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	<57 U	**81**	<97 U	<68 U
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	<57 U	<61 U	<97 U	<68 U
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<110 U	**150**	<190 U	<140 U
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<290 U	<310 U	<490 U	<340 U
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	<57 U	**91**	<97 U	<68 U
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	<57 U	<61 U	<97 U	<68 U
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	<57 U	**210**	<97 U	<68 U
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	ND	**241**	ND	ND
Organics - Pesticides (ug/kg)												
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	--	--	--	--
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	--	--	--	--
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	--	--	--	--
Asbestos												
									--	--	--	--
Other (mg/kg)												
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SS07	CHTC-SS08	CHTC-SS09	CHTC-SS10	CHTC-SS12
Field Sample ID									CHTC - SS07 - 3''-9''	CHTC - SS08 - 3''-9''	CHTC - SS09 - 0-6''	CHTC - SS-10 - 0-6''	CHTC - SS-12 - 0-6''
Sample Date:									8/20/2015	8/20/2015	8/20/2015	8/20/2015	8/20/2015
Sample Interval (bgs):									0.25 - 0.75 ft	0.25 - 0.75 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:									Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
Inorganics - Metals (mg/kg)													
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	12000	6400	17000	15000	25000
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	1.0	0.3	8.1	1.1	0.5
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	3.7	2.4	490	370	39
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	2200	35	280	93	38
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	0.9	0.3	<2.0 U	<2.0 U	<2.0 U
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	0.8	0.3	3.0	0.7	0.3
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)	32	<20 U	140	46	140
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	13	6.4	17	15	33
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	1600	950	74000	68000	35000
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	20000 J	15000 J	81000 J	74000 J	44000 J
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	3300	170	480	540	110
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)	6.5	5.7	11	8.0	10
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	11000	4700	12000	8000	17000
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	1200	160	1200	470	1000
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	0.7	0.09	1.3	0.3	<0.06 U
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	24	20	63	150	50
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	0.3	<0.2 U	<2.0 U	<2.0 U	<2.0 U
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	1.1	0.6	40	32	7.7
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	1400	63	850	310	140
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)	12 J	<0.13 U	0.22	<0.13 U	<0.12 U
Organics - PCBs (ug/kg)													
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<240 U	<130 U	<650 U	<660 UJ	<120 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<240 U	<130 U	<650 U	<640 UJ	<120 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<240 U	<130 U	<650 U	<630 UJ	<120 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)													
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	<6100 U	<6300 U	<6500 U	<3200 U	<610 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	<2400 U	<2500 U	<2600 U	<1300 U	<240 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	<2400 U	<2500 U	<2600 U	<1300 U	<240 U
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	<2400 U	<2500 U	<2600 U	<1300 U	<240 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<2400 U	<2500 U	<2600 U	<1300 U	<240 U
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<4900 U	<5000 U	<5200 U	<2500 U	<490 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	<4900 U	<5000 U	<5200 U	<2500 U	<490 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	<4900 U	<5000 U	<5200 U	<2500 U	<490 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<4900 U	<5000 U	<5200 U	<2500 U	<490 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	--	--	--	--	--

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	CHTC-SS07	CHTC-SS08	CHTC-SS09	CHTC-SS10	CHTC-SS12
Field Sample ID									CHTC - SS07 - 3''-9''	CHTC - SS08 - 3''-9''	CHTC - SS09 - 0-6''	CHTC - SS-10 - 0-6''	CHTC - SS-12 - 0-6''
Sample Date:									8/20/2015	8/20/2015	8/20/2015	8/20/2015	8/20/2015
Sample Interval (bgs):									0.25 - 0.75 ft	0.25 - 0.75 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:									Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
Organics - SVOCs (ug/kg) - continued													
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)	<2400 U	<2500 U	<2600 U	<1300 U	<240 U
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<4900 U	<5000 U	<5200 U	<2500 U	<490 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	--	--	--	--	--
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	--	--	--	--	--
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	--	--	--	--	--
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	<2400 U	**3900**	<2600 U	<1300 U	<240 U
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<2400 U	<2500 U	<2600 U	<1300 U	<240 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<4900 U	<5000 U	<5200 U	<2500 U	<490 U
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<2400 U	<2500 U	<2600 U	<1300 U	<240 U
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	<2400 U	<2500 U	<2600 U	<1300 U	<240 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	<2400 U	**4400**	<2600 U	<1300 U	<240 U
Organics - VOCs (ug/kg)													
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	<81 U	<83 U	<81 U	<77 U	<71 U
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	<81 U	<83 U	<81 U	<77 U	<71 U
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	<81 U	<83 U	<81 U	<77 U	<71 U
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	<410 U	<420 U	<410 U	<380 U	<350 U
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	<81 U	<83 U	<81 U	<77 U	<71 U
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	<81 U	<83 U	<81 U	<77 U	<71 U
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<160 U	<170 U	<160 U	<150 U	<140 U
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<410 U	<420 U	<410 U	<380 U	<350 U
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	<81 U	<83 U	<81 U	<77 U	<71 U
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	<81 U	<83 U	<81 U	<77 U	<71 U
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	<81 U	<83 U	<81 U	<77 U	<71 U
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	ND	ND	ND	ND	ND
Organics - Pesticides (ug/kg)													
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	--	--	--	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	--	--	--	--	--
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	--	--	--	--	--
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	--	--	--	--	--
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	--	--	--	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	--	--	--	--	--
Asbestos													
									--	--	--	--	--
Other (mg/kg)													
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SB-01 (2013 SI)	SB-02 (2013 SI)		SB-03 (2013 SI)	SB-04 (2013 SI)	SB-05 (2013 SI)	SB-06 (2013 SI)	SB-08 (2013 SI)
Field Sample ID									SB-01	SB-02	SB-02D	SB-03	SB-04	SB-05	SB-06	SB-08
Sample Date:									11/5/2012	11/5/2012	11/5/2012	11/6/2012	11/6/2012	11/5/2012	11/5/2012	11/6/2012
Sample Interval (bgs):									1 - 1.83 ft	1.83 - 2.83 ft	1.83 - 2.83 ft	1.5 - 2.83 ft	1.83 - 2.83 ft	2.17 - 3.5 ft	1.83 - 3.75 ft	1.83 - 2.83 ft
Sample Description:									--	--	Field Duplicate	--	--	--	--	--
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**6720**	**6830**	**5430**	**6140**	**4750**	**3600**	**2400**	**4230**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<6.5 UJ	<6.9 UJ	<6.6 UJ	<6.5 U	<6.3 UJ	<6.5 U	<6.5 U	**13.4**
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**1.4 J**	**2.2 J**	**2.3 J**	**2.1**	**2.3 J**	**4.3**	**1.1 J**	**4.9**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**38.5 J**	**38.1 J**	**46.8 J**	**11.9 J**	**25.8 J**	**46.2 J**	**18.4 J**	**57.0 J**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	<0.54 UJ	<0.57 UJ	<0.55 UJ	<0.54 UJ	<0.53 UJ	<0.54 UJ	<0.54 UJ	<0.55 UJ
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	<0.54 UJ	**0.23 J**	**0.19 J**	**0.19 J**	<0.53 UJ	**0.25 J**	<0.54 U	**0.30 J**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**2100**	**6940**	**5820**	**9570 J**	**4010**	**3390 J**	**1390 J**	**2960 J**
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	**12.3 J-**	**17.5 J-**	**13.7 J-**	**17.9 J**	**11.8 J-**	**10.5 J**	**4.7 J**	**10.7 J**
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**7.3 J**	**7.1 J**	**6.4 J**	**13.4**	**7.0 J**	**5.9**	**2.7 J**	**6**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**711**	**539**	**577**	**1000**	**880**	**1250**	**392**	**841**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**14800**	**10200**	**9130**	**9900 J**	**8090**	**7680 J**	**4060 J**	**14600 J**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**4.9**	**25.7**	**14.6**	**13.5**	**21.5**	**51.7**	**26.5**	**241**
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)	**5220**	**5370**	**3810**	**8290 J**	**4120**	**3370 J**	**954 J**	**3180 J**
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**225 J**	**196 J**	**171 J**	**221 J**	**148 J**	**144 J**	**150 J**	**348 J**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	<0.11 U	**0.021 J**	**0.044 J**	**0.031 J**	<0.11 U	**0.14**	**0.050 J**	**0.072 J**
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**22.6 J**	**14.3 J**	**12.3 J**	**27.8**	**18.3 J**	**11.7**	**4.4**	**15.6**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	**316 J**	**440 J**	**387 J**	**173 J**	**248 J**	**213 J**	**255 J**	**264 J**
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<3.8 UJ	<4.0 UJ	<3.8 UJ	<3.8 U	<3.7 UJ	<3.8 U	<3.8 U	**1.8 J**
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**R**	**R**	**R**	**0.43 J-**	**R**	**R**	**R**	**R**
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	<545 U	**347 J**	**253 J**	<541 U	<525 U	<540 U	<544 U	<547 U
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	**14.3 J**	**18.9 J**	**17.5 J**	**24.6 J**	**16.0 J**	**17.9 J**	**10.3 J**	**13.1 J**
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**38.5 J**	**39.2 J**	**27.9 J**	**58.8**	**25.5 J**	**79.7**	**12.6**	**50.4**
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)	<0.55 U	<0.58 U	<0.55 U	<0.54 U	<0.53 U	<0.54 U	<0.55 U	<0.55 U
Organics - PCBs (ug/kg)																
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<37 U	<36 U	<37 U	<35 U	<35 U	<37 U	<36 U	<69 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<37 U	<36 U	<37 U	<35 U	<35 U	<37 U	<36 U	<69 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<37 U	<36 U	<37 U	<35 U	<35 U	<37 U	<36 U	<69 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)																
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	**410**
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	**1500**
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	**900**
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	**3100**
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	<350 UJ
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<190 U	**190**	**250**	**77 J**	**130 J**	<190 U	<190 U	**4500**
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<190 U	**200**	**230**	<180 U	**130 J**	**130 J**	<190 U	**5200**
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	<190 U	**160 J**	**200**	<180 UJ	**130 J**	<190 U	<190 U	**3800**
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	<190 U	**150 J**	**150 J**	<180 U	**99 J**	**220**	<190 U	**4300**
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<190 U	**180 J**	**170 J**	<180 U	**120 J**	**78 J**	<190 U	**3500**
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	<190 U	<190 U	**180 J**	<180 U	<180 U	**76 J**	**88 J**	<350 U

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SB-01 (2013 SI)	SB-02 (2013 SI)		SB-03 (2013 SI)	SB-04 (2013 SI)	SB-05 (2013 SI)	SB-06 (2013 SI)	SB-08 (2013 SI)
Field Sample ID									SB-01	SB-02	SB-02D	SB-03	SB-04	SB-05	SB-06	SB-08
Sample Date:									11/5/2012	11/5/2012	11/5/2012	11/6/2012	11/6/2012	11/5/2012	11/5/2012	11/6/2012
Sample Interval (bgs):									1 - 1.83 ft	1.83 - 2.83 ft	1.83 - 2.83 ft	1.5 - 2.83 ft	1.83 - 2.83 ft	2.17 - 3.5 ft	1.83 - 3.75 ft	1.83 - 2.83 ft
Sample Description:									--	--	Field Duplicate	--	--	--	--	--
Organics - SVOCs (ug/kg) - continued																
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	**1800**
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	<190 U	**260**	**290**	**92 J**	**160 J**	**160 J**	<190 U	**4600**
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	**2100**
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	**1000**
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	<190 U	<190 U	<190 U	<180 U	<180 U	**86 J**	<190 U	<350 U
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	<190 U	<190 U	<190 U	<180 U	<180 U	**160 J**	<190 U	**160 J**
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	<190 U	**530**	**470**	**160 J**	**320**	**140 J**	<190 U	**7000**
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	**1600**
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<190 U	**130 J**	**140 J**	<180 U	**80 J**	**77 J**	<190 U	**4200**
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	<350 U
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<190 U	<190 U	<190 U	<180 U	<180 U	<190 U	<190 U	**830**
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	<190 U	**220**	**320**	<180 U	<180 U	<190 U	<190 U	**8100**
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	<190 U	**350**	**450**	**120 J**	**320**	**140 J**	<190 U	**8300**
Organics - VOCs (ug/kg)																
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	<74 U	<61 U	<59 U	<58 U	<58 U	<56 U	<57 U	<69 U
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	<74 U	<61 U	<59 U	<58 U	<58 U	<56 U	<57 U	<69 U
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	<74 U	<61 U	<59 U	<58 U	<58 U	<56 U	<57 U	<69 U
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	<370 UJ	<300 UJ	<300 UJ	<290 UJ	<290 U	<280 UJ	<290 UJ	<350 U
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	<74 U	<61 U	<59 U	<58 U	<58 U	<56 U	<57 U	<69 U
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	<74 U	**92**	**72**	<58 U	<58 U	<56 U	<57 U	<69 U
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<150 U	<120 U	<120 U	<120 U	<120 U	<110 U	<110 U	<140 U
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<370 UJ	<300 UJ	<300 UJ	<290 UJ	<290 UJ	<280 UJ	<290 UJ	<350 UJ
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	<74 U	<61 U	<59 U	<58 U	<58 U	<56 U	<57 U	<69 U
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	<74 U	**69**	**60**	<58 U	<58 U	<56 U	<57 U	<69 U
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	<74 U	**200**	**200**	<58 U	<58 U	<56 U	<57 U	<69 U
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	ND	ND	ND	ND	ND	ND	ND	ND
Organics - Pesticides (ug/kg)																
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	<3.6 UJ	<3.6 U	<3.7 U	<3.5 U	<3.5 UJ	<3.7 U	<3.6 U	<6.8 U
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	<3.6 UJ	<3.6 U	<3.7 U	<3.5 U	<3.5 UJ	<3.7 U	<3.6 U	<6.8 U
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	<1.9 UJ	<1.9 U	<1.9 U	<1.8 U	<1.8 UJ	<1.9 U	<1.9 U	**23 J**
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	<3.6 UJ	<3.6 U	<3.7 U	<3.5 U	<3.5 UJ	<3.7 U	<3.6 U	<6.8 U
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	<3.6 UJ	<3.6 U	<3.7 U	<3.5 U	<3.5 UJ	<3.7 U	<3.6 U	<6.8 U
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	<3.6 UJ	<3.6 U	<3.7 U	<3.5 U	<3.5 UJ	<3.7 U	<3.6 U	<6.8 U
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	<3.6 UJ	<3.6 U	<3.7 U	<3.5 U	<3.5 UJ	<3.7 U	<3.6 U	<6.8 U
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	<19 UJ	<19 U	<19 U	<18 U	<18 UJ	**4.4 J**	<19 U	<35 U
Asbestos																
									--	--	--	--	--	--	--	--
Other (mg/kg)																
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SB-09 (2013 SI)	SB-10 (2013 SI)		SB-11 (2013 SI)	
Field Sample ID									SB-09	SB-10	SB-10 (lab re)	SB-11	SB-11 (lab re)
Sample Date:									11/6/2012	11/5/2012	11/5/2012	11/6/2012	11/6/2012
Sample Interval (bgs):									1.67 - 3.33 ft	0 - 1.83 ft	0 - 1.83 ft	1.83 - 3 ft	1.83 - 3 ft
Sample Description:									--	--	--	--	--
Inorganics - Metals (mg/kg)													
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**1780**	**6370**	--	**3590**	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<6.5 U	<6.5 U	--	<6.5 U	--
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**0.78 J**	**2.0**	--	**1.6**	--
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**13.7 J**	**27.1 J**	--	**72.8 J**	--
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	<0.54 UJ	<0.54 UJ	--	<0.54 UJ	--
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	<0.54 U	**0.18 J**	--	**0.30 J**	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**4290 J**	**10300 J**	--	**1620 J**	--
CHROMIUM	7440-47-3	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)	**3.8 J**	**14.6 J**	--	**7.4 J**	--
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**1.9 J**	**8.6**	--	**2.9 J**	--
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**13.0**	**605**	--	**569**	--
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**3450 J**	**10000 J**	--	**6030 J**	--
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**1.0 J**	**32.4**	--	**50.6**	--
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)	**1570 J**	**5220 J**	--	**1420 J**	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**64.0 J**	**248 J**	--	**102 J**	--
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	<0.11 U	**0.043 J**	--	**0.032 J**	--
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**3.5 J**	**20.4**	--	**6.5**	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	**415 J**	**326 J**	--	**213 J**	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<3.8 U	<3.8 U	--	<3.8 U	--
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**R**	**R**	--	**R**	--
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	<538 U	**208 J**	--	<540 U	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	**8.1 J**	**20.2 J**	--	**10.8 J**	--
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**5.4 J**	**49.6**	--	**76.2**	--
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	<0.54 U	--	<0.54 U	--
Organics - PCBs (ug/kg)													
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<36 U	<36 U	--	<37 U	--
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<36 U	<36 U	--	<37 U	--
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<36 U	<36 U	--	<37 U	--
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	--	ND	--
Organics - SVOCs (ug/kg)													
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	<180 U	<190 UJ	<190 UJ	<190 U	<190 UJ
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	<180 U	<190 U	<190 U	<190 U	<190 UJ
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	<180 U	**83 J**	<190 U	<190 U	<190 UJ
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	<180 U	<190 U	<190 U	<190 U	<190 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	<180 U	<190 UJ	<190 UJ	<190 UJ	<190 UJ
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<180 U	**290**	**300**	**170 J**	**160 J**
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<180 U	**320**	**330**	**170 J**	**150 J**
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	<180 U	**300**	**350**	**150 J**	**120 J**
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	<180 U	**310**	**290**	**110 J**	**89 J**
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<180 U	**380**	**360**	**170 J**	**150 J**
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	**360**	<190 U	<190 U	<190 U	<190 U

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SB-09 (2013 SI)	SB-10 (2013 SI)		SB-11 (2013 SI)	
Field Sample ID									SB-09	SB-10	SB-10 (lab re)	SB-11	SB-11 (lab re)
Sample Date:									11/6/2012	11/5/2012	11/5/2012	11/6/2012	11/6/2012
Sample Interval (bgs):									1.67 - 3.33 ft	0 - 1.83 ft	0 - 1.83 ft	1.83 - 3 ft	1.83 - 3 ft
Sample Description:									--	--	--	--	--
Organics - SVOCs (ug/kg) - continued													
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	<180 U	<190 U	<190 U	<190 U	<190 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	<180 U	**400**	**370**	**190**	**180 J**
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<180 U	**120 J**	**120 J**	<190 U	<190 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	<180 U	<190 U	<190 U	<190 U	<190 UJ
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	<180 U	<190 U	<190 U	<190 U	<190 UJ
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	<180 U	**98 J**	**94 J**	<190 U	<190 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	**130 J**	**580**	**520**	**400**	**400**
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<180 U	<190 U	<190 U	<190 U	<190 UJ
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<180 U	**280**	**240**	**110 J**	**86 J**
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	<180 U	<190 UJ	<190 UJ	<190 U	<190 UJ
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<180 U	<190 UJ	<190 UJ	<190 U	<190 UJ
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	<180 U	**160 J**	**150 J**	**230**	<190 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	**120 J**	**530**	**500**	**310**	**300**
Organics - VOCs (ug/kg)													
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	<57 U	<62 U	--	<62 U	--
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	<57 U	<62 U	--	<62 U	--
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	<57 U	<62 U	--	<62 U	--
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	<280 U	<310 UJ	--	<310 U	--
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	<57 U	<62 U	--	<62 U	--
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	<57 U	<62 U	--	<62 U	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<110 U	<120 U	--	<120 U	--
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<280 UJ	<310 UJ	--	<310 UJ	--
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	<57 U	<62 U	--	<62 U	--
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	<57 U	<62 U	--	<62 U	--
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	<57 U	<62 U	--	<62 U	--
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	ND	ND	--	ND	--
Organics - Pesticides (ug/kg)													
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	<3.6 U	<3.6 U	--	<3.7 U	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	<3.6 U	<3.6 U	--	<3.7 U	--
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	<1.9 U	<1.9 U	--	<1.9 U	--
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	<3.6 U	<3.6 U	--	<3.7 U	--
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	<3.6 U	<3.6 U	--	<3.7 U	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	<3.6 U	<3.6 U	--	<3.7 U	--
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	<3.6 U	<3.6 U	--	<3.7 U	--
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	<19 U	<19 U	--	<19 U	--
Asbestos													
									--	--	--	--	--
Other (mg/kg)													
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SB-12 (2013 SI)		SS-01 (2013 SI)	SS-02 (2013 SI)		SS-03 (2013 SI)	SS-04 (2013 SI)	SS-05 (2013 SI)
Field Sample ID									SB-12	SB-12 (lab re)	SS-01	SS-02	SS-02D	SS-03	SS-04	SS-05
Sample Date:									11/6/2012	11/6/2012	11/6/2012	11/5/2012	11/5/2012	11/5/2012	11/5/2012	11/5/2012
Sample Interval (bgs):									2 - 3 ft	2 - 3 ft	0 - 0.67 ft	0 - 0.75 ft	0 - 0.75 ft	0 - 0.5 ft	0 - 0.125 ft	0 - 0.42 ft
Sample Description:									--	--	--	--	Field Duplicate	--	--	--
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**4530**	--	**4940**	**5290**	**4900**	**10400**	**8140**	**8730**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<6.2 U	--	<6.7 UJ	<6.7 UJ	<6.5 UJ	<12.7 UJ	**34.3 J**	<6.4 UJ
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**0.66 J**	--	**1.8 J**	**13.1 J**	**15.9 J**	**8.2 J**	**8.2 J**	**434 J**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**20.9 J**	--	**20.3 J**	**106 J**	**139 J**	**67.8 J**	**687 J**	**55.2 J**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	<0.52 UJ	--	<0.56 UJ	**0.41 J**	**0.59 J**	<1.1 UJ	<0.57 UJ	<0.53 UJ
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	<0.52 U	--	**0.19 J**	**0.45 J**	**0.46 J**	**1.3 J**	**9.7 J**	**4.4 J**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**2140 J**	--	**3360**	**3710**	**4370**	**11400**	**6700**	**7070**
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)	**7.9 J**	--	**11.6 J-**	**16.1 J-**	**8.5 J-**	**21.9 J-**	**32.0 J-**	**27.7 J-**
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**5.6**	--	**7.3 J**	**5.7 J**	**5.9 J**	**14.5 J**	**13.0 J**	**15.1 J**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**28.2**	--	**448**	**511**	**528**	**5180**	**124000**	**316000**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**5700 J**	--	**7720**	**13800**	**11800**	**21000**	**19100**	**39000**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**0.99 J**	--	**10.1**	**32.3**	**41.1**	**504**	**5680**	**448**
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)	**3690 J**	--	**4600**	**2480**	**2440**	**9130**	**9230**	**9210**
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**125 J**	--	**157 J**	**202 J**	**121 J**	**425 J**	**344 J**	**304 J**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	<0.10 U	--	**0.030 J**	**0.082 J**	**0.084 J**	**0.38**	**3.2**	**0.2**
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**14.9**	--	**11.4 J**	**12.5 J**	**11.4 J**	**31.9 J**	**86.3 J**	**24.9 J**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	**241 J**	--	**376 J**	**436 J**	**444 J**	**571 J**	<568 U	**463 J**
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<3.6 U	--	<3.9 UJ	**6.1 J**	**8.2 J**	<7.4 UJ	**3.8 J**	**2.2 J**
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**R**	--	**R**	**R**	**R**	**3.2 J-**	**9.0 J-**	**591 J-**
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	**323 J**	--	<556 U	<561 U	<542 U	<1060 U	**230 J**	**1080**
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	**12.0 J**	--	**17.9 J**	**20.2 J**	**15.6 J**	**26.0 J**	**18.6 J**	**14.6 J**
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**19.2**	--	**35.8 J**	**39.3 J**	**33.0 J**	**187 J**	**2500 J**	**161 J**
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)	<0.52 U	--	<0.56 U	<0.56 U	<0.54 U	<1.1 U	<0.57 U	<0.53 U
Organics - PCBs (ug/kg)																
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<35 U	--	<38 U	<38 U	<38 U	<71 U	**1400**	<36 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<35 U	--	<38 U	<38 U	<38 U	<71 U	**1900**	<36 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<35 U	--	<38 U	<38 U	<38 U	<71 U	**330 J**	<36 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	--	ND	ND	ND	ND	**3,630**	ND
Organics - SVOCs (ug/kg)																
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	<180 UJ	<180 UJ	<190 U	<200 U	<190 U	**160 J**	<200 U	<180 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	<180 UJ	<180 UJ	<190 U	<200 U	<190 U	**590**	<200 U	<180 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	<180 UJ	<180 UJ	<190 U	<200 U	<190 U	**150 J**	<200 U	<180 U
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	<180 U	<180 U	<190 U	**110 J**	**98 J**	**1700**	<200 U	**250**
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	<180 UJ	<180 UJ	<190 U	<200 U	<190 U	**160 J**	<200 U	<180 U
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<180 U	<180 U	<190 U	**370**	**310**	**5300**	**260**	**810**
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<180 U	<180 U	<190 U	**340**	**290**	**4500**	**270**	**780**
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	<180 U	<180 U	<190 U	**330**	**340**	**4500**	**370**	**850**
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	<180 U	<180 U	<190 U	**260**	**260**	**3600**	**370**	**690**
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<180 U	<180 U	<190 U	**320**	**280**	**3700**	**260**	**610**
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	<180 U	<180 U	<190 U	<200 U	<190 U	<370 U	**2100**	**130 J**

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Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SB-12 (2013 SI)		SS-01 (2013 SI)	SS-02 (2013 SI)		SS-03 (2013 SI)	SS-04 (2013 SI)	SS-05 (2013 SI)
Field Sample ID									SB-12	SB-12 (lab re)	SS-01	SS-02	SS-02D	SS-03	SS-04	SS-05
Sample Date:									11/6/2012	11/6/2012	11/6/2012	11/5/2012	11/5/2012	11/5/2012	11/5/2012	11/5/2012
Sample Interval (bgs):									2 - 3 ft	2 - 3 ft	0 - 0.67 ft	0 - 0.75 ft	0 - 0.75 ft	0 - 0.5 ft	0 - 0.125 ft	0 - 0.42 ft
Sample Description:									--	--	--	--	Field Duplicate	--	--	--
Organics - SVOCs (ug/kg) - continued																
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	<180 U	<180 U	<190 U	<200 U	<190 U	**1100**	<200 U	**110 J**
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	<180 U	<180 U	<190 U	**470**	**420**	**6200**	**360**	**980**
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<180 U	<180 U	<190 U	<200 U	<190 U	**1200**	**110 J**	**200**
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	<180 UJ	<180 UJ	<190 U	<200 U	<190 U	**400**	<200 U	<180 U
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	<180 UJ	<180 UJ	<190 U	**85 J**	<190 U	<370 U	**96 J**	**92 J**
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	<180 U	<180 U	<190 U	<200 U	<190 U	<370 U	<200 U	<180 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	<180 U	<180 U	<190 U	**920**	**680**	**8900**	**420**	**1600**
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<180 UJ	<180 UJ	<190 U	<200 U	<190 U	**470**	<200 U	<180 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<180 U	<180 U	<190 U	**230**	**230**	**3200**	**270**	**610**
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	<180 UJ	<180 UJ	<190 U	<200 U	<190 U	<370 U	<200 U	<180 U
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<180 UJ	<180 UJ	<190 U	<200 U	<190 U	**210 J**	<200 U	<180 U
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	<180 U	<180 U	<190 U	**700 J**	**540**	**9200**	**210**	**1300**
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	<180 U	<180 U	<190 U	**840**	**640**	**10000 J**	**400**	**1600**
Organics - VOCs (ug/kg)																
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	<67 U	--	<59 U	**79**	**78**	<150 U	<65 U	<59 U
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	<67 U	--	<59 U	**150**	**180**	<150 U	<65 U	<59 U
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	<67 U	--	<59 U	<55 U	<56 U	<150 U	<65 U	<59 U
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	**370 J**	--	<300 U	<280 UJ	**520 J**	<740 UJ	<320 UJ	<300 UJ
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	<67 U	--	<59 U	<55 U	<56 U	<150 U	<65 U	<59 U
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	<67 U	--	<59 U	<55 U	<56 U	<150 U	<65 U	<59 U
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<130 U	--	<120 U	**240**	**290**	<290 U	<130 U	<120 U
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<330 UJ	--	<300 UJ	<280 UJ	**300 J**	<740 UJ	<320 UJ	<300 UJ
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	<67 U	--	<59 U	**180**	**200**	<150 U	<65 U	<59 U
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	**5200**	--	<59 U	<55 U	<56 U	<150 U	<65 U	<59 U
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	<67 U	--	<59 U	**170**	**240**	<150 U	<65 U	<59 U
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	ND	--	ND	**420**	**490**	ND	ND	ND
Organics - Pesticides (ug/kg)																
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	<3.5 U	--	<3.7 U	<3.8 U	<3.8 U	<7.2 U	**85**	<3.6 U
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	<3.5 U	--	<3.7 U	<3.8 U	<3.8 U	**8.5 J**	**100**	**2.2 J**
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	<1.8 U	--	<1.9 U	<2.0 U	<1.9 U	<3.7 U	**2.0 J**	<1.8 U
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	<3.5 U	--	<3.7 U	<3.8 U	<3.8 U	<7.2 U	**38 J**	<3.6 U
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	<3.5 U	--	<3.7 U	<3.8 U	<3.8 U	**5.0 J**	<3.8 U	<3.6 U
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	<3.5 U	--	<3.7 U	<3.8 U	<3.8 U	**5.2 J**	**10 J**	<3.6 U
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	<3.5 U	--	<3.7 U	**2.8 J**	**2.0 J**	**29 J**	<3.8 U	<3.6 U
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	<18 U	--	<19 U	<20 U	<19 U	<37 U	<20 U	<18 U
Asbestos																
									--	--	--	--	--	--	--	--
Other (mg/kg)																
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-06 (2013 SI)	SS-07 (2013 SI)	SS-08 (2013 SI)	SS-09 (2013 SI)	SS-10 (2013 SI)	SS-11 (2013 SI)
Field Sample ID									SS-06	SS-07	SS-08	SS-09	SS-10	SS-11
Sample Date:									11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.67 ft	0 - 8.3 ft	0 - 0.17 ft	0 - 0.5 ft	0 - 0.67 ft
Sample Description:									--	--	--	--	--	--
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**4720**	**2350**	**9360**	**3600**	**12500**	**3730**
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<7.1 UJ	<7.1 UJ	<7.4 UJ	<6.5 UJ	**6.7 J**	<6.5 UJ
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**6.6 J**	**4.8 J**	**15.8 J**	**2.0 J**	**14.6 J**	**9.8 J**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**142 J**	**29.2 J**	**543 J**	**61.4 J**	**5710 J**	**61.6 J**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	<0.59 UJ	<0.59 UJ	**0.42 J**	<0.54 UJ	<0.64 UJ	<0.54 UJ
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	**1.4 J**	**0.31 J**	**3.1 J**	**0.35 J**	**2.6 J**	**0.69 J**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**4160**	**1920**	**54200**	**2610**	**16600**	**1780**
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)	**12.0 J-**	**7.1 J-**	**38.0 J-**	**8.3 J-**	**128 J-**	**18.2 J-**
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**7.3 J**	**2.9 J**	**13.2 J**	**5.3 J**	**34.5 J**	**6.2 J**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**946**	**4290**	**21500**	**419**	**9080**	**1380**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**10500**	**9070**	**35400**	**6050**	**43300**	**28600**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**200**	**400**	**2000**	**50.1**	**8260**	**247**
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)	**4040**	**1710**	**8310**	**2910**	**12900**	**2000**
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**208 J**	**81.2 J**	**1010 J**	**152 J**	**747 J**	**304 J**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	**1.9**	**0.24**	**2.1**	**0.086 J**	**0.18**	**0.14**
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	--	--
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**15.8 J**	**8.6 J**	**39.5 J**	**9.6 J**	**296 J**	**18.6 J**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	**297 J**	**195 J**	**404 J**	**284 J**	**1450**	**236 J**
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<4.1 UJ	<4.1 UJ	**2.5 J**	<3.8 UJ	**2.9 J**	**2.7 J**
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**1.0 J-**	**7.4 J-**	**10.5 J-**	**R**	**5.6 J-**	**0.45 J-**
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	<592 U	<591 U	**191 J**	<541 U	**783**	<545 U
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	**17.8 J**	**8.5 J**	**21.2 J**	**12.9 J**	**40.7 J**	**12.8 J**
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**325 J**	**49.3 J**	**1880 J**	**118 J**	**5240 J**	**110 J**
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)	<0.59 U	<0.59 U	<0.62 U	<0.54 U	<0.64 U	<0.55 U
Organics - PCBs (ug/kg)														
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<42 U	<42 U	<42 U	<37 U	<43 U	<37 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<42 U	<42 U	<42 U	<37 U	<43 U	<37 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<42 U	<42 U	<42 U	<37 U	<43 U	<37 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	<220 U	<220 U	<220 U	<190 U	<220 U	<190 U
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	<220 U	**94 J**	<220 U	<190 U	<220 U	<190 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	<220 U	<220 U	**110 J**	<190 U	<220 U	<190 U
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	<220 U	**290**	**430**	<190 U	<220 U	<190 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	<220 U	<220 U	<220 U	<190 U	<220 U	<190 U
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<220 U	**1000**	**4100**	<190 U	**92 J**	**82 J**
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<220 U	**900**	**3200**	<190 U	<220 U	<190 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	<220 U	**840**	**4200**	<190 U	<220 U	<190 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	<220 U	**700**	**2600**	**81 J**	<220 U	<190 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	<220 U	**740**	**3100**	<190 U	<220 U	<190 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	<220 U	<220 U	<220 U	<190 U	<220 U	<190 U

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-06 (2013 SI)	SS-07 (2013 SI)	SS-08 (2013 SI)	SS-09 (2013 SI)	SS-10 (2013 SI)	SS-11 (2013 SI)
Field Sample ID									SS-06	SS-07	SS-08	SS-09	SS-10	SS-11
Sample Date:									11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012
Sample Interval (bgs):									0 - 0.5 ft	0 - 0.67 ft	0 - 8.3 ft	0 - 0.17 ft	0 - 0.5 ft	0 - 0.67 ft
Sample Description:									--	--	--	--	--	--
Organics - SVOCs (ug/kg) - continued														
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	<220 U	**140 J**	**280**	<190 U	<220 U	<190 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	<220 U	**1100**	**5400**	**85 J**	**150 J**	**100 J**
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<220 U	**200 J**	**1100**	<190 U	<220 U	<190 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	<220 U	<220 U	<220 U	<190 U	<220 U	<190 U
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	<220 U	<220 U	<220 U	<190 U	<220 U	<190 U
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	<220 U	<220 U	<220 U	<190 U	<220 U	<190 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	**170 J**	**2200**	**5400**	**110 J**	**180 J**	**150 J**
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<220 U	**86 J**	<220 U	<190 U	<220 U	<190 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<220 U	**600**	**2400**	<190 U	<220 U	<190 U
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	<220 U	<220 U	<220 U	<190 U	<220 U	<190 U
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<220 U	<220 U	<220 U	<190 U	<220 U	<190 U
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	<220 U	**1400**	**2200**	<190 U	<220 U	<190 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	**130 J**	**2000**	**7800**	**110 J**	**180 J**	**120 J**
Organics - VOCs (ug/kg)														
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	<74 U	<68 U	<81 U	<55 U	<99 U	<64 U
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	<74 U	<68 U	<81 U	<55 U	<99 U	<64 U
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	<74 U	<68 U	<81 U	<55 U	<99 U	<64 U
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	<370 UJ	<340 UJ	<400 U	<270 UJ	<500 U	<320 U
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	<74 U	<68 U	<81 U	<55 U	<99 U	<64 U
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	<74 U	<68 U	<81 U	<55 U	<99 U	<64 U
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<150 U	<140 U	<160 U	<110 U	<200 U	<130 U
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<370 UJ	<340 UJ	<400 UJ	<270 UJ	<500 UJ	<320 UJ
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	<74 U	<68 U	<81 U	<55 U	<99 U	<64 U
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	<74 U	<68 U	<81 U	<55 U	<99 U	<64 U
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	<74 U	<68 U	<81 U	<55 U	<99 U	<64 U
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	ND	ND	ND	ND	ND	ND
Organics - Pesticides (ug/kg)														
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	<4.2 U	<4.2 U	<4.2 U	<3.7 U	<4.3 UJ	<3.7 UJ
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	<4.2 U	<4.2 U	**20 J**	<3.7 U	<4.3 UJ	<3.7 UJ
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	<2.2 U	<2.2 U	<2.2 U	<1.9 U	<2.2 UJ	<1.9 UJ
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	<4.2 U	<4.2 U	<4.2 U	<3.7 U	<4.3 UJ	<3.7 UJ
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	<4.2 U	<4.2 U	<4.2 U	<3.7 U	<4.3 UJ	<3.7 UJ
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	<4.2 U	<4.2 U	<4.2 U	<3.7 U	<4.3 UJ	<3.7 UJ
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	<4.2 U	<4.2 U	<4.2 U	<3.7 U	<4.3 UJ	<3.7 UJ
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	<22 U	<22 U	<22 U	<19 U	<22 UJ	<19 UJ
Asbestos														
									--	--	--	--	--	--
Other (mg/kg)														
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-12 (2013 SI)		SS-13 (2013 SI)	SS-14 (2013 SI)	Waste 1 (2013 SI)	Waste 2 (2013 SI)
Field Sample ID									SS-12	SS-12D	SS-13	SS-14	W-1	W-2
Sample Date:									11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/5/2012	11/5/2012
Sample Interval (bgs):									0 - 0.67 ft	0 - 0.67 ft	0 - 0.67 ft	0 - 0.67 ft	0 - 0.33 ft	0 - 0.25 ft
Sample Description:									--	Field Duplicate	--	--	--	--
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	6,900 (B)	NA	ID	50,000 (DD)	6,900 (B)	ID	370,000 (DD)	**3420**	**4340**	**4190**	**4510**	--	--
ANTIMONY	7440-36-0	4.3	1.2 (X)	13,000	180	4.3	5,900	670	<6.7 UJ	<6.7 UJ	<6.8 UJ	**3.2 J**	**10**	**1.1**
ARSENIC	7440-38-2	4.6	4.6	720	7.6	4.6	910	37	**3.4 J**	**2.9 J**	**6.9 J**	**8.1 J**	**120**	**1300**
BARIUM	7440-39-3	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000	**54.3 J**	**55.9 J**	**535 J**	**1420 J**	**51**	**29**
BERYLLIUM	7440-41-7	51	4.6 (G)	1,300	410	51	590	1,600	<0.56 UJ	<0.56 UJ	<0.57 UJ	**0.41 J**	**0.570**	**0.480**
CADMIUM	7440-43-9	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100	**0.34 J**	**0.34 J**	**0.95 J**	**2.6 J**	**4.3**	**0.420**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	**2760**	**2360**	**4700**	**2840**	--	--
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)	**13.3 J-**	**10.5 J-**	**23.2 J-**	**62.0 J-**	**4600.000**	**35.000**
COBALT	7440-48-4	0.8	2.0	13,000	2,600	2.0	5,900	9,000	**6.5 J**	**7.1 J**	**7.1 J**	**6.3 J**	**53**	**69**
COPPER	7440-50-8	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000	**796**	**762**	**2170**	**935**	**76000**	**36000**
IRON	7439-89-6	12,000 (B)	NA	ID	160,000	12,000 (B)	ID	580,000	**10600**	**9370**	**24800**	**12300**	**210000**	**75000**
LEAD	7439-92-1	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)	**384**	**121**	**1530**	**1850**	**35**	**15**
LITHIUM	7439-93-2	9.8 (B)	9.8 (B)	2,300,000	4,200 (DD)	9.8 (B)	1,000,000	31,000 (DD)	--	--	--	--	--	--
MAGNESIUM	7439-95-4	8,000	NA	6,700,000	1,000,000 (D)	22,000	2,900,000	1,000,000 (D)	**3470**	**4940**	**4010**	**2690**	--	--
MANGANESE	7439-96-5	440 (B)	440 (B,G,X)	3,300	25,000	440 (B)	1,500	90,000	**135 J**	**189 J**	**225 J**	**228 J**	**1900**	**560**
MERCURY	7439-97-6	1.7 (Z)	0.13 (B, Z)	20,000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)	**0.056 J**	**0.058 J**	**0.59**	**1.4**	**0.400 J**	**0.380 J**
MOLYBDENUM	7439-98-7	1.5	2.4 (X)	ID	2,600	1.5	ID	9,600	--	--	--	--	**74000**	**140000**
NICKEL	7440-02-0	100	29 (G)	13,000	40,000	100	16,000	150,000	**17.6 J**	**18.1 J**	**23.4 J**	**19.3 J**	**260**	**500**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	**195 J**	**225 J**	**237 J**	**306 J**	--	--
SELENIUM	7782-49-2	4.0	0.41 (B)	130,000	2,600	4.0	59,000	9,600	<3.9 UJ	<3.9 UJ	**2.0 J**	**2.1 J**	**4.3**	<0.020 U
SILVER	7440-22-4	4.5	1.0 (M)	6,700	2,500	13	2,900	9,000	**R**	**R**	**0.90 J-**	**1.0 J-**	**49**	**220**
SODIUM	7440-23-5	NA	NA	NA	NA	NA	NA	NA	<558 U	<561 U	<565 U	<725 U	--	--
VANADIUM	7440-62-2	72	430	ID	750 (DD)	990	ID	5,500 (DD)	**14.7 J**	**22.4 J**	**11.9 J**	**15.9 J**	**87**	**65**
ZINC	7440-66-6	2,400	62 (G)	ID	170,000	5,000	ID	630,000	**57.7 J**	**67.2 J**	**834 J**	**743 J**	**170**	**41**
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)	<0.56 U	<0.56 U	<0.56 U	<0.72 U	--	--
Organics - PCBs (ug/kg)														
AROCLOR-1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	<38 U	<38 UJ	<38 U	<50 U	<100 U	<1400 U
AROCLOR-1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	<38 U	<38 UJ	<38 U	<50 U	<100 U	<1400 U
AROCLOR-1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	<38 U	<38 UJ	<38 U	<50 U	<100 U	<1400 U
TOTAL PCBS (J,T)	TPCB	NLL	NLL	5,200,000	1,000 (T)	NLL	6,500,000	1,000 (T)	ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/kg)														
2-METHYLNAPHTHALENE (SVOC)	91-57-6S	57,000	4,200	6.70E+08	8,100,000	170,000	2.90E+08	2.60E+07	<190 U	<190 U	<190 U	<260 U	--	--
ACENAPHTHENE	83-32-9	300,000	8,700	1.40E+10	4.10E+07	880,000	6.20E+09	1.30E+08	<190 U	<190 U	<190 U	<260 U	<210 U	<14000 U
ACENAPHTHYLENE	208-96-8	5,900	ID	2.30E+09	1.6E+06	17,000	1.00E+09	5,200,000	<190 U	<190 U	**170 J**	**340**	<210 U	<14000 U
ANTHRACENE	120-12-7	41,000	ID	6.70E+10	2.30E+08	41,000	2.90E+10	7.30E+08	<190 U	<190 U	**160 J**	**410**	<210 U	<14000 U
BENZALDEHYDE	100-52-7	NA	NA	NA	NA	NA	NA	NA	<190 U	<190 U	<190 U	<260 U	--	--
BENZO(A)ANTHRACENE	56-55-3	NLL	NLL	ID	20,000	NLL	ID	80,000	<190 U	<190 U	**1000**	**1500**	<210 U	<14000 U
BENZO(A)PYRENE	50-32-8	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)	<190 U	<190 U	**800**	**1100**	<410 U	<28000 U
BENZO(B)FLUORANTHENE	205-99-2	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)	**85 J**	<190 U	**610**	**1000**	<410 U	<28000 U
BENZO(G,H,I)PERYLENE	191-24-2	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.50E+08	7,000,000 (Q)	<190 U	<190 U	**650**	**810**	<410 U	<28000 U
BENZO(K)FLUORANTHENE	207-08-9	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)	**84 J**	**76 J**	**790**	**980**	<410 U	<28000 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	NLL	NLL	7.00E+08	2,800,000	NLL	8.90E+08	1.2E+07 (C)	<190 U	<190 U	<190 U	**110 J**	<520 U	<35000 U

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	SS-12 (2013 SI)		SS-13 (2013 SI)	SS-14 (2013 SI)	Waste 1 (2013 SI)	Waste 2 (2013 SI)
Field Sample ID									SS-12	SS-12D	SS-13	SS-14	W-1	W-2
Sample Date:									11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/5/2012	11/5/2012
Sample Interval (bgs):									0 - 0.67 ft	0 - 0.67 ft	0 - 0.67 ft	0 - 0.67 ft	0 - 0.33 ft	0 - 0.25 ft
Sample Description:									--	Field Duplicate	--	--	--	--
Organics - SVOCs (ug/kg) - continued														
CARBAZOLE	86-74-8	9,400	1,100	6.2E+07	530,000	39,000	7.8E+07	2,400,000	<190 U	<190 U	**150 J**	**220 J**	<520 U	<35000 U
CHRYSENE	218-01-9	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)	**90 J**	**92 J**	**1100**	**1800**	<210 U	<14000 U
DIBENZO(A,H)ANTHRACENE	53-70-3	NLL	NLL	ID	2,000 (Q)	NLL	ID	8,000 (Q)	<190 U	<190 U	**260**	**270**	<410 U	<28000 U
DIBENZOFURAN	132-64-9	ID	1,700	6,700,000	ID	ID	2.9E+06	ID	<190 U	<190 U	<190 U	<260 U	<520 U	<35000 U
DIETHYL PHTHALATE	84-66-2	110,000	2,200	3.3E+09	1.7E+08 (C)	320,000	1.50E+09	5.5E+08 (C)	<190 U	<190 U	<190 U	<260 U	<520 U	<35000 U
DI-N-BUTYLPHTHALATE	84-74-2	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)	<190 U	<190 U	<190 U	<260 U	<520 U	<35000 U
FLUORANTHENE	206-44-0	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08	**130 J**	**140 J**	**1900**	**2900**	<210 U	<14000 U
FLUORENE	86-73-7	390,000	5,300	9.3E+09	2.7E+07	890,000	4.1E+09	8.7E+07	<190 U	<190 U	<190 U	**120 J**	<210 U	<14000 U
INDENO(1,2,3-CD)PYRENE	193-39-5	NLL	NLL	ID	20,000	NLL	ID	80,000	<190 U	<190 U	**650**	**830**	<410 U	<28000 U
ISOPHORONE	78-59-1	15,000	6,200 (X)	1.2E+10	4,800,000 (C)	62,000	8.2E+09	2.2E+07 (C)	<190 U	<190 U	<190 U	<260 U	**260 J**	<14000 UJ
NAPHTHALENE (SVOC)	91-20-3S	35,000	730	2.0E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<190 U	<190 U	<190 U	<260 U	--	--
PHENANTHRENE	85-01-8	56,000	2,100	6.7E+06	1.6E+06	160,000	2.9E+06	5.2E+06	<190 U	<190 U	**310**	**1200**	<210 U	<14000 U
PYRENE	129-00-0	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07	**120 J**	**120 J**	**1400**	**2300**	<210 U	<14000 U
Organics - VOCs (ug/kg)														
1,2,3-TRIMETHYLBENZENE	526-73-8	NA	NA	NA	NA	NA	NA	NA	<60 U	<57 U	<65 U	<88 U	--	--
1,2,4-TRIMETHYLBENZENE (I)	95-63-6	2,100	570	8.2E+10	3.2E+07 (C)	2,100	3.6E+10	1E+08 (C)	<60 U	<57 U	<65 U	<88 U	--	--
1,3,5-TRIMETHYLBENZENE (I)	108-67-8	1,800	1,100	8.2E+10	3.2E+07 (C)	1,800	3.6E+10	1E+08 (C)	<60 U	<57 U	<65 U	<88 U	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6V	57,000	4,200	6.7E+08	8,100,000	170,000	2.9E+08	2.6E+07	<300 U	<280 U	<320 U	<440 U	<520 U	<35000 U
BENZENE (I)	71-43-2	100	240 (X)	3.8E+08	180,000	100	4.7E+08	840,000 (C)	<60 U	<57 U	<65 U	<88 U	--	--
ETHYLBENZENE (I)	100-41-4	1,500	360	1E+10	2.2E+07 (C)	1,500	1.3E+10	7.1E+07 (C)	<60 U	<57 U	<65 U	<88 U	--	--
M,P-XYLENE	1330-20-7	NA	NA	NA	NA	NA	NA	NA	<120 U	<110 U	<130 U	**340**	--	--
NAPHTHALENE (VOC)	91-20-3V	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07	<300 UJ	<280 UJ	<320 UJ	<440 UJ	<210 U	<14000 U
O-XYLENE	95-47-6	NA	NA	NA	NA	NA	NA	NA	<60 U	<57 U	<65 U	**160**	--	--
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	<60 U	<57 U	<65 U	<88 U	--	--
TOLUENE (I)	108-88-3	16,000	5,400	2.7E+10	5E+07 (C)	16,000	1.2E+10	1.6E+08 (C)	<60 U	<57 U	**90 J**	**430**	--	--
XYLENE - TOTAL (I)	--	5,600	820	2.9E+11	4.1E+08 (C)	5,600	1.3E+11	1E+09	ND	ND	ND	**500**	--	--
Organics - Pesticides (ug/kg)														
4,4'-DDE	72-55-9	NLL	NLL	3.20E+07	45,000	NLL	4.00E+07	190,000	<3.8 U	<3.8 UJ	<3.8 U	<5.0 U	--	--
4,4'-DDT	50-29-3	NLL	NLL	3.20E+07	57,000	NLL	4.00E+07	280,000	<3.8 U	<3.8 UJ	**6.2 J**	<5.0 U	--	--
beta-BHC	319-85-7	37	ID	5.90E+06	5,400	150	NLV	25,000	<1.9 U	<1.9 UJ	<1.9 U	<2.6 U	--	--
Dieldrin	60-57-1	NLL	NLL	680,000	1,100	NLL	850,000	4,700	<3.8 U	<3.8 UJ	<3.8 U	<5.0 U	--	--
Endrin	72-20-8	NLL	NLL	ID	6,500	NLL	ID	190,000	<3.8 U	<3.8 UJ	<3.8 U	<5.0 U	--	--
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	NA	NA	NA	<3.8 U	<3.8 UJ	<3.8 U	<5.0 U	--	--
Endrin ketone	53494-70-5	NA	NA	NA	NA	NA	NA	NA	<3.8 U	<3.8 UJ	<3.8 U	<5.0 U	--	--
Methoxychlor	72-43-5	16,000	NA	ID	1.90E+06	16,000	ID	5.60E+06	<19 U	<19 UJ	<19 U	<26 U	--	--
Asbestos														
									--	--	--	--	--	--
Other (mg/kg)														
HEM Oil and Grease		NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--

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

TABLE 6-2
Sample Analytical Summary - Soil
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Soil Table Footnotes:

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

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

-- = Not analyzed/Not Reported
bgs = Below ground surface
ft = Feet
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.

(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.

(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
R = Rejected result
U = Analyte analyzed for but not detected above the reported sample reporting limit.

TABLE 6-3
Sample Analytical Summary - Groundwater
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHTC-GW13	CHTC-GW14	CHTC-GW17	CHTC-GW20		CHTC-GW23
Field Sample ID									CHTC-GW-13-14'-19'	CHTC-GW-14-8'-13'	CHTC-GW-17-16'-21'	CHTC-GW-20-8'-13'	CHTC-GW-20-8'-13'-DUP	CHTC-GW-23-16'-21'
Sample Date									5/14/2015	5/14/2015	5/15/2015	5/15/2015	5/15/2015	5/16/2015
Sample Interval (bgs)									14 - 19 ft	8 - 13 ft	16 - 21 ft	8 - 13 ft	8 - 13 ft	16 - 21 ft
Sample Description									--	--	--	--	Field Duplicate	--
Inorganics - Metals (ug/l)														
ARSENIC	7440-38-2	10 (A)	10 (A)	10	NLV	NLV	NA	ID	--	--	--	--	--	--
BARIUM	7440-39-3	2,000 (A)	2,000 (A)	200 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
CHROMIUM	7440-47-3	100 (A,H)	100 (A,H)	40 (G,H,X)	NLV	NLV	NA	ID	--	--	--	--	--	--
COBALT	7440-48-4	40	100	100	NLV	NLV	NA	ID	--	--	--	--	--	--
COPPER	7440-50-8	1,000 (E)	1,000 (E)	4.7 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--
IRON	7439-89-6	300 (E)	300 (E)	NA	NLV	NLV	NA	ID	--	--	--	--	--	--
LEAD	7439-92-1	4.0 (L)	4.0 (L)	11 (G,X)	NLV	NLV	NA	ID	--	--	--	--	--	--
MAGNESIUM	7439-95-4	400,000	1,100,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--
MANGANESE	7439-96-5	50 (E)	50 (E)	1,000 (G,X)	NLV	NLV	NA	ID	--	--	--	--	--	--
NICKEL	7440-02-0	100 (A)	100 (A)	28 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
SELENIUM	7782-49-2	50 (A)	50 (A)	5.0	NLV	NLV	NA	ID	--	--	--	--	--	--
SODIUM	7440-23-5	230, 000 (HH)	350,000	NA	NLV	NLV	NA	ID	--	--	--	--	--	--
VANADIUM	7440-62-2	4.5	62	27	NLV	NLV	NA	ID	--	--	--	--	--	--
ZINC	7440-66-6	2,400	5,000 (E)	63 (G)	NLV	NLV	NA	ID	--	--	--	--	--	--
Inorganics - Cyanide														
									--	--	--	--	--	--
Organics - PCBs														
									ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/l)														
BENZO(A)ANTHRACENE	56-55-3	2.1	8.5	ID	NLV	NLV	9.4	ID	<1.0 U	<1.0 UJ	<1.0 U	<1.0 U	<1.0 U	**1.2**
CHRYSENE	218-01-9	1.6 (S)	1.6 (S)	ID	ID	ID	1.6	ID	<1.0 U	<1.0 UJ	<1.0 U	<1.0 U	<1.0 U	**1.3**
Organics - VOCs (ug/l)														
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 UJ	<1.0 U	**15**
Organics - Pesticides														
									--	--	--	--	--	--
Other (mg/L)														
Chloride		250 (E)	250 (E)	(FF)	NLV	NLV	NA	ID	**6.2**	<10 U	--	--	--	--
Sulfate		250 (E)	250 (E)	NA	NLV	NLV	NA	ID	**9.0**	**7.0**	--	--	--	--
Field Measurements														
Conductivity (mS/cm)	NA	NA	NA	NA	NA	NA	NA	NA	**0.163**	**0.152**	--	--	--	--
pH	NA	NA	NA	NA	NA	NA	NA	NA	**7.86**	**9.89**	--	--	--	--
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	**9.4**	**10.6**	--	--	--	--

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

TABLE 6-3
Sample Analytical Summary - Groundwater
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Station Name	CAS Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	CHTC-GW25	TMW-01 (2013 SI)	TMW-02 (2013 SI)	TMW-02 (2013 SI)	TMW-03 (2013 SI)	TMW-05 (2013 SI)
Field Sample ID									CHTC-GW-25-22'-27'	TMW-01	TMW-02	TMW-02D	TMW-03	TMW-05
Sample Date									5/16/2015	11/6/2012	11/5/2012	11/5/2012	11/5/2012	11/6/2012
Sample Interval (bgs)									22 - 27 ft	12.75 - 17.75 ft	11.16 - 16.16 ft	11.16 - 16.16 ft	11.82 - 16.82 ft	23.23 - 28.23 ft
Sample Description									--	--	--	Field Duplicate	--	--
Inorganics - Metals (ug/l)														
ARSENIC	7440-38-2	10 (A)	10 (A)	10	NLV	NLV	NA	ID	--	<1.0 U	**1.5**	**1.5**	<1.0 U	<1.0 U
BARIUM	7440-39-3	2,000 (A)	2,000 (A)	200 (G)	NLV	NLV	NA	ID	--	**110**	**174**	**175**	**69.5**	**95.9**
CALCIUM	7440-70-2	NA	NA	NA	NA	NA	NA	NA	--	**63300**	**42500**	**44000**	**44400**	**52300**
CHROMIUM	7440-47-3	100 (A,H)	100 (A,H)	40 (G,H,X)	NLV	NLV	NA	ID	--	<2.0 U	**1.3 J**	**1.4 J**	<2.0 U	<2.0 U
COBALT	7440-48-4	40	100	100	NLV	NLV	NA	ID	--	<1.0 U	**0.69 J**	**0.72 J**	<1.0 U	<1.0 U
COPPER	7440-50-8	1,000 (E)	1,000 (E)	4.7 (G)	NLV	NLV	NA	ID	--	**2.4**	**8.0**	**8.5**	**12.6**	**2.2**
IRON	7439-89-6	300 (E)	300 (E)	NA	NLV	NLV	NA	ID	--	**289 J+**	**6260**	**6490**	**101 J+**	**122 J+**
LEAD	7439-92-1	4.0 (L)	4.0 (L)	11 (G,X)	NLV	NLV	NA	ID	--	<1.0 U	**0.24 J**	**0.41 J**	<1.0 U	<1.0 U
MAGNESIUM	7439-95-4	400,000	1,100,000	NA	NLV	NLV	NA	ID	--	**12700**	**9100**	**9450**	**8840**	**6080**
MANGANESE	7439-96-5	50 (E)	50 (E)	1,000 (G,X)	NLV	NLV	NA	ID	--	**114**	**1380**	**1340**	**420**	**21.0**
NICKEL	7440-02-0	100 (A)	100 (A)	28 (G)	NLV	NLV	NA	ID	--	**1.2**	**1.6**	**0.86 J**	**0.49 J**	**0.73 J**
POTASSIUM	7440-09-7	NA	NA	NA	NA	NA	NA	NA	--	**2090 J**	**4880 J**	**5060**	**2360 J**	**5260**
SELENIUM	7782-49-2	50 (A)	50 (A)	5.0	NLV	NLV	NA	ID	--	<5.0 U	**1.3 J**	**1.2 J**	<5.0 U	**1.2 J**
SODIUM	7440-23-5	230, 000 (HH)	350,000	NA	NLV	NLV	NA	ID	--	**26200**	**48600**	**51000**	**22200**	**39300**
VANADIUM	7440-62-2	4.5	62	27	NLV	NLV	NA	ID	--	**3.7 J**	**5.9**	**5.9**	**2.3 J**	**1.6 J**
ZINC	7440-66-6	2,400	5,000 (E)	63 (G)	NLV	NLV	NA	ID	--	**2.1 J+**	**2.3 J+**	**2.9 J+**	<2.0 U	<2.0 U
Inorganics - Cyanide														
									--	ND	ND	ND	ND	ND
Organics - PCBs														
									ND	ND	ND	ND	ND	ND
Organics - SVOCs (ug/l)														
BENZO(A)ANTHRACENE	56-55-3	2.1	8.5	ID	NLV	NLV	9.4	ID	--	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U
CHRYSENE	218-01-9	1.6 (S)	1.6 (S)	ID	ID	ID	1.6	ID	--	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U
Organics - VOCs (ug/l)														
P-ISOPROPYL TOLUENE (p-CYMENE)	99-87-6	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Organics - Pesticides														
									--	ND	ND	ND	ND	ND
Other (mg/L)														
Chloride		250 (E)	250 (E)	(FF)	NLV	NLV	NA	ID	--	--	--	--	--	--
Sulfate		250 (E)	250 (E)	NA	NLV	NLV	NA	ID	--	--	--	--	--	--
Field Measurements														
Conductivity (mS/cm)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
pH	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--
Temperature (°C)	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--

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

TABLE 6-3
Sample Analytical Summary - Groundwater
Tamarack Processing Area
Abandoned Mining Wastes - Torch Lake Non-Superfund Site

Groundwater Table Footnotes:

- MDEQ Part 201 residential and non-residential generic cleanup criteria and screening levels criteria were originally promulgated December 21, 2002 within the Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. This table reflects revisions to the criteria pursuant to the December 2010 Part 201 amendments and new criteria consistent with the provisions of R299.5706a.Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Release Date: December 30, 2013.

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

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

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

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

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

Groundwater Table Footnotes:

ID = Insufficient data to develop criterion.

NA = A criterion or value is not available

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

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

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

(FF) = The chloride GSI criterion shall be 125 mg/l when the discharge is to surface waters of the state designated as public water supply sources or 50 mg/l when the discharge is to the Great Lakes or connecting waters. Chloride GSI criteria shall not apply for surface waters of the state that are not designated as a public water supply source, however, the total dissolved solids criterion is applicable.

(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.

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

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

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

(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.)

Laboratory Footnotes:

ND = Not detected

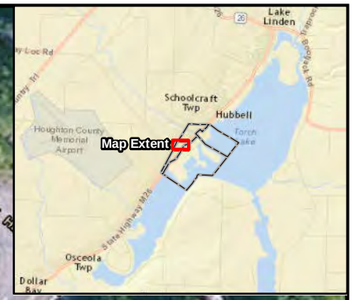
J = Estimated result

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

SECTION 6

DETAILED FINDINGS REPORT – TAMARACK PROCESSING AREA FIGURES

Image Source: ESRI World Imagery (NAIP 2014)



Tamarack Hill Rd
Conglomerate St
N Anvordsfield St
Maple St
Spruce St
Tamarack Hill Rd
Oneco Rd
Junction Rd
M-26
51539
51689
26298
51435

SS-01
SS-13
SS-11
CHTC-ASBBLK02A
CHTC-ASBBLK02C
CHTC-ASBBLK02B
CHTC-ASBBLK03A
CHTC-ASBBLK03B
CHTC-ASBBLK06A
SB-01
CHTC-ASBBLK05B
CHTC-ASBBLK04B
CHTC-ASBBLK03C
CHTC-ASBBLK04A
CHTC-ASBBLK05C
SS-10
CHTC-ASBBLK04C
CHTC-ASBBLK05A
CHTC-SB16
SS-08
CHTC-SB17
CHTC-GW13
CHTC-SS06
CHTC-SB18
CHTC-GW14
SB-11
SS-09
CHTC-SS05
CHTC-ASBBLK01A
CHTC-ASBBLK01B
CHTC-ASBBLK01C
CHTC-SS04
CHTC-SS03
SS-12
CHTC-SS07
CHTC-DM01
CHTC-SB19
SB-12
CHTC-DM02
SS-14
CHTC-SB20
SB-09
CHTC-SS02
SB-06
TMW-02
SB-05
TMW-03
SS-06
CHTC-SS08
SS-07
CHTC-SB21

Sampling Location Type

- Bulk Asbestos
- Abandoned Containers
- Soil
- Groundwater

Conceptual Site and Geographic Area Boundaries

N

0 100 Ft

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
WESTON SOLUTIONS of MICHIGAN, INC
P.O. Box 577
Houghton, MI 49931

Figure 6-1a
Sampling Location Map
Tamarack Processing Area - Tamarack Reclamation Plant Complex
Tamarack City, Houghton County, Michigan

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Image Source: ESRI World Imagery (NAIP 2014)

CHTC-DM04
CHTC-SS09
CHTC-DM03
CHTC-SS10
CHTC-SB24
CHTC-ASBBLK07A
CHTC-ASBBLK08A
CHTC-ASBBLK08B
CHTC-SB23
W-2
SS-05
CHTC-SS12
TMW-01
W-1
SB-03
SS-04
SB-04
CHTC-ASBBLK07C
CHTC-ASBBLK07B
CHTC-ASBBLK08C
CHTC-SB27
SB-08
CHTC-SB25
CHTC-GW20
CHTC-SB22
CHTC-GW17
TMW-05
CHTC-SB26
SB-02
SS-03
CHTC-SB28
CHTC-GW23
SS-02
CHTC-SB32
SB-10
CHTC-SB30
CHTC-GW25
CHTC-SB31

51400 N Amygdaloid St
Junction Rd
Junction Rd
51499
51399 M-26
Red Metal Cir
51101 S Amygdaloid Rd
Osceola Hill Rd
M-26
26

Lake Linden
Schoolcraft Twp
Hubbell
Houghton County Memorial Airport
Map Extent
Osceola Twp
Dollar Bay

Sampling Location Type

- Bulk Asbestos
- Abandoned Containers
- Soil
- Groundwater
- Waste
- Conceptual Site and Geographic Area Boundaries

N

0 150 Ft

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
WESTON SOLUTIONS of MICHIGAN, INC
P.O. Box 577
Houghton, MI 49931

Figure 6-1b
Sampling Location Map
Tamarack Processing Area - Tamarack Stamp Mill Complex
Tamarack City, Houghton County, Michigan

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Image Source: ESRI World Imagery - (NAIP 2014)

CHTC-ASBBLK05A 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	5	%	[1%]

CHTC-ASBBLK04C 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	20	%	[1%]

CHTC-ASBBLK04B 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	20	%	[1%]

CHTC-ASBBLK04A 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	20	%	[1%]

CHTC-ASBBLK01 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	30	%	[1%]

CHTC-ASBBLK05B 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	2	%	[1%]

CHTC-ASBBLK05C 06/29/15

Parameter	Result	Units	[Criteria]
ASBESTOS-CHRYSOTILE	5	%	[1%]

CHTC-DM02 08/20/15

Parameter	Result	Units	[Criteria]
ARSENIC	530	mg/kg	[10,17]
COPPER	27000	mg/kg	[10]

CHTC-DM04 08/20/15

Parameter	Result	Units	[Criteria]
ARSENIC	350	mg/kg	[10,17]
COPPER	59000	mg/kg	[10]
CYANIDE	0.26	mg/kg	[2]

CHTC-DM03 08/20/15

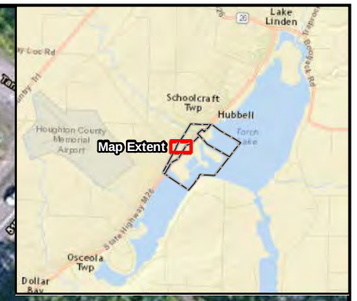
Parameter	Result	Units	[Criteria]
ARSENIC	420	mg/kg	[10,17]
COPPER	74000	mg/kg	[10,16,17]

W-2 11/05/12

Depth	Parameter	Result	Units	[Criteria]
0-0.25	ARSENIC	1300	mg/kg	[9,10,16,17]
0-0.25	COPPER	36000	mg/kg	[10]

W-1 11/05/12

Depth	Parameter	Result	Units	[Criteria]
0-0.33	ARSENIC	120	mg/kg	[10,17]
0-0.33	COPPER	76000	mg/kg	[10,16,17]
0-0.33	IRON	210000	mg/kg	[10]
0-0.33	MANGANESE	1900	mg/kg	[16]



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
* Exceedances of criteria 2, 4, and 11 shown for organics and cyanide only

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Locations are included within a different geographical area boundary

Locations Analyzed for PCBs

- No Detections
- At Least One Detection
- Conceptual Site and Geographic Area Boundaries

Notes:
mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram

N

0 125 Ft

Coordinate System: MIGeoRef(m)

FILE: J:\GIS_Projects\MDEQ\20177.001.001_Torch_Lake\mxd\2016_CHTC_SI_Report\Sec06-TProcessing\Fig06-2_TP_Misc_Exceeds_v20160301.mxd 10:05:36 AM 3/1/2016 BROWNK

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
WESTON SOLUTIONS of MICHIGAN, INC
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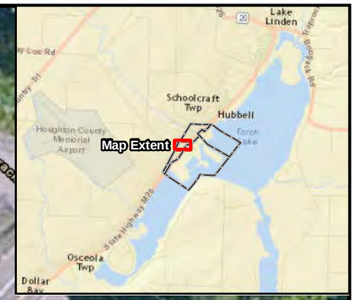
Houghton, MI 49931

Figure 6-2
Sample Analytical Result Map - Building Materials, Containers, and Wastes
Tamarack Processing Area
Tamarack City, Houghton County, Michigan

Image Source: ESRI World Imagery - (NAIP 2014)



XRF123 XRF122 XRF137 XRF120 XRF121 XRF124 XRF-57 XRF101 XRF99 XRF138 XRF100 XRF98 XRF-56 XRF119 XRF118 XRF102 XRF-58 XRF139 XRF97 XRF103 XRF140 XRF125 XRF104 XRF117 XRF96 XRF136 XRF116 XRF105 XRF-59 XRF141 XRF113 XRF111 XRF110 XRF106 XRF95 XRF135 XRF115 XRF94 XRF130 XRF129 XRF114 XRF109 XRF79 XRF93 XRF131 XRF108 XRF92 XRF112 XRF134 XRF-55 XRF107 XRF80 XRF132 XRF128 XRF78 XRF77 XRF133 XRF91 XRF127 XRF81 XRF126 XRF76 XRF89 XRF83 XRF90 XRF-61 XRF-63 XRF-60 XRF-62 XRF74 XRF88 XRF75 XRF87

Tamarack Hill Rd
Tamarack Hill Rd
26298
Maple St
Tamarack
Conglomerate St
Conglomerate St
N Amygdaloid St
N Amygdaloid St
51689
51689
Spruce St
Onsco Rd
M-26
M-26
41X35
Junction Rd

Locations Screened for Metals - At least one exceedance of:

- Residential Direct Contact Criteria
- Residential Particulate Soil Inhalation Criteria
- Non Residential Direct Contact Criteria
- Non Residential Particulate Soil Inhalation Criteria

- Screening locations with no exceedances
- Locations are included within a different geographical area boundary
- Conceptual Site and Geographic Area Boundaries

Xray Fluorescence screening results are from surface soils unless otherwise specified.

N

0 100 Ft

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
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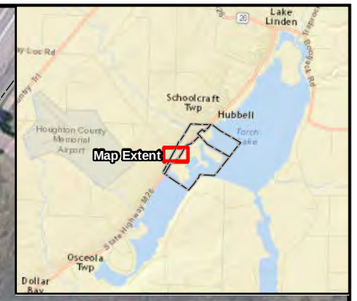
Figure 6-3a
Soil Screening Results Map - Soil
Tamarack Processing Area - Tamarack Reclamation Plant Complex
Tamarack City, Houghton County, Michigan

FILE: J:\GIS_Projects\MDEQ\20177.001.001_Torch_Lake\mxd\2016_CHTC_SI_Report\Sec06-TProcessing\Fig06-3a_TP_XRF_v20160201.mxd 12:30:17 PM 3/1/2016 BROWNK

Image Source: ESRI World Imagery (NAIP 2014)



XRF61 XRF60 XRF84 XRF62 XRF63 XRF59 XRF64 XRF85 XRF65 XRF54 XRF58 XRF73 XRF66 XRF57 XRF55 XRF72 XRF67 XRF53 XRF47 XRF44 XRF68 XRF56 XRF45 XRF52 XRF46 XRF43 XRF51 XRF48 XRF69 XRF70 XRF49 XRF42 XRF71 XRF50 XRF40 XRF41 XRF19 XRF17 XRF18 XRF15 XRF16 XRF13 XRF21 XRF14 XRF37 XRF04 XRF20 XRF39 XRF05 XRF-64 XRF22 XRF36 XRF38 XRF12 XRF35 XRF11 XRF23 XRF34 XRF24 XRF25 XRF33 XRF27 XRF26 XRF-68 XRF10 XRF09 XRF06 XRF-66 XRF08 XRF28 XRF-67 XRF29 XRF-65 XRF07 XRF31 XRF32 XRF30

51400 N Amygdaloid St
Junction Rd
Junction Rd
51499
51399 M-26
Red Metal Cir
51101 S Amygdaloid Rd
Osceola Hill Rd
M-26
26
26

Locations Screened for Metals - At least one exceedance of:

- Residential Direct Contact Criteria
- Residential Particulate Soil Inhalation Criteria
- Non Residential Direct Contact Criteria
- Non Residential Particulate Soil Inhalation Criteria
- Screening locations with no exceedances
- Locations are included within a different geographical area boundary
- Conceptual Site and Geographic Area Boundaries

Xray Fluorescence screening results are from surface soils unless otherwise specified.

N

0 150 Ft

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
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Figure 6-3b
Soil Screening Results Map - Soil
Tamarack Processing Area - Tamarack Stamp Mill Complex
Tamarack City, Houghton County, Michigan

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Image Source: ESRI World Imagery - (NAIP 2014)

SS-13 11/06/12

Depth	Parameter	Result	Units	[Criteria]
0-0.67	LEAD	1530	mg/kg	[10,17]

SS-10 11/06/12

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	14.6 J	mg/kg	[10]
0-0.5	LEAD	8260	mg/kg	[10,17]

SS-14 11/06/12

Depth	Parameter	Result	Units	[Criteria]
0-0.67	ARSENIC	8.1 J	mg/kg	[10]
0-0.67	LEAD	1850	mg/kg	[10,17]

CHTC-SS02 08/20/15

Depth	Parameter	Result	Units	[Criteria]
0.25-0.75	CYANIDE	0.42	mg/kg	[2]

CHTC-SS-09 08/20/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	490	mg/kg	[10,17]
0-0.5	CYANIDE	0.22	mg/kg	[2]
0-0.5	COPPER	74000	mg/kg	[10,16,17]
0-0.5	LEAD	480	mg/kg	[10]

CHTC-SS10 08/20/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	370	mg/kg	[10,17]
0-0.5	COPPER	68000	mg/kg	[10,16]
0-0.5	LEAD	540	mg/kg	[10]

SB-08 11/06/12

Depth	Parameter	Result	Units	[Criteria]
1.83-2.83	BENZO(A)PYRENE	5200	ug/kg	[10]
1.83-2.83	CARBAZOLE	1800	ug/kg	[2]
1.83-2.83	DIBENZO(A,H)ANTHRACENE	2100	ug/kg	[10]
1.83-2.83	FLUORANTHENE	7000	ug/kg	[2]
1.83-2.83	NAPHTHALENE (SVOC)	830	ug/kg	[2]
1.83-2.83	PHENANTHRENE	8100	ug/kg	[2]

SS-02 11/05/12

Depth	Parameter	Result	Units	[Criteria]
0-0.75	ARSENIC	13.1 J	mg/kg	[10]
0-0.75	ARSENIC (DUP)	15.9 J	mg/kg	[10]

SS-11 11/06/12

Depth	Parameter	Result	Units	[Criteria]
0-0.67	ARSENIC	9.8 J	mg/kg	[10]

CHTC-SS05 08/20/15

Depth	Parameter	Result	Units	[Criteria]
0.25-0.75	LEAD	410	mg/kg	[10]

SS-08 11/06/12

Depth	Parameter	Result	Units	[Criteria]
0-0.083	ARSENIC	15.8 J	mg/kg	[10]
0-0.083	COPPER	21500	mg/kg	[10]
0-0.083	LEAD	2000	mg/kg	[10,17]
0-0.083	BENZO(A)PYRENE	3200	ug/kg	[10]
0-0.083	PHENANTHRENE	2200	ug/kg	[2]

CHTC-SB18 5/14/2015

Depth	Parameter	Result	Units	[Criteria]
0.5-6.0	HEM Oil and Grease	1800	mg/kg	[--]

CHTC-SS07 08/20/15

Depth	Parameter	Result	Units	[Criteria]
0.25-0.75	CYANIDE	12 J	mg/kg	[2,4,11]
0.25-0.75	LEAD	3300	mg/kg	[10,17]

SS-04 11/05/12

Depth	Parameter	Result	Units	[Criteria]
0-0.125	ARSENIC	8.2 J	mg/kg	[10]
0-0.125	COPPER	124000	mg/kg	[10,16,17]
0-0.125	LEAD	5680	mg/kg	[10,17]
0-0.125	TOTAL PCBS	3630	ug/kg	[10,17]

SS-05 11/05/12

Depth	Parameter	Result	Units	[Criteria]
0-0.42	ARSENIC	434 J	mg/kg	[10,17]
0-0.42	COPPER	316000	mg/kg	[9,10,16,17]
0-0.42	LEAD	448	mg/kg	[10]

CHTC-SS12 08/20/15

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	39	mg/kg	[10,17]
0-0.5	COPPER	35000	mg/kg	[10]

SS-03 11/05/12

Depth	Parameter	Result	Units	[Criteria]
0-0.5	ARSENIC	8.2 J	mg/kg	[10]
0-0.5	LEAD	504	mg/kg	[10]
0-0.5	BENZO(A)PYRENE	4500	ug/kg	[10]
0-0.5	FLUORANTHENE	8900	ug/kg	[2]
0-0.5	PHENANTHRENE	9200	ug/kg	[2]

Map Extent

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
-- No criteria exists for HEM Oil and Grease. Postive detections are shown
* Exceedances of criteria 2, 4, and 11 shown for organics and cyanide only

- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Locations are included within a different geographical area boundary

Locations Analyzed for PCBs

- No Detections
- At Least One Detection
- Conceptual Site and Geographic Area Boundaries

Notes:
MG/KG = milligrams per kilogram
UG/KG = micrograms per kilogram
Sample depths shown in feet below ground surface.

N

0 250 Ft

Coordinate System: MIGeoRef(m)

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
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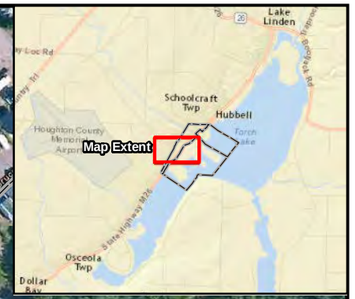
Houghton, MI 49931

Figure 6-4
Sample Analytical Result Map - Soil
Tamarack Processing Area
Tamarack City, Houghton County, Michigan

FILE: J:\GIS_Projects\MDEQ\20177.001.001_Torch_Lake\mxd\2016_CHTC_SI_Report\Sec06-TProcessInFir\06-4 TP_Soil_Exceeds_v20160301.mxd 1:12:56 PM, 3/1/2016 BROWNK

Image Source: ESRI World Imagery - (NAIP 2014)



- Sampling locations with at least one exceedance
- Sampling locations with no exceedances
- Locations are included within a different geographical area boundary

Locations Analyzed for PCBs

- No Detections
- At Least One Detection
- Conceptual Site and Geographic Area Boundaries

N

0 250 Ft

Coordinate System: MIGeoRef(m)

MDEQ Part 201 Cleanup Criteria for Response Action
1*=Residential Drinking Water Criteria
2*=Nonresidential Drinking Water Criteria
3*=Groundwater Surface Water Interface Criteria
4=Water Solubility
5=Residential Groundwater Vol to Indoor Air Inhalation
6=Nonresidential Groundwater Vol to Indoor Air Inhalation
7=Flammability and Explosivity Screening Level
* Exceedances of criteria 1, 2, and 3 are shown for organics only

Prepared for:
Michigan Department of Environmental Quality

Prepared By:
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Houghton, MI 49931

Figure 6-5
Sample Analytical Result Map - Groundwater
Tamarack Processing Area
Tamarack City, Houghton County, Michigan

FILE: J:\GIS_Projects\MDEQ\20177.001.001_Torch_Lake\mxd\2016_CHTC_SI_Report\Sec06-TProcessing\Fig06-5_TP_GW_Exceeds_v20160301.mxd 1:20:15 PM 3/1/2016 BROWNK