TETRA TECH

JEFFREY S. BINKLEY
PROJECT MANAGER

January 29, 2018

Mr. Brian Kelly
On-Scene Coordinator
U.S. Environmental Protection Agency Region 5
9311 Groh Road
Gross Ile, MI 48138-1697

Subject: **Removal Assessment Report**
C&H Mineral Building - RS Site
EPA Contract No.: EP-S5-13-01
Technical Direction Document No.: S05-0001-1711-007
Document Tracking No.: 2255B

Dear Mr. Kelly:

The Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) is submitting this Removal Assessment Report for the Calumet and Hecla (C&H) Mineral Building - RS Site. This report summarizes (1) the findings of a review of existing information and (2) sampling of building material and waste piles completed by START per the Field Sampling and Analysis Plan.

If you have any questions regarding this report, please contact me at (906) 281-3404.

Sincerely,

Jeffrey S. Binkley
The Mannik & Smith Group (Subcontractor of Tetra Tech) Project Manager

Enclosure

cc: TDD File
Kevin Scott, Tetra Tech Program Manager

Tetra Tech, Inc.
1 South Wacker Dr. Suite 3700, Chicago, IL 60606
Tel 312.201.7772 | Fax 312.201.0031
www.tetratech.com

REMOVAL ASSESSMENT REPORT
FOR
C&H MINERAL BUILDING – RS SITE
52986 HIGHWAY M-26
HUBBELL, HOUGHTON COUNTY, MICHIGAN

U.S. Environmental Protection Agency
Emergency Response Branch
Region 5
9311 Groh Road
Gross Ile, MI 48138-1697

Submitted by

Tetra Tech, Inc.
1 South Wacker Drive, 37th Floor
Chicago, IL 60606

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Prepared by:
Jeffrey S. Binkley
Project Manager

Approved by:
John Dirgo
START QC Reviewer

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1.0 INTRODUCTION

Under the Superfund Technical Assessment and Response Team (START) Contract No. EP-S5-13-01, U.S. Environmental Protection Agency (EPA) Region 5 tasked Tetra Tech, Inc. (Tetra Tech) to prepare a removal assessment report for the Calumet & Hecla (C&H) Mineral Building – RS Site in Hubbell, Houghton County, Michigan. The purpose of the removal assessment was to evaluate the potential for threats to human health and/or the environment to assess the necessity for a removal action.

Under Technical Direction Document (TDD) No. S05-0001-1711-007, Tetra Tech START performed the following activities during this assessment:

- Prepared a Sampling and Analysis Plan (SAP) (Tetra Tech 2017).
- Prepared a Site Health and Safety Plan.
- Conducted written logbook documentation activities in accordance with Tetra Tech Standard Operating Procedure (SOP) No. 024, "Recording Notes in Field Logbooks" (Tetra Tech 2014).
- Collected samples of building material and waste piles in accordance with the site-specific SAP (Tetra Tech 2017).
- Documented prior asbestos containing building material (ACBM) recovery efforts and provided photodocumentation of post-recovery site conditions (Tetra Tech 2018).
- Reviewed existing analytical data and background information from multiple state and federal agencies.
- Compared existing and START analytical data to applicable screening levels.

Section 2.0 of this removal assessment report discusses the site location and site history; Section 3.0 discusses the field investigation; Section 4.0 discusses the screening levels, summarizes the existing information review findings, and evaluates the existing and START data; and, Section 5.0 presents conclusions and recommendations. All references cited in this report are listed after the text. Site tables are attached following the reference list, and Appendix A contains figures. Appendix B provides the Michigan Department of Environmental Quality Remediation and Redevelopment (DEQ RRD) request for EPA assistance. A waste pile Photographic Documentation Log is provided in Appendix C.

2.0 SITE BACKGROUND

This section describes the Site location and summarizes its history.

2.1 SITE LOCATION

The Site, an unused vacant mining era industrial property owned by Silver Shores Enterprises, is located at 52986 Highway M-26 in Hubbell, Houghton County, Michigan. The general location of the Site is depicted on Figure 1 in Appendix A. Two mining era structures are present at the Site. The surface of the 9.28 acre Site property is mainly barren (except for an approximately 170 foot wide vegetated strip along Torch Lake) including 2.9 acres covered with 35 waste piles and stack debris.

The following table provides a summary of the waste piles and indicates for the sampled piles which regulatory screening criteria have been exceeded. Waste pile descriptions, depositional history, and potential management methods are further detailed later in the report.

	Site Screening Level				
	Exceedance of Screening Level				
	Toxicity Characteristic Leaching Procedure Test	**EPA Regulated Asbestos Containing Material**	**DEQ Particulate Soil Inhalation Criteria (asbestos)**	**EPA Industrial Removal Management Level**	**DEQ Non-Residential Direct Contact Criteria**
WP-01	NE	--	--	X	X
WP-02	--	--	--	X	X
WP-03	--	--	--	X	X
WP-04	--	--	--	--	--
WP-05	--	--	--	--	--
WP-06	--	--	--	--	--
WP-07	--	--	--	--	--
WP-08	--	--	--	--	--
WP-09	--	ND	ND	X	X
WP-10	--	--	--	NE	X
WP-12	--	--	--	--	--
WP-13	--	--	--	--	--
WP-14	--	--	--	--	--
WP-15	--	--	--	--	--
WP-16	--	--	--	--	--
WP-17	--	--	--	--	--
WP-18	--	--	--	--	--
WP-19	--	--	--	--	--

	Site Screening Level Exceedance of Screening Level				
	Toxicity Characteristic Leaching Procedure Test	**EPA Regulated Asbestos Containing Material**	**DEQ Particulate Soil Inhalation Criteria (asbestos)**	**EPA Industrial Removal Management Level**	**DEQ Non-Residential Direct Contact Criteria**
WP-20	--	--	--	--	--
WP-21	--	--	--	--	--
WP-22	--	--	--	--	--
WP-23	NE	X	X	X	X
WP-24	--	--	--	--	--
WP-25	--	--	--	--	--
WP-26	--	--	--	--	--
WP-27	X	X	X	X	X
WP-28	X	X	X	X	X
WP-29	--	--	--	--	--
WP-30	--	--	--	--	--
WP-31	--	--	--	--	--
WP-32	--	--	--	NE	NE
WP-33	--	--	--	--	--
WP-45	--	--	--	--	--
WP-46	--	--	--	--	--
WP-48	X	--	--	X	X
Stack Debris	X	X	X	X	X

-- Not sampled. ND Not detected. NE Not exceeded.

The Site is bordered to the northeast by a contiguous vacant mining era industrial property (coal dock), to the southwest by Koppers' Hubbell Plant, a contiguous mining era industrial property (smelter) currently used as a performance chemical manufacturing facility, to the northwest by the Michigan Department of Transportation (MDOT) Highway M-26 right of way (ROW) that includes a wide paved shoulder used heavily by local residents (beyond which there are single-family residences), and to the southeast by Torch Lake. A chain link fence has been established along the southwest and northwest Site property boundaries. The Site layout and proximal historic C&H mining era buildings and structures are depicted on Figure 2 in Appendix A.

2.2 TORCH LAKE SUPERFUND SITE HISTORY

Copper mining was extensive in Houghton and Keweenaw Counties in the Upper Peninsula of Michigan and formed the backbone of the regional economy and society. Copper ore milling and smelting operations

conducted from the mid-1860s to the 1960s included the importation, reprocessing, and smelting of various scrap metals in the later years of operation. Consistent with past industrial practices, Torch Lake served as a receptor for virtually all mining industry-related waste products, including tailings, slag, mine pumpage, and various chemicals including metal-bearing wastes, leaching and flotation agents (pine oil, creosotes, and xanthates), cupric ammonium carbonate, and other mining byproducts. At least 20 percent of Torch Lake's volume is estimated to be filled with tailings and other waste products.

Beyond capping a strip of the Site property surface bordering Torch Lake, no EPA remedial actions have been implemented at the Site. Tamarack City Torch Lake EPA Superfund Site as-built drawings (USDA NRCS 2001) indicate that the vegetated cap along Torch Lake located on the Site property (and the adjacent former smelter property) was placed as part of the Torch Lake Superfund Site Hubbell/Tamarack remedial action. The Torch Lake Superfund Site Five-Year Review Report (EPA 2013) indicated that construction was completed in 2000 and that the Hubbell/Tamarack City parcel was deleted from the NPL in 2004. The capped areas are subject to an on-going DEQ operation and maintenance plan. The balance of the Site property and former smelter property and adjacent coal dock were not addressed as part of the Torch Lake Superfund Site remedial action.

2.3 SITE HISTORY

The Site property was previously (until circa late 1960s) a portion of the C&H Mining Company beneficiation and reclamation industrial complex that includes the Mineral Building and a portion of the ruins of the C&H smelter facility. Two mining era structures are present at the Site. Construction of the approximately 290 by 80 foot, nearly four story tall Mineral Building was completed in 1929, and it had a reinforced concrete foundation and compartment walls for mineral storage, including 10 main compartments for 15,000 tons of material and a 7.5 ton overhead electric crane carrying a clam shall bucket for handling the mineral (MTU 2014). The second structure is an approximately 30 by 40 foot single story building of sandstone construction.

Located adjacent to the northeast and southwest of the Site were the related C&H coal dock and smelter, respectively. Further to the northeast in the Village of Lake Linden, the C&H industrial complex included regrinding, leaching, flotation plant, stamping, and power generation operations. The Mineral Building received the processed copper ore from the C&H stamp mills. The copper ore was sorted and stored in the

Mineral Building prior to transfer to the C&H smelter for additional processing. The Site layout and proximal historic C&H mining era buildings and structures are depicted on Figure 2 in Appendix A.

C&H was incorporated in 1871 in Michigan as a consolidation of the Hecla, Calumet, Portland, and Scott Mining companies. C&H grew by buying and merging with neighboring copper mines and, in 1923, was renamed the Calumet & Hecla Consolidated Copper Company, which essentially controlled all the operating mines north of Hancock, Michigan. C&H reincorporated in 1952 as Calumet & Hecla, Inc., dropping any specific reference to being a mining company. On April 30, 1968, Universal Oil Products Company merged with Calumet & Hecla, Inc., and operated it as a subsidiary named Calumet & Hecla Corp.

Reclamation of copper from scrap electrical materials occurred within the C&H industrial complex in Hubbell, including the Site property, and the C&H leaching plant in Lake Linden from about 1940 until 1968, when the mines and mills closed (EPA 2012a). Workers in the smelter reported that electrical material that presumably contained copper was transported by ship and rail to the smelter from the lower Midwest. It was then doused with a flammable substance and burned so that all the rubber or asbestos insulation was removed leaving bare metal. The metal was brought to the smelter for extraction of copper. The resulting slag from this process was dumped into the lake and along the shoreline. The waste from this reclamation had large enrichments of lead, tin, zinc, and chromium.

A former employee of C&H provided additional information to EPA about the scrap recycling that took place at C&H (EPA2012a). He stated that C&H accepted scrap electrical equipment to reclaim the copper. This included large and small motors, car starters, generators, alternators, washing machine motors, and electric fan motors. He also said he observed employees behind C&H's smelter in the yard near Torch Lake burning off the insulation on copper wires on the large motors and the solder (60% lead and 40% tin) that held the wires to the lead and zinc bearings. The former employee said he observed C&H employees push the insulation ash and melted solder into Torch Lake behind the C&H smelter. The C&H smelter was located in Hubbell, in part on the Site property.

The former employee said the large motors were then hauled to the C&H leaching plant in Lake Linden where any remaining copper was leached off the motors. Small electric motors such as car starters, generators, alternators, washing machine motors, and electric fan motors were sent directly to the C&H

leaching plant where the ammonia and salt solution leached out the copper. The copper remained in the solution and was sent to the still house where the copper precipitated as an oxide. The lead solder from the scrap sank to the bottom of the leaching tanks and formed sludge.

Historical research indicates that this practice occurred in the C&H Hubbell industrial complex, including the Site property, from approximately the 1940s until sometime prior or up to April 8, 1969 when all of the Calumet Division of Universal Oil Products (corporate successor to C&H) was closed.

Historic aerial imagery review indicates that the C&H Smelter was demolished in the 1976-77 timeframe, and that the associated stacks (debris piles still present on the landscape) were demolished between 1993 and 1997. Since closure, the Site has not had any known significant use beyond serving as a disposal location for construction waste and debris.

Currently, 2.9 acres of the Site surface is covered with 35 waste piles and stack debris. Eighteen waste piles totaling an estimated 4,758 tons appear to be mining era waste and debris. The other 17 remaining waste piles totaling an estimated 3,486 tons consist of construction and demolition, roadwork, and/or woody debris generally do not appear to have originated during the mining era. In addition to the waste piles, an estimated 2,810 cubic yards of mining era stack debris is present on the Site property.

The waste piles and stack debris are depicted on Figure 3 in Appendix A. Table 1 presents an inventory of the waste and debris piles along with a depositional history based on aerial photography review. The mining era waste piles include ladles and other tools suggesting the origin was C&H industrial complex operations such as the smelter.

2.4 2016 – 2017 SITE INVESTIGATION AND INTERIM RESPONSES

In 2016 and 2017, the DEQ RRD evaluated the results of several key studies conducted at the Site between 2005 and 2015. In addition, DEQ RRD undertook site investigation (SI) activities from 2014 through 2017 and interim response (IR) activities in 2016 and 2017. Completion of these activities identified potential threats to human and ecological receptors, including but not limited to: human health risks in the event of direct contact with polychlorinated biphenyls (PCBs) and metals contaminated surface soils, residual process materials (RPM), abandoned containers, waste piles, and stack debris; inhalation of particulates and asbestos containing material (ACM); and physical hazards. Exposed ACBM, specifically roofing

material that had fallen and/or been blown off the roof of the Mineral Building, was present on the ground, waste pile, and stack debris surfaces, including outside of the fenced Site property in the MDOT ROW.

Based on the conditions the DEQ RRD completed a series of IRs and continued SI activities in 2016 and 2017 that included:

- Waste Pile WP-11 (approximately 112 tons), a Toxic Substances Control Act (TSCA) waste which contained 100 parts per million (ppm) PCBs and a Resource Conservation and Recovery Act (RCRA) hazardous waste due to a Toxicity Characteristic Leach Procedure (TCLP) result of 110 milligrams/liter (mg /L) lead was transported off-site for disposal during 2017. SI results indicated that additional remaining waste piles contain leachable lead concentrations in excess of the TCLP limit, total PCBs less than TSCA criteria, and friable ACBM (greater than 1% asbestos).

- 13.58 tons of actual or suspect ACBM were removed and disposed of in 2016 by the DEQ. Removed were roofing material, transite, gaskets, insulating material, and any other known or suspected ACBM from the ground, waste piles, and stack debris surfaces, including outside of the fenced Site property in the MDOT ROW (MSG 2017a and MSG 2017b). Actual or suspect ACBM roofing materials have been and will continue to fall and blow off of the Mineral Building roof onto the Site property, bordering properties, and the adjacent MDOT Highway M-26 ROW (Tetra Tech 2018).

- Sixteen abandoned containers, including those with hazardous and non-hazardous contents (MSG 2017c), and RPM were removed in 2016 (MSG 2017b). Removed were abandoned containers and RPM from the surface of the ground and debris piles. Additional drums and RPM potentially remain within the waste piles.

- SI results indicate surface soils, remaining waste piles, and stack debris contain concentrations of arsenic, copper, lead, total PCBs, asbestos, and semivolatile organic compounds (SVOCs) that exceed multiple DEQ criteria.
- Drainage ditch and storm water control measures were implemented on the adjacent C&H coal dock during 2016 and 2017, but the exposed soils and waste on the Site continue to pose a risk for leaching, inhalation of particulates and asbestos, direct contact, and water and wind erosion.

DEQ concluded that remaining threats to human health and/or the environment requiring further mitigation include:

- Total PCB, metal, and SVOC contaminated surface soils, remaining waste piles, stack debris, and ACBM, including roofing materials that have been and will continue to fall and blow off of the Mineral Building roof onto the Site property, bordering properties, and the adjacent MDOT Highway M-26 ROW.
- Wind and water erosion and deposition of contaminated soils and wastes into the environment.

Based on the evaluation, SI, and IR findings in a November 9, 2017 letter, DEQ requested assistance from the EPA Emergency Response Branch (ERB) to address the risks posed by the Site. The request for assistance document is included in Appendix B.

3.0 FIELD INVESTIGATION

This section summarizes the scope of work and describes the sampling activities conducted during the EPA removal assessment at the Site.

3.1 SCOPE OF WORK

Field work was conducted in accordance with the START SAP (Tetra Tech 2017) for the Site and the contract Quality Assurance Project Plan (QAPP) (Tetra Tech 2016).

3.2 SAMPLING ACTIVITIES

This section describes sampling activities conducted at the Site on December 7, 2017. Existing and START sampling locations are depicted on Figures 4, 5, and 6 in Appendix A. Photographic documentation of the waste piles is provided in Appendix C.

3.2.1 Waste Pile Sampling

START collected eight waste pile samples during the December 2017 sampling event along with two duplicate and two matrix spike/matrix spike duplicate (MS/MSD) samples per the site-specific SAP (Tetra Tech 2017). Sample locations were biased to verify previous DEQ sampling events where soils contained leachable lead in excess of TCLP criteria or total PCBs.

For waste pile sample collection, START utilized a disposable (dedicated) scoop to collect waste material samples from a depth of 0 to 3 inches below ground surface. Samples were placed in laboratory-supplied, 8-ounce glass jars in accordance with Tetra Tech SOP No. 005-3, "Soil Sampling." Sample labels and tags containing the unique sample identifier and date and time of sampling were attached to each 8-oz jar following sample collection. Sampling data—including sample analyses, sample collection times and dates—were recorded on laboratory chain-of-custody forms. The samples were submitted under chain-of-custody to Tetra Tech's subcontracted laboratory (CT Laboratories in Baraboo, WI) for TCLP Lead and PCB Aroclor analyses.

3.2.2 Building Material Sampling

START collected five bulk asbestos samples during the December 2017 sampling per the site-specific SAP (Tetra Tech 2017). Sample locations were selected by START personnel familiar with asbestos-related building materials and were biased toward locations that were previously identified by the DEQ to contain asbestos.

In accordance with EPA Environmental Response Team (ERT) SOP No. 2013, "Bulk Sampling for Asbestos," START utilized dedicated sampling equipment for each sample to prevent potential cross contamination of asbestos fibers and samples were placed in individual sealable plastic bags.

Each sample bag was labeled with the unique sample identifier, date, and time of sampling following sample collection. Sampling data—including sample analyses, sample collection times and dates—were recorded on laboratory chain-of-custody forms. The samples were submitted under chain-of-custody to ALS Laboratories in Cincinnati, Ohio for analysis of asbestos content by polarized light microscopy (PLM) analyses.

All laboratory data were validated and reviewed to assist in verification of the existing Site information and characterizing the on-site contamination.

4.0 SITE SCREENING LEVELS AND EXISTING DATA EVALUATION

This section describes the selected Site screening levels and provides an evaluation of the existing and START analytical data.

4.1 SITE SCREENING LEVELS

The following provides a summary of the regulatory criteria utilized for evaluating existing and START analytical results from soil, RPM, waste pile, stack debris, and suspect ACBM sampling.

- EPA industrial direct contact removal management levels (RMLs) (EPA 2017). EPA RMLs are modified based on target risk levels for carcinogens (TCR) and hazard quotients (HQ). EPA's generic RML tables were used with specific TCR and HQ modifiers. The EPA's RMLs were used with a criterion of 10^{-4} TCR and a HQ of 3 for non-carcinogens.
    - Soil, waste, and stack debris.

- Part 201 of Michigan's Natural Resources and Environmental Protection Act (NREPA), being PA 451 of 1994, as amended Non Residential Direct Contact Criteria (DCC) for Response Activity (DEQ 2013).
    - Soil, waste, and stack debris.
- Part 201 of NREPA, being PA 451 of 1994, as amended Particulate Soil Inhalation Criteria (PSIC) for Response Activity (DEQ 2013).
    - Asbestos.
- EPA, Resource Conservation and Recovery Act (RCRA), Identification and Listing of Hazardous Waste Criteria (40 CFR, Part 261, Subpart C) (EPA 2012b).
    - Waste and stack debris.
- EPA, National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR, Part 61, Subpart M) (EPA 1984).
    - Asbestos.

4.2 DATA EVALUATION

Major DEQ and EPA studies associated with Torch Lake are available on the DEQ's Abandoned Mining Waste Project website http://www.michigan.gov/deq/0,4561,7-135-3311_4109_9846_76560---,00.html. In development of this removal assessment report the soil, RPM, waste pile, and suspect ACBM data from the following key studies were evaluated, relative to the screening levels described in Section 4.1, to assist in characterizing and delineating the extent of the impacted media at the Site:

- *Summary Report for the Torch Lake Area Assessment, Torch Lake NPL Site and Surrounding Areas, Keweenaw Peninsula, Michigan – December 2007. (Weston 2007).*
- *Site Inspection (SI) Report for C&H Lake Linden Operations, Lake Linden, Michigan, 49945 – June 2014.* Prepared by the MDEQ-RRD, Superfund Section, Pre-remedial Group, Site Evaluation Unit (Pre-remedial Group). *(MDEQ 2014).*
- *Site Investigation Report for Abandoned Mining Wastes Torch Lake Non-Superfund Site, Calumet and Hecla – Lake Linden Operations, Houghton County, Michigan. March 2016. (Weston 2016).*
- *Supplemental Site Investigation Findings for Abandoned Mining Wastes Torch Lake Non-Superfund Site, Calumet and Hecla – Lake Linden Operations, Houghton County, Michigan included in EPA Referral Package. December 2017. (MSG 2017d).*

The following section provides a summary of the key documents reviewed to support preparation of the removal assessment report.

4.2.1 Key Document Reviews

Summary Report for the Torch Lake Area Assessment, Torch Lake NPL Site and Surrounding Areas, Keweenaw Peninsula, Michigan – December 2007. In September 2007, the EPA at the request of the DEQ, conducted assessment activities near Torch Lake. The focus of the assessment was on 17 Areas of Investigation (AOI) identified jointly by the EPA and the DEQ that were impacted by historical copper mining operations in the Keweenaw Peninsula.

The primary project objectives of the Torch Lake Area Assessment were to evaluate imminent threats to human health, welfare and the environment. The geographical locations specific to Torch Lake, and pathways evaluated during the assessment were:

- Direct-contact hazards associated with exposed stamp sand and the potential presence of other mining-era related waste along the western shoreline of Torch Lake. At the time of the investigation, the evaluated area included recently exposed shoreline between the edge of the EPA-installed vegetative cover and the water's edge because of the significantly lower surface-water levels in Lake Superior and its contiguous water bodies. These previously shallow water areas had not been investigated; and,
- Limited evaluation of potential environmental concerns at abandoned mining-era related industrial buildings, ruins, and land areas proximal to the western shoreline of Torch Lake.

The Mineral Building portion of AOI 22 – Hubbell Docks, Mineral Building, and the C&H Smelter, included in the Torch Lake Area Assessment is relevant to the Site. The findings were documented in a report prepared by the EPA that details the completed investigative activities, analytical findings, and recommendations. The following summarizes the key findings for the Site.

The assessment was limited to select areas of the interior of the Mineral Building, as the first story of the building was locked and the majority of the second story was unsafe to traverse, and the exterior of the building. The concrete bins observed inside the building were stained green and blue on their interior walls. Similar discoloration had been observed on copper- and lead-based material previously screened during the assessment.

Stained and potentially contaminated materials that were present in the building included light- colored soil, red-stained stamp sands, gray stamp sands, gray slag, white powder, brown-stained soil, ash, and yellow-stained soil. The red-stained stamp sand area was located near a small concrete vault east of the Mineral Building.

Other features that were documented during the assessment included:

- Poor site security;
- Empty drums;
- Potential roofing ACM scattered on the property in a 100-foot radius of the Mineral Building in all directions;
- Numerous debris piles;
- Evidence of household-waste dumping;
- Building paint that is likely lead-based;
- A concrete vault on the east side of the building that contains water and metal debris or a drum;
- A pipe exiting the south side of the Mineral Building that is wrapped with insulation that may be ACM, and additional wrapped piping in the first story of the building that may be ACM;
- A small, red sandstone building located east of the Mineral Building that had one open door and a pile of white powder inside (MineralB-9, exceeded DEQ residential DCC for arsenic) and white ceiling tiles and brackets;
- A large drainage ditch discharging to Torch Lake;
- Three large-diameter pipes (approximately 12-inches) at the shoreline that appear to be discharging from the Mineral Building;
- Piles of railroad ties near the shoreline; and
- A large pile of green brick just south of the property boundary.

Ten locations inside the Mineral Building and across the Site were screened with an X-ray fluorescence spectrometer (XRF). Two samples (MineralB-6 and MineralB-11) were collected and submitted for verification of metals concentrations and PCBs via laboratory analysis. XRF screening indicated metals concentrations greater that the DEQ residential DCC inside the Mineral Building and across the Site. The laboratory analysis confirmed the presence of metals in excess of residential DCC. PCBs were not detected in one sample and were detected below the residential DCC in the other sample.

Sample results for the laboratory samples collected at the Site, as well as a comparison to applicable criteria, are depicted on Figure 5 in Appendix A.

MDEQ Pre-remedial Group - SI Report for C&H Lake Linden Operations – 2014. Under the authority of a cooperative agreement between the DEQ and the EPA, the DEQ's Pre-Remedial Group conducted assessment

activities in October 2011 at the C&H operations site in Lake Linden and Hubbell. The SI fieldwork was completed between October 10 and 13, 2011. The findings were documented in a report prepared by the DEQ that details the completed investigative activities, analytical findings, and demographics from the C & H Lake Linden Operations site.

The investigation was prompted by historical findings of elevated levels of metals and ACM in surface soils; lead and arsenic in sludges; SVOCs and PCBs in waste materials; volatile organic compounds (VOCs) venting into Torch Lake from contaminated groundwater; and metals in groundwater.

The scope and objectives of the SI were designed to meet the investigative requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 105 to provide sufficient data for NPL or No Further Remedial Action Planned (NFRAP) decisions and/or to support the need for time-critical or non-time-critical removal actions. SI activities included interviews with local residents; reconnaissance inspections of the properties; installation of temporary groundwater monitoring wells; collection of soil, groundwater, surface water, and sediment samples; and documentation of C&H Lake Linden Operations site conditions. Four migration pathways of concern were discussed in the report and included groundwater, surface water, soil, and air. Most relevant to the Site were the results that are summarized in the following paragraphs.

Groundwater analytical results from the SI investigation were compared to Michigan's Cleanup Criteria Requirements for Response Activity (Formerly the Part 201 Generic Cleanup Criteria and Screening Levels) for Residential Drinking Water Criteria (RDWC), Groundwater Surface Water Interface Criteria (GSIC), and Groundwater Contact Criteria (*Note: Groundwater Contact Criteria is not a relevant criterion under Michigan's Cleanup Criteria Requirements for Response Activity*). Inorganic contaminants detected in groundwater exceeded criteria and were generally determined to be attributable to wastes observed in source areas in the study area, including the Site. Inorganic contaminants observed in wastes documented in surficial soils at the Mineral Building property were detected in groundwater samples collected from near these “source areas”. The DEQ concluded that the potential remains for continued migration of contaminants from soils and waste deposits at the Site.

The DEQ determined that risks to surface water were present due to waste deposits located along the shoreline as well as the potential for venting groundwater to cause impacts in the surface water pathway. The DEQ

noted that the topography adjacent to the Site is at higher elevations directing surface runoff flow across the Site and into surface waters. Historical documentation of surface soil contamination across the C & H Lake Linden Operations site makes Torch Lake susceptible to the contaminants documented in the shallow soils. The surface water samples collected from areas adjacent to documented source areas indicate an observed release of contaminants into Torch Lake at these source areas. A limited number of inorganic analytes exceeded both RDWC and GSIC. No exceedances of DCC were identified.

Similar to surface water, sediment samples collected from areas adjacent to documented source areas indicate an observed release of contaminants into Torch Lake at these source areas. The concentrations of 12 inorganic contaminants exceeded at least one more of the applicable criteria. Of these 12 contaminants, 10 exceeded Groundwater Surface Water Interface Protection Criteria (GSIPC) and seven exceeded Residential Drinking Water Protection Criteria (RDWPC). Since no public water intakes are present within the 15-Mile target distance limit, the exceedances of RDWPC were determined to be insignificant. Arsenic, cadmium, chromium, cobalt, copper, lead, mercury, nickel, silver, and zinc exceeded GSIPC.

The DEQ utilized XRF to screen surface soils during the implementation of the SI. XRF screening documented many areas where inorganic contaminant concentrations exceeded applicable criteria. Nine or more of the 20 surface soil samples collected during the SI also exceeded RDWPC for arsenic, copper, and lead. Deeper soil was also determined to pose a direct contact risk, but such soil would become a risk only during excavation. The report stated, "The most significant degree of soil contamination and waste was found in the southern parts of the Site, in both the Coal Dock property and the Mineral Building property… Some of the highest concentrations are from waste material, but soil and mixed soil/waste materials contained high concentrations as well. The soil contamination and waste found in this area is attributable to the Site since this is where the main C & H smelting operation took place."

A release of potential contaminants to the air was not documented during the investigation of the Site; however, the DEQ believes that potential releases to air exist. Significant surface waste and soil contamination have been documented at the Mineral Building property that is only minimally vegetated, making the surface soil subject to wind erosion potentially allowing particulates to become airborne and respirable.

The findings of the 2011 SI determined that significant quantities of waste were present at the Site; and shallow and subsurface soils, groundwater, surface water, and sediments have become contaminated with heavy

metals, especially arsenic, chromium, copper, and lead. Sample results for the soil samples located on the Site along with a comparison to the applicable criteria are depicted on Figure 5 in Appendix A.

Site Investigation Report for Abandoned Mining Wastes Torch Lake Non-Superfund Site, Calumet and Hecla – Lake Linden Operations, Houghton County, Michigan. March 2016. The DEQ's Abandoned Mining Waste Project is addressing some of the remaining concerns in Houghton County that were not addressed by the EPA Torch Lake Superfund project. The Abandoned Mining Wastes Project concerns involve groundwater, surface water, sediments, and "upland" media within and adjacent to the entire western shoreline of Torch Lake. Known or suspected problems which are being evaluated include: an unidentified, significant in-lake and/or terrestrial source of PCBs, uncharacterized waste deposits and more than 750 uncharacterized drums on the lake bottom, slag, landfills, industrial ruins, coal storage areas, underground storage tanks (USTs), RPM, ACM, and any other waste materials that may be identified during future investigations.

During 2014 and 2015, the DEQ RRD conducted SI activities and confirmed that the remaining concerns in the Abandoned Mining Wastes Project area involve groundwater, surface water, sediments, and "upland" media. Priority concerns which were evaluated and deemed to require IR measures include significant terrestrial sources of PCBs, ACM, RPM, abandoned mining-era containers, seeps, limited areas of soil in which there are DCC and PSIC exceedances, and physical hazards.

DEQ RRD concluded that the Hubbell Processing Area, of which the Site is a portion, is generally characterized by detections of organic and inorganic contaminants in soil, waste, groundwater, sediment, and surface water; repercussions of mining era operations in the region.

The DEQ RRD SI activities are summarized as follows:

- Asbestos analytical results for various building materials including, but not limited to asphaltic roofing material, transite, and cable wrap indicted ACM are present in the study area. These materials are widely distributed across the study area and are subject to migration via wind and water erosion. Asbestos concentrations in 11 bulk material samples contained asbestos fibers at concentrations greater than 1 percent (1%). The damaged and friable nature of these materials poses a potential risk to human health as it relates to the inhalation pathway.
- Two dilapidated drums were sampled in the study area and contained inorganic contaminants that exceeded DEQ GSIPC, and PSIC and DCC in both of the residential and nonresidential exposure scenarios. In addition, TCLP analytical results indicated that the sampled drum contents were characteristically hazardous for lead.

- Contents of partially buried abandoned drums protruding from the EPA cap near the Torch Lake shoreline adjacent to the smelter property contained concentrations of inorganic contaminants of concern (COCs), cyanide, and SVOCs that exceeded GSIPC, and PSIC and DCC in both of the residential and nonresidential exposure scenarios. One of the samples contained Total PCBs in excess of DCC for the residential and non-residential exposure pathways.
- RPM that were sampled in the study area contained concentrations of Total PCBs that exceeded Volatile Soil Inhalation Criteria (VSIC) and DCC for both residential and nonresidential exposure scenarios.
- Sampled waste piles in the study area contained concentrations of inorganic contaminants that exceeded GSIPC and DCC for both residential and nonresidential exposure scenarios. Analytical results from two of the waste piles contained Total PCB concentrations that exceeded DCC for both residential and nonresidential exposure scenarios. One waste pile contained cyanide at a concentration that exceeded GSIPC. Lastly, one waste pile also contained SVOCs that exceeded GSIPC and VOCs that exceeded DWPC for both residential and nonresidential exposure scenarios and GSIPC.
- Soil analytical results exceeded PSIC and DCC in both of the residential and nonresidential exposure scenarios for inorganic contaminants. In addition, a limited number of samples analyzed for cyanide and SVOCs exceeded GSIPC. Lastly, Total PCB concentrations in 16 samples collected from the study area exceeded DCC for both residential and nonresidential exposure scenarios.
- Surface soil screening results included measured inorganic contaminant concentrations that exceeded DCC and PSIC in both residential and non-residential exposure scenarios.
- Groundwater analytical results for one groundwater sample exceeded DWC for both residential and nonresidential exposure scenarios and GSIC for Total PCBs.
- Sediment analytical results exceeded Ecological Screening Levels (ESLs), Threshold Effect Concentrations (TECs), and Probable Effects Concentrations (PECs) for inorganic contaminants, SVOCs, and Total PCBs. Concentrations of cyanide exceeded ESLs in one sample.
- Surface water analytical results exceeded ESLs for one SVOC constituent. Surface water analytical results exceeded the ESL and the Surface Water Rule 57 values for Total PCBs and inorganics in a sample collected near a partially submerged drum at the shoreline adjacent to the smelter property.

In addition to the evaluation of analytical results, the following provides a summary of findings derived from the assessment of the DEQ's Hubbell Processing Area, of which the Site is a portion, and Torch Lake with respect to the goals and objectives for the Abandoned Mining Wastes Project:

- Significant in-lake and terrestrial sources of contamination were present in the form of metals, VOCs, SVOCs, PCBs, and asbestos in the study area. Reconnaissance documented that the majority of the terrestrial portions of the study area were covered by acres of uncontrolled deposits of coal, PCB-laden debris, and charred residual process materials. Further, debris and waste piles, apparently placed in the study area after mining era operations ceased, contained multiple COCs that exceeded applicable regulatory criteria. Offshore sampling in the vicinity of drums and waste

deposits confirmed that multiple COCs were present in the surficial sediments in the nearshore environment of the study area;

- In-lake and terrestrial uncharacterized waste deposits were identified in the study area. Multiple abandoned drums in various stages of degradation were present in the study area, the contents of some of which have been determined to be characteristically hazardous and/or PCB containing. Debris and waste piles located in the study area were laden with COCs that exceeded applicable regulatory criteria. Further, these waste deposits were subject to erosion and migration to Torch Lake via eroded channels on the ground surface that discharged through voids and openings in the former coal dock bulkhead. Offshore sediment sampling confirmed that COCs were present in sediment adjacent to the former smelter and coal dock operations;
- Bulk disposal areas, including the charred PCB-laden remnants of copper recovery operations covered acres of the ground surface in the study area. Similarly, the ground surface in the northern portion of the study area was covered with coal and numerous coal piles were interspersed throughout the property. Waste and debris piles containing COCs above regulatory criteria were also observed. Offshore side-scan sonar and underwater video surveillance confirmed that large deposits of drums, circuit board waste, and other materials are present in the nearshore sediment; and,
- Industrial ruins, including buildings, foundations, and building floors associated with the smelter, mineral building, and coal dock complex are present at the ground surface. In addition, stacks related to the former smelter operations were razed and the associated debris and structural components left in-place on the ground surface. The deteriorated conditions of the buildings on the property have resulted in the widespread distribution of roofing materials across the study area. The unsecured buildings and foundations also feature physical hazards, including voids and pits ranging from 6 feet to 20 feett deep. Mining era ACM, containers, and building materials were all observed in the study area.

Sample results for the soil, waste pile, RPM, and Stack Debris samples located at the Site (not the entire study area), as well as a comparison to applicable criteria, are depicted on Figures 4 and 5 in Appendix A.

Supplemental Site Investigation Findings for Abandoned Mining Wastes Torch Lake Non-Superfund Site, Calumet and Hecla – Lake Linden Operations, Houghton County, Michigan included in EPA Referral Package - December 2017. To supplement the 2016 SI report findings summarized in the preceding section, DEQ's Abandoned Mining Waste Project conducted additional waste pile and ACBM sampling at the Site during 2017. Analytical results of EPA START waste pile and ACBM December 7, 2017 sampling verified the DEQ sampling results. Sample results for the DEQ supplemental and START verification waste pile and ACBM samples located at the Site, as well as a comparison to applicable criteria, are depicted on Figures 4, 5, and 6 in Appendix A.

5.0 CONCLUSIONS AND CONCEPTUAL REMOVAL ACTION

5.1 CONCLUSIONS

Removal assessment activities consisted of reviewing existing analytical data and background information from multiple state and federal agencies, START collection of verification waste and building material samples, and comparing existing analytical and START data to applicable screening levels to evaluate the potential for threats to human health and/or the environment.

The data reviewed from studies previously conducted by various DEQ and EPA entities, and START's December 2017 sampling, included 55 (plus 3 field duplicates) RPM, soil, waste pile, and stack debris samples, 14 (plus 1 field duplicate) waste pile waste characterization samples, and 109 ACBM samples within the Site footprint. Analyses varied by study, but generally included metals, PCBs, VOCs, and SVOCs for RPM, soil, waste, and stack debris samples, TCLP lead and/or arsenic for waste pile waste characterization samples, and asbestos for the ACBM samples. The samples were analyzed by a combination of laboratories, including the DEQ environmental laboratory, and DEQ- and EPA-contracted laboratories. Analytical results that exceeded the selected screening criteria are depicted on Figures 4, 5, and 6 in Appendix A and presented in Tables 2, 3, and 4.

Based on the analytical results and previously completed DEQ RRD IRs, multi-media contamination, potential abandoned containers, ACBM, and physical hazards associated with the Site remain. This includes:

- Waste and stack debris with leachable lead concentrations in excess of the TCLP limit, thus characterizing them as a hazardous waste, and friable ACBM (greater than 1% asbestos).
- Friable ACBM (greater than 1% asbestos), including roofing materials across the Site surface that have been and will continue to fall and blow off of the Mineral Building roof onto the Site property, bordering properties, and the adjacent MDOT Highway M-26 ROW.
- Potential for wind and water erosion and deposition of contaminated soils and wastes into the environment.
- RPM, soil, waste, and stack debris with concentrations of arsenic, copper, lead, and PCB Aroclor 1254 that exceed the EPA RML for industrial soil.
- RPM, soil, waste, and stack debris with concentrations of arsenic, copper, lead, and total PCBs that exceed the DEQ non-residential DCC.
- Potential abandoned containers within the waste piles.

- Physical hazards associated with the unsecured Mineral Building, and waste pile and stack debris including voids and pits ranging from 6 to 20 feet deep.

The Site is bordered by an operating chemical manufacturing facility, the MDOT Highway M-26 ROW that includes a wide paved shoulder used heavily by local residents for recreational purposes (beyond which there are single-family residences), and Torch Lake. Though partially fenced the Site is accessible to trespassers.

The damaged and friable ACBM and ACBM with the potential to become friable pose a potential risk to human health related to the inhalation pathway. ACBM, including roofing materials that have been and will continue to fall and blow off of the Mineral Building roof onto the Site property, bordering properties, and the adjacent MDOT Highway M-26 ROW increase the potential for human exposure to asbestos. TCLP testing identified wastes likely to leach concentrations of lead that may be harmful to human health or the environment as well. There is also potential exposure of ecological receptors to Site contamination as the potential for wind and water erosion, and deposition of contaminated soils and wastes into the environment, including the adjacent Torch Lake. There is potential exposure of Site contamination to human receptors through inhalation of and direct contact with the contaminated media including RPM, soil, waste, stack debris, ACBM, and potential abandoned containers. Physical hazards associated with the unsecured Mineral Building, and waste pile and stack debris are present at the Site. The close proximity of the MDOT ROW, residences and an operating industrial facility, and potential for trespassers greatly increases the likelihood of human health and environmental impacts.

A summary of analytical results that exceeded the selected screening criteria are depicted on Figures 4, 5, and 6 in Appendix A and presented in Tables 2, 3, and 4.

Potential exposure could occur through each of these migration pathways and cause imminent danger to human health and the environment. The conditions at the Site may present a threat to the public health or welfare, and the environment, and meet the criteria for a time-critical removal action as provided for in the NCP as outlined in 40 CFR § 300.415(b)(2). These criteria include, but are not limited to, the following:

Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;

Analytical data and background information reviewed during development of this removal assessment

report documented multiple media contaminated with metals (lead, arsenic, and copper), PCBs, asbestos, and leachable lead at the Site. These contaminants poses an actual or potential exposure to human health including adjacent land users and trespassers, and the environment.

The toxicological effects of lead, arsenic, copper, PCBs, and asbestos have been studied by the Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological information taken directly from ATSDR documents is provided below and referenced at the end of this report.

Lead – The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in the body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage (ATSDR 2007b).

Arsenic - Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet. Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso. Skin contact with inorganic arsenic may cause redness and swelling (ATSDR 2007a).

Copper - Absorption of small amounts of copper is essential for good health. However, high levels of copper can be harmful. Breathing high levels of copper can cause irritation of the nose and throat. Ingesting high levels of copper can cause nausea, vomiting, and diarrhea. Very high doses of copper can damage the liver and kidneys, and can even cause death (ATSDR 2004).

PCBs – PCBs affect primarily the liver, stomach, and thyroid gland in the body. The main target for PCB toxicity is the liver in adults. Studies of long-term exposure of adult workers indicated changes in the blood and urine that may indicate liver damage. PCBs have also been shown to cause anemia and are a probable carcinogen found to cause cancer in the liver and biliary tract. Short-term exposure to high levels of PCBs

by dermal contact can cause skin conditions such as acne and rashes. Women who were exposed to relatively high levels of PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women exposed to PCBs showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs (ATSDR 2014).

Asbestos – Asbestos is the name given to a group of six different fibrous minerals (amosite, chrysotile, crocidolite, and the fibrous varieties of tremolite, actinolite, and anthophyllite) that occur naturally in the environment. Asbestos minerals have separable long fibers that are strong and flexible enough to be spun and woven and are heat resistant. Because of these characteristics, asbestos has been used for a wide range of manufactured goods, mostly in building materials (roofing shingles, ceiling and floor tiles, paper products, and asbestos cement products), friction products (automobile clutch, brake, and transmission parts), heat-resistant fabrics, packaging, gaskets, and coatings.

Asbestos mainly affects the lungs and the membrane that surrounds the lungs. Breathing high levels of asbestos fibers for a long time may result in scar-like tissue in the lungs and in the pleural membrane (lining) that surrounds the lung (ATSDR 2001).

Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release;

DEQ RRD removed abandoned containers that contained hazardous substances, pollutants, or contaminants from the Site, but there are potential abandoned containers remaining within the waste piles. Potential additional abandoned containers pose a threat of release to adjacent land users, trespassers, and the environment.

Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released; and,

The Upper Peninsula of Michigan receives a substantial amount of precipitation, and winter temperatures are normally below freezing. Weather conditions will contribute to the further deterioration of the potential abandoned containers, ACBM, and wind and water erosion and deposition of contaminated soils and wastes

into the environment. Barren soils and waste piles subject to erosion are within 40 feet of a ditch that drains directly into Torch Lake and within 140 feet of Torch Lake itself, including WP-48 that contains the greatest levels of leachable lead at the Site.

The availability of other appropriate federal or state response mechanisms to respond to the release;

The DEQ referred the Site to the EPA Region 5. Neither the Site property owner nor the State are known to have funding available to address the issues associated with the Site. In a November 9, 2017 letter, DEQ requested assistance from the EPA ERB to address the risks posed by the Site.

5.2 CONCEPTUAL REMOVAL ACTION

The conceptualized removal plan entails the construction of temporary facilities, including access improvements, and implementation of soil erosion and sedimentation control measures and perimeter air monitoring. Visible ACBM would be picked-up and contained prior to commencing activities that could damage or abrade the material and throughout the removal action as ACBM is observed. To access the Site, all trucks and equipment will need to meet the height limitations imposed by the existing driveway route or access would need to be obtained through the Koppers Inc. property to the south. Hazardous waste and debris intended for removal would be loaded directly into haul trucks and transported to U.S Ecology in Detroit, Michigan, subject to waste disposal acceptance. Hazardous waste transport to U.S. Ecology would be limited to 45 tons maximum per load due to weight restrictions on the Mackinac Bridge. Currently characterized and uncharacterized mining-era waste piles intended for disposal were assumed hazardous waste. Mining-era waste piles dominated by stamp sand, slag, and concrete were assumed to not require off-site disposal. Non-hazardous waste and debris intended for removal would be loaded directly into haul trucks and transported to the Waste Management landfill in Ontonagon, Michigan, subject to waste disposal acceptance. All loads containing ACBM would be appropriately wrapped and packaged. Potential abandoned containers and RPM would be contained and staged for transport and disposal as they are observed throughout the removal action. During implementation, segregation of large concrete debris from the waste piles and particularly the stack debris pile could reduce the tonnage of material removed from the Site, reducing overall project costs. Remaining waste and debris piles and segregated concrete would then be consolidated against the embankment south of the Mineral Building or used, as appropriate, for fill as part of Site grading to promote positive drainage. As part of grading, a drainage swale would be constructed starting near the south end of the property and flowing northeasterly into the existing drainage channel

along the north property boundary to route runoff from the Site property, alleviating the existing areas of standing water. Upon completion of Site grading, 6-inches of gravel will be applied to the existing Site driveways and 6-inches of sandy loam soil will be applied to all other areas of the Site that are not currently capped in accordance with the standards used for other EPA Superfund caps that have been applied in the region. Amendments would be applied to the surface of the cap to increase nutrient and organic matter content and grass seed and mulch would be applied. A one-year warranty would be required on the vegetation establishment and cap integrity, after which time the capped area would be subject to ongoing cap operation and maintenance.

At the completion of the removal activities, the temporary facilities would be removed and any remaining disturbed areas would be restored to existing conditions. The conceptualized removal action is intended to address wastes, debris, and soils contaminated with lead, ACBM, and other contaminants, as well as removing RPM, surface ACBM, and potential abandoned containers.

Given the potential historical significance of the Site, it is recommended that the removal action maintain historic integrity by not eliminating any structures or foundations and maintaining visibility of foundations to the extent reasonably possible.

A conceptual layout of the removal project is depicted on Figure 7 in Appendix A. A summary of the waste debris management methods is included in Table 5.

Although direct abatement of the Mineral Building roof would be more definitive, it has not been contemplated in this report. It is recommended that the abatement of the deteriorating Mineral Building roof be referred to other regulatory agencies.

The level of expected risk reduction achieved by a remedy, expressed as the Removal Action Objectives for the Site, is the following:

- Mitigate waste and stack debris with leachable lead concentrations in excess of the TCLP limit and ACBM greater than 1%.
- Address ACBM in roofing materials across the Site surface.
- Address the potential for wind and water erosion and deposition of contaminated soils and wastes into the environment.
- Remove potential abandoned containers within the waste piles.

- Mitigate RPM, soil, waste, and stack debris with concentrations of copper, lead, and PCB Aroclor 1254 that exceed the EPA RML for industrial soil.
- Mitigate RPM, soil, waste, and stack debris with concentrations of arsenic, copper, lead, and total PCBs that exceed the DEQ non-residential DCC.

Conceptually, the conditions to be achieved are removal of RPM and potential abandoned containers, removal of wastes and debris containing ACBM and characteristically hazardous levels of lead, consolidation of all other wastes and debris, grading to promote drainage, and cap installation over consolidated material to mitigate erosion concerns. Cap maintenance could be subject to on-going operation and maintenance and potentially deed restrictions.

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TABLES

TABLE 1
WASTE AND DEBRIS PILE SUMMARY
C&H Mineral Building Site - RS
Hubbell, Houghton County, Michigan

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

TABLE 2
SUMMARY OF BULK ASBESTOS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

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

TABLE 2
SUMMARY OF BULK ASBESTOS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

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

TABLE 2
SUMMARY OF BULK ASBESTOS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Sample Location	Field Sample ID	Sample Date	Asbestos	Note	Sample Description
Michigan Department of Transportation M-26 Right-of-Way adjacent to the Mineral Building	K330273	7/12/2017	ND		Roofing material / Tar Mastic
	K330273	7/12/2017	20 %	CHRYSOTILE	Roofing material / Other
	K330274	7/12/2017	ND		Roofing material / Tar Mastic
	K330274	7/12/2017	15 %	CHRYSOTILE	Roofing material / Other
	K330275	7/12/2017	ND		Roofing material / String
	K330275	7/12/2017	ND		Roofing material / Tar Mastic
	K330275	7/12/2017	20 %	CHRYSOTILE	Roofing material / Other
	K330276	7/12/2017	2 %	CHRYSOTILE	Roofing material / Mastic 1
	K330276	7/12/2017	8 %	CHRYSOTILE	Roofing material / Mastic 2
	K330276	7/12/2017	ND		Roofing material / Other
	K330277	7/12/2017	ND		Roofing material / Mastic
	K330277	7/12/2017	25 %	CHRYSOTILE	Roofing material / Other
	K330278	7/12/2017	ND		Roofing material / Mastic
	K330278	7/12/2017	25 %	CHRYSOTILE	Roofing material / Other
	K330279	7/12/2017	ND		Roofing material / Top
	K330279	7/12/2017	ND		Roofing material / Mastic
	K330279	7/12/2017	ND		Roofing material / Other
	K330280	7/12/2017	ND		Roofing material / Top Mastic
	K330280	7/12/2017	ND		Roofing material / Bottom Mastic
	K330280	7/12/2017	15 %	CHRYSOTILE	Roofing material / Middle
	K330281	7/12/2017	30 %	CHRYSOTILE	Roofing material / Bottom White
	K330281	7/12/2017	15 %	CHRYSOTILE	Roofing material / Middle
	K330281	7/12/2017	ND		Roofing material / Top Black
	K330282	7/12/2017	25 %	CHRYSOTILE	Roofing material / White
	K330282	7/12/2017	ND		Roofing material / Mastic Tar
	K330282	7/12/2017	ND		Roofing material / Other
CHLL-ASBBLK66	CHS-ACBM-01-120717	12/7/2017	0.6 %	CHRYSOTILE	Black felt mastic
CHLL-ASBBLK75, CHLL-WP23	CHS-ACBM-02-120717	12/7/2017	60-70 %	CHRYSOTILE	White/brown TSI
CHLL-ASBBLK67, CHLL-WP28	CHS-ACBM-03-120717	12/7/2017	50-60 %	CHRYSOTILE	Gray TSI w/ cardboard underneath
CHLL-ASBBLK76, CHLL-WP27	CHS-ACBM-04-120717	12/7/2017	60-70 %	CHRYSOTILE	White/gray woven gasket material

ND = Not detected
TSI = Thermal System Insulation
Results greater than the National Emissions Standard for Hazardous Air Pollutants (NESHAP) and MDEQ Particulate Soil Inhalation Criteria of 1% are bolded and shaded.
Indicates sampled item/material has been removed from the site.
Evaluation based on MDEQ Criteria at time of Project completion.

TABLE 3
SUMMARY OF SOIL, WASTE PILE, RESIDUAL PROCESSING MATERIAL, AND STACK DEBRIS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name	CAS Number	USEPA - RML Industrial Soil (Nov 2017)[a]	MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil[b]	CHLL-RPM-04	CHLL-SB52		CHLL-SB75		CHLL-SB76	CHLL-SB77	CHLL-SB78	CHLL-SB79	CHLL-SB80		CHLL-SB81
Field Sample ID:				CHLL-RPM04-101514	CHLL-SB52 0-6"	CHLL-SB52 6"-4'	CHLL-SB75-0-6"	CHLL-SB75-0-6"-DUP	CHLL-SB76-0-6"	CHLL-SB77-0-6"	CHLL-SB78-6"-12""	CHLL-SB79-0-6"	CHLL-SB80-0-6"	CHLL-SB80-0-6"-DUP	CHLL-SB81-0-6"
Sample Date:				10/15/2014	6/11/2014	6/11/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014
Sample Interval (bgs):				0 - 0.5 ft	0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:				Greenish gray, Sludge, Eroding from stack debris	SAND, Fine grained, Gray to 1 ft	SAND, Fine grained, Gray to 1 ft; SAND, Medium to fine grained, Reddish Brown	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	Field Duplicate	SAND AND GRAVEL, Black
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	3,400,000	370,000 (DD)	--	8,000	3,300	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	1,400	670	--	9.8	0.4	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	300	37	--	120	3.4	--	--	--	--	--	--	45	37	--
BARIUM	7440-39-3	650,000	130,000	--	180	29	--	--	--	--	--	--	130	83	--
BERYLLIUM	7440-41-7	6,900	1,600	--	0.6	0.3	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	2,900	2,100	--	1.2	<0.2 U	--	--	--	--	--	--	0.9	1.1	--
CALCIUM	7440-70-2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	NA	1,000,000 (D,H)	--	34	8.0	--	--	--	--	--	--	33	28	--
COBALT	7440-48-4	1,000	9,000	--	7.1	2.6	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	140,000	73,000	--	26,000	1,500	--	--	--	--	--	--	17,000	11,000	--
IRON	7439-89-6	2,500,000	580,000	--	19,000 J	6,100 J	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	800	900 (DD)	--	1,700	28	--	--	--	--	--	--	330	230	--
LITHIUM	7439-93-2	7,000	31,000 (DD)	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	1,000,000 (D)	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	77,000	90,000	--	320	87	--	--	--	--	--	--	310	240	--
MERCURY	7439-97-6	140	580 (Z)	--	0.1	<0.06 U	--	--	--	--	--	--	0.1	0.1	--
NICKEL	7440-02-0	67,000	150,000	--	21	7.5	--	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	18,000	9,600	--	1.0	<0.2 U	--	--	--	--	--	--	0.4	<0.2 U	--
SILVER	7440-22-4	18,000	9,000	--	10	0.6	--	--	--	--	--	--	5.7	2.9	--
SODIUM	7440-23-5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	17,000	5,500 (DD)	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	1,100,000	630,000	--	<1000 U	23	--	--	--	--	--	--	310	270	--
Inorganics - Cyanide (mg/kg)															
CYANIDE	57-12-5	NA	250 (P,R)	--	<0.12 U	<0.11 U	--	--	--	--	--	--	<0.13 U	<0.12 U	--
Organics - PCBs (ug/kg)															
AROCLOR-1248	12672-29-6	95,000	NA	<180 UJ	<120 U	<110 U	<110 U	<110 U	<120 U	<110 U	<110 UJ	<110 U	<130 U	<120 U	<230 U
AROCLOR-1254	11097-69-1	44,000	NA	220 J	<330 U	<110 U	<110 U	<110 U	<120 U	<110 U	190 J	120	<130 U	<120 U	<230 U
AROCLOR-1260	11096-82-5	99,000	NA	150 J	<210 U	<110 U	<150 U	<200 U	<120 U	<110 U	<270 UJ	<120 U	<130 U	<120 U	<250 U
AROCLOR-1262	37324-23-5	NA	NA	<160 UJ	<210 U	<110 U	140	190	<120 U	<110 U	270 J	<110 U	<130 U	<120 U	230
AROCLOR-1268	11100-14-4	NA	NA	<180 UJ	<120 U	<110 U	<110 U	<110 U	<120 U	<110 U	<110 UJ	<110 U	<130 U	<120 U	<230 U
TOTAL PCBS	TPCB	94,000	1000 (J)	370 J	ND	ND	140	190	ND	ND	460 J	120	ND	ND	230
Organics - SVOCs (ug/kg)															
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,100,000	2.5E+08		--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6	9,000,000	2.6E+07	--	<3000 UJ	<560 UJ	--	--	--	--	--	--	<660 U	<600 UJ	--
ACENAPHTHENE	83-32-9	1.4E+08	1.3E+08	--	<1200 U	<230 U	--	--	--	--	--	--	<260 U	<240 UJ	--
ACENAPHTHYLENE	208-96-8	NA	5,200,000	--	<1200 U	<230 U	--	--	--	--	--	--	<260 U	<240 UJ	--

TABLE 3
SUMMARY OF SOIL, WASTE PILE, RESIDUAL PROCESSING MATERIAL, AND STACK DEBRIS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name	CAS Number	USEPA - RML Industrial Soil (Nov 2017)[a]	MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil[b]	CHLL-RPM-04	CHLL-SB52		CHLL-SB75		CHLL-SB76	CHLL-SB77	CHLL-SB78	CHLL-SB79	CHLL-SB80		CHLL-SB81
Field Sample ID:				CHLL-RPM04-101514	CHLL-SB52 0-6"	CHLL-SB52 6"-4'	CHLL-SB75-0-6"	CHLL-SB75-0-6"-DUP	CHLL-SB76-0-6"	CHLL-SB77-0-6"	CHLL-SB78-6"-12""	CHLL-SB79-0-6"	CHLL-SB80-0-6"	CHLL-SB80-0-6"-DUP	CHLL-SB81-0-6"
Sample Date:				10/15/2014	6/11/2014	6/11/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014	8/20/2014
Sample Interval (bgs):				0 - 0.5 ft	0 - 0.5 ft	0.5 - 4 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:				Greenish gray, Sludge, Eroding from stack debris	SAND, Fine grained, Gray to 1 ft	SAND, Fine grained, Gray to 1 ft; SAND, Medium to fine grained, Reddish Brown	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	Field Duplicate	SAND AND GRAVEL, Black
Organics - SVOCs (ug/kg) (cont'd)															
ACETOPHENONE	98-86-2	3.5E+08	1.5E+08 (C)	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	6.8E+08	7.3E+08	--	<1200 U	<230 U	--	--	--	--	--	--	<260 U	<240 UJ	--
BENZO(A)ANTHRACENE	56-55-3	2,100,000	80,000 (Q)	--	<1200 U	<230 U	--	--	--	--	--	--	<260 U	<240 UJ	--
BENZO(A)PYRENE	50-32-8	210,000	8,000 (Q)	--	<2400 U	<450 U	--	--	--	--	--	--	<530 U	<480 UJ	--
BENZO(B)FLUORANTHENE	205-99-2	2,100,000	80,000 (Q)	--	<2400 U	<450 U	--	--	--	--	--	--	<530 U	<480 UJ	--
BENZO(G,H,I)PERYLENE	191-24-2	NA	7,000,000 (Q)	--	<2400 U	<450 U	--	--	--	--	--	--	<530 U	<480 UJ	--
BENZO(K)FLUORANTHENE	207-08-9	2.1E+07	800,000 (Q)	--	<2400 U	<450 U	--	--	--	--	--	--	<530 U	<480 UJ	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	1.6E+07	1.2E+07 (C)	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	2,400,000	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	2.1E+08	8,000,000 (Q)	--	<1200 U	<230 U	--	--	--	--	--	--	<260 U	<240 UJ	--
DIBENZO(A,H)ANTHRACENE	53-70-3	210,000	8,000 (Q)	--	<2400 U	<450 U	--	--	--	--	--	--	<530 U	<480 UJ	--
DIBENZOFURAN	132-64-9	3,100,000	ID	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	9.0E+07	1.3E+08	--	<1200 U	<230 U	--	--	--	--	--	--	<260 U	<240 UJ	--
FLUORENE	86-73-7	9.0E+07	8.7E+07	--	<1200 U	<230 U	--	--	--	--	--	--	<260 U	<240 UJ	--
HEXACHLOROBENZENE	118-74-1	96,000	37,000	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	2,100,000	80,000	--	<2400 U	<450 U	--	--	--	--	--	--	<530 U	<480 UJ	--
NAPHTHALENE (SVOC)	91-20-3	1,700,000	5.2E+07	--	<1200 UJ	<230 UJ	--	--	--	--	--	--	<260 U	<240 UJ	--
PHENANTHRENE	85-01-8	NA	5,200,000	--	<1200 U	<230 U	--	--	--	--	--	--	260	220 J	--
PYRENE	129-00-0	6.8E+07	8.4E+07	--	<1200 U	<230 U	--	--	--	--	--	--	<260 U	<240 UJ	--
Organics - VOCs (ug/kg)															
1,2,3-TRIMETHYLBENZENE	526-73-8	6,100,000	NA	--	<70 UJ	<61 UJ	--	--	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	5,300,000	1E+08 (C,I)	--	110 J	<61 UJ	--	--	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	4,500,000	1E+08 (C,I)	--	<70 UJ	<61 UJ	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	9,000,000	2.6E+07	--	<350 UJ	<310 UJ	--	--	--	--	--	--	--	--	--
BENZENE	71-43-2	510,000	840,000 (C,I)	--	<70 UJ	<61 UJ	--	--	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	8.2E+07	NA	--	<350 UJ	<310 UJ	--	--	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	2,500,000	7.1E+07 (C, I)	--	<70 UJ	<61 UJ	--	--	--	--	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	3.0E+07	8E+07 (C)	--	<70 UJ	<61 UJ	--	--	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	7,500,000	NA	--	210 J	<120 UJ	--	--	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	1,700,000	5.2E+07	--	<350 UJ	<310 UJ	--	--	--	--	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1.8E+08	8,000,000	--	<70 UJ	<61 UJ	--	--	--	--	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	7.3E+07	8,000,000 (I)	--	<70 UJ	<61 UJ	--	--	--	--	--	--	--	--	--
O-XYLENE	95-47-6	8,400,000	NA	--	150 J	<61 UJ	--	--	--	--	--	--	--	--	--
TOLUENE	108-88-3	1.4E+08	1.6E+08 (C,I)	--	190 J	<61 UJ	--	--	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	7,500,000	1E+09 (I)	--	360 J	ND	--	--	--	--	--	--	--	--	--
Asbestos (%)															
ASBESTOS	ASB	NA	ID	ND	ND	--	--	--	--	--	--	--	--	--	--

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

TABLE 3
SUMMARY OF SOIL, WASTE PILE, RESIDUAL PROCESSING MATERIAL, AND STACK DEBRIS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name	CAS Number	USEPA - RML Industrial Soil (Nov 2017)[a]	MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil[b]	CHLL-SB82		CHLL-SB107		CHLL-SB108		CHLL-SB165		CHLL-SB166			STACK DEBRIS	
Field Sample ID:				CHLL-SB 82 0-6"	CHLL-SB 82 6"-5'	CHLL-SB 107 0-6"	CHLL-SB 107 6"-3'	CHLL-SB 108 0-6"	CHLL-SB 108 6"-3'	CHLL-SB165 0"-6"	CHLL-SB165 6"-5'	CHLL-SB166 0"-6"	CHLL-SB166 6"-5'	CHLL-SB166 6"-5' DUP	CHLL-Stack-1	CHLL-Stack-2
Sample Date:				8/19/2014	8/19/2014	8/19/2014	8/19/2014	8/19/2014	8/19/2014	8/19/2015	8/19/2015	8/19/2015	8/19/2015	8/19/2015	10/23/2017	10/23/2017
Sample Interval (bgs):				0 - 0.5 ft	0.5 - 5 ft	0 - 0.5 ft	0.5 - 3 ft	0 - 0.5 ft	0.5 - 3 ft	0 - 0.5 ft	0.5 - 5 ft	0 - 0.5 ft	0.5 - 5 ft	0.5 - 5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:				SAND, Fine to medium grained, Gray	SAND, Fine to medium grained, Reddish brown	SAND, Medium grained, Brown	SAND, Medium grained, Brown to 3 ft; SAND, Medium grained, Reddish brown	SAND, Medium grained, Brown	SAND, Medium grained, Brown to 3 ft; SAND, Medium grained, Reddish brown	TOPSOIL	SAND, Brown, Fine to 1 ft; SAND, Reddish brown, Fine to medium	TOPSOIL	SAND, Light brown, Fine to 0.75 ft; SAND, Dark gray, Fine to medium; to 1 ft; SAND, Reddish brown, Fine to medium	Field Duplicate	Fine grained gray material	Fine grained light to dark gray material
Inorganics - Metals (mg/kg)																
ALUMINUM	7429-90-5	3,400,000	370,000 (DD)	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	1,400	670	--	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	300	37	--	--	--	--	--	--	--	--	--	--	--	7,100	1,200
BARIUM	7440-39-3	650,000	130,000	--	--	--	--	--	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	6,900	1,600	--	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	2,900	2,100	--	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	NA	1,000,000 (D,H)	--	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	1,000	9,000	--	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	140,000	73,000	--	--	--	--	--	--	--	--	--	--	--	--	--
IRON	7439-89-6	2,500,000	580,000	--	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	800	900 (DD)	--	--	--	--	--	--	--	--	--	--	--	620	2,500
LITHIUM	7439-93-2	7,000	31,000 (DD)	--	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	1,000,000 (D)	--	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	77,000	90,000	--	--	--	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	140	580 (Z)	--	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	67,000	150,000	--	--	--	--	--	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	18,000	9,600	--	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	18,000	9,000	--	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	17,000	5,500 (DD)	--	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	1,100,000	630,000	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)																
CYANIDE	57-12-5	NA	250 (P,R)	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)																
AROCLOR-1248	12672-29-6	95,000	NA	<110 U	<110 UJ	<240 U	<110 U	<110 U	<110 U	<110 U	<110 U	<100 U	<110 U	<110 U	<150 U	<1200 U
AROCLOR-1254	11097-69-1	44,000	NA	<110 U	220 J	<240 U	<110 U	<110 U	<110 U	<110 U	<160 U	<120 U	<110 U	<110 U	<150 U	<2300 U
AROCLOR-1260	11096-82-5	99,000	NA	<110 U	<260 UJ	<410 U	<110 U	<110 U	<110 U	<110 U	<250 U	<150 U	<110 U	<110 U	<150 U	<4600 U
AROCLOR-1262	37324-23-5	NA	NA	<110 U	260 J	<410 U	<110 U	<110 U	<110 U	<110 U	240	150	<110 U	<150 U	<150 U	<4600 U
AROCLOR-1268	11100-14-4	NA	NA	<110 U	<180 UJ	<240 U	<110 U	<110 U	<110 U	<110 U	<110 U	<100 U	<110 U	<110 U	180	<1200 U
TOTAL PCBS	TPCB	94,000	1000 (J)	ND	480 J	ND	ND	ND	ND	ND	240	150	ND	ND	180	ND
Organics - SVOCs (ug/kg)																
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,100,000	2.5E+08	--	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6	9,000,000	2.6E+07	--	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	1.4E+08	1.3E+08	--	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	NA	5,200,000	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 3
SUMMARY OF SOIL, WASTE PILE, RESIDUAL PROCESSING MATERIAL, AND STACK DEBRIS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name	CAS Number	USEPA - RML Industrial Soil (Nov 2017)[a]	MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil[b]	CHLL-SB82		CHLL-SB107		CHLL-SB108		CHLL-SB165		CHLL-SB166			STACK DEBRIS	
Field Sample ID:				CHLL-SB 82 0-6"	CHLL-SB 82 6"-5'	CHLL-SB 107 0-6"	CHLL-SB 107 6"-3'	CHLL-SB 108 0-6"	CHLL-SB 108 6"-3'	CHLL-SB165 0"-6"	CHLL-SB165 6"-5'	CHLL-SB166 0"-6"	CHLL-SB166 6"-5'	CHLL-SB166 6"-5' DUP	CHLL-Stack-1	CHLL-Stack-2
Sample Date:				8/19/2014	8/19/2014	8/19/2014	8/19/2014	8/19/2014	8/19/2014	8/19/2015	8/19/2015	8/19/2015	8/19/2015	8/19/2015	10/23/2017	10/23/2017
Sample Interval (bgs):				0 - 0.5 ft	0.5 - 5 ft	0 - 0.5 ft	0.5 - 3 ft	0 - 0.5 ft	0.5 - 3 ft	0 - 0.5 ft	0.5 - 5 ft	0 - 0.5 ft	0.5 - 5 ft	0.5 - 5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:				SAND, Fine to medium grained, Gray	SAND, Fine to medium grained, Reddish brown	SAND, Medium grained, Brown	SAND, Medium grained, Brown to 3 ft; SAND, Medium grained, Reddish brown	SAND, Medium grained, Brown	SAND, Medium grained, Brown to 3 ft; SAND, Medium grained, Reddish brown	TOPSOIL	SAND, Brown, Fine to 1 ft; SAND, Reddish brown, Fine to medium	TOPSOIL	SAND, Light brown, Fine to 0.75 ft; SAND, Dark gray, Fine to medium; to 1 ft; SAND, Reddish brown, Fine to medium	Field Duplicate	Fine grained gray material	Fine grained light to dark gray material
Organics - SVOCs (ug/kg) (cont'd)																
ACETOPHENONE	98-86-2	3.5E+08	1.5E+08 (C)	--	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	6.8E+08	7.3E+08	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	2,100,000	80,000 (Q)	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	210,000	8,000 (Q)	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	2,100,000	80,000 (Q)	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NA	7,000,000 (Q)	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	2.1E+07	800,000 (Q)	--	--	--	--	--	--	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	1.6E+07	1.2E+07 (C)	--	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	2,400,000	--	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	2.1E+08	8,000,000 (Q)	--	--	--	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	210,000	8,000 (Q)	--	--	--	--	--	--	--	--	--	--	--	--	--
DIBENZOFURAN	132-64-9	3,100,000	ID	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	9.0E+07	1.3E+08	--	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	9.0E+07	8.7E+07	--	--	--	--	--	--	--	--	--	--	--	--	--
HEXACHLOROBENZENE	118-74-1	96,000	37,000	--	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	2,100,000	80,000	--	--	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3	1,700,000	5.2E+07	--	--	--	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	NA	5,200,000	--	--	--	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	6.8E+07	8.4E+07	--	--	--	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)																
1,2,3-TRIMETHYLBENZENE	526-73-8	6,100,000	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	5,300,000	1E+08 (C,I)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	4,500,000	1E+08 (C,I)	--	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	9,000,000	2.6E+07	--	--	--	--	--	--	--	--	--	--	--	--	--
BENZENE	71-43-2	510,000	840,000 (C,I)	--	--	--	--	--	--	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	8.2E+07	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	2,500,000	7.1E+07 (C, I)	--	--	--	--	--	--	--	--	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	3.0E+07	8E+07 (C)	--	--	--	--	--	--	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	7,500,000	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	1,700,000	5.2E+07	--	--	--	--	--	--	--	--	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1.8E+08	8,000,000	--	--	--	--	--	--	--	--	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	7.3E+07	8,000,000 (I)	--	--	--	--	--	--	--	--	--	--	--	--	--
O-XYLENE	95-47-6	8,400,000	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
TOLUENE	108-88-3	1.4E+08	1.6E+08 (C,I)	--	--	--	--	--	--	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	7,500,000	1E+09 (I)	--	--	--	--	--	--	--	--	--	--	--	--	--
Asbestos (%)																
ASBESTOS	ASB	NA	ID	--	--	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 3
SUMMARY OF SOIL, WASTE PILE, RESIDUAL PROCESSING MATERIAL, AND STACK DEBRIS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name	CAS Number	USEPA - RML Industrial Soil (Nov 2017)[a]	MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil[b]	CHLL-WP01	CHLL-WP01		CHLL-WP02	CHLL-WP03	CHLL-WP09		CHLL-WP23		CHLL-WP27		
Field Sample ID:				CHLL-WP01-101514	CHLL-WP-01-1	CHLL-WP-01-2	CHLL-WP02-101514	CHLL-WP03-101514	CHLL-WP-09-1	CHLL-WP-09-2	CHLL-WP-23-1	CHLL-WP 23-2	CHLL-WP-27-1	CHLL-WP-27-2	CHLL-WP-27-3
Sample Date:				10/15/2014	8/21/2017	8/21/2017	10/15/2014	10/15/2014	8/21/2017	8/21/2017	8/21/2017	10/23/2017	8/21/2017	8/21/2017	8/21/2017
Sample Interval (bgs):				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:				SAND AND GRAVEL, Black * Waste pile (resampled as WP-11) has been removed	Black, oily, and blue crystalline material	Medium grained, light brown material	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	Dark soil, mixed with debris and charred wood	Blue-ish crystalline material	Darker stained soil	Dark brown soil mixed with debris	White, orange, black, coarse grained material mixed w/ brown soil and black debris	Orange granular material, saturated, mixed w/ brown soil, brick debris and roofing	Dark to light brown soil
Inorganics - Metals (mg/kg)															
ALUMINUM	7429-90-5	3,400,000	370,000 (DD)	--	--	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	1,400	670	--	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	300	37	77	110	150	92	100	43	58	270	120	130	410	190
BARIUM	7440-39-3	650,000	130,000	170	--	--	110	1,700 J	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	6,900	1,600	--	--	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	2,900	2,100	--	--	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	NA	1,000,000 (D,H)	--	--	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	1,000	9,000	--	--	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	140,000	73,000	7,800	--	--	25,000	22,000	--	--	--	--	--	--	--
IRON	7439-89-6	2,500,000	580,000	--	--	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	800	900 (DD)	1,800	460	1,400	1,100	2,200	630	1,100	450	1,300	1,900	1,700	740
LITHIUM	7439-93-2	7,000	31,000 (DD)	--	--	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	1,000,000 (D)	--	--	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	77,000	90,000	430	--	--	450	350	--	--	--	--	--	--	--
MERCURY	7439-97-6	140	580 (Z)	--	--	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	67,000	150,000	--	--	--	--	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	18,000	9,600	--	--	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	18,000	9,000	--	--	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	17,000	5,500 (DD)	--	--	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	1,100,000	630,000	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)															
CYANIDE	57-12-5	NA	250 (P,R)	<0.54 U	--	--	0.33	<0.55 U	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)															
AROCLOR-1248	12672-29-6	95,000	NA	<8500 UJ	<140 U	210 J	<280 UJ	<920 UJ	<120 U	<130 U	<130 U	<6400 U	<280 U	<140 U	<130 U
AROCLOR-1254	11097-69-1	44,000	NA	61,000 J	280	490 J	460 J	730 J	<120 U	<130 U	240 J	<5300 U	270 J	410 J	230 J
AROCLOR-1260	11096-82-5	99,000	NA	8,800 J	<140 U	310 J	150 J	840 J	<120 U	<130 U	290 J	<7000 U	<500 U	<470 U	<210 U
AROCLOR-1262	37324-23-5	NA	NA	<8900 UJ	<140 U	<310 U	<160 UJ	<850 UJ	<120 U	<130 U	<300 U	<7000 U	<500 U	<470 U	<210 U
AROCLOR-1268	11100-14-4	NA	NA	2,400 J	<140 U	<120 U	<130 UJ	<760 UJ	<120 U	<130 U	<110 U	<2900 U	<130 U	<140 U	<120 U
TOTAL PCBS	TPCB	94,000	1000 (J)	72,200 J	280	1,010 J	610 J	1,570 J	ND	ND	530 J	ND	270 J	410 J	230 J
Organics - SVOCs (ug/kg)															
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,100,000	2.5E+08	--	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6	9,000,000	2.6E+07	<560 UJ	--	--	<660 UJ	<7200 UJ	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	1.4E+08	1.3E+08	<220 U	--	--	<260 U	<2900 U	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	NA	5,200,000	<220 U	--	--	<260 U	<2900 U	--	--	--	--	--	--	--

TABLE 3
SUMMARY OF SOIL, WASTE PILE, RESIDUAL PROCESSING MATERIAL, AND STACK DEBRIS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name	CAS Number	USEPA - RML Industrial Soil (Nov 2017)[a]	MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil[b]	CHLL-WP01	CHLL-WP01		CHLL-WP02	CHLL-WP03	CHLL-WP09		CHLL-WP23		CHLL-WP27		
Field Sample ID:				CHLL-WP01-101514	CHLL-WP-01-1	CHLL-WP-01-2	CHLL-WP02-101514	CHLL-WP03-101514	CHLL-WP-09-1	CHLL-WP-09-2	CHLL-WP-23-1	CHLL-WP 23-2	CHLL-WP-27-1	CHLL-WP-27-2	CHLL-WP-27-3
Sample Date:				10/15/2014	8/21/2017	8/21/2017	10/15/2014	10/15/2014	8/21/2017	8/21/2017	8/21/2017	10/23/2017	8/21/2017	8/21/2017	8/21/2017
Sample Interval (bgs):				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Description:				SAND AND GRAVEL, Black * Waste pile (resampled as WP-11) has been removed	Black, oily, and blue crystalline material	Medium grained, light brown material	SAND AND GRAVEL, Black	SAND AND GRAVEL, Black	Dark soil, mixed with debris and charred wood	Blue-ish crystalline material	Darker stained soil	Dark brown soil mixed with debris	White, orange, black, coarse grained material mixed w/ brown soil and black debris	Orange granular material, saturated, mixed w/ brown soil, brick debris and roofing	Dark to light brown soil
Organics - SVOCs (ug/kg) (cont'd)															
ACETOPHENONE	98-86-2	3.5E+08	1.5E+08 (C)	--	--	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	6.8E+08	7.3E+08	<220 U	--	--	<260 U	<2900 U	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	2,100,000	80,000 (Q)	<220 U	--	--	690	3,600	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	210,000	8,000 (Q)	<440 U	--	--	590	<5700 U	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	2,100,000	80,000 (Q)	<440 U	--	--	1,100	6,100	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NA	7,000,000 (Q)	<440 U	--	--	<530 U	<5700 U	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	2.1E+07	800,000 (Q)	<440 U	--	--	<530 U	<5700 U	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	1.6E+07	1.2E+07 (C)	--	--	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	2,400,000	--	--	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	2.1E+08	8,000,000 (Q)	<220 U	--	--	920	3,900	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	210,000	8,000 (Q)	<440 U	--	--	<530 U	<5700 U	--	--	--	--	--	--	--
DIBENZOFURAN	132-64-9	3,100,000	ID	--	--	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	9.0E+07	1.3E+08	<220 U	--	--	1,800	8,200	--	--	--	--	--	--	--
FLUORENE	86-73-7	9.0E+07	8.7E+07	<220 U	--	--	<260 U	<2900 U	--	--	--	--	--	--	--
HEXACHLOROBENZENE	118-74-1	96,000	37,000	--	--	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	2,100,000	80,000	<440 U	--	--	<530 U	<5700 U	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3	1,700,000	5.2E+07	<220 UJ	--	--	270 J	<2900 UJ	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	NA	5,200,000	<220 U	--	--	1,200	3,100	--	--	--	--	--	--	--
PYRENE	129-00-0	6.8E+07	8.4E+07	<220 U	--	--	1,500	6,500	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)															
1,2,3-TRIMETHYLBENZENE	526-73-8	6,100,000	NA	<62 UJ	--	--	<95 UJ	370 J	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	5,300,000	1E+08 (C,I)	<62 UJ	--	--	<95 UJ	610 J	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	4,500,000	1E+08 (C,I)	<62 UJ	--	--	<95 UJ	110 J	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	9,000,000	2.6E+07	<310 UJ	--	--	<470 UJ	1,400 J	--	--	--	--	--	--	--
BENZENE	71-43-2	510,000	840,000 (C,I)	<62 UJ	--	--	<95 UJ	240 J	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	8.2E+07	NA	<310 UJ	--	--	<470 UJ	580 J	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	2,500,000	7.1E+07 (C, I)	<62 UJ	--	--	<95 UJ	300 J	--	--	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	3.0E+07	8E+07 (C)	<62 UJ	--	--	<95 UJ	75 J	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	7,500,000	NA	<120 UJ	--	--	<190 UJ	1,800 J	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	1,700,000	5.2E+07	<310 UJ	--	--	<470 UJ	1,500 J	--	--	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1.8E+08	8,000,000	<62 UJ	--	--	<95 UJ	79 J	--	--	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	7.3E+07	8,000,000 (I)	<62 UJ	--	--	<95 UJ	110 J	--	--	--	--	--	--	--
O-XYLENE	95-47-6	8,400,000	NA	61 J	--	--	<95 UJ	970 J	--	--	--	--	--	--	--
TOLUENE	108-88-3	1.4E+08	1.6E+08 (C,I)	93 J	--	--	<95 UJ	2,500 J	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	7,500,000	1E+09 (I)	61 J	--	--	ND	2,770 J	--	--	--	--	--	--	--
Asbestos (%)															
ASBESTOS	ASB	NA	ID	ND	--	--	ND	0.25 (CHRYSOTILE)	--	--	--	--	--	--	--

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

TABLE 3
SUMMARY OF SOIL, WASTE PILE, RESIDUAL PROCESSING MATERIAL, AND STACK DEBRIS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name	CAS Number	USEPA - RML Industrial Soil (Nov 2017)[a]	MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil[b]	CHLL-WP28				CHLL-WP32	CHLL-WP48			CHS-WM-01	CHS-WM-04
Field Sample ID:				CHLL-WP-28-1	CHLL-WP-28-2	CHLL-WP 28-3	CHLL-WP 28-4	CHLL-WP 32-1	CHLL-WP 48-1	CHLL-WP 48-2	CHLL-WP 48-3	CHS-WM-01-120717	CHS-WM-04-120717
Sample Date:				8/21/2017	8/21/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	12/7/2017	12/7/2017
Sample Interval (bgs):				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 2 in	0 - 2 in	0 - 2 in	--	--
Sample Description:				Dark brown soil, yellow/mustard brown clay-like seam	Dark brown soil w/ white clay-like material	Dark brown soil, mixed with debris	Dark brown soil, mixed with debris	White crystalline material	Brown sand with gravel	Brown sand with gravel	Brown sand with gravel	SAND, brown medium to coarse, mixed with metal debris and large cobbles	SAND, brown coarse, saturated, includes cobbles and pebbles
Inorganics - Metals (mg/kg)													
ALUMINUM	7429-90-5	3,400,000	370,000 (DD)	--	--	--	--	--	--	--	--	--	--
ANTIMONY	7440-36-0	1,400	670	--	--	--	--	--	--	--	--	--	--
ARSENIC	7440-38-2	300	37	200	170	73	120	2.7	75	650	28	--	--
BARIUM	7440-39-3	650,000	130,000	--	--	--	--	--	--	--	--	--	--
BERYLLIUM	7440-41-7	6,900	1,600	--	--	--	--	--	--	--	--	--	--
CADMIUM	7440-43-9	2,900	2,100	--	--	--	--	--	--	--	--	--	--
CALCIUM	7440-70-2	NA	NA	--	--	--	--	--	--	--	--	--	--
CHROMIUM	7440-47-3	NA	1,000,000 (D,H)	--	--	--	--	--	--	--	--	--	--
COBALT	7440-48-4	1,000	9,000	--	--	--	--	--	--	--	--	--	--
COPPER	7440-50-8	140,000	73,000	--	--	--	--	--	--	--	--	--	--
IRON	7439-89-6	2,500,000	580,000	--	--	--	--	--	--	--	--	--	--
LEAD	7439-92-1	800	900 (DD)	1,900	1,600	2,200	6,800	65	25,000	11,000	11,000	--	--
LITHIUM	7439-93-2	7,000	31,000 (DD)	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	1,000,000 (D)	--	--	--	--	--	--	--	--	--	--
MANGANESE	7439-96-5	77,000	90,000	--	--	--	--	--	--	--	--	--	--
MERCURY	7439-97-6	140	580 (Z)	--	--	--	--	--	--	--	--	--	--
NICKEL	7440-02-0	67,000	150,000	--	--	--	--	--	--	--	--	--	--
POTASSIUM	7440-09-7	NA	NA	--	--	--	--	--	--	--	--	--	--
SELENIUM	7782-49-2	18,000	9,600	--	--	--	--	--	--	--	--	--	--
SILVER	7440-22-4	18,000	9,000	--	--	--	--	--	--	--	--	--	--
SODIUM	7440-23-5	NA	NA	--	--	--	--	--	--	--	--	--	--
VANADIUM	7440-62-2	17,000	5,500 (DD)	--	--	--	--	--	--	--	--	--	--
ZINC	7440-66-6	1,100,000	630,000	--	--	--	--	--	--	--	--	--	--
Inorganics - Cyanide (mg/kg)													
CYANIDE	57-12-5	NA	250 (P,R)	--	--	--	--	--	--	--	--	--	--
Organics - PCBs (ug/kg)													
AROCLOR-1248	12672-29-6	95,000	NA	3,100 J	<670 U	<1900 U	<2700 U	<170 U	<1100 U	<1100 U	<100 U	<34 U	<160 U
AROCLOR-1254	11097-69-1	44,000	NA	3,100 J	<670 U	5,100 J	<2700 U	<170 U	<1200 U	<2000 U	<100 U	414	3,230
AROCLOR-1260	11096-82-5	99,000	NA	2,200 J	<670 U	<2700 U	<7000 U	<240 U	<1500 U	<5200 U	<100 U	245	<160 U
AROCLOR-1262	37324-23-5	NA	NA	<2300 U	<670 U	<2700 U	<7000 U	<240 U	<1500 U	<5200 U	<100 U	<34 U	659
AROCLOR-1268	11100-14-4	NA	NA	<1300 U	<670 U	<1100 U	<2700 U	<170 U	<1100 U	<1100 U	<100 U	<34 U	<160 U
TOTAL PCBS	TPCB	94,000	1000 (J)	8,400 J	ND	5,100 J	ND	ND	ND	ND	ND	660	3,900
Organics - SVOCs (ug/kg)													
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,100,000	2.5E+08	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (SVOC)	91-57-6	9,000,000	2.6E+07	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	1.4E+08	1.3E+08	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	NA	5,200,000	--	--	--	--	--	--	--	--	--	--

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C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name	CAS Number	USEPA - RML Industrial Soil (Nov 2017)[a]	MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil[b]	CHLL-WP28				CHLL-WP32	CHLL-WP48			CHS-WM-01	CHS-WM-04
Field Sample ID:				CHLL-WP-28-1	CHLL-WP-28-2	CHLL-WP 28-3	CHLL-WP 28-4	CHLL-WP 32-1	CHLL-WP 48-1	CHLL-WP 48-2	CHLL-WP 48-3	CHS-WM-01-120717	CHS-WM-04-120717
Sample Date:				8/21/2017	8/21/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	12/7/2017	12/7/2017
Sample Interval (bgs):				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 2 in	0 - 2 in	0 - 2 in	--	--
Sample Description:				Dark brown soil, yellow/mustard brown clay-like seam	Dark brown soil w/ white clay-like material	Dark brown soil, mixed with debris	Dark brown soil, mixed with debris	White crystalline material	Brown sand with gravel	Brown sand with gravel	Brown sand with gravel	SAND, brown medium to coarse, mixed with metal debris and large cobbles	SAND, brown coarse, saturated, includes cobbles and pebbles
Organics - SVOCs (ug/kg) (cont'd)													
ACETOPHENONE	98-86-2	3.5E+08	1.5E+08 (C)	--	--	--	--	--	--	--	--	--	--
ANTHRACENE	120-12-7	6.8E+08	7.3E+08	--	--	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	2,100,000	80,000 (Q)	--	--	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	210,000	8,000 (Q)	--	--	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	2,100,000	80,000 (Q)	--	--	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	NA	7,000,000 (Q)	--	--	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	2.1E+07	800,000 (Q)	--	--	--	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	1.6E+07	1.2E+07 (C)	--	--	--	--	--	--	--	--	--	--
CARBAZOLE	86-74-8	NA	2,400,000	--	--	--	--	--	--	--	--	--	--
CHRYSENE	218-01-9	2.1E+08	8,000,000 (Q)	--	--	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	210,000	8,000 (Q)	--	--	--	--	--	--	--	--	--	--
DIBENZOFURAN	132-64-9	3,100,000	ID	--	--	--	--	--	--	--	--	--	--
FLUORANTHENE	206-44-0	9.0E+07	1.3E+08	--	--	--	--	--	--	--	--	--	--
FLUORENE	86-73-7	9.0E+07	8.7E+07	--	--	--	--	--	--	--	--	--	--
HEXACHLOROBENZENE	118-74-1	96,000	37,000	--	--	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	2,100,000	80,000	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (SVOC)	91-20-3	1,700,000	5.2E+07	--	--	--	--	--	--	--	--	--	--
PHENANTHRENE	85-01-8	NA	5,200,000	--	--	--	--	--	--	--	--	--	--
PYRENE	129-00-0	6.8E+07	8.4E+07	--	--	--	--	--	--	--	--	--	--
Organics - VOCs (ug/kg)													
1,2,3-TRIMETHYLBENZENE	526-73-8	6,100,000	NA	--	--	--	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	5,300,000	1E+08 (C,I)	--	--	--	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	4,500,000	1E+08 (C,I)	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	9,000,000	2.6E+07	--	--	--	--	--	--	--	--	--	--
BENZENE	71-43-2	510,000	840,000 (C,I)	--	--	--	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	8.2E+07	NA	--	--	--	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	2,500,000	7.1E+07 (C, I)	--	--	--	--	--	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	3.0E+07	8E+07 (C)	--	--	--	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	7,500,000	NA	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	1,700,000	5.2E+07	--	--	--	--	--	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1.8E+08	8,000,000	--	--	--	--	--	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	7.3E+07	8,000,000 (I)	--	--	--	--	--	--	--	--	--	--
O-XYLENE	95-47-6	8,400,000	NA	--	--	--	--	--	--	--	--	--	--
TOLUENE	108-88-3	1.4E+08	1.6E+08 (C,I)	--	--	--	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	7,500,000	1E+09 (I)	--	--	--	--	--	--	--	--	--	--
Asbestos (%)													
ASBESTOS	ASB	NA	ID	--	--	--	--	--	--	--	--	--	--

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C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name	CAS Number	USEPA - RML Industrial Soil (Nov 2017)[a]	MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil[b]	CHS-WM-05	CHS-WM-06		MineralB-11	MineralB-6	SB-11	SB-12	SB-14	SS-18	SS-19	SS-20
Field Sample ID:				CHS-WM-05-120717	CHS-WM-06-120717	CHS-WM-06-120717-DP	Mineral XRF11	Mineral XRF6	SB-11	SB-12	SB-14	SS-18	SS-19	SS-20
Sample Date:				12/7/2017	12/7/2017	12/7/2017	9/7/2007	9/7/2007	10/11/2011	10/11/2011	10/11/2011	10/11/2011	10/11/2011	10/11/2011
Sample Interval (bgs):				--	--	--	0 - 0 in	0 - 0 in	0 - 16 in	6 - 12 in	0 - 14 in	0 - 6 in	0 - 4 in	0 - 0.75 in
Sample Description:				SAND, dark brown, coarse, top 3 inches frozen, mixed with roofing debris and wood	SAND, dark brown/black, coarse	Field Duplicate	--	--	--	--	--	--	--	--
Inorganics - Metals (mg/kg)														
ALUMINUM	7429-90-5	3,400,000	370,000 (DD)	--	--	--	6,200 J	3,200 J	2,670	2,930	2,010	10600 J	8,660	8,260
ANTIMONY	7440-36-0	1,400	670	--	--	--	--	--	1.5 J	0.71 J	1.4 J	80.2	13.2	4.8 J
ARSENIC	7440-38-2	300	37	--	--	--	52	230	27.1 J-	8.6 J-	41.5 J	1,220	5600 J	66.9 J
BARIUM	7440-39-3	650,000	130,000	--	--	--	--	--	43.9	69.1	33.8	291 J	212	434
BERYLLIUM	7440-41-7	6,900	1,600	--	--	--	0.5 J	<3.2 U	0.3 J	0.37 J	0.27 J	1.2	3.6	1.5
CADMIUM	7440-43-9	2,900	2,100	--	--	--	--	--	0.73	0.66	0.8	5.8	96.3	11.4
CALCIUM	7440-70-2	NA	NA	--	--	--	--	--	1,720	3,620	1,240	21100 J	2,220	26,800
CHROMIUM	7440-47-3	NA	1,000,000 (D,H)	--	--	--	6.9 J	56	9.3	10	14.6	244	37.7	56.6
COBALT	7440-48-4	1,000	9,000	--	--	--	6.9	48	2.6 J	3.8 J	<5.0 U	8.8	<5.0 U	9
COPPER	7440-50-8	140,000	73,000	--	--	--	17,000	44,000	6,600	3,660	14,300 J	26,900 J	199,000 J	20,300 J
IRON	7439-89-6	2,500,000	580,000	--	--	--	--	--	8,090	10,300	6,170	31,500 J	4,380	92,200
LEAD	7439-92-1	800	900 (DD)	--	--	--	280	1,900	54.7	16.6	83	715	1,610	1,010
LITHIUM	7439-93-2	7,000	31,000 (DD)	--	--	--	4.7	<0.64 U	--	--	--	--	--	--
MAGNESIUM	7439-95-4	NA	1,000,000 (D)	--	--	--	--	--	1,650	1,590	1,240	5,270	<500 U	6,050
MANGANESE	7439-96-5	77,000	90,000	--	--	--	180	73	105	246	82.4	306 J	31.4	596
MERCURY	7439-97-6	140	580 (Z)	--	--	--	0.1	0.022	0.058 J	0.018 J	0.041 J	0.21 J-	20.8	1.7
NICKEL	7440-02-0	67,000	150,000	--	--	--	24	540	8.2	7	9.9	49.4	95.3	31.5
POTASSIUM	7440-09-7	NA	NA	--	--	--	--	--	<500 U	<500 U	<500 U	1,190	1,380	727
SELENIUM	7782-49-2	18,000	9,600	--	--	--	--	--	<3.5 U	0.33 J	0.44 J-	<3.5 U	69.3	<3.5 U
SILVER	7440-22-4	18,000	9,000	--	--	--	5.0	9.0	1.7	1	3.9	9.5	45.5	11.8
SODIUM	7440-23-5	NA	NA	--	--	--	--	--	198 J	165 J	132 J	3,930	1,390	887
VANADIUM	7440-62-2	17,000	5,500 (DD)	--	--	--	--	--	18.3	25.9	10.4	39.7 J	30.2	31.7
ZINC	7440-66-6	1,100,000	630,000	--	--	--	490 J	5,400 J	78.7	35.2	181	1310 J	14,800	3,050
Inorganics - Cyanide (mg/kg)														
CYANIDE	57-12-5	NA	250 (P,R)	--	--	--	--	--	<0.5 UJ	0.13 J	0.15 J	1.9	0.24 J	0.14 J
Organics - PCBs (ug/kg)														
AROCLOR-1248	12672-29-6	95,000	NA	<360 U	1,610 J+	2,180	<68 U	<70 U	<35 U	<38 U	<35 U	<35 U	<57 U	<33 U
AROCLOR-1254	11097-69-1	44,000	NA	5,460	<170 U	<190 U	<68 U	<70 U	23 J	<38 U	<35 U	490	<57 U	30 J
AROCLOR-1260	11096-82-5	99,000	NA	826	1,060 J+	1,040	<68 U	<70 U	21 J	<38 U	<35 U	540	<57 U	28 J
AROCLOR-1262	37324-23-5	NA	NA	<360 U	<170 U	<190 U	24 J	<70 U	<35 U	<38 U	<35 U	<35 U	<57 U	<33 U
AROCLOR-1268	11100-14-4	NA	NA	<360 U	<170 U	<190 U	--	--	<35 U	<38 U	<35 U	<35 U	<57 U	<33 U
TOTAL PCBS	TPCB	94,000	1000 (J)	6,300	2,700 J+	3,200	24 J	ND	44	ND	ND	ND	ND	58
Organics - SVOCs (ug/kg)														
1,2,4,5-TETRACHLOROBENZENE	95-94-3	1,100,000	2.5E+08	--	--	--	--	--	<170 U	<170 U	<170 U	<170 U	290 J	<170 U
2-METHYLNAPHTHALENE (SVOC)	91-57-6	9,000,000	2.6E+07	--	--	--	--	--	<170 U	250	<170 U	170 J	<170 U	<170 U
ACENAPHTHENE	83-32-9	1.4E+08	1.3E+08	--	--	--	--	--	<170 U	<170 U	<170 U	380	<170 U	<170 U
ACENAPHTHYLENE	208-96-8	NA	5,200,000	--	--	--	--	--	<170 U	<170 U	<170 U	<170 U	<170 U	130 J

TABLE 3
SUMMARY OF SOIL, WASTE PILE, RESIDUAL PROCESSING MATERIAL, AND STACK DEBRIS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name	CAS Number	USEPA - RML Industrial Soil (Nov 2017)[a]	MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil[b]	CHS-WM-05	CHS-WM-06		MineralB-11	MineralB-6	SB-11	SB-12	SB-14	SS-18	SS-19	SS-20
Field Sample ID:				CHS-WM-05-120717	CHS-WM-06-120717	CHS-WM-06-120717-DP	Mineral XRF11	Mineral XRF6	SB-11	SB-12	SB-14	SS-18	SS-19	SS-20
Sample Date:				12/7/2017	12/7/2017	12/7/2017	9/7/2007	9/7/2007	10/11/2011	10/11/2011	10/11/2011	10/11/2011	10/11/2011	10/11/2011
Sample Interval (bgs):				--	--	--	0 - 0 in	0 - 0 in	0 - 16 in	6 - 12 in	0 - 14 in	0 - 6 in	0 - 4 in	0 - 0.75 in
Sample Description:				SAND, dark brown, coarse, top 3 inches frozen, mixed with roofing debris and wood	SAND, dark brown/black, coarse	Field Duplicate	--	--	--	--	--	--	--	--
Organics - SVOCs (ug/kg) (cont'd)														
ACETOPHENONE	98-86-2	3.5E+08	1.5E+08 (C)	--	--	--	--	--	<170 U	<170 U	<170 U	<170 U	<170 U	220
ANTHRACENE	120-12-7	6.8E+08	7.3E+08	--	--	--	--	--	<170 U	<170 U	<170 U	800	<170 U	<170 U
BENZO(A)ANTHRACENE	56-55-3	2,100,000	80,000 (Q)	--	--	--	--	--	<170 U	<170 U	<170 U	1,500 J	<170 UJ	680
BENZO(A)PYRENE	50-32-8	210,000	8,000 (Q)	--	--	--	--	--	<170 U	<170 U	<170 U	1,300 J	<170 UJ	600
BENZO(B)FLUORANTHENE	205-99-2	2,100,000	80,000 (Q)	--	--	--	--	--	<170 U	<170 U	<170 U	<170 UJ	<170 UJ	860
BENZO(G,H,I)PERYLENE	191-24-2	NA	7,000,000 (Q)	--	--	--	--	--	<170 U	<170 U	<170 U	640 J	<170 UJ	420
BENZO(K)FLUORANTHENE	207-08-9	2.1E+07	800,000 (Q)	--	--	--	--	--	<170 U	<170 U	<170 U	1,300 J	<170 UJ	770
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	1.6E+07	1.2E+07 (C)	--	--	--	--	--	<170 U	<170 U	<170 U	94 J	580	<170 U
CARBAZOLE	86-74-8	NA	2,400,000	--	--	--	--	--	<170 U	<170 U	<170 U	330 J	<170 U	84 J
CHRYSENE	218-01-9	2.1E+08	8,000,000 (Q)	--	--	--	--	--	<170 U	<170 U	96 J	1,700 J	<170 UJ	980
DIBENZO(A,H)ANTHRACENE	53-70-3	210,000	8,000 (Q)	--	--	--	--	--	<170 U	<170 U	<170 U	300 J	<170 UJ	160 J
DIBENZOFURAN	132-64-9	3,100,000	ID	--	--	--	--	--	<170 U	<170 U	<170 U	220 J	<170 U	<170 U
FLUORANTHENE	206-44-0	9.0E+07	1.3E+08	--	--	--	--	--	<170 UJ	140 J	<170 U	5,200 J	<170 UJ	1700 J
FLUORENE	86-73-7	9.0E+07	8.7E+07	--	--	--	--	--	<170 U	<170 U	<170 U	320 J	<170 U	<170 U
HEXACHLOROBENZENE	118-74-1	96,000	37,000	--	--	--	--	--	<170 U	<170 U	<170 U	<170 U	850	<170 U
INDENO(1,2,3-CD)PYRENE	193-39-5	2,100,000	80,000	--	--	--	--	--	<170 U	<170 U	<170 U	<170 UJ	<170 UJ	420
NAPHTHALENE (SVOC)	91-20-3	1,700,000	5.2E+07	--	--	--	--	--	<170 U	150 J	<170 U	150 J	<170 U	<170 U
PHENANTHRENE	85-01-8	NA	5,200,000	--	--	--	--	--	<170 U	180 J	<170 U	4,400	<170 U	280
PYRENE	129-00-0	6.8E+07	8.4E+07	--	--	--	--	--	<170 U	130 J	<170 UJ	4,000	<170 UJ	1,300
Organics - VOCs (ug/kg)														
1,2,3-TRIMETHYLBENZENE	526-73-8	6,100,000	NA	--	--	--	--	--	--	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	95-63-6	5,300,000	1E+08 (C,I)	--	--	--	--	--	--	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	108-67-8	4,500,000	1E+08 (C,I)	--	--	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE (VOC)	91-57-6	9,000,000	2.6E+07	--	--	--	--	--	--	--	--	--	--	--
BENZENE	71-43-2	510,000	840,000 (C,I)	--	--	--	--	--	--	--	--	--	--	--
CYCLOHEXANE	110-82-7	8.2E+07	NA	--	--	--	--	--	--	--	--	--	--	--
ETHYLBENZENE	100-41-4	2,500,000	7.1E+07 (C, I)	--	--	--	--	--	--	--	--	--	--	--
ISOPROPYLBENZENE	98-82-8	3.0E+07	8E+07 (C)	--	--	--	--	--	--	--	--	--	--	--
M,P-XYLENE	1330-20-7	7,500,000	NA	--	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE (VOC)	91-20-3	1,700,000	5.2E+07	--	--	--	--	--	--	--	--	--	--	--
N-BUTYLBENZENE	104-51-8	1.8E+08	8,000,000	--	--	--	--	--	--	--	--	--	--	--
N-PROPYLBENZENE	103-65-1	7.3E+07	8,000,000 (I)	--	--	--	--	--	--	--	--	--	--	--
O-XYLENE	95-47-6	8,400,000	NA	--	--	--	--	--	--	--	--	--	--	--
TOLUENE	108-88-3	1.4E+08	1.6E+08 (C,I)	--	--	--	--	--	--	--	--	--	--	--
XYLENE - TOTAL	1330-20-7	7,500,000	1E+09 (I)	--	--	--	--	--	--	--	--	--	--	--
Asbestos (%)														
ASBESTOS	ASB	NA	ID	--	--	--	--	--	--	--	--	--	--	--

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

TABLE 3
SUMMARY OF SOIL, WASTE PILE, RESIDUAL PROCESSING MATERIAL, AND STACK DEBRIS ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Note: Only detected analytes are showned.

[a]EPA Removal Management Levels for Chemicals (RMLs), dated November 2017

[b]MDEQ Part 201 Nonresidential Direct Contact Cleanup Criteria (DCC) for Response Activity, dated December 30, 2013

EPA RML using 10-4 risk level for carcinogens or a Hazard Quotient (HQ) of 3 for non-carcinogens

Bold values indicate detected concentrations.

Shaded values exceed the EPA RML.

Bold borders indicate values exceed MDEQ Part 201 Nonresidential Direct Contact Criteria for Soil.

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

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

-- = Not analyzed

bgs = Below ground surface

in = Inches

ft = Feet

mg/kg = Milligrams per kilogram.

ug/kg = Micrograms per kilogram

PCBs = Polychlorinated biphenyls

SVOC = Semi-volatile organic compound

VOC = Volatile organic compound

Criteria Footnotes

ID = Insufficient data to develop criterion.

NA = A criterion or value is not available

(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.

(H) = Valence-specific chromium data (Cr III and Cr VI) shall be compared to the corresponding valence-specific cleanup criteria. If both Cr III and Cr VI are present in groundwater, the total concentration of both cannot exceed the drinking water criterion of 100 ug/L. If analytical data are provided for total chromium only, they shall be compared to the cleanup criteria for Cr VI. Cr III soil cleanup criterion for protection of drinking water can only be used at sites where groundwater is prevented from being used as a public water supply, currently and in the future, through an approved land or resource use restriction.

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

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

(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.

(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 = The analyte was positiviely identified; the associated value is the approximate concentration of the analyte in the sample.

J- = The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample and may be biased low.

J+ = The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample and may be biased high.

U = The analyte was analyzed for, but was not detected at or above the associated value (reporting limit).

UJ = The analyte was analyzed for, but not detected. The reported quantitation limit is approximate.

ND = Not detected

TABLE 4
SUMMARY OF WASTE PILE CHARACTERIZATION ANALYTICAL RESULTS
C&H MINERAL BUILDING - RS SITE
HUBBELL, HOUGHTON COUNTY, MICHIGAN

Station Name		Hazardous Waste Toxicity Value	STACK DEBRIS		CHLL-WP01	CHLL-WP23	CHLL-WP27	CHLL-WP28			CHLL-WP48			CHS-WM-02	CHS-WM-03	CHS-WM-07		CHS-WM-08
Field Sample ID:			CHLL-Stack-1	CHLL-Stack-2	CHLL-WP01-2	CHLL-WP23-2	CHLL-WP27-1	CHLL-WP28-1	CHLL-WP28-3	CHLL-WP28-4	CHLL-WP48-1	CHLL-WP48-2	CHLL-WP48-3	CHS-WM-02-120717	CHS-WM-03-120717	CHS-WM-07-120717	CHS-WM-07-120717-DP	CHS-WM-08-120717
Sample Date:			10/23/2017	10/23/2017	8/21/2017	10/23/2017	8/21/2017	8/21/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	10/23/2017	12/7/2017	12/7/2017	12/7/2017	12/7/2017	12/7/2017
Chemical Name	Unit																Field Duplicate	
Inorganics, TCLP																		
Arsenic, TCLP	mg/L	5.0	1.4	<0.05 UJ	<0.05 U	<0.05 UJ	<0.05 U	<0.05 U	<0.05 UJ	<0.05 U	<0.05 UJ	0.066	<0.05 U	--	--	--	--	--
Lead, TCLP	mg/L	5.0	0.2	7.3	1.1	5	10	1.3	28	37	800	310	390	690 J	230	9.3	8.9	4.6

Notes:

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

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

TCLP = Toxicity Characteristic Leaching Procedure

mg/L = Milligram per liter

U = The analyte was analyzed for, but was not detected at or above the associated value (reporting limit).

J = The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample.

UJ = The analyte was analyzed for, but not detected. The reported quantitation limit is approximate.

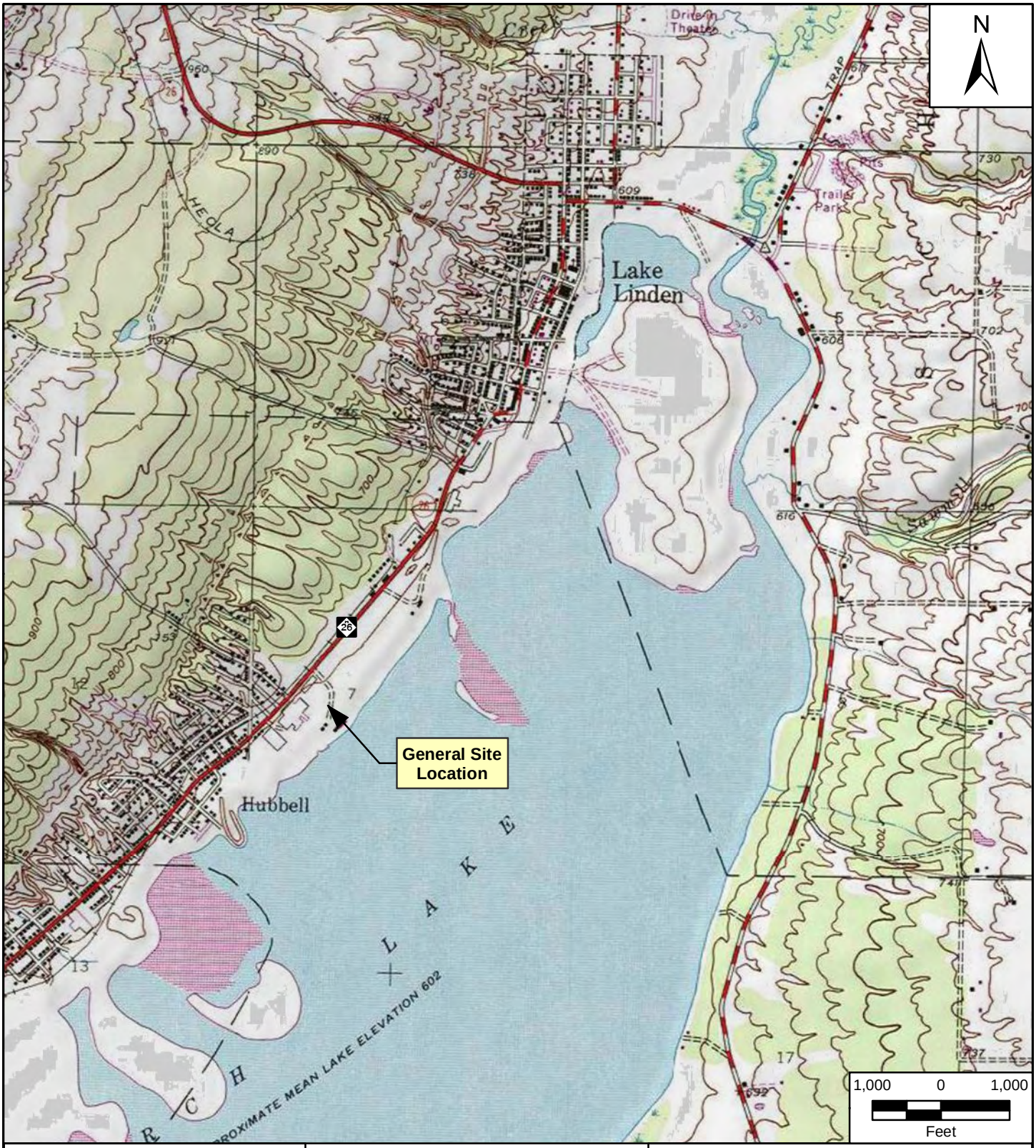
TABLE 5
WASTE AND DEBRIS PILE MANAGEMENT METHODS
C&H Mineral Building Site - RS
Hubbell, Houghton County, Michigan

Waste Pile Identification	Pile Description	General Category				Waste Characterization					Approximate Area (square feet)	Estimated Volume (cubic yards)	Management Method			
		Mining Era Waste and Debris	Construction and Demolition	Road Work	Woody	Non-Regulated Material	Hazardous Waste	Non-Hazardous Waste	Known to Contain Asbestos	Unknown - Requires Characterization			Consolidate and Cap	Possibly Suitable as Fill Material Beneath Cap	Remove and Dispose	Woody Debris, Consolidate, Not Capped
Mineral Building Property																
WP-01	Soil, slag, concrete, wastes, and building materials. Appears "industrial".	X	X					X			10,466	1,102			X	
WP-02	Fire brick, metal, wood, concrete, and older appearing debris mixed with soil	X	X							X	636	36			X	
WP-03	Concrete slabs		X			X					1,018	15	X			
WP-04	Refractory	X								X	95	1			X	
WP-05	Soil, rusted metal, wood, and corrugated paper	X	X							X	535	25			X	
WP-06	Soil and clay pipe pieces		X							X	1,063	58	X			
WP-07	Large concrete pieces (footers and base supports)		X			X					2,823	61	X			
WP-08	Wood, steel, and circuit board debris	X	X							X	147	1			X	
WP-09	Soil, rusted metal, fiberglass cloth, and charred wood	X	X					X			736	14			X	
WP-10	Brick, much of which has a partial black coating, along with concrete, metal, and wood pieces	X	X							X	3,417	32	X			
WP-12	Asphalt and concrete			X		X					309	11	X			
WP-13	Gravel, asphalt, and concrete			X		X					11,497	822		X		
WP-14	Milled asphalt			X		X					2,991	206	X			
WP-15	Burnt wood, metal, and miscellaneous surface debris		X		X					X	1,323	5	X			
WP-16	Logs and wood timbers				X	X					637	15				X
WP-17	Concrete pieces, wood, bricks, slag, and metal mixed with soil	X	X							X	1,512	97	X			
WP-18	Mostly slag with some soil and gravel	X								X	609	12	X			
WP-19	Wood, stumps, and soil				X	X					1,933	40	X			
WP-20	Slag and gravel	X								X	841	62		X		
WP-21	Primarily asphalt with at least one area of gravel, soil, and concrete			X		X					3,634	132	X			
WP-22	Mostly soil and stamp sand with concrete pieces and some steel	X	X							X	4,522	319		X		
WP-23	Soil, concrete, roofing, metal, and other industrial debris	X	X					X	X		1,306	109			X	
WP-24	Slag, gravel, wood, concrete, clay pipe pieces, cable, and wire	X	X							X	331	15	X			
WP-25	Concrete slabs		X			X					389	10	X			
WP-26	Asphalt pieces			X		X					844	21	X			
WP-27	Fire brick, slag, steel, and concrete pieces	X	X				X		X		1,820	75			X	
WP-28	Concrete, wood, metal, soil, fire brick, and transite pieces	X	X				X		X		2,989	236			X	
WP-29	Soil, stamp sand, concrete bases, and steel pieces		X							X	7,066	309		X		
WP-30	Gravel, soil, concrete, and asphalt pieces		X			X					11,880	569		X		
WP-31	Soil with metal and wood pieces		X							X	500	40		X		
WP-32	Primarily coal, slag, and concrete refractory	X	X							X	155	5	X			
WP-33	Limestone					X					519	7		X		
WP-45	Refractory	X	X							X	123	1			X	
WP-46	Concrete pieces		X			X					50	3	X			
WP-48	Waste pile residual, primarily fine to medium grained sand with some wood and metal debris, and deteriorated corrugated cardboard	X					X				27,828	1,031			X	
Stack Debris	Concrete, brick, refractory, some with black coating	X	X				X		X		19,700	2,810			X	
Subtotal approximate cubic yards by category:		5,983	5,947	1,192	60	1,912	4,152	1,225	3,230	1,018	8,307	723	2,128	5,441	15	
Subtotal approximate tons by category, at 1.5 tons/cubic yard:		8,974	8,920	1,788	90	2,868	6,228	1,838	4,845	1,526	12,460	1,085	3,192	8,161	23	

Note that the total volume or tonnage by category may exceed the sum for all piles since some waste piles fit more than one General or Waste Characterization category.

APPENDIX A

FIGURES



C&H Mineral Building - RS Site
Hubbell, Michigan

Figure 1

Site Location

Base Map Source: ESRI USA Topo Maps map service

EPA Contract No.: EP-S5-13-01
TDD No.: 0001/S05-0001-1711-007

TETRA TECH

Prepared For: USEPA | Prepared By: KRB - MSG

File Path: H:\GIS_Projects\T1130082_CHMinBldg\mxds\DRAFT\Fig01_Site_Location_v20171222.mxd

Date Saved: 12/22/2017

Coordinate System: NAD_1983_StatePlane_Michigan_North_FIPS_2111_Feet_Intl

Legend

Mining Era Buildings and Structures

Source of Aerial Photograph: MIS - Public Imagery and ESRI World Imagery (NAIP 2014)

EPA Contract No.: EP-S5-13-01

TDD No.: 0001/S05-0001-1711-007

N

0 450 900

Feet

C&H Mineral Building - RS Site
Hubbell, Michigan

Figure 2

Site Layout

TETRA TECH

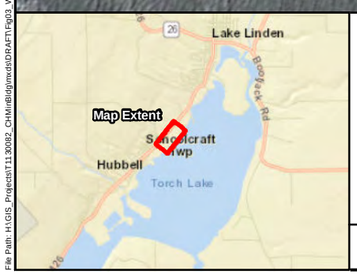
Prepared For: USEPA

Prepared By: KRB - MSG

Coordinate System: NAD_1983_StatePlane_Michigan_North_FIPS_2111_Feet_Intl

File Path: H:\GIS_Projects\T1130082_CHMineBldgs\mxds\DRAFT\Fig02_Site_Layout_v20171222.mxd

Date Saved: 12/22/2017



Legend

- Fence
- Property Boundary
- Waste Pile Boundary
- Removed Waste Pile
- Stack Debris Pile

Notes:
- The residual impact boundary for WP-48 is estimated

EPA Contract No.: EP-S5-13-01
TDD No.: 0001/S05-0001-1711-007

0 70 140
Feet

C&H Mineral Building - RS Site
Hubbell, Michigan

Figure 3

Waste and Debris Pile Locations

TETRA TECH

Prepared For: USEPA
Prepared By: KRB - MSG

Coordinate System: NAD_1983_StatePlane_Michigan_North_FIPS_2111_Feet_Intl

File Path: H:\GIS_Projects\T1130982_CHMinBldg\mxds\DR4FT\Fig03_Waste_and_Debris_Pile_Locations_v20180117.mxd

Date Saved: 1/17/2018

CHLL-ASBBLK66 &
CHS-ACBM-01-120717

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

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

CHS-ACBM-03-120717
GRAY TSI W/ CARBOARD UNDERNEATH - *FRIABLE*
ASBESTOS-CHRYSOTILE 50-60%

APPROXIMATE AREA OF JULY 12, 2017 DEQ
AQD POSITIVE ACBM SAMPLE LOCATIONS
(9 out of 10 samples were positive for asbestos)

ACBM IN ROW

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

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

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

CHLL-ASBBLK65A
CHLL-ASBBLK65B
CHS-ACBM-01-120717

STACK DEBRIS

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

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

CHS-ACBM-04-120717
WHITE/GRAY WOVEN GASKET MATERIAL - *FRIABLE*
ASBESTOS-CHRYSOTILE 60-70%

CHLL-ASBBLK71A
CHLL-ASBBLK71B
CHLL-ASBBLK71C

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

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

CHLL-ASBBLK76 &
CHS-ACBM-04-120717

CHLL-ASBBLK31A 10/15/2017
BLACK, TAR-LIKE COATING ON CONCRETE STACK COMPONENTS, DAMAGED - *FRIABLE*
ASBESTOS-CHRYSOTILE 15%

CHLL-ASBBLK31B 10/15/2017
BLACK, TAR-LIKE COATING ON CONCRETE STACK COMPONENTS, DAMAGED - *FRIABLE*
ASBESTOS-CHRYSOTILE 15%

CHLL-ASBBLK31C 10/15/2017
BLACK, TAR-LIKE COATING ON CONCRETE STACK COMPONENTS, DAMAGED - *FRIABLE*
ASBESTOS-CHRYSOTILE 15%

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

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

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

CHLL-ASBBLK74

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

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

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

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

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

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

CHLL-ASBBLK70

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

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

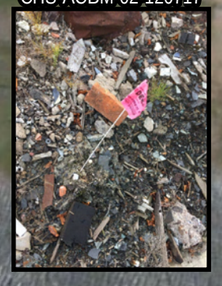
CHLL-ASBBLK73C 10/23/2017
WHITE W/ GREEN FIBROUS MATERIAL - *FRIABLE*
ASBESTOS-CHRYSOTILE 40%

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

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

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

CHLL-ASBBLK75 &
CHS-ACBM-02-120717



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

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

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

CHS-ACBM-02-120717
WHITE/BROWN TSI - *FRIABLE*
ASBESTOS-CHRYSOTILE 60-70%

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

CHLL-ASBBLK77A
CHLL-ASBBLK77B

MINERAL BUILDING PROPERTY PANORAMA

Bulk Asbestos Sample Locations

- Detected Greater than 1%
- Detected Less than 1%
- Not Detected

- MDEQ AQD Sample Location Area
- Waste Pile Boundary
- Removed Waste Pile
- Stack Debris Pile

× — × · Fence

Property Boundary

Notes:
- Sample locations positive for asbestos and not shown were removed in 2016.
- Non-detect samples from 2014 are not shown.
- Asbestos Containing Material (ACM) are materials containing greater than 1% asbestos, as defined and regulated by the EPA per 40 CFR Part 61, Subpart M and MIOSHA/OHSA 29 CFR 1926.1101

EPA Contract No.: EP-S5-13-01
TDD No.: 0001/S05-0001-1711-007

0 70 140
Feet

C&H Mineral Building - RS Site
Hubbell, Michigan

Figure 4

Asbestos Analytical Results Map

TETRA TECH

Prepared For: USEPA
Prepared By: KRB - MSG

Coordinate System: NAD_1983_StatePlane_Michigan_North_FIPS_2111_Feet_Intl

Date Saved: 1/17/2018

File Path: H:\GIS_Projects\T1130082_CHMineBldg\mxds\DRAFT\Fig04_Asbestos_Results_x20180117.mxd

SS-19 10/11/2011
0-4" ARSENIC 5600 J mg/kg [DCC, RML]
0-4" COPPER 199000 J mg/kg [DCC, RML]
0-4" LEAD 1610 mg/kg [DCC, RML]

MineralB-6 9/7/2007
ARSENIC 230 mg/kg [DCC]
LEAD 1900 mg/kg [DCC, RML]

CHLL-WP28-1 8/21/2017
ARSENIC 200 mg/kg [DCC]
LEAD 1900 mg/kg [DCC, RML]
TOTAL PCBS 8400 J ug/kg [DCC]

CHLL-STACK-1 10/23/2017
ARSENIC 7100 mg/kg [DCC, RML]

CHLL-WP03 10/15/2014
0-0.5' ARSENIC 100 mg/kg [DCC]
0-0.5' LEAD 2200 mg/kg [DCC, RML]
0-0.5' TOTAL PCBS 1570 J ug/kg [DCC]

SS-20 10/11/2011
0-0.75' ARSENIC 66.9 J mg/kg [DCC]
0-0.75' LEAD 1010 mg/kg [DCC, RML]

CHLL-WP27-2 8/21/2017
ARSENIC 410 mg/kg [DCC, RML]
LEAD 1700 mg/kg [DCC, RML]

CHLL-WP27-3 8/21/2017
ARSENIC 190 mg/kg [DCC]

CHLL-WP27-1 8/21/2017
ARSENIC 130 mg/kg [DCC]
LEAD 1900 mg/kg [DCC, RML]

CHLL-STACK-2 10/23/2017
ARSENIC 1200 mg/kg [DCC, RML]
LEAD 2500 mg/kg [DCC, RML]

CHLL-WP28-4 10/23/2017
ARSENIC 120 mg/kg [DCC]
LEAD 6800 mg/kg [DCC, RML]

CHS-WM-05 12/7/2017
TOTAL PCBS 6300 ug/kg [DCC]

SB-14 10/11/2011
0-14" ARSENIC 41.5 J mg/kg [DCC]

CHLL-WP28-3 10/23/2017
ARSENIC 73 mg/kg [DCC]
LEAD 2200 mg/kg [DCC, RML]
TOTAL PCBS 5100 J ug/kg [DCC]

MineralB-11 9/7/2007
ARSENIC 52 mg/kg [DCC]

CHS-WM-06 12/7/2017
TOTAL PCBS 2700 J+ ug/kg [DCC]
TOTAL PCBS (DUP) 3200 ug/kg [DCC]

CHLL-WP28-2 8/21/2017
ARSENIC 170 mg/kg [DCC]
LEAD 1600 mg/kg [DCC, RML]

CHLL-SB80 8/20/2014
0-0.5' ARSENIC 45 mg/kg [DCC]

CHLL-WP23-1 8/21/2017
ARSENIC 270 mg/kg [DCC]

CHLL-WP01 10/15/2014
0-0.5' ARSENIC 77 mg/kg [DCC]
0-0.5' LEAD 1800 mg/kg [DCC, RML]
0-0.5' AROCLOR-1254 61000 J ug/kg [RML]
0-0.5' TOTAL PCBS 72200 J ug/kg [DCC]

CHLL-WP23-2 10/23/2017
ARSENIC 120 mg/kg [DCC]
LEAD 1300 mg/kg [DCC, RML]

CHLL-SB52 6/11/2014
0-0.5' ARSENIC 120 mg/kg [DCC]
0-0.5' LEAD 1700 mg/kg [DCC, RML]

CHS-WM-04 12/7/2017
TOTAL PCBS 3900 ug/kg [DCC]

CHLL-WP01-2 8/21/2017
ARSENIC 150 mg/kg [DCC]
LEAD 1400 mg/kg [DCC, RML]
TOTAL PCBS 1010 J ug/kg [DCC]

CHLL-WP09-2 8/21/2017
ARSENIC 58 mg/kg [DCC]
LEAD 1100 mg/kg [DCC, RML]

SS-18 10/11/2011
0-6" ARSENIC 1220 mg/kg [DCC, RML]

CHLL-WP09-1 8/21/2017
ARSENIC 43 mg/kg [DCC]

CHLL-WP48-3 10/23/2017
LEAD 11000 mg/kg [DCC, RML]

CHLL-WP01-1 8/21/2017
ARSENIC 110 mg/kg [DCC]

CHLL-WP48-1 10/23/2017
ARSENIC 75 mg/kg [DCC]
LEAD 25000 mg/kg [DCC, RML]

CHLL-WP02 10/15/2014
0-0.5' ARSENIC 92 mg/kg [DCC]
0-0.5' LEAD 1100 mg/kg [DCC, RML]

CHLL-WP48-2 10/23/2017
ARSENIC 650 mg/kg [DCC, RML]
LEAD 11000 mg/kg [DCC, RML]

CHLL-RPM-04
STACK/DEBRIS
CHLL-SB107
CHLL-SB108
CHLL-WP32-1
CHLL-SB75
CHLL-SB79
CHLL-SB76
CHLL-SB77
CHLL-SB81
CHLL-SB78
CHLL-SB82
CHLL-SB165
CHLL-SB166
CHS-WM-01
SB-11
SB-12
WP-01
WP-02
WP-03
WP-04
WP-05
WP-06
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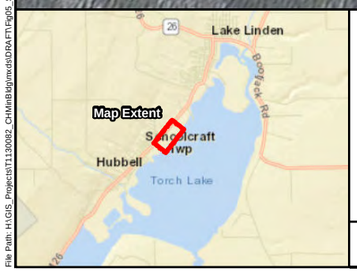
WP-48
52399
52489
52599
52679
M-26



Sampling Location Type

- Soil
- Residual Process Material
- Stack Debris
- Waste Pile

- Results exceed MDEQ Part 201 Nonresidential Soil DCC
- Results exceed USEPA Regional RML for Industrial Soil (TR=1E-04, HQ=3)
- Waste Pile Boundary
- Removed Waste Pile
- Stack Debris Pile

× — × Fence

Property Boundary

Notes:
- DCC = Direct Contact Criteria
- RML = Removal Management Levels
- Sample location that have been remediated/removed in 2016 are not shown.
- The residual impact boundary for WP-48 is estimated

EPA Contract No.: EP-S5-13-01
TDD No.: 0001/S05-0001-1711-007

0 70 140
Feet

C&H Mineral Building - RS Site
Hubbell, Michigan

Figure 5

Soil, Waste Pile, Residual Processing Material, and Stack Debris Analytical Results Map

TETRA TECH

Prepared For: USEPA
Prepared By: KRB - MSG

File Path: H:\GIS_Projects\TT1130082_CHMineBldg\mxd\DRAFT\Fig05_Soil_et_Results_20180117.mxd

Date Saved: 1/17/2018

Coordinate System: NAD_1983_StatePlane_Michigan_North_FIPS_2111_Feet_Intl

Legend

- Waste Characterization Sample with Results Exceeding Hazardous Waste Toxicity Screening Values
- Waste Characterization Sample with all Results Not Exceeding Hazardous Waste Toxicity Screening Values
- Waste Pile Boundary
- Removed Waste Pile
- Stack Debris Pile
- Fence
- Property Boundary

Notes:
- Hazardous Waste Toxicity Screening values from Title 40 of the *Code of Federal Regulations*, Chapter 1, Section 261.20-24
- Sample location that have been remediated/removed in 2016 are not shown.
- The residual impact boundary for WP-48 is estimated

EPA Contract No.: EP-S5-13-01
TDD No.: 0001/S05-0001-1711-007

0 70 140
Feet

C&H Mineral Building - RS Site
Hubbell, Michigan

Figure 6
Waste Pile Characterization Sample Analytical Results Map

TETRA TECH

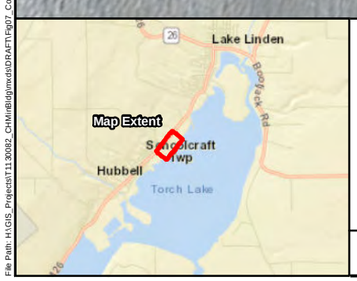
Prepared For: USEPA
Prepared By: KRB - MSG

Coordinate System: NAD_1983_StatePlane_Michigan_North_FIPS_2111_Feet_Intl

File Path: H:\GIS_Projects\T1130082_CH\MxdMgt\words\DRAFT\Fig06_WP_Characterization_Results_x20180117.mxd

Date Saved: 1/17/2018

Concrete Foundation
Material Consolidation Area
Stack Debris
Mineral Building
WP-30
WP-32
WP-33
WP-31
WP-27
WP-28
Existing Driveway
Concrete Slab
WP-26
WP-25
WP-29
WP-24
Concrete Slab
SandstoneBuilding
Existing Ditch
WP-23
WP-18
WP-22
WP-20
WP-19
WP-46
WP-15
WP-21
WP-14
WP-17
WP-16
Conceptual Drainage Swale
WP-13
Already Capped Along Ditch
WP-12
WP-07
WP-04
WP-02
WP-03
WP-05
WP-10
WP-01
WP-06
WP-08
WP-48
WP-09
WP-45
Existing Cap



Legend

Waste Pile Management Method

- Consolidate and cap
- Possibly suitable as fill material beneath cap
- Remove and dispose
- Woody debris - consolidate, not capped

- Material Consolidation Area
- Drainage Feature
- 6" Sandy Loam Cap, Seed and Mulch
- Area Already Capped Along Ditch
- Gravel Driveway Cap

- Fence
- Property Boundary

Notes:
- The residual impact boundary for WP-48 is estimated

EPA Contract No.: EP-S5-13-01
TDD No.: 0001/S05-0001-1711-007

0 62.5 125
Feet

C&H Mineral Building - RS Site
Hubbell, Michigan

Figure 7

Conceptual Removal Action

TETRA TECH

Prepared For: USEPA
Prepared By: KRB - MSG

Coordinate System: NAD_1983_StatePlane_Michigan_North_FIPS_2111_Feet_Intl

File Path: H:\GIS_Projects\T1130082_CH\MxdBig\mxds\DRAFT\Fig07_Conceptual_Removal_Action_v20180125b.mxd

Date Saved: 1/25/2018

APPENDIX B

DEQ REQUEST FOR EPA ERB ASSISTANCE AT THE C&H MINERAL BUILDING SITE

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
UPPER PENINSULA DISTRICT OFFICE

C. HEIDI GRETHER
DIRECTOR

November 9, 2017

VIA E-MAIL

Mr. Brian Kelly
U.S. Environmental Protection Agency
Region V - Emergency Response Branch
9311 Groh Road
Grosse Ile, Michigan 48138

Dear Mr. Kelly:

SUBJECT: Calumet & Hecla (C&H) Mineral Building
Request for Assistance
Hubbell, Houghton County, Michigan
DEQ Site ID 31000081

The Department of Environmental Quality (DEQ) Remediation and Redevelopment Division (RRD) is seeking the U.S. Environmental Protection Agency (EPA) Emergency Response Branch's (ERB) assistance to address waste piles and the uncontrolled dispersion of asbestos containing building materials (ACBM) at the C&H Mineral Building portion of RRD's Abandoned Mining Wastes (AMW) project.

This portion of the AMW project area is adjacent to Torch Lake and is comprised of the former mineral building associated with the Calumet & Hecla Mining Company and the surrounding land. Numerous waste piles are present on the property, many containing residual processing material (RPM), mining era demolition debris, and more modern wastes. The roof of the mineral building is extremely deteriorated, and ACBM has blown off onto the C&H Mineral Building property and the adjacent Highway M-26 right-of-way (ROW). RRD repaired fencing around the property in 2016, however, it is still subject to trespass.

RRD's 2017 investigation results indicate most of the waste piles contain polychlorinated biphenyls (PCBs) and/or lead, arsenic, other metals and semi-volatile organic compounds (SVOCs). We have recently compiled the available data and the attached figures highlight the locations and concentrations of contaminants and asbestos present at the property. Also attached is an inventory and photographic log detailing each of the waste piles. We continue to supplement the data set with results from samples collected on October 23, 2017 (additional PCB, arsenic, lead and asbestos sample results are still pending). Of this recent data, seven of the twelve additional waste pile samples were characterized as hazardous waste for lead by the Resource Conservation and Recovery Act (RCRA) toxicity characteristic leaching procedure (TCLP).

In July 2017, the DEQ Air Quality Division asbestos inspector collected samples of ACBM which originated from the C&H Mineral Building and came to be located on the Highway M-26 ROW. These results are also attached. The Highway M-26 ROW is used as an exercise path for parents with strollers, walkers and runners, including the area's high school track and field athletes.

In 2017, the RRD disposed of 112 tons of smelter debris from a pile at the C&H Mineral Building, which we have referred to as Waste Pile 11 (WP-11). WP-11 contained PCBs (100 ppm), making it a Toxic Substances Control Act (TSCA) waste. Samples from WP-11 also leached lead via the TCLP at 110 mg/L, exceeding RCRA hazardous waste criteria. Due to the significant concentrations of contaminants present in WP-11 and its criteria as both TSCA and RCRA hazardous waste, the waste was disposed of at Chemical Waste Management's landfill in Arlington, Oregon. Based on additional RRD sampling conducted in August and October 2017, it is likely that similar waste still exists in other piles at the C&H Mineral Building. The RRD has also collected and disposed of nearly 13 tons of ACBM through three abatement efforts. Recent aerial photographs indicate that the roof still has up to 3 layers of roofing material which continues to shed.

A Baseline Environmental Assessment for the 9.28 acre C&H Mineral Building property was submitted in 2000 by the current property owner, Silver Shores Enterprises Inc. Based on review of a sequence of aerial photographs for this property we have determined that demolition of significant mining era structures, including the former C&H Smelter and associated smokestacks, took place largely between 1976 and 1997. Since that time, waste piles of various composition and sources have appeared including smelter debris, smelter stack debris, mining era structure demolition debris, asphalt, concrete, stumps and burned wastes.

The DEQ RRD does not have the resources necessary to address the remaining waste piles and ACBM at the C&H Mineral Building. Due to the significant concentrations of PCBs and lead in waste piles adjacent to Torch Lake and the continued dispersal of ABCM from the mineral building onto areas frequented by pedestrians, DEQ is requesting the EPA ERB's assistance. Please let us know if the EPA ERB can be of help. If you have any questions, please contact Ms. Amy Keranen, Project Manager, at the DEQ RRD, 55195 U.S. 41, Calumet, Michigan 49913, at keranena@michigan.gov, or 906-337-0389.

Sincerely,

Clifton Clark

Clifton Clark, District Supervisor
Remediation and Redevelopment Division
Upper Peninsula District Office
906-228-4516

Attachments

cc: Ms. Kathleen Shirey, DEQ
Mr. David O'Donnell, DEQ
Ms. Amy Keranen, DEQ

APPENDIX C

PHOTOGRAPHIC DOCUMENTATION LOG

Waste Pile Photograph Log
Hubbell Processing Area – Mineral Building
Hubbell, Michigan

Photograph 1: Waste Pile 45 (WP-45) in the foreground (a small pile of refractory) with WP-01, containing soil, slag, and concrete in the background. The material appears to be “industrial” in nature. Photograph by J. Chrestensen, July 20, 2016.

Photograph 2: WP-02 containing fire brick, metal, wood, concrete, and old appearing debris mixed with soil. Photograph by J. Chrestensen, July 20, 2016.

Photograph 3: WP-03 containing concrete slabs. Photograph by J. Chrestensen, July 20, 2016.

Photograph 4: WP-04 containing refractory. Photograph by J. Chrestensen, July 20, 2016.

Photograph 5: WP-05 containing soil, rusted metal, wood, and corrugated paper. The material appears to be “industrial” in nature. Photograph by J. Chrestensen, July 20, 2016.

Photograph 6: WP-06 containing soil and clay pipe pieces. Photograph by MDEQ-GSU, July 22, 2016.

Photograph 7: WP-07 containing large concrete pieces (footers and base supports). Photograph by MDEQ-GSU, July 22, 2016.

Photograph 8: WP-08 containing primarily wood, steel, and circuit board debris. Photograph by MDEQ-GSU, July 22, 2016.

Photograph 9: WP-09 containing soil, rusty metal, fiberglass cloth, and charred wood. The material appears to be “industrial” in nature. Photograph by J. Chrestensen, July 20, 2016.

Photograph 10: WP-10 containing fire brick, much of which has a partial black coating, along with concrete, metal, and wood pieces. Photograph by J. Chrestensen, July 20, 2016.

Photograph 11: WP-11 containing soil, slag, brick, concrete, metal, and wood timbers. Photograph by J. Chrestensen, July 20, 2016.

Photograph 12: WP-12 containing asphalt and concrete. Photograph by MDEQ-GSU, July 22, 2016.

Photograph 13: Looking south across WP-13 which contains gravel and some minor amounts of asphalt and concrete. The material appears to be from road work. Photograph by J. Chrestensen, July 20, 2016.

Photograph 14: WP-14 containing milled asphalt. Photograph by J. Chrestensen, July 20, 2016.

Photograph 15: WP-15 containing burnt wood, metal, and miscellaneous surface debris. Photograph by J. Chrestensen, July 20, 2016.

Photograph 16: WP-16 containing logs and timbers. Photograph by J. Chrestensen, July 20, 2016.

Photograph 17: WP-17 containing concrete pieces, wood, bricks, slag, and metal mixed with soil. The material appears older in nature. Photograph by J. Chrestensen, July 20, 2016.

Photograph 18: WP-18 containing mostly slag with some soil and gravel. Photograph by J. Chrestensen, July 20, 2016.

Photograph 19: WP-19 containing wood, stumps, and soil. Photograph by J. Chrestensen, July 20, 2016.

Photograph 20: WP-20 containing slag and gravel. Photograph by MDEQ-GSU, July 22, 2016.

Photograph 21: WP-21 containing primarily asphalt with an area of gravel, soil, and concrete. Photograph by MDEQ-GSU, July 22, 2016.

Photograph 22: WP-22 containing mostly soil and stamp sand with concrete pieces and some steel. Photograph by MDEQ-GSU, July 22, 2016.

Photograph 23: WP-23 containing soil, concrete, roofing, metal, and other industrial appearing debris. Photograph by J. Chrestensen, July 20, 2016.

Photograph 24: WP-24 containing slag, gravel, wood, concrete, clay pipe pieces, cable, and wire. The asphalt in the background is WP-26. Photograph by MDEQ-GSU, July 22, 2016.

Photograph 25: WP-25 containing concrete slabs. Photograph by J. Chrestensen, July 20, 2016.

Photograph 26: WP-26 containing asphalt pieces. Photograph by J. Chrestensen, July 20, 2016.

Photograph 27: WP-27 containing fire brick, slag, steel, and concrete pieces. The material appears older in nature. Photograph by J. Chrestensen, July 20, 2016.

Photograph 28: WP-28 containing concrete, wood, metal, soil, fire brick, and transite pieces. The material appears older in nature. Photograph by J. Chrestensen, July 20, 2016.

Photograph 29: WP-29 containing soil, stamp sand, concrete bases, and steel pieces. Photograph by J. Chrestensen, July 20, 2016.

Photograph 30: WP-30 containing gravel, soil, concrete, and asphalt pieces. Photograph by J. Chrestensen, July 20, 2016.

Photograph 31: WP-31 containing soil with metal and wood pieces. Photograph by J. Chrestensen, July 20, 2016.

Photograph 32: WP-32 containing primarily coal, slag, and concrete refractory. Photograph by MDEQ-GSU, July 22, 2016.

Photograph 33: WP-33 containing limestone. Photograph by MDEQ-GSU, July 22, 2016.

Photograph 34: WP-46 containing concrete pieces. Photograph by J. Chrestensen, August 25, 2016.

Photograph 35: WP-48 residual, primarily fine to medium grained sand with some wood and metal debris, and deteriorated corrugated cardboard. Photograph by MDEQ, October 23, 2017.