

# INTERIM RESPONSE CONSTRUCTION SUMMARY REPORT FOR SEEP REMOVAL

ABANDONED MINING WASTES – TORCH LAKE NON-SUPERFUND SITE  
CHTC - TAMARACK SANDS AREA  
HOUGHTON COUNTY, MICHIGAN  
SITE ID# 31000098



DECEMBER 2017

PREPARED FOR:

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
REMEDIATION & REDEVELOPMENT DIVISION  
CALUMET FIELD OFFICE  
CALUMET, MICHIGAN



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**Seep Removal**  
**Site ID: 31000098**  
**Houghton County, Michigan**

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## 1.0 INTRODUCTION

The Mannik & Smith Group, Inc. (MSG) has prepared this *Interim Response Construction Summary Report (CSR) for Seep Removal* as part of the Abandoned Mining Wastes – Torch Lake non-Superfund Site (Project) [http://www.michigan.gov/deq/0,4561,7-135-3311\\_4109\\_9846\\_76560---,00.html](http://www.michigan.gov/deq/0,4561,7-135-3311_4109_9846_76560---,00.html) (Site ID: 31000098). This CSR summarizes the seep removal interim response (IR) completed at the Calumet & Hecla Tamarack City Operations Area (CHTC) Tamarack Sands Area. The IR entailed the removal and disposal of seep material. The seeps were emanating from beneath the U.S. Environmental Protection Agency (EPA) installed vegetative cap in Tamarack City, Houghton County, Michigan. This CSR was prepared in accordance with the *Indefinite Scope Indefinite Delivery (ISID) Discretionary Proposal for FS and Remedial Action Activities* (24 February 2016) prepared by MSG in response to a request from the Michigan Department of Environmental Quality (DEQ), Remediation and Redevelopment Division (RRD), Calumet Field Office under MSG's 2015 Environmental Services ISID Contract Number 00538 with the State of Michigan.

### 1.1 Project Location

The Project area is located along the shoreline and in Torch Lake, Houghton County, Michigan. Due to the complex nature and very large area RRD subdivided the Project into study areas based on past use and known issues. Depicted on *Figure 1, Project Location Map* are the CHTC and Calumet & Hecla Lake Linden (CHLL) areas and their respective former industrial operations.

Centralized around Calumet & Hecla's copper mining and processing operations near Tamarack City, Michigan, the CHTC consists of approximately 110 acres of land extending approximately 1.25 miles along the shoreline of Torch Lake, and incorporates over 187 different parcels with multiple property owners.

The CHTC Tamarack Sands Area is located just south of Tamarack City along the southeast side of Highway M-26 and is comprised of mining era industrial properties, historic municipal dump, and a capped in-lake stamp sand deposit associated with the industrial operations in the Ahmeek Mill and Tamarack Processing Areas. The Tamarack Sands Area is bordered by residential (single-family residences) and industrial (vacant mining era properties) land uses, and Torch Lake. The IR for seep removal was limited to the seep area in the southeastern portion of the Tamarack Sands Area. *Figure 2, Seep and Anomaly Locations* depicts features and the former location of removed seeps.

### 1.2 Project Background

Copper mining was extensive in the Keweenaw 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 dumping grounds for virtually all mining industry related waste products produced, including tailings, slag, and various chemicals. It is estimated that at least 20 percent of Torch Lake's volume was filled with tailings and other waste products.

The environmental legacy resulting from over 100 years of mining and reclamation led to Torch Lake and its western shoreline to be designated as a Superfund site by the United States Environmental Protection Agency (EPA) <https://cumulis.epa.gov/supercpad/cursites/csinfo.cfm?id=0503034> and a Great Lakes Area of Concern (AOC) under the U.S./Canada Great Lakes Water Quality Agreement <https://www.epa.gov/torch-lake-aoc>. The EPA undertook cleanup activities to address some of the byproducts of the mining industry while others were not addressed or left to recover through natural processes.

Environmental impairments within Torch Lake and along the shoreline resulting from historical mining era industrial operations:

- Present potential exposure risk to human and ecological receptors;

- Limit the recovery of the Torch Lake ecosystem;
- Create uncertainty over safe and beneficial reuse of the land; and,
- Prevent delisting of Torch Lake as an AOC due to Beneficial Use Impairments (BUIs) related to restrictions on fish and wildlife consumption because of the on-going presence of polychlorinated biphenyls (PCBs) in fish and degradation of benthos because of metals contaminated sediments.

PCBs are of particular concern in Torch Lake sediments, surface water, and submerged abandoned container contents, as well as in upland soil, waste, residual processing materials (RPM), and abandoned container contents in former industrial areas along the shoreline as they serve as a continuing source of PCBs into the environment.

The DEQ Project is addressing some of the remaining concerns in Houghton County not addressed by the EPA. The Project concerns involve groundwater, surface water, sediments, and "upland" media. Known or suspected problems which are being evaluated include: an unidentified, significant in-lake and/or terrestrial source of PCBs; uncharacterized waste deposits and >750 uncharacterized drums on the lake bottom; slag; landfills; industrial ruins; coal storage areas; underground storage tanks (USTs); RPM; asbestos containing materials (ACM); and any other waste materials identified during future investigations.

From 2014 through 2016, RRD conducted Site Investigation (SI) activities and confirmed the remaining concerns in the Project area involve groundwater, surface water, sediments, "upland" media, seeps, RPM, and abandoned containers. Priority concerns which were evaluated and deemed to require IRs include: significant terrestrial and in-lake sources of PCBs; ACM; RPM; abandoned mining era containers; seeps; limited areas of soil in which there are Direct Contact Criteria and Particulate Soil Inhalation Criteria exceedances; and, physical hazards.

In the case of the CHTC Tamarack Sands Area, the identified risks from the seeps included potential threats to human and ecological receptors, including but not limited to human health risks in the event of seep materials leaching to groundwater and/or surface water; direct contact with affected media; physical hazards; and erosion and deposition of wastes into Torch Lake.

Based on these conditions the Upper Peninsula RRD staff prepared an Emergency Procurement Action Form included in *Appendix A, Emergency Procurement Action Form*. Upon authorization, RRD staff completed an IR that removed and disposed of seep materials to mitigate potential risks to human health and the environment.

## 2.0 OBJECTIVE AND SCOPE OF WORK

The objective of the IR was to remove and dispose of seep material emanating from beneath the EPA installed cap, test pit in anomalous areas identified through geophysics by the DEQ Geological Services Unit, and subsequent replacement/repair of any disturbed areas to meet EPA capping standards to mitigate potential risks to human health and the environment. To meet this objective MSG developed a Trade Contractor (TC) scope of work and assisted DEQ with soliciting bids in accordance with DEQ RRD Emergency Funding and Procurement Procedures.

## 3.0 INTERIM RESPONSE ACTIVITIES

MSG supported the DEQ RRD in the procurement and oversight of a TC during implementation of the IR. The TC selected and retained by the State of Michigan was UP Environmental Services (UPES) of Bark River, Michigan. Refer to *Appendix B, Purchase Order*. UPES completed the work in accordance with the TC procurement package included in *Appendix C, Tamarack Sands Seep Area Interim Response Scope of Work* during July 2017 at a cost of \$28,132.09 (\$64,507.91.00 less than the purchase order amount).



Due to the proximity of the work to Torch Lake a Part 91, Soil Erosion and Sedimentation Control (SESC) Permit included in *Appendix D, Soil Erosion and Sedimentation Control Permit and Release*, was required.

Based on analytical testing and an evaluation of waste disposal methods, the seep material was determined to contain elevated levels of tetrachloroethylene and Di-N-butylphthalate, and characterized as non-hazardous for disposal purposes. The source of the seeps is unknown, but based on field observations, the material was a white, flowing, plasticizer-type waste. Remnants of plastic drum liners were observed in the seep areas. The seep areas were over excavated such that all material was removed. The material did not appear to be from the mining era. Documentation of seep material disposal is included in *Appendix E, Waste Management Records*. Photographs of the IR operations are included in *Appendix F, Photographic Log*. Test pitting did not indicate the presence of waste or abandoned containers in the geophysical anomaly areas. Excavated areas were backfilled with stamp sand and imported clean sand and topped with a minimum of 6-inches of topsoil to restore the cap. All disturbed areas were seeded and mulched.

#### **4.0 SUMMARY AND CONCLUSIONS**

Completed seep IR operations within the CHTC Tamarack Sands included test pitting; characterization, transportation, and disposal of 19.29 tons of seep material; and restoration in accordance with EPA capping standards for the Torch Lake Superfund site.

The completed IR operations met the objective of seep removal to mitigate potential risks to human health and the environment.

#### **5.0 RECOMMENDATIONS**

MSG has the following recommendations:

- Conduct characterization, transportation, and disposal of any additional seeps identified during future Project SI or IR activities.

FIGURES





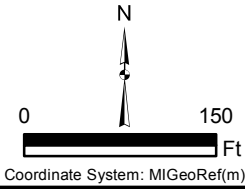






FILE: C:\temp\Projects\MDE\EQ0070\GIS\mxd\Planning\20171208-Tamarack\Sarids\_IR\Fig2 Seep and Anomaly Locations v20171208.mxd 4:28:21 PM 12/8/2017 KBrown

- Legend**
- Observed Seep Removed
  - ⬮ Electromagnetic Anomaly Test Pitted



**DEQ**  
Prepared for:  
**Michigan Department of  
Environmental Quality**

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**Figure 2**  
Seep and Anomaly Locations  
C & H Tamarack City Operations  
Tamarack City, Houghton County, Michigan



## APPENDIX A

### Emergency Procurement Action Form



## EMERGENCY PROCUREMENT ACTION FORM

Site Name: Abandoned Mining Wastes County: Houghton

Index: 44251 PCA: 30872 Project #: 456990

ERD Staff Contact: Amy Keranen Date of Emergency: September 2016

District Supervisor's Signature: Chifton Clark

**Site Description:** The "Abandoned Mining Wastes- Tamarack Sands Waste Seep" area of the Abandoned Mining Wastes (AMW) project involves an area in Tamarack City where seepage of wastes containing high concentrations of tetrachloroethylene and phthalates are present on the ground surface. 3 magnetic anomalies have been identified by RRD-GSU using EM Survey and Ground Penetrating Radar techniques. It is assumed the seeps appearing on the ground surface are coming from subsurface drums or containers which are decomposing and subsiding, releasing their wastes to the surface. These waste seeps are present in areas accessible to human direct contact- there is a walking trail within 250' of the seep area and Torch Lake is adjacent to the trail.

Failure to undertake emergency response actions will allow for the on-going release of contaminants into Torch Lake and continued presence in areas accessible to the public.

**Cause of Emergency:** Suspected buried drums or other containers of waste materials were left behind after the mining era and are present in areas accessible to leaching into the soil and groundwater, for erosion into the lake and for human direct contact.

**Specific Threats:** Concentrations of contaminants exceeding residential and non-residential drinking water and groundwater-surfacewater interface protection criteria, and residential direct contact criteria are present in locations accessible to human direct contact and leaking into the soils, groundwater and surface waters at Torch Lake.

**Action Taken:** Because of the imminent threat the emergency procurement process is being utilized to contract removal of the waste seep material and its source. Specifications have been developed and a Pre-Bid Meeting was conducted September 15, 2016 to obtain firm bids for the work.

### Additional Information:

4 bids were obtained on October 28, 2016 and evaluated. Based on the evaluation, it is recommended that the bid be awarded to **UP Environmental Services** for **\$92,640.00**

Their address is:

**UP Environmental Services, Inc, attn.: Wayne Stenberg**  
**P.O. Box 127**  
**Bark River, MI 49807**  
**(906)466-9900**



**Funding Source:** CMI Funds: **SWQIF Funds: \$92,640.00**

**Authorized by:**

**Responsible Party:** none identified

**Cost Recovery:**

## APPENDIX B

### Purchase Order



## STATE OF MICHIGAN

PAGE : 1

FORM DMB-287  
(REV 11/94)

PURCHASE ORDER

PURCHASE ORDER  
NUMBER 761P7700124REQUESTING DEPARTMENT OR AGENCY : RD - CONTRACTS I  
MICHIGAN DEPT OF ENVIRONMENTAL QUALITYCONSTITUTION HALL, 4TH FLOOR  
525 WEST ALLEGAN  
LANSING

MI 48933

CONTACT: TRACEY CURTIS 517 284-5083 EXT:	DELIVERY REQUIRED 12/05/16	AGENCY REF # 76120100	REQ NO. 761R7700204	ORDER DATE 12/02/16
---	-------------------------------	--------------------------	------------------------	------------------------

U P ENVIRONMENTAL SERVICES INC  
P O BOX 127  
BARK RIVER MI 49807-0127CASH DISCOUNT : NET 30 DAYS  
DELIVERY REQUIRED :  
FREIGHT CARRIER :  
F.O.B. : DELIVERED

VENDOR PHONE : -

SHIP TO:  
MICHIGAN DEPT OF ENVIRONMENTAL QUALIT  
CALUMET FIELD OFFICE - RRD55195 U.S. 41  
CALUMET MI 49913BILL TO:  
MICHIGAN DEPT OF ENVIRONMENTAL QUALIT  
REMEDATION AND REDEVELOPMENT DIVISIO  
ADMINISTRATION 5TH FLOOR SOUTH TOWER  
PO BOX 30426  
LANSING MI 48909-7926

ITEM	COMMODITY ID	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
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1	912-68	1.00	EA	92,640.0000	92,640.00
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MANAGEMENT, CONSTRUCTION #

FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND RELATED WORK REQUIRED TO  
REMOVE WASTE SEEP CONTAINING HIGH LEVELS OF SOLVENTS AND PLASTICIZERS  
NEAR A WALKING TRAIL AND TORCH LAKE AT THE ABANDONED MININGS WASTES,  
TAMARACK SANDS SITE #31000098

PM: A. KERANEN

START: 12/1/16

END: 7/1/18

GRAND TOTAL 92,640.00

ADDITIONAL REQUIREMENTS :

AUTHORITY: ACT 431 OF 1984. RESPONSE: REQUIRED. PENALTY: FAILURE TO  
DELIVER MAY RESULT IN CANCELLATION OF ORDER OR CONTRACT.  
AUTHORIZED SIGNATURE

## STATE OF MICHIGAN

PAGE : 2

FORM DMB-287  
(REV 11/94)

PURCHASE ORDER

PURCHASE ORDER  
NUMBER 761P7700124

## ACCOUNTING INFORMATION :

SX	AGY	Y	INDEX	PCA	COBJ	AOBJ	GRANT	PH	PROJ	PH	AG1	AG2	AG3	TOTAL
01	761	4	44251	30872		6127			45699000					92640.00

PENALTY: FAILURE TO DELIVER MAY RESULT IN CANCELLATION OF ORDER OR CONTRACT

--- END OF DOCUMENT ---

## APPENDIX C

### Tamarack Sands Seep Area Interim Response Scope of Work



**Scope of Work and Bid Table**  
**Tamarack Sands Seep Area Interim Response**  
Abandoned Mining Wastes – Torch Lake Non-Superfund Site

The Michigan Department of Environmental Quality (MDEQ) has identified the presence of several seeps of unknown material near the south end of the Tamarack Sands portion of the Abandoned Mining Wastes – Torch Lake Non-Superfund Site (Project). To reduce potential risks to the public and the environment, MDEQ is seeking cost estimates to conduct test pit excavation and potentially remove and properly dispose the underlying material.

**Figure 1** depicts the location. **Figure 2** depicts the seep and anomaly locations along with existing sample results for characterization and health and safety planning purposes. MDEQ will be collecting additional characterization and delineation sampling data in September 2016 and this data will be provided via Addendum prior to bids being due. This Scope of Work (SOW) also includes replacement/repair of any disturbed areas to meet capping standards implemented by the United States Environmental Protection Agency (USEPA) along the shore of Torch Lake.

**Permits**

Due to the proximity of Torch Lake, a soil erosion and sedimentation control (SESC) permit (acquired by the Contractor) is required. Refer to:

- <http://www.houghtoncounty.net/directory-drain-commissioner.php>; and,
- [http://www.houghtoncounty.net/docs/SESC\\_Email\\_Att.pdf](http://www.houghtoncounty.net/docs/SESC_Email_Att.pdf).

SESC best management practices must be applied and are expected to include silt fence encircling the downhill side of the disturbed areas, which could require up to 400 feet of silt fence installation, maintenance, and ultimately removal.

**Work Elements**

Test pit excavation and potential removal and disposal of underlying materials shall consist of the following:

- Excavation of test pits at each of the three seep locations to determine from where the seepage material is originating. This includes excavation to follow the seepage material immediately beneath the cap and through the subsurface to a depth assumed to not exceed eight feet.
- Excavation of test pits at each of the three anomaly locations to determine what is present in the subsurface that caused the detection of the electromagnetic anomaly.
- Test pits shall be excavated in a methodical manner that allows time for MDEQ and/or its agents time between scoops to evaluate what is being uncovered and inspect the sides and/or floors of the test pits as they progress.



- Test pit spoils shall be staged on plastic sheeting of at least 6-mil thickness. All spoils shall be placed back in the test pits prior to the completion of each day or shall be covered with plastic sheeting for the overnight period.
- Potential excavation and disposal of an estimated 400 tons of material from seep and anomaly locations. MDEQ and/or its agents will direct which material shall be staged for disposal. The Contractor shall be prepared to cover and stage excavated material on plastic sheeting of at least 6-mil thickness. Delays due to the Contractor obtaining plastic sheeting during excavation shall not count against the hourly unit rate. The pile cover shall be maintained by the Contractor until waste characterization results are available and the material is loaded for transport to the disposal facility.
- Excavation may include whole and/or partial containers and their contents. If containers with contents other than subsurface materials similar to the remainder of the excavated material are identified, they shall be segregated for container-specific waste characterization and over-packing or bulking of containers if appropriate.
- Waste profiling and disposal facility coordination and acceptance for excavated material and containers, if applicable. Note that waste characterization sampling and analysis of the upper 24 inches of material from the seep areas will be conducted by MDEQ in September 2016. These results will be provided to the Contractor prior to the work starting. Any other required waste characterization sampling and analysis, including payment of analysis fees, will be the responsibility of the Contractor.
- Backfilling and compacting all excavated areas. Material removed from each test pit shall be placed back into the excavation (unless staged for disposal) and compacted using the excavator bucket in lifts not to exceed one-foot in thickness. Backfill in areas that were removed for disposal shall consist of clean sand from commercial sources or stamp sand from local sources. Compaction in areas larger than a test pit shall be accomplished using a walk-behind plate compactor. Each lift for the plate compactor shall not exceed eight inches in thickness. Each lift shall receive two passes with the plate compactor to mitigate potential future settling.
- Site restoration including provision of up to 105 in-place cubic yards of sandy loam soil suitable for vigorous grass growth over all excavation and test pit locations, spread to 6-inches compacted thickness. Grade soil placement areas to match surrounding grades. Any capped areas that are compromised by the work shall similarly receive additional sandy loam soil such that the compacted cap thickness remains six-inches. Soil placement areas and any other areas with significant disturbance from equipment tracking shall be seeded with the seed mixture specified below and mulched with 100% biodegradable straw mulch blankets. All access routes, staging and decontamination areas, and other areas outside of the test pit and excavation limits that are disturbed by the work shall be restored to pre-work conditions. This includes raking to remove tracks and placement of grass seed in areas that were originally vegetated but that are disturbed during execution of the work. Trees shall be saved to the extent reasonably possible. Hydroseeding may be substituted for loose mulch and blankets.

- Areas that require reseeding shall be seeded with the following mixture:
  - 10 lbs./ac. red clover.
  - 25 lbs./ac. creeping red fescue
  - 5 lbs./ac. vernal alfalfa (legume seed shall be inoculated)
  - 5 lbs./ac white dutch clover.
  - 10 lbs./ac. perennial rye grass
  - 5 lbs./ac. sweet clover
  - 15lbs./ac. orchard grass
- All Contractor tools and equipment that may have encountered contaminated media during execution of the work shall be decontaminated. Decontamination water that is free of detergents or other cleaning additives may be applied to the ground surface on the Property.
- Transportation of excavated materials and properly packaged, labeled, and placarded containers and their contents (as may be applicable) to proper disposal facilities, including all manifests.
- Disposal of hazardous and non-hazardous materials and containers and provision to MDEQ of fully executed manifests and any other disposal documentation as may be appropriate (such as scale receipts, destruction records, etc.).

#### **Access, Coordination, Notifications, Health and Safety**

MDEQ has secured written access to the property where the work will occur. The Contractor shall provide MDEQ and/or its designated agent at least two weeks notice before mobilization with the exception of picking up characterized waste for transportation to a disposal facility, which will require one-week notice. Work hours shall be between 7:00 a.m. and 6:00 p.m. local time.

The MDEQ shall be provided all waste characterization and disposal documents for review and approval at least two business days in advance of when they are needed. MDEQ will sign all disposal documents as the waste generator.

The Contractor is responsible for compliance with all State and Federal health and safety, transportation, and disposal regulations. This also includes work practices and engineering controls to prevent contaminant release and potential exposure to site workers, the public, and the environment.

40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training is required for all on-site persons that may encounter contaminated media. A summary of existing data for the work location is provided on **Figure 2**. The Contractor is responsible for their own health and safety, including compliance with 29 Code of Federal Regulations (CFR) Part 1910 and 29 CFR Part 1926.

Refer to **Attachment A** for Conditions for Emergency Bids that will apply to the work. In addition, the selected Contractor must supply the following written information within five business days after receiving a telephone authorization from the MDEQ district Project Manager to start the work:

- Copy of Certificate of Awardability, for contracts over \$100,000.
- Proof of 40-hour hazardous waste safety training for on-site personnel.

The Contractor's invoice(s) shall be submitted to the invoicing address on the Purchase Order as well as a copy to Amy Keranen the MDEQ Project Manager at 55195 US-41, Calumet, MI 49913. Invoices shall include a breakdown of charges by Work Item from the Bid Table and disposal documentation must be provided prior to the invoice(s) being processed for payment.

**Schedule:**

- 15 September 2016 – Pre-Bid Meeting/Walkover at the location
- 12 October 2016 – Bids due at 5:00 p.m. local time via electronic mail
- 17 October 2016 – Award work (tentative)
- 24 October 2016 – Issue Purchase Order (tentative)
- Spring 2017 – Test pit excavation and removal work shall occur at a time mutually agreeable to the Contractor and MDEQ.
- No on-site work shall occur on weekends or government holidays without prior written approval.

The following tasks comprise the Scope of Work. Quantities shown are estimated for bid comparison purposes. Actual quantities may be more or less than the estimated value. Unit rates will be paid for the actual work performed. Fully executed disposal documentation will be required for payment of "remove and dispose" Work Items. Bids shall remain valid through 31 October 2017. If the Contractor intends to use Waste Management, please coordinate with Mr. Dan Roddan at [droddan1@wm.com](mailto:droddan1@wm.com) / 920-539-1167 for project-specific rates.

<u>Work Item</u>	<u>Contractor Quote</u>
1. Obtain a SESC Permit. Install, maintain, and ultimately remove silt fence and/or other measures when the disturbed areas have been stabilized and the permit is released.	\$ _____
2. Mobilization and demobilization of all materials, tools, labor, and equipment required to characterize soils and container contents for disposal acceptance, conduct test pitting, conduct potential excavation and staging of materials for disposal including plastic sheeting, and over-pack up to two drums. Mobilization is to the location of the seeps and anomalies, not just the entrance gate to the property. This includes waste profiling and disposal facility coordination and acceptance using the MDEQ-provided seep waste characterization data.	\$ _____
3. Conduct test-pit and potential removal excavation of seep and anomaly locations. This includes replacement and compaction of existing soil that is not disposed into the test pit(s). Unit rate per hour = \$ _____	\$ _____ (assuming 12 hours)
4. Backfill and compaction of excavation(s) using imported sand or stamp sand. Unit rate per ton = \$ _____	\$ _____ (assuming 400 tons)
5. Waste characterization sampling (per container/soil sample) and analysis as may be required for disposal facility acceptance (including payment of analysis fees). This also includes waste profiling and disposal facility coordination and acceptance for these waste streams. Unit rate each sample = \$ _____	\$ _____ (assuming 2 samples)
6. Remove, stage, and transport for disposal characteristically non-hazardous waste. Unit rate per ton = \$ _____	\$ _____ (assuming 400 tons)

Scope of Work and Bid Table  
Tamarack Sands Seep Area Interim Response

7. Unit rate for disposal from Waste Management = \$38.00 per ton for non-hazardous contaminated soils.\* \$ 15,200.00  
(assuming 400 tons)
8. Budgeted amount for other Waste Management charges of tax at \$0.36 per ton, \$20.00 per load environmental fee, and \$100.00 profile fee.\* \$ 600.00
9. Site restoration including provision of 6-inches compacted thickness sandy loam soil that is free of large roots and rocks and is suitable for vigorous grass growth over all excavation areas. Any capped areas that are compromised by the work shall similarly receive additional sandy loam soil such that the compacted cap thickness remains six-inches. Restoration includes seeding mulching as detailed in the work element descriptions. Hydroseeding may be substituted for loose mulch and blankets. \$ \_\_\_\_\_
10. Provisional allowance for activities, situations, and/or waste streams not included above. Payment under the Provisional Allowance will be based on rates agreed upon prior to conducting the work and receipts provided. \$ 15,000.00

**TOTAL**

**\$ \_\_\_\_\_**

\* = Payment for Item 7 will be on a per-ton basis. Payment for Item 8 will be for actual taxes and fees. The number of tons/loads is estimated and may be more or less than the estimated value. Payment to the Contractor for disposal will be at the stated unit rates for the actual quantities disposed to complete the project. Disposal at Waste Management shall be coordinated through Mr. Dan Roddan at droddan1@wm.com / 920-539-1167.

Bidder Company Name: \_\_\_\_\_

Represented by (print): \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Date Submitted: \_\_\_\_\_

Signature: \_\_\_\_\_

Estimated Duration to Complete the Work: \_\_\_\_\_

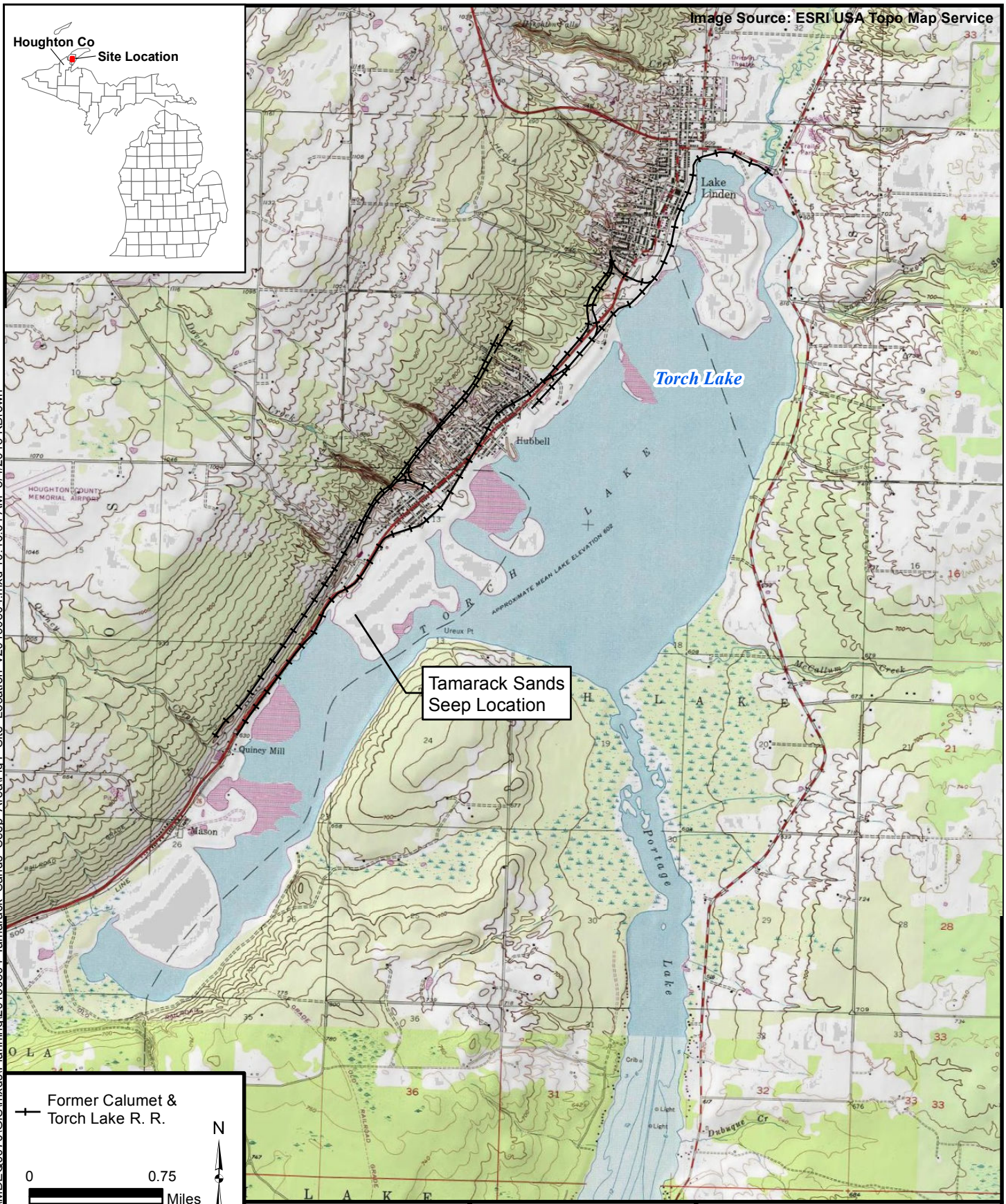
Proposed Disposal Facilities: \_\_\_\_\_

Addendum(s) Received (Date): \_\_\_\_\_

## FIGURES



FILE: C:\temp\Projects\MDEQ\0070\GIS\mxd\Planning\20160804-Tamarack Sands Seep Area\Fig1 Site Location v20160804.mxd 10:46:01 AM 8/4/2016 KBrown



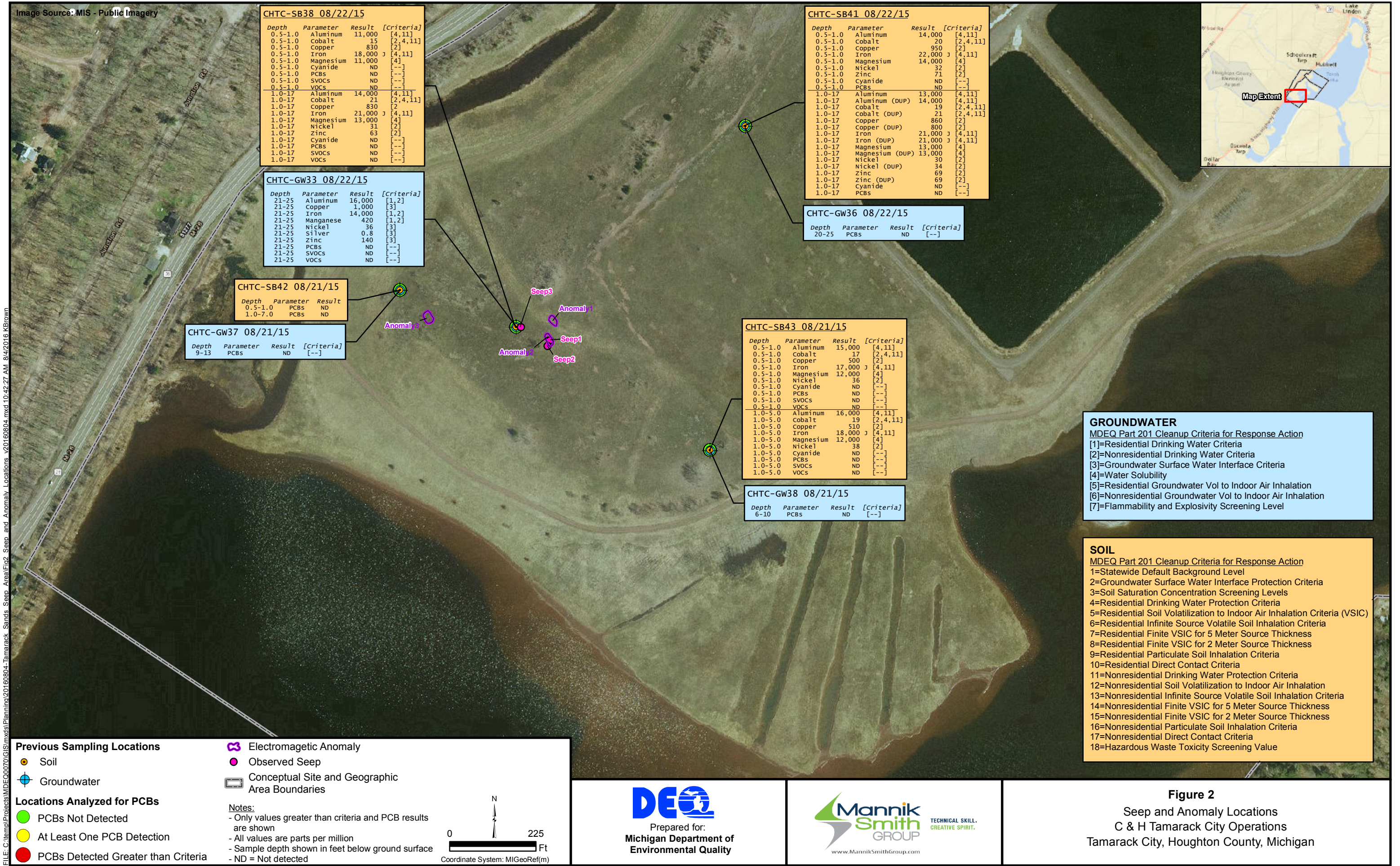
Source: Draft Site Inspection (SI)  
Report for C&H Lake Linden Operations,  
Lake Linden, Michigan, 49945 -  
March 2013. Prepared by the MDEQ-RRD  
Superfund Section, Pre-remedial Group,  
Site Evaluation Unit (Pre-remedial Group)

**DEQ**  
Prepared for:  
**Michigan Department of  
Environmental Quality**

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**Figure 1**  
Location Map  
Tamarack Sands Seep Area  
Tamarack City, Houghton County,  
Michigan







## **ATTACHMENT A**



**Remediation and Redevelopment Division  
Department of Environmental Quality  
Conditions for Emergency Bids**

*Printed under the authority of the Natural Resources and Environmental  
Protection Act, PA 451, February 1995, as amended*

By your response to the Department of Environmental Quality request for bids on the \_\_\_\_\_ site, the contractor agrees to provide all labor, materials, equipment, tools and services required to complete the work and comply with the following conditions:

- 1. INSURANCE:** No work connected with this contract shall be started until the contractor has submitted evidence that (a) all workers are insured to protect him/her from claims for damages for personal injury or death which may arise from operations under this contract and that (b) he/she is covered by Property Damage Insurance in the amount of \$100,000 and Public Liability Insurance in the amount of \$100,000-\$300,000. All of the above insurances shall be maintained until final payment is made. The contractor shall assume full responsibility for any damage which may result from any cause including fire or other casualty until completion of the contract and final payment. Any casualties shall not relieve the contractor from performing the contract.
- 2. EMPLOYEES AND SUPERINTENDENT:** Contractor shall enforce good order among his/her employees and shall not employ on the work site any disorderly, intemperate, or unfit person or anyone not skilled in the work assigned to him/her. Contractor or a competent person having authority to act for him/her shall be at the work site at all times.
- 3. PROTECTION:** Contractor shall properly protect all new and existing work from damage. Proper safety provisions shall be made at all times for the protection of all persons.
- 4. ROYALTIES, PATENTS, NOTICES, AND FEES:** Contractor shall give all notices and pay all royalties, building permits, and fees. He/she shall defend all suits or claims for infringement of any patent rights and shall save the state harmless from loss on account thereof. He/she shall comply with all laws, ordinances, and codes applicable to any portion of the work.
- 5. EXAMINATION OF PREMISES:** Bidder shall familiarize himself/herself with local conditions affecting the job. He/she shall take his/her own measurements and be responsible for the correctness of same. Bidder shall be held to have made such examinations and no allowances will be made in his/her behalf by reason of error or omission on his/her part. If any part of the contractor's work depends upon existing work for proper results or the work of another contractor, the contractor shall notify the Department before commencing work of any defects that will affect the results. Failure to so notify will constitute his/her acceptance of the conditions.
- 6. OTHER CONTRACTS:** The state may let other contracts in connection with the work and the contractor shall properly connect and coordinate his/her work with the work of such other contractors. The state shall not be liable for any damages or increased costs occasioned by the failure of other contractors to execute their work as may be anticipated by these documents.
- 7. PAYMENT:** Payment for the work will be made in one sum upon completion of the work. When applying for payment, the contractor shall submit a statement based upon an itemized schedule. The work will not be considered complete until the work has been finally accepted by the Department of Environmental Quality and the contractor has furnished satisfactory evidence that all payrolls and other indebtedness connected with the work have been paid.

- 8. REGULATIONS:** The contractor shall comply with all authorities having jurisdiction over the work. This includes all applicable federal, state, and local laws, ordinances, rules and regulations.
- 9. PREVAILING WAGES.** The contractor shall comply with Michigan's Prevailing Wage Act, MCL 408.551 et seq. Shall ensure that all employees covered by this act are compensated at a rate not less than those established by the Michigan Department of Consumer and Industry Service as Prevailing Wage and Fringe Benefit rates.

The contractor shall secure all construction permits necessary for proper execution of the work prior to starting work on the project. All fees for securing the permits shall be paid by the contractor, including all inspection costs which may be legally assessed by the Bureau of Construction Codes in accordance with authority granted under 1980 PA 371. All work shall be executed in accordance with the state of Michigan's Construction Codes. If the contractor performs any work knowing it to be contrary to the state of Michigan's Construction Codes, the contractor shall assume full responsibility and shall bear all attributable costs.

The contractor shall conform to the provisions of the Michigan Right to Know law, 1986 PA 80 and all other applicable state and federal health and safety regulations, including U.S. Occupational Safety and Health Administration (29 CFR 1910).

The contractor shall follow all state and federal laws and regulations that govern the handling, transportation, and disposal of material and waste that are deemed part of the work and shall use licensed personnel were appropriate.

STATE OF MICHIGAN  
Department of Technology, Management and Budget  
State Facilities Administration  
3111 W. St. Joseph Street  
Lansing, Michigan 48917

Date Issued: 12 October 2016  
Index No(s): NA  
File No: NA  
Department: MDEQ-RRD  
Project Name: Abandoned Mining  
Wastes Torch Lake Non-Superfund Site

Subject: Clarification to Scope of Work

Bid Opening Date: 28 October 2016

## ADDENDUM NO. 1

TO: All Bidders

SUBJECT: Tamarack Sands Seep Area Interim Response

INTENT: This Addendum No. 1 is issued to revise the Bid Opening Date, adjust quantities to align with discussions during the Pre-Bid Meeting walkover, clarify the scope of work by answering questions, and provide analysis results and Prevailing Wage Rates. This Addendum No. 1 consists of one page and five attachments including Attachment A – Sign In Sheet, Attachment B – Revised Bid Table, Attachment C – Prevailing Wages, Attachment D – Answers to Questions, and Attachment E – Analysis Summary Tables and Lab Report.

Item 1 – Revised Bid Opening Date: The Bid Opening Date is revised to October 28, 2016 at 5:00 pm Eastern Daylight Time (EDT). Bids shall be submitted via electronic mail to Mr. Jed Chrestensen of The Mannik Smith Group, Inc. at [JChrestensen@manniksmithgroup.com](mailto:JChrestensen@manniksmithgroup.com) and Ms. Amy Keranen of MDEQ at [keranena@michigan.gov](mailto:keranena@michigan.gov).

Item 2 – Bid Table Amendment: The quantity for Work Item 3 in the Bid Table has been revised. A revised Bid Table is provided in Attachment B.

Item 3 – Deadline for Questions: The deadline for submitting questions is October 19, 2016 at 5:00 pm EDT.

Item 4 – Answers to Questions: Several questions have been posed by Bidders. Please refer to Attachment D for answers and clarifications.

Item 5 – Addition of Seeding Guarantee: The revised Bid Table in Attachment B includes a one year guarantee for the vegetative cover. Refer to the revised Bid Table for details.

ACKNOWLEDGEMENT: This Addendum must be acknowledged by the bidder in the space provided at the bottom of the Bid Table for submission of a valid bid. The changes and information shall become part of the contract documents.



ATTACHMENT A  
PRE-BID MEETING SIGN-IN SHEET

[illegible]

ATTACHMENT B  
REVISED BID TABLE

The following tasks comprise the Scope of Work. Quantities shown are estimated for bid comparison purposes. Actual quantities may be more or less than the estimated value. Unit rates will be paid for the actual work performed. Fully executed disposal documentation will be required for payment of "remove and dispose" Work Items. Bids shall remain valid through 31 October 2017. If the Contractor intends to use Waste Management, please coordinate with Mr. Dan Roddan at [droddan1@wm.com](mailto:droddan1@wm.com) / 920-539-1167 for project-specific rates.

<u>Work Item</u>	<u>Contractor Quote</u>
1. Obtain a SESC Permit. Install, maintain, and ultimately remove silt fence and/or other measures when the disturbed areas have been stabilized and the permit is released.	\$ _____
2. Mobilization and demobilization of all materials, tools, labor, and equipment required to characterize soils and container contents for disposal acceptance, conduct test pitting, conduct potential excavation and staging of materials for disposal including plastic sheeting, and over-pack up to two drums. Mobilization is to the location of the seeps and anomalies, not just the entrance gate to the property. This includes waste profiling and disposal facility coordination and acceptance using the MDEQ-provided seep waste characterization data.	\$ _____
3. Conduct test-pit and potential removal excavation of seep and anomaly locations. This includes replacement and compaction of existing soil that is not disposed into the test pit(s). Unit rate per hour = \$ _____	\$ _____ (assuming 16 hours)
4. Backfill and compaction of excavation(s) using imported sand or stamp sand. Unit rate per ton = \$ _____	\$ _____ (assuming 400 tons)
5. Waste characterization sampling (per container/soil sample) and analysis as may be required for disposal facility acceptance (including payment of analysis fees). This also includes waste profiling and disposal facility coordination and acceptance for these waste streams. Unit rate each sample = \$ _____	\$ _____ (assuming 2 samples)
6. Remove, stage, and transport for disposal characteristically non-hazardous waste. Unit rate per ton = \$ _____	\$ _____ (assuming 400 tons)

Scope of Work and Revised Bid Table  
Tamarack Sands Seep Area Interim Response

7. Unit rate for disposal from Waste Management = \$38.00 per ton for non-hazardous contaminated soils.\* \$ 15,200.00  
(assuming 400 tons)
8. Budgeted amount for other Waste Management charges of tax at \$0.36 per ton, \$20.00 per load environmental fee, and \$100.00 profile fee.\* \$ 600.00
9. Site restoration including provision of 6-inches compacted thickness sandy loam soil that is free of large roots and rocks and is suitable for vigorous grass growth over all excavation areas. Any capped areas that are compromised by the work shall similarly receive additional sandy loam soil such that the compacted cap thickness remains six-inches. Restoration includes seeding mulching as detailed in the work element descriptions. Hydroseeding may be substituted for loose mulch and blankets. Guarantee vegetative cover for 1 year\*\*.
10. Provisional allowance for activities, situations, and/or waste streams not included above. Payment under the Provisional Allowance will be based on rates agreed upon prior to conducting the work and receipts provided. \$ 15,000.00

**TOTAL**

\$

\* = Payment for Item 7 will be on a per-ton basis. Payment for Item 8 will be for actual taxes and fees. The number of tons/loads is estimated and may be more or less than the estimated value. Payment to the Contractor for disposal will be at the stated unit rates for the actual quantities disposed to complete the project. Disposal at Waste Management shall be coordinated through Mr. Dan Roddan at droddan1@wm.com / 920-539-1167.

Bidder Company Name: \_\_\_\_\_

Represented by (print): \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Date Submitted: \_\_\_\_\_

Signature: \_\_\_\_\_

Estimated Duration to Complete the Work: \_\_\_\_\_

Proposed Disposal Facilities: \_\_\_\_\_

Addendum(s) Received (Date): \_\_\_\_\_

\*\* = Seeded areas will be accepted when a full uniform stand of grass has become established and maintained for one year. A satisfactory stand of grass is defined as no bare spots larger than one square foot and not more than 10 percent of the area with bare spots larger than 3-inches by 3-inches. 80% of the line item amount will be paid upon completion of seeding with the balance upon acceptance after the following growing season or within one year, whichever occurs first.

ATTACHMENT C

PREVAILING WAGES



## STATE OF MICHIGAN

Wage and Hour Division

PO Box 30476

Lansing, MI 48909

517-284-7800

### ***Informational Sheet: Prevailing Wages on State Projects***

#### **REQUIREMENTS OF THE PREVAILING WAGES ON STATE PROJECTS ACT, PUBLIC ACT 166 OF 1965**

The State of Michigan determines prevailing rates pursuant to the Prevailing Wages on State Projects Act, Public Act 166 of 1965, as amended. The purpose of establishing prevailing rates is to provide minimum rates of pay that must be paid to workers on construction projects for which the state or a school district is the contracting agent and which is financed or financially supported by the state. By law, prevailing rates are compiled from the rates contained in collectively bargained agreements which cover the locations of the state projects. The official prevailing rate schedule provides an hourly rate which includes *wage and fringe benefit totals* for designated construction mechanic classifications. The overtime rates also include *wage and fringe benefit totals*. Please pay special attention to the overtime and premium pay requirements. Prevailing wage is satisfied when wages plus fringe benefits paid to a worker are equal to or greater than the required rate.

#### **State of Michigan responsibilities under the law:**

- The department establishes the prevailing rate for each classification of construction mechanic ***requested by a contracting agent*** prior to contracts being let out for bid on a state project.

#### **Contracting agent responsibilities under the law:**

- If a contract is not awarded or construction does not start within 90 days of the date of the issuance of rates, a re-determination of rates must be requested by the contracting agent.
- Rates for classifications needed but not provided on the Prevailing Rate Schedule, ***must*** be obtained ***prior*** to contracts being let out for bid on a state project.
- The contracting agent, by written notice to the contractor and the sureties of the contractor known to the contracting agent, may terminate the contractor's right to proceed with that part of the contract, for which less than the prevailing rates have been or will be paid, and may proceed to complete the contract by separate agreement with another contractor or otherwise, and the original contractor and his sureties shall be liable to the contracting agent for any excess costs occasioned thereby.

#### **Contractor responsibilities under the law:**

- Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing rates prescribed in a contract.
- Every contractor and subcontractor shall keep an accurate record showing the name and occupation of and the actual wages and benefits paid to each construction mechanic employed by him in connection including certified payroll, as used in the industry, with said contract. This record shall be available for reasonable inspection by the contracting agent or the department.
- Each contractor or subcontractor is separately liable for the payment of the prevailing rate to its employees.
- The prime contractor is responsible for advising all subcontractors of the requirement to pay the prevailing rate prior to commencement of work.
- The prime contractor is secondarily liable for payment of prevailing rates that are not paid by a subcontractor.
- A construction mechanic ***shall only*** be paid the apprentice rate if registered with the United States Department of Labor, Bureau of Apprenticeship and Training and the rate is included in the contract.

#### **Enforcement:**

A person who has information of an alleged prevailing wage violation on a state project may file a complaint with the State of Michigan. The department will investigate and attempt to resolve the complaint informally. During the course of an investigation, if the requested records and posting certification are not made available in compliance with Section 5 of Act 166, the investigation will be concluded and a referral to the Office of Attorney General for civil action will be made. The Office of Attorney General will pursue costs and fees associated with a lawsuit if filing is necessary to obtain records.



# STATE OF MICHIGAN

Wage and Hour Division

PO Box 30476

Lansing, MI 48909

517-284-7800

## Informational Sheet: Prevailing Wages on State Projects

### General Information Regarding Fringe Benefits

**Certain** fringe benefits **may** be credited toward the payment of the Prevailing Wage Rate:

- If a fringe benefit is paid directly to a construction mechanic
- If a fringe benefit contribution or payment is made on behalf of a construction mechanic
- If a fringe benefit, which may be provided to a construction mechanic, is pursuant to a written contract or policy
- If a fringe benefit is paid into a fund, for a construction mechanic

When a fringe benefit is not paid by an hourly rate, the hourly credit will be calculated based on the annual value of the fringe benefit divided by 2080 hours per year (52 weeks @ 40 hours per week).

The following is an example of the types of fringe benefits allowed and how an hourly credit is calculated:

Vacation	40 hours X \$14.00 per hour = \$560/2080 =	\$0.27
Dental insurance	\$31.07 monthly premium X 12 mos. = \$372.84 /2080 =	\$0.18
Vision insurance	\$5.38 monthly premium X 12 mos. = \$64.56/2080 =	\$0.03
Health insurance	\$230.00 monthly premium X 12 mos. = \$2,760.00/2080 =	\$1.33
Life insurance	\$27.04 monthly premium X 12 mos. = \$324.48/2080 =	\$0.16
Tuition	\$500.00 annual cost/2080 =	\$0.24
Bonus	4 quarterly bonus/year x \$250 = \$1000.00/2080 =	\$0.48
401k Employer Contribution	\$2000.00 total annual contribution/2080 =	\$0.96
Total Hourly Credit		\$3.65

Other examples of the types of fringe benefits allowed:

- Sick pay
- Holiday pay
- Accidental Death & Dismemberment insurance premiums

The following are examples of items that **will not** be credited toward the payment of the Prevailing Wage Rate

- Legally required payments, such as:
  - Unemployment Insurance payments
  - Workers' Compensation Insurance payments
  - FICA (Social Security contributions, Medicare contributions)
- Reimbursable expenses, such as:
  - Clothing allowance or reimbursement
  - Uniform allowance or reimbursement
  - Gas allowance or reimbursement
  - Travel time or payment
  - Meals or lodging allowance or reimbursement
  - Per diem allowance or payment
- Other payments to or on behalf of a construction mechanic that are not wages or fringe benefits, such as:
  - Industry advancement funds
  - Financial or material loans





## State of Michigan

### OVERTIME PROVISIONS for MICHIGAN PREVAILING WAGE RATE COMMERCIAL SCHEDULE

- Overtime is represented as a nine character code. Each character represents a certain period of time after the first 8 hours Monday thru Friday.

	Monday thru Friday	Saturday	Sunday & Holidays	Four 10s
First 8 Hours		4	8	9
9th Hour	1	5		
10th Hour	2	6		
Over 10 hours	3	7		

#### Overtime for Monday thru Friday after 8 hours:

the 1st character is for time worked in the 9th hour (8.1 - 9 hours)

the 2nd character is for time worked in the 10th hour (9.1 - 10 hours)

the 3rd character is for time worked beyond the 10th hour (10.1 and beyond)

#### Overtime on Saturday:

the 4th character is for time worked in the first 8 hours on Saturday (0 - 8 hours)

the 5th character is for time worked in the 9th hour on Saturday (8.1 - 9 hours)

the 6th character is for time worked in the 10th hour (9.1 - 10 hours)

the 7th character is for time worked beyond the 10th hour (10.01 and beyond)

#### Overtime on Sundays & Holidays

The 8th character is for time worked on Sunday or on a holiday

#### Four Ten Hour Days

The 9th character indicates if an optional 4-day 10-hour per day workweek can be worked **between Monday and Friday without paying overtime after 8 hours worked, unless otherwise noted in the rate schedule. To utilize a 4 ten workweek, notice is required from the employer to employee prior to the start of work on the project.**

- Overtime Indicators Used in the Overtime Provision:

H - means TIME AND ONE-HALF due

X - means TIME AND ONE-HALF due after 40 HOURS worked

D - means DOUBLE PAY due

Y - means YES an optional 4-day 10-hour per day workweek can be worked without paying overtime after 8 hours worked

N - means NO an optional 4-day 10-hour per day workweek *can not* be worked without paying overtime after 8 hours worked

- EXAMPLES:

HHHHHHHDN - This example shows that the 1½ rate must be used for time worked after 8 hours Monday thru Friday (*characters 1 - 3*); for all hours worked on Saturday, 1½ rate is due (*characters 4 - 7*). Work done on Sundays or holidays must be paid double time (*character 8*). The N (*character 9*) indicates that 4 ten-hour days is not an acceptable workweek at regular pay.

XXXHHHHDY - This example shows that the 1½ rate must be used for time worked after 40 hours are worked Monday thru Friday (*characters 1-3*); for hours worked on Saturday, 1½ rate is due (*characters 4 – 7*). Work done on Sundays or holidays must be paid double time (*character 8*). The Y (*character 9*) indicates that 4 ten-hour days is an acceptable alternative workweek.

LARA is an equal opportunity employer.

Auxiliary aids, services and other reasonable accommodations are available, upon request, to individuals with disabilities.

Wage and Hour Division

P.O. BOX 30476 • LANSING, MICHIGAN 48909

[www.michigan.gov/wagehour](http://www.michigan.gov/wagehour) • Phone : (517) 284-7800

## ENGINEERS - CLASSES OF EQUIPMENT LIST

### UNDERGROUND ENGINEERS

#### **CLASS I**

Backfiller Tamper, Backhoe, Batch Plant Operator, Clam-Shell, Concrete Paver (2 drums or larger), Conveyor Loader (Euclid type), Crane (crawler, truck type or pile driving), Dozer, Dragline, Elevating Grader, End Loader, Gradall (and similar type machine), Grader, Power Shovel, Roller (asphalt), Scraper (self propelled or tractor drawn), Side Broom Tractor (type D-4 or larger), Slope Paver, Trencher (over 8' digging capacity), Well Drilling Rig, Mechanic, Slip Form Paver, Hydro Excavator.

#### **CLASS II**

Boom Truck (power swing type boom), Crusher, Hoist, Pump (1 or more 6" discharge or larger gas or diesel powered by generator of 300 amps or more, inclusive of generator), Side Boom Tractor (smaller than type D-4 or equivalent), Tractor (pneu-tired, other than backhoe or front end loader), Trencher (8' digging capacity and smaller), Vac Truck.

#### **CLASS III**

Air Compressors (600 cfm or larger), Air Compressors (2 or more less than 600 cfm), Boom Truck (non-swinging, non-powered type boom), Concrete Breaker (self-propelled or truck mounted, includes compressor), Concrete Paver (1 drum,  $\frac{1}{2}$  yard or larger), Elevator (other than passenger), Maintenance Man, Mechanic Helper, Pump (2 or more 4" up to 6" discharge, gas or diesel powered, excluding submersible pump), Pumpcrete Machine (and similar equipment), Wagon Drill Machine, Welding Machine or Generator (2 or more 300 amp or larger, gas or diesel powered).

#### **CLASS IV**

Boiler, Concrete Saw (40HP or over), Curing Machine (self-propelled), Farm Tractor (w/attachment), Finishing Machine (concrete), Firemen, Hydraulic Pipe Pushing Machine, Mulching Equipment, Oiler (2 or more up to 4", exclude submersible), Pumps (2 or more up to 4" discharge if used 3 hrs or more a day-gas or diesel powered, excluding submersible pumps), Roller (other than asphalt), Stump Remover, Vibrating Compaction Equipment (6' wide or over), Trencher (service) Sweeper (Wayne type and similar equipment), Water Wagon, Extend-a-Boom Forklift.

### HAZARDOUS WASTE ABATEMENT ENGINEERS

#### **CLASS I**

Backhoe, Batch Plant Operator, Clamshell, Concrete Breaker when attached to hoe, Concrete Cleaning Decontamination Machine Operator, Concrete Pump, Concrete Paver, Crusher, Dozer, Elevating Grader, Endloader, Farm Tractor (90 h.p. and higher), Gradall, Grader, Heavy Equipment Robotics Operator, Hydro Excavator, Loader, Pug Mill, Pumpcrete Machines, Pump Trucks, Roller, Scraper (self-propelled or tractor drawn), Side Boom Tractor, Slip Form Paver, Slope Paver, Trencher, Ultra High Pressure Waterjet Cutting Tool System Operator, Vactors, Vacuum Blasting Machine Operator, Vertical Lifting Hoist, Vibrating Compaction Equipment (self-propelled), and Well Drilling Rig.

#### **CLASS II**

Air Compressor, Concrete Breaker when not attached to hoe, Elevator, End Dumps, Equipment Decontamination Operator, Farm Tractor (less than 90 h.p.), Forklift, Generator, Heater, Mulcher, Pigs (Portable Reagent Storage Tanks), Power Screens, Pumps (water), Stationary Compressed Air Plant, Sweeper, Water Wagon and Welding Machine.

# State of Michigan

WHPWRequest@michigan.gov

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit excavation, container removal & disposal

Project Number: 761/16108.SAR

## Houghton County

### Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

Page 1 of 26

Classification		Last Updated	Straight Time and Hourly	a Double Time	Overtime Provision
Name	Description				
=====					
<b>Asbestos &amp; Lead Abatement Laborer</b>					
Asbestos & Lead Abatement Laborer	MLDC		\$41.25	\$55.00	\$68.75 H H H X X X D Y
4 ten hour days @ straight time allowed					
Monday-Saturday, must be consecutive					
9/16/2016					

### Asbestos & Lead Abatement, Hazardous Material Handler

Asbestos and Lead Abatement, Hazardous Material Handler	AS207		\$40.75	\$54.25	\$67.75 H H H X X X D Y
4 ten hour days @ straight time allowed					
Monday-Saturday, must be consecutive					
10/30/2015					

### Boilermaker

Boilermaker	BO169		\$54.70	\$81.08	\$107.45 H H H H H H D Y
2/17/2015					

#### Apprentice Rates:

1st 6 months	\$40.31	\$59.49	\$78.67
2nd 6 months	\$41.45	\$61.21	\$80.95
3rd 6 months	\$42.57	\$62.88	\$83.19
4th 6 months	\$43.69	\$64.57	\$85.43
5th 6 months	\$44.81	\$66.24	\$87.67
6th 6 months	\$48.63	\$72.50	\$96.36
7th 6 months	\$49.32	\$73.01	\$96.69
8th 6 months	\$51.58	\$76.40	\$101.21

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

### Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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<u>Classification</u>		Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision
Name	Description					
=====						
<b>Bricklayer</b>						
Marble, Tile and Terrazzo Finisher	BR6		\$36.55	\$45.79	\$55.03	H H D X H H D D Y
<i>Make up day allowed comment</i>		6/2/2014				
Four 10s allowed Monday-Thurs. Make up days: Friday & Saturday.						
Bricklayer, stone mason, moisaic worker, plasterer, tuck pointer, pointer, caulker & cleaner	BR6-2		\$42.71	\$55.03	\$67.35	X X H X X H H D Y
<i>Make up day allowed comment</i>		6/2/2014				
Saturday						
All time over 12 hours pr day - double						
<b>Apprentice Rates:</b>						
0 - 749 hours			\$32.85	\$40.24	\$47.63	
750 - 1499 hours			\$34.09	\$42.10	\$50.11	
1500 - 2249 hours			\$35.32	\$43.95	\$52.57	
2250 - 2999 hours			\$36.55	\$45.79	\$55.03	
3000 - 3749 hours			\$37.78	\$47.63	\$57.49	
3750 - 4499 hours			\$39.01	\$49.48	\$59.95	
4500 - 5249 hours			\$40.25	\$51.34	\$62.43	
5250 - 6000 hours			\$41.48	\$53.19	\$64.89	
Marble, Tile and Terrazzo Layer	BR6TL		\$42.71	\$55.03	\$67.35	H H D X H H D D Y
<i>Make up day allowed comment</i>		6/2/2014				
Four 10s allowed Monday-Thurs. Make up days: Friday & Saturday.						

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

Page 3 of 26

Classification		Last Updated	Straight Time and Hourly	a Double Time	Overtime Provision
Name	Description				

## Carpenter

Carpenter, Drywall Taper & Finisher, & Floor CA1510-C \$42.75 \$54.46 \$66.17 X X H X X H H D Y  
*Make up day allowed comment* 7/26/2016  
 Saturday

### Apprentice Rates:

1st 6 months	\$33.38	\$40.41	\$47.43
2nd 6 months	\$34.55	\$42.16	\$49.77
3rd 6 months	\$35.72	\$43.91	\$52.11
4th 6 months	\$36.90	\$45.69	\$54.47
5th 6 months	\$38.07	\$47.44	\$56.81
6th 6 months	\$39.24	\$49.19	\$59.15
7th 6 months	\$40.41	\$50.95	\$61.49
8th 6 months	\$41.58	\$52.71	\$63.83

Pile driver CA1510-P \$42.95 \$54.76 \$66.57 X X H X X H H D Y  
*Make up day allowed comment* 7/26/2016  
 Saturday

### Apprentice Rates:

1st 6 months	\$33.50	\$40.59	\$47.67
2nd 6 months	\$34.68	\$42.35	\$50.03
3rd 6 months	\$35.86	\$44.13	\$52.39
4th 6 months	\$37.05	\$45.91	\$54.77
5th 6 months	\$38.23	\$47.68	\$57.13
6th 6 months	\$39.41	\$49.45	\$59.49
7th 6 months	\$40.59	\$51.22	\$61.85
8th 6 months	\$41.77	\$52.99	\$64.21

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

Page 4 of 26

Classification		Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision
Name	Description					

## Cement Mason

Cement Mason BR6-CM \$42.71 \$55.03 \$67.35 H H D X H H D D Y

*Make up day allowed comment* 6/2/2014

Four 10s allowed Monday-Thurs. Make up days: Friday and Saturday.

### Apprentice Rates:

0 - 749 hours	\$34.09	\$42.10	\$50.11
750 - 1499 hours	\$35.32	\$43.95	\$52.57
1500 - 2249 hours	\$36.55	\$45.79	\$55.03
2250 - 2999 hours	\$37.78	\$47.63	\$57.49
3000 - 3749 hours	\$39.01	\$49.48	\$59.95
3750 - 4500 hours	\$40.25	\$51.34	\$62.43

Cement Mason PL16-16 \$33.04 \$43.99 \$54.93 H H H H H H H D Y

Four 10s allowed Monday-Thursday with Friday or Saturday inclement weather make up days.

Saturday hours for inclement weather make up shall be paid straight rate unless over 40 hours worked.

*Make up day allowed comment* 8/18/2016

Friday or Saturday for inclement weather

### Apprentice Rates:

1st year	\$25.38	\$32.49	\$39.61
2nd year	\$27.57	\$35.78	\$43.99
3rd year	\$29.76	\$39.07	\$48.37

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Time and Hourly	a Double Time	Overtime Provision
Name	Description				

## Electrician

Sound and Communications Technician EC-1070 \$36.60 \$47.73 \$58.85 H H H H H H D Y  
4 10 hour days allowed M-Th

Make up day allowed comment 8/26/2016

Friday for inclement weather or holidays

### Apprentice Rates:

1st Period	\$27.70	\$34.37	\$41.04
2nd Period	\$29.93	\$37.72	\$45.50
3rd Period	\$31.04	\$39.38	\$47.72
4th Period	\$32.15	\$41.04	\$49.94
5th Period	\$33.27	\$42.73	\$52.18
6th Period	\$34.38	\$44.40	\$54.40

Inside wireman for work above \$160,000 EC-906z2H \$51.23 \$68.06 \$84.90 H H H H H H D Y

A 4 ten schedule may be worked if 4 consecutive days, M-Th

Make up day allowed comment 8/30/2016

Friday

### Apprentice Rates:

2nd period indentured before 10/12/15	\$32.77	\$43.20	\$53.63
3rd period indentured before 10/12/15	\$36.26	\$48.44	\$60.61
4th period indentured before 10/12/15	\$39.73	\$53.64	\$67.55
5th period indentured before 10/12/15	\$41.47	\$56.25	\$71.03
6th period indentured before 10/12/15	\$43.21	\$58.86	\$74.51
1st period indentured after 10/12/15	\$25.83	\$32.79	\$39.75
2nd period indentured after 10/12/15	\$27.56	\$35.39	\$43.21
3rd period indentured after 10/12/15	\$31.04	\$40.60	\$50.17
4th period indentured after 10/12/15	\$34.52	\$45.83	\$57.13
5th period indentured after 10/12/15	\$37.99	\$51.03	\$64.07
6th period indentured after 10/12/15	\$41.47	\$56.25	\$71.03

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision
Name	Description					

Inside wireman for work below 160,000	EC-906z2L		\$48.94	\$64.63	\$80.32	H H H H H H H D Y
A 4 ten schedule may be worked if 4 consecutive days, M-Th						
Make up day allowed comment		8/30/2016				
Friday						

## Apprentice Rates:

1st period indentured before 10/12/15	\$29.30	\$38.00	\$46.69
2nd period indentured before 10/12/15	\$32.77	\$43.20	\$53.63
3rd period indentured before 10/12/15	\$36.26	\$48.44	\$60.61
4th period indentured before 10/12/15	\$39.73	\$53.64	\$67.55
5th period indentured before 10/12/15	\$41.47	\$56.25	\$71.03
6th period indentured before 10/12/15	\$43.21	\$58.86	\$74.51
1st period indentured after 10/12/15	\$25.83	\$32.79	\$39.75
2nd period indentured after 10/12/15	\$27.56	\$35.39	\$43.21
3rd period indentured after 10/12/15	\$31.04	\$40.60	\$50.17
4th period indentured after 10/12/15	\$34.52	\$45.83	\$57.13
5th period indentured after 10/12/15	\$37.99	\$51.03	\$64.07
6th period indentured after 10/12/15	\$41.47	\$56.25	\$71.03

## Elevator Constructor

Elevator Constructor Mechanic	EL-85		\$70.77	\$116.32	D D D D D D D D Y	
comment		4/8/2013				
4 tens allowed M-TH						

## Apprentice Rates:

1st year	\$50.27	\$75.32
2nd year	\$54.83	\$84.44
3rd year	\$57.10	\$88.98
4th year	\$61.66	\$98.10

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.



# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Time and Hourly	a Double Time	Overtime Provision
Name	Description				
=====					
<b>Glazier</b>					
Glazier	GL-826		\$44.78	\$60.87	\$76.95 H H H H H H D Y
4 tens allowed on consecutive days					
		6/3/2016			
<b>Apprentice Rates:</b>					
1st 6 months			\$31.91	\$41.57	\$51.21
2nd 6 months			\$33.52	\$43.98	\$54.43
3rd 6 months			\$35.12	\$46.38	\$57.63
4th 6 months			\$36.74	\$48.81	\$60.87
5th 6 months			\$38.35	\$51.22	\$64.09
6th 6 months			\$39.96	\$53.64	\$67.31
7th 6 months			\$41.57	\$56.05	\$70.53
8th 6 months			\$43.17	\$58.45	\$73.73
<b>Heat and Frost Insulator</b>					
Heat and Frost Insulator	AS127		\$42.97	\$55.93	\$68.89 H H H H D D D Y
Make up day allowed					
		11/3/2014			
<b>Apprentice Rates:</b>					
1st year			\$30.01	\$36.49	\$42.97
2nd year			\$32.60	\$40.37	\$48.15
3rd year			\$35.19	\$44.26	\$53.33
4th year			\$37.79	\$48.16	\$58.53
Spray Insulation	AS25S		\$25.29	\$36.51	X X X H H H H N
		6/2/2016			

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Statewide

## Official Rate Schedule

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision
Name	Description					

## Ironworker

For work over \$10 million: Structural, IR-8-A \$50.07 \$69.76 \$89.45 H H D H D D D D Y  
Ornamental, Machinery Rigger & Reinforcing  
Ironworker; installation of sheet metal siding

A 4-10 work week allowed Monday thru Thursday. Friday may be used as a make-up day. Hours in excess of 40 must be paid time and one half.

Make up day allowed

9/29/2014

### Apprentice Rates:

0 - 1,000 hours	\$25.39	\$37.75	\$50.11
1,001 - 2,000 hours	\$37.71	\$51.22	\$64.73
2,001 - 3,000 hours	\$39.01	\$53.17	\$67.33
3,001 - 4,000 hours	\$40.31	\$55.12	\$69.93
4,001 - 5,000 hours	\$41.61	\$57.07	\$72.53
5,001 - 6,000 hours	\$42.92	\$59.04	\$75.15
6,001 - 7,000 hours	\$44.22	\$60.98	\$77.75

For work under \$10 Million: Structural, IR-8-B \$46.73 \$64.76 \$82.79 H H D H D D D D Y  
Ornamental, Machinery Rigger & Reinforcing  
Ironworker; pre-engineered metal buildings

A 4-10 work week allowed Monday thru Thursday. Friday may be used as a make-up day. Hours in excess of 40 must be paid time and one half.

Make up day allowed

9/29/2014

### Apprentice Rates:

0-1,000 hours	\$25.39	\$37.75	\$50.11
1,001 - 2,000 hours	\$37.71	\$51.22	\$64.73
2,001 - 3,000 hours	\$39.01	\$53.17	\$67.33
3,001 - 4,000 hours	\$40.31	\$55.12	\$69.93
4,001 - 5,000 hours	\$41.61	\$57.07	\$72.53
5,001 - 6,000 hours	\$42.92	\$59.04	\$75.15
6,001 - 7,000 hours	\$44.22	\$60.98	\$77.75

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Time and Hourly	a Double Time	Overtime Provision
Name	Description				
<b>Laborer</b>					
Class A Laborer - construction laborer on building and heavy construction work, storm, and sanitary sewers on all construction sites and streets which are not included in the road builder rates, tool crib attendant, civil engineer helper, rodman, oxi-gun operator, propane or acetylene cutting torch operator, motor driven buggies, chipping hammers, tamping machines, green cutting, sand blasters, mason tenders, mortar mixers, marterial mixers, vibrator operators, concrete mixers, laborers with concrete crew, mixer to pour, including pour time from trucks.	L1329-B-A	5/4/2016	\$33.71	\$43.89	\$54.07 X X X X X X D Y
<b>Apprentice Rates:</b>					
0 - 1,000 hours			\$28.62	\$36.25	\$43.89
1,001 - 2,000 hours			\$29.64	\$37.79	\$45.93
2,001 - 3,000 hours			\$30.66	\$39.31	\$47.97
3,001 - 4,000 hours			\$32.69	\$42.36	\$52.03
Class B Laborer - Cement gun nozzleman, blasters, miners, drillers, buster operators, layers of all non-metallic pipe	L1329-B-B	5/4/2016	\$34.13	\$44.52	\$54.91 X X X X X X D Y
Class C Laborer - caisson worker & airtrack	L1329-B-C	5/4/2016	\$34.49	\$45.06	\$55.63 X X X X X X D Y
Class E Laborer - digester, tanks & kilns	L1329-B-D	5/4/2016	\$35.85	\$47.10	\$58.35 X X X X X X D Y

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision
Name	Description					

## Laborer - Hazardous

Class A - performing work in conjunction with site preparation and other preliminary work prior to actual removal, handling, or containment of hazardous waste substances not requiring use of personal protective equipment required by state or federal regulations; or a laborer performing work in conjunction with the removal, handling, or containment of hazardous waste substances when use of personal protective equipment level "D" is required.

LHAZ-Z11-A

\$32.91 \$46.37 \$59.82 H H H H H H D Y

*Make up day allowed comment*

11/7/2014

4 10s allowed M-Th or T-F; inclement weather makeup day Friday

### Apprentice Rates:

0-1,000 work hours	\$27.93	\$38.90	\$49.86
1,001-2,000 work hours	\$28.93	\$40.40	\$51.86
2,001-3,000 work hours	\$29.92	\$41.88	\$53.84
3,001-4,000 work hours	\$31.91	\$44.86	\$57.82

Class B - performing work in conjunction with the removal, handling, or containment of hazardous waste substances when the use of personal protective equipment levels "A", "B" or "C" is required.

LHAZ-Z11-B

\$33.91 \$47.87 \$61.82 H H H H H H D Y

*Make up day allowed comment*

11/7/2014

4 10s allowed M-Th or T-F; inclement weather makeup day Friday

### Apprentice Rates:

0-1,000 work hours	\$28.68	\$40.02	\$51.36
1,001-2,000 work hours	\$29.73	\$41.60	\$53.46
2,001-3,000 work hours	\$30.77	\$43.16	\$55.54
3,001-4,000 work hours	\$32.86	\$46.29	\$59.72

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision
Name	Description					

## Laborer Underground - Tunnel, Shaft & Caisson

Class I - Tunnel, shaft and caisson laborer, dump man, shanty man, hog house tender, testing man (on gas), and watchman.

LAUCT-Z2-1

\$35.67 \$47.07 \$58.47 X X X X X X D Y

10/30/2014

### Apprentice Rates:

0-1,000 work hours	\$30.52	\$39.35	\$48.17
1,001-2,000 work hours	\$31.55	\$40.90	\$50.23
2,001-3,000 work hours	\$32.58	\$42.44	\$52.29
3,001-4,000 work hours	\$34.64	\$45.53	\$56.41

Class II - Manhole, headwall, catch basin builder, bricklayer tender, mortar man, material mixer, fence erector, and guard rail builder

LAUCT-Z2-2

\$35.76 \$47.21 \$58.65 X X X X X X D Y

10/30/2014

### Apprentice Rates:

0-1,000 work hours	\$30.58	\$39.44	\$48.29
1,001-2,000 work hours	\$31.62	\$41.00	\$50.37
2,001-3,000 work hours	\$32.66	\$42.56	\$52.45
3,001-4,000 work hours	\$34.72	\$45.65	\$56.57

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification									
Name	Description	Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision			
	Class III - Air tool operator (jack hammer man, bush hammer man and grinding man), first bottom man, second bottom man, cage tender, car pusher, carrier man, concrete man, concrete form man, concrete repair man, cement invert laborer, cement finisher, concrete shoveler, conveyor man, floor man, gasoline and electric tool operator, gunnite man, grout operator, welder, heading dinky man, inside lock tender, pea gravel operator, pump man, outside lock tender, scaffold man, top signal man, switch man, track man, tugger man, utility man, vibrator man, winch operator, pipe jacking man, wagon drill and air track operator and concrete saw operator (under 40 h.p.).	LAUCT-Z2-3	\$35.86	\$47.36	\$58.85	X X X X X X D Y			

10/30/2014

## Apprentice Rates:

0-1,000 work hours	\$30.66	\$39.56	\$48.45
1,001-2,000 work hours	\$31.70	\$41.12	\$50.53
2,001-3,000 work hours	\$32.74	\$42.68	\$52.61
3,001-4,000 work hours	\$34.82	\$45.80	\$56.77

Class IV - Tunnel, shaft and caisson mucker, bracer man, liner plate man, long haul dinky driver and well point man.	LAUCT-Z2-4	\$36.02	\$47.60	\$59.17	X X X X X X D Y
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10/30/2014

## Apprentice Rates:

0-1,000 work hours	\$30.78	\$39.74	\$48.69
1,001-2,000 work hours	\$31.83	\$41.32	\$50.79
2,001-3,000 work hours	\$32.88	\$42.89	\$52.89
3,001-4,000 work hours	\$34.97	\$46.02	\$57.07

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Time and a Double Overtime		
Name	Description	Hourly	Half	Time	Provision
=====					
Class V - Tunnel, shaft and caisson miner, drill runner, keyboard operator, power knife operator, reinforced steel or mesh man (e.g. wire mesh, steel mats, dowel bars)	LAUCT-Z2-5	10/30/2014	\$36.28	\$47.99	\$59.69 X X X X X X D Y
<b>Apprentice Rates:</b>					
0-1,000 work hours			\$30.98	\$40.04	\$49.09
1,001-2,000 work hours			\$32.04	\$41.63	\$51.21
2,001-3,000 work hours			\$33.10	\$43.22	\$53.33
3,001-4,000 work hours			\$35.22	\$46.40	\$57.57
Class VI - Dynamite man and powder man.	LAUCT-Z2-6	10/30/2014	\$36.59	\$48.45	\$60.31 X X X X X X D Y
<b>Apprentice Rates:</b>					
0-1,000 work hours			\$31.21	\$40.38	\$49.55
1,001-2,000 work hours			\$32.28	\$41.99	\$51.69
2,001-3,000 work hours			\$33.36	\$43.61	\$53.85
3,001-4,000 work hours			\$35.51	\$46.84	\$58.15
Class VII - Restoration laborer, seeding, sodding, planting, cutting, mulching and topsoil grading and the restoration of property such as replacing mail boxes, wood chips, planter boxes and flagstones.	LAUCT-Z2-7	10/30/2014	\$28.86	\$36.86	\$44.85 X X X X X X D Y
<b>Apprentice Rates:</b>					
0-1,000 work hours			\$25.41	\$31.68	\$37.95
1,001-2,000 work hours			\$26.10	\$32.72	\$39.33
2,001-3,000 work hours			\$26.79	\$33.76	\$40.71
3,001-4,000 work hours			\$28.17	\$35.82	\$43.47

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Time and Hourly	a Double Time	Overtime Provision
Name	Description				
<b>Landscape Laborer</b>					
	Landscape Specialist includes air, gas, and diesel equipment operator, skidsteer (or equivalent), lawn sprinkler installer on landscaping work where seeding, sodding, planting, cutting, trimming, backfilling, rough grading or maintenance of landscape projects occurs. Sundays paid at time & one half. Holidays paid at double time.	LLAN-Z2-A	\$28.25	\$39.04	\$49.82 X X H X X X H D Y
		10/13/2015			
	Skilled Landscape Laborer: small power tool operator, lawn sprinkler installers' tender, material mover, truck driver on when seeding, sodding, planting, cutting, trimming, backfilling, rough grading or maintaining of landscape projects occurs. Sundays paid at time & one half. Holidays paid at double time.	LLAN-Z2-B	\$24.05	\$32.74	\$41.42 X X H X X X H D Y
		10/13/2015			
<b>Operating Engineer - DIVER</b>					
	Diver/Wet Tender/Tender/Rov Pilot/Rov Tender	GLF D	\$52.80	\$79.20	\$105.60 H H H H H H H D N
		4/2/2014			
<b>Operating Engineer - Marine Construction</b>					
	Diver/Wet Tender, Engineer (hydraulic dredge)	GLF-1	\$65.00	\$84.85	\$104.70 X X H H H H H D Y
		2/12/2014			
	<i>Make up day allowed</i>				
	<u>Subdivision of county</u>	all Great Lakes, islands therein, & connecting & tributary waters			
	Crane/Backhoe Operator, 70 ton or over Tug Operator, Mechanic/Welder, Assistant Engineer (hydraulic dredge), Leverman (hydraulic dredge), Diver Tender	GLF-2	\$63.50	\$82.60	\$101.70 X X H H H H H D Y
	Holiday pay = \$120.80 per hour, wages &				
	<i>Make up day allowed</i>				
	<u>Subdivision of county</u>	All Great Lakes, islands therein, & connecting & tributary waters			

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Statewide

## Official Rate Schedule

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification							
Name	Description	Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision	

Friction, Lattice Boom or Crane License	GLF-2B		\$64.50	\$84.10	\$103.70	X X H H H H H D Y
Certification						

Holiday pay = \$123.30

Make up day allowed

2/12/2014

Subdivision of county All Great Lakes, islands, therein, & connecting & tributary waters

Deck Equipment Operator, Machineryman, Maintenance of Crane (over 50 ton capacity) or Backhoe (115,000 lbs or more), Tug/Launch Operator, Loader, Dozer on Barge, Deck Machinery	GLF-3		\$59.30	\$76.30	\$93.30	X X H H H H H D Y
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Holiday pay = \$110.30 per hour, wages &

Make up day allowed

2/12/2014

Subdivision of county All Great Lakes, islands therein, & connecting & tributary waters

Deck Equipment Operator, (Machineryman/Fireman), (4 equipment units or more), Off Road Trucks, Deck Hand, Tug Engineer, & Crane Maintenance 50 ton capacity and under or Backhoe 115,000 lbs or less, Assistant Tug Operator	GLF-4		\$53.60	\$67.75	\$81.90	X X H H H H H D Y
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Holiday pay = \$96.05 per hour, wages & fringes

Make up day allowed

2/12/2014

Subdivision of county All Great Lakes, islands therein, & connecting & tributary waters

## Operating Engineer General Construction & Underground

Crane 120' boom & jib	EN-324UP-120GU		\$51.45	\$65.86	\$80.26	X X H H H H H D N
<i>comment</i>		5/24/2016				
Double time after 12 hours Mon-Sat						
Crane 140' boom & jib	EN-324UP-140GU		\$51.70	\$66.23	\$80.76	X X H H H H H D N
<i>comment</i>		5/24/2016				
Double time after 12 hours Mon-Sat						
Crane with 400' or longer main boom & jib	EN-324UP-400GU		\$54.40	\$70.28	\$86.17	X X H H H H H D N
<i>comment</i>		5/24/2016				
Double time after 12 hours Mon-Sat						

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification Name	Description	Last Updated	Straight Time and Hourly	a Double Half	Time	Overtime Provision
Class A- Regular equipment operator, crane, dozer, front end loader, pumpcrete, squeeze crete, job mechanic, welder, concrete pump, excavator, milling & pulverizing machines, & scraper (self-propelled & tractor drawn).	EN-324UP-AGU		\$50.95	\$65.11	\$79.26	X X H H H H D N
	<i>comment</i>	5/24/2016				
	Double time after 12 hours Mon-Sat					
<b>Apprentice Rates:</b>						
	1st 6 months		\$40.71	\$50.62	\$60.53	
	2nd 6 months		\$42.12	\$52.74	\$63.35	
	3rd 6 months		\$43.54	\$54.87	\$66.19	
	4th 6 months		\$44.96	\$57.00	\$69.03	
	5th 6 months		\$46.37	\$59.11	\$71.85	
	6th 6 months		\$47.79	\$61.24	\$74.69	
Class B- Air-Trac Drill, boom truck (non-swing), concrete mixers, material hoist and tugger, pumps 6" and over, beltcrete, sweeping machine, trencher, head grease man, winches, well points and freeze systems	EN-324UP-BGU		\$47.70	\$60.23	\$72.76	X X H H H H D N
	<i>comment</i>	5/24/2016				
	Double time after 12 hours Mon-Sat					
Class C- Fork Truck, air compressor, conveyer, concrete saw, farm tractor(without attachments), generator, guard post driver, mulching machines, pumps under 6", welding machines,	EN-324UP-CGU		\$47.12	\$59.36	\$71.60	X X H H H H D N
	<i>comment</i>	5/24/2016				
	Double time after 12 hours Mon-Sat					
Class D- Oiler, fireman, heater operator, brock concrete breaker, elevators (other than passenger), end dump & skid steer	EN-324UP-DGU		\$46.18	\$57.95	\$69.72	X X H H H H D N
	<i>comment</i>	5/24/2016				
	Double time after 12 hours Mon-Sat					
Crane 220' boom & jib	EN-324UP-GU		\$51.95	\$66.61	\$81.26	X X H H H H D N
	<i>comment</i>	5/24/2016				
	Double time after 12 hours Mon-Sat					

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification Name Description	Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision
Mechanic w/ truck & tools <i>comment</i> Double time after 12 hours Mon-Sat	EN-324UP-MGU 5/24/2016	\$52.45	\$67.36	\$82.26	X X H H H H H D N
<b>Operating Engineer Steel Work</b>					
Crane 120' boom & jib <i>comment</i> Double time after 12 hours Mon-Sat	EN-324UP-120S 5/24/2016	\$51.85	\$66.46	\$81.06	X X H H H H H D Y
Crane 140' boom & jib <i>comment</i> Double time after 12 hours Mon-Sat	EN-324UP-140S 7/8/2015	\$52.10	\$66.83	\$81.56	X X H H H H H D Y
Crane 220' boom & jib <i>comment</i> Double time after 12 hours Mon-Sat	EN-324UP-220S 5/24/2016	\$52.35	\$67.21	\$82.06	X X H H H H H D Y
Crane with 300' boom & jib <i>Make up day allowed comment</i> Double time after 12 hours Mon-Sat	EN-324UP-300S 5/24/2016	\$54.07	\$69.79	\$85.50	X X H H H H H D Y
Crane with 400' boom & jib <i>Make up day allowed comment</i> Double time after 12 hours Mon-Sat	EN-324UP-400S 5/24/2016	\$55.79	\$72.37	\$88.95	X X H H H H H D Y
Compressor, Welder & Forklift <i>comment</i> Double time after 12 hours Mon-Sat	EN-324UP-CWS 5/24/2016	\$48.10	\$60.83	\$73.56	X X H H H H H D Y
Mechanic w/ truck & tools <i>comment</i> Double time after 12 hours Mon-Sat	EN-324UP-MS 5/24/2016	\$52.85	\$67.96	\$83.06	X X H H H H H D Y
Oiler & Fireman <i>comment</i> Double time after 12 hours Mon-Sat	EN-324UP-OFS 5/24/2016	\$46.80	\$58.88	\$70.96	X X H H H H H D Y

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Issue Date: 10/7/2016

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Classification		Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision						
Name	Description											
Operator		EN-324UP-OS	\$51.35	\$65.71	\$80.06	X	X	H	H	H	H	D Y
	<i>comment</i>	5/24/2016										
	Double time after 12 hours Mon-Sat											

## Apprentice Rates:

1st 6 months	\$40.99	\$51.04	\$61.09
2nd 6 months	\$42.26	\$52.95	\$63.63
3rd 6 months	\$43.87	\$55.36	\$66.85
4th 6 months	\$45.29	\$57.49	\$69.69
5th 6 months	\$46.73	\$59.65	\$72.57
6th 6 months	\$48.17	\$61.81	\$75.45

## Painter

Painter		PT-1011	\$31.25	\$41.01	\$50.76	H	H	H	H	H	H	D N
		7/17/2015										

## Apprentice Rates:

1st 1000 hours	\$23.45	\$29.30	\$35.16
2nd 1000 hours	\$24.42	\$30.76	\$37.10
3rd 1000 hours	\$25.40	\$32.23	\$39.06
4th 1000 hours	\$26.37	\$33.68	\$41.00
5th 1000 hours	\$27.35	\$35.16	\$42.96
6th 1000 hours	\$28.32	\$36.61	\$44.90
7th 1000 hours	\$29.30	\$38.08	\$46.86
8th 1000 hours	\$30.27	\$39.54	\$48.80

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Time and a Double	Overtime
Name	Description	Hourly	Half	Time
=====				
Bridge Painter (under 30 feet)	PT-1011B	\$35.89	\$47.97	\$60.04 H H H H H H D N
8/28/2015				
<b>Apprentice Rates:</b>				
1st 1,000 hours		\$26.23	\$33.48	\$40.72
2nd 1,000 hours		\$27.44	\$35.29	\$43.14
3rd 1,000 hours		\$28.64	\$37.09	\$45.54
4th 1,000 hours		\$29.85	\$38.90	\$47.96
5th 1,000 hours		\$31.06	\$40.72	\$50.38
6th 1,000 hours		\$32.27	\$42.54	\$52.80
7th 1,000 hours		\$33.48	\$44.35	\$55.22
8th 1,000 hours		\$34.68	\$46.15	\$57.62
Drywall Finisher, Soundproofing, & Plural Component Applicator	PT-1011-DF	\$37.67	\$50.64	\$63.60 H H H H H H D N
7/17/2015				
<b>Apprentice Rates:</b>				
2nd 1,000 hours		\$28.59	\$37.02	\$45.44
3rd 1,000 hours		\$29.89	\$38.96	\$48.04
4th 1,000 hours		\$31.19	\$40.92	\$50.64
5th 1,000 hours		\$32.48	\$42.85	\$53.22
6th 1,000 hours		\$33.78	\$44.80	\$55.82
7th 1,000 hours		\$35.08	\$46.75	\$58.42
8th 1,000 hours		\$36.37	\$48.68	\$61.00
<b>Pipe and Manhole Rehab</b>				
General Laborer for rehab work or normal cleaning and cctv work-top man, scaffold man, CCTV assistant, jetter-vac assistant	TM247	\$28.20	\$38.20	H H H H H H H N
4/17/2015				
Tap cutter/CCTV Tech/Grout Equipment Operator: unit driver and operator of CCTV; grouting equipment and tap cutting equipment	TM247-2	\$32.70	\$44.95	H H H H H H H N
4/17/2015				

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Statewide

## Official Rate Schedule

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision
Name	Description					
CCTV Technician/Combo Unit Operator: unit driver and operator of cctv unit or combo unit in connection with normal cleaning and televising work	TM247-3	4/17/2015	\$31.45	\$43.07		H H H H H H H N
Boiler Operator: unit driver and operator of steam/water heater units and all ancillary equipment associated	TM247-4	4/17/2015	\$33.20	\$45.70		H H H H H H H N
Combo Unit driver & Jetter-Vac Operator	TM247-5	4/17/2015	\$33.20	\$45.70		H H H H H H H N
Pipe Bursting & Slip-lining Equipment Operator	TM247-6	4/17/2015	\$34.20	\$47.20		H H H H H H H N
<b>Plasterer</b>						
Plasterer	PL16UP	10/23/2012	\$38.71	\$51.63	\$64.54	H H H H H H H D N
<b>Apprentice Rates:</b>						
1st year			\$29.67	\$38.06	\$46.46	
2nd year			\$32.25	\$41.94	\$51.62	
3rd year			\$34.84	\$45.82	\$56.80	

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Time and Hourly	a Double Time	Overtime Provision
Name	Description				

## Plumber & Pipefitter

Plumber & Pipefitter PL-111 \$47.61 \$71.42 \$95.22 H H H H H H D Y  
 4 ten hour days may be worked only Monday-Thursday

Make up day allowed

7/30/2009

### Apprentice Rates:

1st 6 months	\$23.96	\$35.94	\$47.92
2nd 6 months	\$25.44	\$38.16	\$50.88
3rd 6 months	\$35.32	\$52.98	\$70.64
4th 6 months	\$36.65	\$54.98	\$73.30
5th 6 months	\$37.99	\$56.98	\$75.98
6th 6 months	\$39.47	\$59.20	\$78.94
7th 6 months	\$40.80	\$61.20	\$81.60
8th 6 months	\$42.13	\$63.20	\$84.26
9th 6 months	\$43.46	\$65.19	\$86.92

## Roofer

Commercial Roofer RO-149-UP \$28.23 \$36.56 \$44.88 X X X X X X D Y  
 Make up day allowed

4/17/2015

### Apprentice Rates:

Apprentice 1	\$20.84	\$25.96	\$31.08
Apprentice 2	\$21.67	\$27.17	\$32.67
Apprentice 3	\$22.48	\$28.37	\$34.26
Apprentice 4	\$23.29	\$29.56	\$35.82
Apprentice 5	\$24.09	\$30.72	\$37.36
Apprentice 6	\$24.90	\$31.91	\$38.93

## Sewer Relining

Class I-Operator of audio visual CCTV system including remote in-ground cutter and other equipment used in conjunction with CCTV SR-I \$43.66 \$59.01 \$74.36 H H H H H H D N

11/24/2015

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Statewide

## Official Rate Schedule

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Hourly	Time and Half	a Double Time	Overtime Provision						
Name	Description											
	Class II-Operator of hot water heaters and circulation system; water jetters; and vacuum and mechanical debris removal systems and those assisting.	SR-II	\$42.13	\$56.72	\$71.30	H	H	H	H	H	H	D N

11/24/2015

## Sheet Metal Worker

Sheet Metal Worker	shm-7-5	\$51.59	\$65.60	\$79.60	H	H	H	H	D	D	D	D Y
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4 10s allowed as consecutive days, M-Th

Make up day allowed comment

11/5/2015

Friday

### Apprentice Rates:

1st 6 months	\$27.84	\$34.14	\$40.44
2nd 6 months	\$29.88	\$36.88	\$43.88
3rd 6 months	\$31.93	\$39.64	\$47.34
4th 6 months	\$33.96	\$42.37	\$50.77
5th 6 months	\$36.01	\$45.12	\$54.22
6th 6 months	\$38.05	\$47.86	\$57.66
7th 6 months	\$40.09	\$50.60	\$61.10
8th 6 months	\$42.13	\$53.34	\$64.54

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

Contract must be awarded by: 1/5/2017

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Classification		Last Updated	Straight Time and Hourly	a Double Time	Overtime Provision
Name	Description				

## Sprinkler Fitter

Sprinkler Fitter	SP 669		\$51.64	\$68.45	\$85.26	H	H	H	H	H	H	D	Y
Make up day allowed		6/24/2016											

### Apprentice Rates:

Class 1	\$23.03	\$30.60	\$38.16
Class 2	\$24.71	\$33.12	\$41.52
Class 3	\$34.01	\$43.26	\$52.50
Class 4	\$35.69	\$45.78	\$55.86
Class 5	\$37.62	\$48.55	\$59.47
Class 6	\$39.30	\$51.07	\$62.83
Class 8	\$42.67	\$56.12	\$69.57
Class 9	\$44.35	\$58.64	\$72.93
Class 10	\$46.03	\$61.16	\$76.29
Class 7	\$40.99	\$53.60	\$66.21

## Truck Driver

of all trucks of 8 cubic yd capacity or over	TM-RB2	6/7/2016	\$44.10	\$48.81		H	H	H	H	H	H	H	Y
of all trucks of 8 cubic yard capacity or less (except dump trucks of 8 cubic yard capacity or over, tandem axle trucks, transit mix and semis, euclid type equipment, double bottoms and low boys)	TM-RB2A	6/7/2016	\$44.00	\$48.66		H	H	H	H	H	H	H	Y
on euclid type equipment	TM-RB2B	6/7/2016	\$44.25	\$49.04		H	H	H	H	H	H	H	Y

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

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# Official 2016 Prevailing Wage Rates for State Funded Projects

Issue Date: 10/7/2016

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Classification		Last Updated	Straight Time and a Double	Overtime
Name	Description		Hourly Half Time	Provision

## Underground Laborer Open Cut, Class I

Construction Laborer	LAUC-Z5-1	\$32.75	\$42.68	\$52.61	X	X	X	X	X	X	X	D	Y
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10/30/2014

### Apprentice Rates:

0-1,000 work hours	\$28.35	\$36.08	\$43.81
1,001-2,000 work hours	\$29.23	\$37.40	\$45.57
2,001-3,000 work hours	\$30.11	\$38.72	\$47.33
3,001-4,000 work hours	\$31.87	\$41.36	\$50.85

## Underground Laborer Open Cut, Class II

Mortar and material mixer, concrete form man, signal man, well point man, manhole, headwall and catch basin builder, guard rail builders, headwall, seawall, breakwall, dock builder and fence erector.	LAUC-Z5-2	\$32.89	\$42.89	\$52.89	X	X	X	X	X	X	X	D	Y
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10/30/2014

### Apprentice Rates:

0-1,000 work hours	\$28.46	\$36.25	\$44.03
1,001-2,000 work hours	\$29.34	\$37.57	\$45.79
2,001-3,000 work hours	\$30.23	\$38.90	\$47.57
3,001-4,000 work hours	\$32.00	\$41.56	\$51.11

## Underground Laborer Open Cut, Class III

Air, gasoline and electric tool operator, vibrator operator, drillers, pump man, tar kettle operator, bracers, rodger, reinforced steel or mesh man (e.g. wire mesh, steel mats, dowel bars, etc.), cement finisher, welder, pipe jacking and boring man, wagon drill and air track operator and concrete saw operator (under 40 h.p.), windlass and tugger man, and directional boring man.	LAUC-Z5-3	\$33.02	\$43.09	\$53.15	X	X	X	X	X	X	X	D	Y
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10/30/2014

### Apprentice Rates:

0-1,000 work hours	\$28.56	\$36.40	\$44.23
1,001-2,000 work hours	\$29.45	\$37.74	\$46.01
2,001-3,000 work hours	\$30.34	\$39.07	\$47.79
3,001-4,000 work hours	\$32.13	\$41.76	\$51.37

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

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Issue Date: 10/7/2016

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Classification		Last Updated	Straight Time and Hourly	a Double Half	Overtime Provision
Name	Description				

## Underground Laborer Open Cut, Class IV

Trench or excavating grade man. LAUC-Z5-4 10/30/2014 \$33.07 \$43.16 \$53.25 X X X X X X D Y

### Apprentice Rates:

0-1,000 work hours	\$28.59	\$36.44	\$44.29
1,001-2,000 work hours	\$29.49	\$37.80	\$46.09
2,001-3,000 work hours	\$30.38	\$39.13	\$47.87
3,001-4,000 work hours	\$32.17	\$41.82	\$51.45

## Underground Laborer Open Cut, Class V

Pipe Layer LAUC-Z5-5 10/30/2014 \$33.12 \$43.24 \$53.35 X X X X X X D Y

### Apprentice Rates:

0-1,000 work hours	\$28.63	\$36.50	\$44.37
1,001-2,000 work hours	\$29.53	\$37.86	\$46.17
2,001-3,000 work hours	\$30.43	\$39.20	\$47.97
3,001-4,000 work hours	\$32.22	\$41.89	\$51.55

## Underground Laborer Open Cut, Class VI

Grouting man, top man assistant, audio visual television operations and all other operations in connection with closed circuit television inspection, pipe cleaning and pipe relining work & the installation and repair of water service pipe and appurtenances. LAUC-Z5-6 10/30/2014 \$30.50 \$39.31 \$48.11 X X X X X X D Y

### Apprentice Rates:

0-1,000 work hours	\$26.66	\$33.55	\$40.43
1,001-2,000 work hours	\$27.43	\$34.70	\$41.97
2,001-3,000 work hours	\$28.20	\$35.86	\$43.51
3,001-4,000 work hours	\$29.73	\$38.16	\$46.57

Official Request #: 1155

Requestor: MDEQ

Project Description: Abandoned mining waste-Torch Lake nonsuperfund site test pit

Project Number: 761/16108.SAR

County: Houghton

## Official Rate Schedule

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ATTACHMENT D

ANSWERS TO QUESTIONS

## ATTACHMENT D

### ANSWERS TO QUESTIONS

Q: Can you send us a copy of the pre bid meeting sign in sheet?

A: Yes, refer to Attachment A.

Q: What is the deadline for questions?

A: The deadline for questions is Wednesday October 19, 2016 at 5:00 pm EDT.

Q: When do you expect the lab results to be completed? Will you send these out prior to the bid opening?

A: The results have been received, tabulated, and are provided in Attachment D. Note that the CHTC-WC01-0-6 sample was collected as a composite of the upper six inches of material seeping from the three seep locations.

Q: Will the bid opening be extended?

A: Yes, refer to the Addendum No. 1 text.

Q: When is this work expected to take place?

A: The work shall take place in the spring of 2017 once the seasonal frost law restrictions have been removed, at a time mutually agreeable to the Contractor and MDEQ.

Q: Is there any stamp sand on site that can be used for backing the excavations if necessary?

A: No. However, if the Contractor uses gravel or small diameter crushed stone for a temporary truck turnaround pad, that material can be used for backfill (but not clean cap material).

Q: Can you provide us with a copy of the prevailing wages for this project?

A: Yes, refer to Attachment C.

Q: Do we need to use wood stakes for the mulch blankets?

A: Yes.

Q: What is required for equipment decontamination?

A: The Contractor shall decontaminate and power wash their equipment at the Site to remove adhered contaminated material and stamp sands/tailings/slag so that no material leaves the Site on equipment or is left upon the clean soil cap. Decontamination shall be performed in such a manner that solid material removed from equipment is deposited back in the excavation area and not left on the clean soil cap. As noted in the Scope of Work, decontamination water that is free of detergents or other cleaning additives may be applied to the ground surface at the Site.

Q: How do we turn trucks around at the Site?

A: The single lane gravel road loops around the Site and exits adjacent to the gate into the wastewater treatment lagoons. However, portions of the eastern and northern sections of this road beyond the proposed work area are less than one foot above the current lake level and may

not support heavy truck traffic. Construction of a temporary turnaround pad near the work area may be advisable. If such a pad is constructed it shall be entirely removed when the work is done and the area raked smooth, seeded, and mulched as part of Site restoration. Shuttling of contaminated material, such as with a front-end loader, to the property entrance to load trucks is not allowed due to the risk of spilling material. Payment for a turnaround pad shall be part of the mobilization line item. Any surplus material shall be removed from the Site upon completion of the work.

## ATTACHMENT E

### ANALYSIS SUMMARY TABLES AND LAB REPORT

**TABLE 1**  
**Sample Analytical Summary - Waste Characterization**  
**Abandoned Minig Wastes - Torch Lake Non-Superfund Site**

Station Name		CHTC-WC01	Hazardous Waste Toxicity Value
Field Sample ID		CHTC-WC01-0-6 TCLP	
Lab Sample ID		1609985-01 1609985-02	
Sample Date		9/10/2016	
Chemical Name	Unit	Result	
<b>TCLP Inorganics - Metals</b>			
ARSENIC	mg/l	< 0.05 U	5.0
BARIUM	mg/l	0.085	100.0
CADMIUM	mg/l	< 0.002 U	1.0
CHROMIUM	mg/l	< 0.05 U	5.0
COPPER	mg/l	0.24	--
LEAD	mg/l	0.077	5.0
MERCURY	mg/l	< 0.002 U	0.2
SELENIUM	mg/l	< 0.05 U	1.0
SILVER	mg/l	< 0.05 U	5.0
ZINC	mg/l	0.1 J	--
<b>TCLP Organics - Pesticides</b>			
gamma-BHC (Lindane)	ug/l	< 0.25 U	400
Chlordane, Technical	ug/l	< 12 U	30
Endrin	ug/l	< 0.5 U	20
Heptachlor	ug/l	< 0.25 U	8.00
Heptachlor epoxide	ug/l	< 0.25 U	8.00
Methoxychlor	ug/l	< 1 U	10,000
Toxaphene	ug/l	< 50 U	500
<b>TCLP Organics - Herbicides</b>			
2,4,5-TP (Silvex)	ug/l	< 5 U	1,000
2,4-D	ug/l	< 5 U	10,000
<b>TCLP Organics - SVOCs</b>			
m-Cresol	ug/l	< 100 U	200,000
p-Cresol	ug/l	< 100 U	200,000
p-Cresol	ug/l	< 100 U	200,000
2,4-DINITROTOLUENE	ug/l	< 100 U	130
HEXACHLORO-1,3-BUTADIENE	ug/l	< 100 U	500
HEXACHLOROBENZENE	ug/l	< 100 U	130
HEXACHLOROETHANE (SVOC)	ug/l	< 100 U	3,000
NITROBENZENE	ug/l	< 100 U	2,000
PENTACHLOROPHENOL	ug/l	< 100 U	100,000
PYRIDINE	ug/l	< 200 U	5,000
2,4,5-TRICHLOROPHENOL	ug/l	< 100 U	400,000
2,4,6-TRICHLOROPHENOL	ug/l	< 100 U	2,000
<b>TCLP Organics - VOCs</b>			
BENZENE	ug/l	39	500
2-BUTANONE (MEK)	ug/l	< 100 U	200,000
CARBON TETRACHLORIDE	ug/l	< 20 U	500
CHLOROBENZENE	ug/l	< 20 U	100,000
CHLOROFORM	ug/l	< 20 U	6,000
1,1-DICHLOROETHYLENE	ug/l	< 20 U	700
1,2-DICHLOROETHANE	ug/l	< 20 U	500
1,4-DICHLOROBENZENE	ug/l	< 100 U	7,500
TETRACHLOROETHYLENE	ug/l	< 20 U	700
TRICHLOROETHYLENE	ug/l	< 20 U	500
VINYL CHLORIDE	ug/l	< 20 U	200
<b>Other - Waste Characteristics</b>			
PERCENT MOISTURE	%	24	--
pH	s.u.	3	--
FLASHPOINT/IGNITABILITY	Deg F	>200	--
FREE LIQUIDS	--	Absent	--
CYANIDE, REACTIVE	mg/kg-dry	<130 U	--
SULFIDE, REACTIVE	mg/kg-dry	< 130 U	---

**Notes:**

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

-- = No value listed

% = Percent

ID = Identification

J = The concentration is an approximate value

mg/L = Milligram per liter

SVOC = Semi-volatile organic compound

TCLP = Toxicity Characteristic Leaching Procedure

U = Analyte analyzed for but

not detected above reported

ug/L = microgram per liter



**TABLE 2**  
**Sample Analytical Summary - Waste Material**  
**Abandoned Minig Wastes - Torch Lake Non-Superfund Site**

Station Name	CHTC-WC01	Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria	Nonresidential Drinking Water Protection Criteria	Nonresidential Particulate Soil Inhalation Criteria	Nonresidential Direct Contact Criteria	
Field Sample ID	CHTC-WC01-0-6								
Lab Sample ID	1609985-02								
Sample Date	9/10/2016								
Chemical Name	Units	Result							
Inorganics - Metals (Totals)									
ARSENIC	mg/kg	< 5.1 U	4.6	4.6	720	7.6	4.6	910	37
BARIUM	mg/kg	19	1,300 (G)	130	330,000	37,000	1,300	150,000	130,000
CADMIUM	mg/kg	< 2.1 UJ	6.0	1.6 (G,X)	1,700	550	6.0	2,200	2,100
CHROMIUM	mg/kg	< 5.1 UJ	1,000,000 (D,H)	1,200,000 (G,H,X)	330,000 (H)	790,000 (H)	1,000,000 (D,H)	150,000 (H)	1,000,000 (D,H)
COPPER	mg/kg	--	5,800	32 (G)	130,000	20,000	5,800	59,000	73,000
LEAD	mg/kg	< 5.1 UJ	700	1,900 (G,X)	100,000	400	700	44,000	900 (DD)
MERCURY	mg/kg	< 0.021 UJ	1.7 (Z)	0.13 (B, Z)	20000 (Z)	160 (Z)	1.7 (Z)	8800 (Z)	580 (Z)
ZINC	mg/kg	--	2,400	62 (G)	ID	170,000	5,000	ID	630,000
Organics - Pesticides (Totals)									
PESTICIDES WERE ALL NON-DETECT		--	--	--	--	--	--	--	--
Organics - Herbicides (Totals)									
2,4,5-TP (Silvex)	ug/kg	< 2 U	3,600	2,200	ID	1,700,000	3,600	ID	5,500,000
Organics - SVOCs (Totals)									
ANTHRACENE	ug/kg	< 10,000 U	41,000	ID	6.7E+10	2.3E+08	41,000	2.9E+10	7.3E+08
BENZO(A)PYRENE	ug/kg	< 10,000 U	NLL	NLL	1,500,000 (Q)	2,000 (Q)	NLL	1,900,000 (Q)	8,000 (Q)
BENZO(B)FLUORANTHENE	ug/kg	< 10,000 U	NLL	NLL	ID	20,000 (Q)	NLL	ID	80,000 (Q)
BENZO(G,H,I)PERYLENE	ug/kg	< 10,000 U	NLL	NLL	8E+08 (Q)	2,500,000 (Q)	NLL	3.5E+08	7,000,000 (Q)
BENZO(K)FLUORANTHENE	ug/kg	< 10,000 U	NLL	NLL	ID	200,000 (Q)	NLL	ID	800,000 (Q)
CHRYSENE	ug/kg	< 10,000 U	NLL	NLL	ID	2,000,000 (Q)	NLL	ID	8,000,000 (Q)
DI-N-BUTYLPHTHALATE	ug/kg	48,000,000	960,000 (C)	11,000	3.3E+09	2.7E+07 (C)	2,700,000 (C)	1.5E+09	8.7E+07 (C)
FLUORANTHENE	ug/kg	< 10,000 U	730,000	5,500	9.3E+09	4.6E+07	730,000	4.1E+09	1.3E+08
INDENO(1,2,3-CD)PYRENE	ug/kg	< 100000 U	NLL	NLL	ID	20,000	NLL	ID	80,000
PHENANTHRENE	ug/kg	< 10,000 U	56,000	2,100	6,700,000	1,600,000	160,000	2,900,000	5,200,000
PYRENE	ug/kg	< 10,000 U	480,000	ID	6.7E+09	2.9E+07	480,000	2.9E+09	8.4E+07
Organics - VOCs (Totals)									
2-METHYLNAPHTHALENE (VOC)	ug/kg	< 32,000 U	57,000	4,200	6.70E+08	8,100,000	170,000	2.9E+08	2.6E+07
METHYLENE CHLORIDE	ug/kg	< 9,500 U	100	30,000 (X)	6.60E+09	1.30E+06	100	8.30E+09	5.8E+06 (C)
NAPHTHALENE (VOC)	ug/kg	< 32,000 UJ	35,000	730	2E+08	1.6E+07	100,000	8.8E+07	5.2E+07
TETRACHLOROETHYLENE	ug/kg	27,000	100	1,200 (X)	2.70E+09	2.0E+05 (C)	100	1.20E+09	9.3E+05 (C)
TOLUENE	ug/kg	< 9,500 U	16,000 (I)	5,400 (I)	2.7E+10 (I)	5E+07 (C,I)	16,000 (I)	1.2E+10 (I)	1.6E+08 (C,I)
Organics - PCBs (Totals)									
AROCLOR-1254	ug/kg	< 1,300 U	NA	NA	NA	NA	NA	NA	NA
Total PCBs (J,T)	ug/kg	< 1,300 U	NLL	NLL	5,200,000 (J)	1,000 (J,T)	NLL	6,500,000 (J)	1,000 (J,T)

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

TABLE 2  
Sample Analytical Summary - Waste Material  
Abandoned Minig Wastes - Torch Lake Non-Superfund Site

**Table Footnotes:**

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

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

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

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

<b>Residential Drinking Water Protection Criteria</b>
<b>Groundwater Surface Water Interface Protection Criteria</b>
<b>Residential Particulate Soil Inhalation Criteria</b>
<b>Residential Direct Contact Criteria</b>
<b>Nonresidential Drinking Water Protection Criteria</b>
<b>Nonresidential Particulate Soil Inhalation Criteria</b>
<b>Nonresidential Direct Contact Criteria</b>

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

**Criteria Footnotes**

ID = Insufficient data to develop criterion.  
NA = A criterion or value is not available  
NLL = Hazardous substance is not likely to leach under most soil conditions.  
NLV = Hazardous substance is not likely to volatilize under most conditions.  
(B) = Background, as defined in R 299.1(b), may be substituted if higher than the calculated cleanup criterion. Background levels may be less than criteria for some inorganic compounds.

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

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

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

(G) = Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water. The final chronic value (FCV) for the protection of aquatic life shall be calculated based on the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg CaCO<sub>3</sub>/L, use 400 mg CaCO<sub>3</sub>/L for the FCV calculation. The FCV formula provides values in units of ug/L or ppb. The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote. A spreadsheet that may be used to calculate GSI and GSI protection criteria for (G)-footnoted hazardous substances is available on the Department of Environmental Quality (DEQ) internet web site.

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

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

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

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

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

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

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

**Laboratory Footnotes**

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



28-Sep-2016

Amy Keranen  
Michigan Dept.of Environmental Quality  
3350 N. Martin Luther King Jr. Blvd.  
Building #44, 3rd Floor  
Lansing, MI 48906

Re: **Abandoned Mining Wastes - Torch Lake**

Work Order: **1609985**

Dear Amy,

ALS Environmental received 4 samples on 17-Sep-2016 08:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with NELAP standard requirements and QC results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is .

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Alex Csaszar".

Electronically approved by: Alex Csaszar

Alex Csaszar  
Project Manager



Certificate No: MI: 0022

## Report of Laboratory Analysis

ADDRESS 3352 128th Avenue Holland, Michigan 49424-9263 | PHONE (616) 399-6070 | FAX (616) 399-6185

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Environmental The ALS logo, a stylized blue triangle with a yellow flame-like shape inside.

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**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Work Order:** 1609985

## Work Order Sample Summary

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
1609985-01	CHTC-WC01-0-6 TCLP	Tclp Extract		9/10/2016 14:28	9/17/2016 08:00	<input type="checkbox"/>
1609985-02	CHTC-WC01-0-6	Waste		9/10/2016 14:28	9/17/2016 08:00	<input type="checkbox"/>
1609985-03	CHLL-WC02-0-6 TCLP	Tclp Extract		9/12/2016 13:54	9/17/2016 08:00	<input type="checkbox"/>
1609985-04	CHLL-WC02-0-6	Waste		9/12/2016 13:54	9/17/2016 08:00	<input type="checkbox"/>

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**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Work Order:** 1609985

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**Case Narrative**

Samples for the above noted Work Order were received on 09/17/2016. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting.

With the following exceptions, all sample analyses achieved analytical criteria.

**Volatile Organics:**

Batch 91663, Method VOC\_8260\_S, Sample 1609985-02B: This sample ran at dilution due to an extremely foamy matrix.

Batch 91663, Method VOC\_8260\_S, Sample LCS-91663: The LCS recoveries were above the upper control limits for 1,2-Dibromoethane and Methyl iodide. All sample results in the batch were non-detect. No qualification is necessary for these analytes.

**Extractable Organics:**

Batch 91791, Method PEST\_8081\_S, Sample 1609985-04A: The reporting limit is elevated due to dilution needed to eliminate matrix-related interference for this analyte: Pesticides - Sample required dilution due to the yellow color of the sample extract.

Batch 91791, Method PEST\_8081\_S, Sample 1609985-04A: The reporting limit is elevated due to dilution needed to eliminate matrix-related interference for this analyte.

**Metals:**

No other deviations or anomalies were noted.

**Wet Chemistry:**

No other deviations or anomalies were noted.

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**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**WorkOrder:** 1609985

---

**QUALIFIERS,  
ACRONYMS, UNITS**



<b><u>Qualifier</u></b>	<b><u>Description</u></b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<b><u>Acronym</u></b>	<b><u>Description</u></b>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<b><u>Units Reported</u></b>	<b><u>Description</u></b>
% of sample	Percent of Sample
°F	Degrees Fahrenheit
µg/Kg	Micrograms per Kilogram
µg/Kg-dry	Micrograms per Kilogram Dry Weight
µg/L	Micrograms per Liter
mg/Kg	Milligrams per Kilogram
mg/Kg-dry	Milligrams per Kilogram Dry Weight
mg/L	Milligrams per Liter

---

none	
s.u.	Standard Units

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6 TCLP  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-01  
**Matrix:** TCLP EXTRACT

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TCLP HERBICIDES</b>						
			<b>SW8151</b>		Prep: SW8151M / 9/22/16	Analyst: <b>KYM</b>
2,4,5-TP (Silvex)	ND		5.0	µg/L	1	9/22/2016 08:32 PM
2,4-D	ND		5.0	µg/L	1	9/22/2016 08:32 PM
Surr: DCAA	30.8		30-150	%REC	1	9/22/2016 08:32 PM
<b>TCLP PESTICIDES</b>						
			<b>SW8081</b>			Analyst: <b>BLM</b>
Chlordane, Technical	ND		12	µg/L	5	9/23/2016 11:59 PM
Endrin	ND		0.50	µg/L	5	9/23/2016 11:59 PM
gamma-BHC (Lindane)	ND		0.25	µg/L	5	9/23/2016 11:59 PM
Heptachlor	ND		0.25	µg/L	5	9/23/2016 11:59 PM
Heptachlor epoxide	ND		0.25	µg/L	5	9/23/2016 11:59 PM
Methoxychlor	ND		1.0	µg/L	5	9/23/2016 11:59 PM
Toxaphene	ND		50	µg/L	5	9/23/2016 11:59 PM
Surr: Decachlorobiphenyl	55.0		42-119	%REC	5	9/23/2016 11:59 PM
Surr: Tetrachloro-m-xylene	75.0		32-104	%REC	5	9/23/2016 11:59 PM
<b>TCLP MERCURY BY CVAA</b>						
			<b>SW7470A</b>		Prep: SW7470 / 9/21/16	Analyst: <b>LR</b>
Mercury	ND		0.0020	mg/L	1	9/21/2016 08:41 PM
<b>TCLP METALS ANALYSIS BY ICP-MS</b>						
			<b>SW6020A</b>		Prep: SW3005A / 9/22/16	Analyst: <b>ML</b>
Arsenic	ND		0.050	mg/L	1	9/23/2016 02:47 AM
<b>Barium</b>	<b>0.085</b>		<b>0.050</b>	<b>mg/L</b>	1	9/23/2016 02:47 AM
Cadmium	ND		0.0020	mg/L	1	9/23/2016 02:47 AM
Chromium	ND		0.050	mg/L	1	9/23/2016 02:47 AM
<b>Copper</b>	<b>0.24</b>		<b>0.050</b>	<b>mg/L</b>	1	9/23/2016 02:47 AM
<b>Lead</b>	<b>0.077</b>		<b>0.050</b>	<b>mg/L</b>	1	9/23/2016 02:47 AM
Selenium	ND		0.050	mg/L	1	9/23/2016 02:47 AM
Silver	ND		0.050	mg/L	1	9/23/2016 02:47 AM
Zinc	ND		0.10	mg/L	1	9/23/2016 02:47 AM
<b>TCLP SEMI-VOLATILE ORGANICS</b>						
			<b>SW8270D</b>		Prep: SW3510 / 9/21/16	Analyst: <b>RM</b>
1,4-Dichlorobenzene	ND		100	µg/L	1	9/23/2016 06:24 AM
2,4,5-Trichlorophenol	ND		100	µg/L	1	9/23/2016 06:24 AM
2,4,6-Trichlorophenol	ND		100	µg/L	1	9/23/2016 06:24 AM
2,4-Dinitrotoluene	ND		100	µg/L	1	9/23/2016 06:24 AM
Hexachloro-1,3-butadiene	ND		100	µg/L	1	9/23/2016 06:24 AM
Hexachlorobenzene	ND		100	µg/L	1	9/23/2016 06:24 AM
Hexachloroethane	ND		100	µg/L	1	9/23/2016 06:24 AM
m-Cresol	ND		100	µg/L	1	9/23/2016 06:24 AM
Nitrobenzene	ND		100	µg/L	1	9/23/2016 06:24 AM
o-Cresol	ND		100	µg/L	1	9/23/2016 06:24 AM
p-Cresol	ND		100	µg/L	1	9/23/2016 06:24 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6 TCLP  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-01  
**Matrix:** TCLP EXTRACT

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Pentachlorophenol	ND		100	µg/L	1	9/23/2016 06:24 AM
Pyridine	ND		200	µg/L	1	9/23/2016 06:24 AM
Surr: 2,4,6-Tribromophenol	76.5		38-115	%REC	1	9/23/2016 06:24 AM
Surr: 2-Fluorobiphenyl	68.0		32-100	%REC	1	9/23/2016 06:24 AM
Surr: 2-Fluorophenol	35.9		22-59	%REC	1	9/23/2016 06:24 AM
Surr: 4-Terphenyl-d14	69.1		23-112	%REC	1	9/23/2016 06:24 AM
Surr: Nitrobenzene-d5	57.4		31-93	%REC	1	9/23/2016 06:24 AM
Surr: Phenol-d6	22.5		13-36	%REC	1	9/23/2016 06:24 AM
<b>TCLP VOLATILE ORGANICS</b>			<b>SW8260B</b>		Leachate: SW1311 / 9/20/16	Analyst: <b>AK</b>
1,1-Dichloroethene	ND		20	µg/L	20	9/21/2016 07:11 PM
1,2-Dichloroethane	ND		20	µg/L	20	9/21/2016 07:11 PM
2-Butanone	ND		100	µg/L	20	9/21/2016 07:11 PM
<b>Benzene</b>	<b>39</b>		<b>20</b>	<b>µg/L</b>	20	9/21/2016 07:11 PM
Carbon tetrachloride	ND		20	µg/L	20	9/21/2016 07:11 PM
Chlorobenzene	ND		20	µg/L	20	9/21/2016 07:11 PM
Chloroform	ND		20	µg/L	20	9/21/2016 07:11 PM
Tetrachloroethene	ND		20	µg/L	20	9/21/2016 07:11 PM
Trichloroethene	ND		20	µg/L	20	9/21/2016 07:11 PM
Vinyl chloride	ND		20	µg/L	20	9/21/2016 07:11 PM
Surr: 1,2-Dichloroethane-d4	96.4		70-130	%REC	20	9/21/2016 07:11 PM
Surr: 4-Bromofluorobenzene	94.0		70-130	%REC	20	9/21/2016 07:11 PM
Surr: Dibromofluoromethane	90.2		70-130	%REC	20	9/21/2016 07:11 PM
Surr: Toluene-d8	97.1		70-130	%REC	20	9/21/2016 07:11 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-02  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>HERBICIDES</b>						
			<b>SW8151</b>		Prep: SW8151M / 9/19/16	Analyst: <b>KYM</b>
2,4,5-T	ND		2.0	µg/Kg-dry	1	9/22/2016 07:06 AM
2,4,5-TP (Silvex)	ND		2.0	µg/Kg-dry	1	9/22/2016 07:06 AM
2,4-D	ND		2.0	µg/Kg-dry	1	9/22/2016 07:06 AM
Surr: DCAA	27.6		10-150	%REC	1	9/22/2016 07:06 AM
<b>PCBS</b>						
			<b>SW8082</b>			Analyst: <b>EB</b>
Aroclor 1016	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1221	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1232	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1242	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1248	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1254	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1260	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Surr: Decachlorobiphenyl	126		40-140	%REC	1	9/27/2016 01:56 AM
Surr: Tetrachloro-m-xylene	134		40-140	%REC	1	9/27/2016 01:56 AM
<b>PESTICIDES</b>						
			<b>SW8081</b>		Prep: SW3580 / 9/27/16	Analyst: <b>BLM</b>
4,4'-DDD	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
4,4'-DDE	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
4,4'-DDT	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Aldrin	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
alpha-BHC	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
alpha-Chlordane	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
beta-BHC	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Chlordane, Technical	ND		33	µg/Kg-dry	1	9/27/2016 02:07 PM
delta-BHC	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Dieldrin	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endosulfan I	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endosulfan II	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endosulfan sulfate	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endrin	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endrin aldehyde	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endrin ketone	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
gamma-BHC (Lindane)	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
gamma-Chlordane	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Heptachlor	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Heptachlor epoxide	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Methoxychlor	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Toxaphene	ND		78	µg/Kg-dry	1	9/27/2016 02:07 PM
Surr: Decachlorobiphenyl	96.0		30-145	%REC	1	9/27/2016 02:07 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-02  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<i>Surr: Tetrachloro-m-xylene</i>	78.0		25-140	%REC	1	9/27/2016 02:07 PM
<b>MERCURY BY CVAA</b>			<b>SW7471B</b>		Prep: SW7471 / 9/25/16	Analyst: <b>LR</b>
Mercury	ND		0.021	mg/Kg-dry	1	9/25/2016 10:54 PM
<b>METALS BY ICP-MS</b>			<b>SW6020A</b>		Prep: SW3050B / 9/23/16	Analyst: <b>ML</b>
Arsenic	ND		5.1	mg/Kg-dry	10	9/23/2016 10:46 PM
<b>Barium</b>	<b>19</b>		<b>5.1</b>	<b>mg/Kg-dry</b>	10	9/23/2016 10:46 PM
Cadmium	ND		2.1	mg/Kg-dry	10	9/23/2016 10:46 PM
Chromium	ND		5.1	mg/Kg-dry	10	9/23/2016 10:46 PM
Lead	ND		5.1	mg/Kg-dry	10	9/23/2016 10:46 PM
Selenium	ND		5.1	mg/Kg-dry	10	9/23/2016 10:46 PM
Silver	ND		5.1	mg/Kg-dry	10	9/23/2016 10:46 PM
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3580 / 9/23/16	Analyst: <b>RS</b>
1,1'-Biphenyl	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,2'-Oxybis(1-chloropropane)	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4,5-Trichlorophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4,6-Trichlorophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4-Dichlorophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4-Dimethylphenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4-Dinitrophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4-Dinitrotoluene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,6-Dichlorophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2-Chloronaphthalene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
2-Chlorophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2-Methylnaphthalene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
2-Methylphenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2-Nitroaniline	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2-Nitrophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
3&4-Methylphenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
3,3'-Dichlorobenzidine	ND		500	mg/Kg	10	9/25/2016 03:34 PM
3-Nitroaniline	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4,6-Dinitro-2-methylphenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Bromophenyl phenyl ether	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Chloro-3-methylphenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Chloroaniline	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Chlorophenyl phenyl ether	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Nitroaniline	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Nitrophenol	ND		500	mg/Kg	10	9/25/2016 03:34 PM
Acenaphthene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Acenaphthylene	ND		10	mg/Kg	10	9/25/2016 03:34 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.



# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-02  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Acetophenone	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Anthracene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Atrazine	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Benzaldehyde	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Benzo(a)anthracene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Benzo(a)pyrene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Benzo(b)fluoranthene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Benzo(g,h,i)perylene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Benzo(k)fluoranthene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Bis(2-chloroethoxy)methane	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Bis(2-chloroethyl)ether	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Bis(2-ethylhexyl)phthalate	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Butyl benzyl phthalate	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Caprolactam	ND		500	mg/Kg	10	9/25/2016 03:34 PM
Carbazole	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Chrysene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Dibenzo(a,h)anthracene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Dibenzofuran	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Diethyl phthalate	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Dimethyl phthalate	ND		100	mg/Kg	10	9/25/2016 03:34 PM
<b>Di-n-butyl phthalate</b>	<b>48,000</b>		<b>2,500</b>	<b>mg/Kg</b>	250	9/25/2016 04:01 PM
Di-n-octyl phthalate	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Fluoranthene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Fluorene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Hexachlorobenzene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Hexachlorobutadiene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Hexachlorocyclopentadiene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Hexachloroethane	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Indeno(1,2,3-cd)pyrene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Isophorone	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Naphthalene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Nitrobenzene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
N-Nitrosodimethylamine	ND		100	mg/Kg	10	9/25/2016 03:34 PM
N-Nitrosodi-n-propylamine	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Pentachlorophenol	ND		500	mg/Kg	10	9/25/2016 03:34 PM
Phenanthrene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Phenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Pyrene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Surr: 2,4,6-Tribromophenol	0		38-115	%REC	10	9/25/2016 03:34 PM
Surr: 2-Fluorobiphenyl	0		32-100	%REC	10	9/25/2016 03:34 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-02  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Surr: 2-Fluorophenol	0		22-59	%REC	10	9/25/2016 03:34 PM
Surr: 4-Terphenyl-d14	0		23-112	%REC	10	9/25/2016 03:34 PM
Surr: Nitrobenzene-d5	0		31-93	%REC	10	9/25/2016 03:34 PM
Surr: Phenol-d6	0		13-36	%REC	10	9/25/2016 03:34 PM
<b>VOLATILE ORGANIC COMPOUNDS</b>			<b>SW8260B</b>	Prep: SW5035 / 9/20/16 Analyst: <b>LSY</b>		
1,1,1,2-Tetrachloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1,1-Trichloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1,2,2-Tetrachloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1,2-Trichloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1,2-Trichlorotrifluoroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1-Dichloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1-Dichloroethene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2,3-Trichloropropane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2,4-Trichlorobenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2,4-Trimethylbenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2-Dibromo-3-chloropropane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2-Dibromoethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2-Dichlorobenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2-Dichloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2-Dichloropropane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,3,5-Trimethylbenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,3-Dichlorobenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,4-Dichlorobenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
2-Butanone	ND		63,000	µg/Kg	100	9/25/2016 01:13 AM
2-Hexanone	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
2-Methylnaphthalene	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
4-Methyl-2-pentanone	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Acetone	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
Acrylonitrile	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
Benzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Bromochloromethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Bromodichloromethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Bromoform	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Bromomethane	ND		24,000	µg/Kg	100	9/25/2016 01:13 AM
Carbon disulfide	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Carbon tetrachloride	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Chlorobenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Chloroethane	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
Chloroform	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Chloromethane	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-02  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
cis-1,2-Dichloroethene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
cis-1,3-Dichloropropene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Dibromochloromethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Dibromomethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Dichlorodifluoromethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Diethyl ether	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Ethylbenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Hexachloroethane	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
Isopropylbenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
m,p-Xylene	ND		19,000	µg/Kg	100	9/25/2016 01:13 AM
Methyl iodide	ND		24,000	µg/Kg	100	9/25/2016 01:13 AM
Methyl tert-butyl ether	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Methylene chloride	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Naphthalene	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
n-Propylbenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
o-Xylene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Styrene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
<b>Tetrachloroethene</b>	<b>27,000</b>		<b>9,500</b>	<b>µg/Kg</b>	100	9/25/2016 01:13 AM
Toluene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
trans-1,2-Dichloroethene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
trans-1,3-Dichloropropene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
trans-1,4-Dichloro-2-butene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Trichloroethene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Trichlorofluoromethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Vinyl acetate	ND		79,000	µg/Kg	100	9/25/2016 01:13 AM
Vinyl chloride	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Xylenes, Total	ND		28,000	µg/Kg	100	9/25/2016 01:13 AM
Surr: 1,2-Dichloroethane-d4	100		70-130	%REC	100	9/25/2016 01:13 AM
Surr: 4-Bromofluorobenzene	97.0		70-130	%REC	100	9/25/2016 01:13 AM
Surr: Dibromofluoromethane	95.2		70-130	%REC	100	9/25/2016 01:13 AM
Surr: Toluene-d8	99.8		70-130	%REC	100	9/25/2016 01:13 AM
<b>CYANIDE, REACTIVE</b>			<b>SW7.3.3.2</b>			Analyst: <b>EE</b>
Cyanide, Reactive	ND		130	mg/Kg-dry	1	9/23/2016 01:00 PM
<b>FLASHPOINT/IGNITABILITY ANALYSIS</b>			<b>SW1010A</b>			Analyst: <b>STP</b>
Flashpoint/Ignitability	>200			°F	1	9/20/2016 10:47 AM
<b>PAINT FILTER (FREE LIQUIDS)</b>			<b>SW9095B</b>			Analyst: <b>KF</b>
Free Liquids	Absent			none	1	9/20/2016 10:34 AM
<b>MOISTURE</b>			<b>SW3550C</b>			Analyst: <b>LW</b>

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

**ALS Group USA, Corp****Date:** 28-Sep-16**Client:** Michigan Dept.of Environmental Quality**Project:** Abandoned Mining Wastes - Torch Lake**Sample ID:** CHTC-WC01-0-6**Collection Date:** 9/10/2016 02:28 PM**Work Order:** 1609985**Lab ID:** 1609985-02**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Moisture	24		0.050	% of sample	1	9/22/2016 01:50 PM
PH			SW9045D		Prep: EXTRACT / 9/17/16	Analyst: EDL
pH	3.0			s.u.	1	9/17/2016 03:30 PM
SULFIDE, REACTIVE			SW7.3.4.2			Analyst: EE
Sulfide, Reactive	ND		130	mg/Kg-dry	1	9/23/2016 01:00 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6 TCLP  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-03  
**Matrix:** TCLP EXTRACT

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TCLP HERBICIDES</b>						
			<b>SW8151</b>		Prep: SW8151M / 9/22/16	Analyst: <b>KYM</b>
2,4,5-TP (Silvex)	ND		5.0	µg/L	1	9/22/2016 08:51 PM
2,4-D	ND		5.0	µg/L	1	9/22/2016 08:51 PM
Surr: DCAA	30.8		30-150	%REC	1	9/22/2016 08:51 PM
<b>TCLP PESTICIDES</b>						
			<b>SW8081</b>			Analyst: <b>BLM</b>
Chlordane, Technical	ND		2.5	µg/L	1	9/24/2016 12:35 AM
Endrin	ND		0.10	µg/L	1	9/24/2016 12:35 AM
gamma-BHC (Lindane)	ND		0.050	µg/L	1	9/24/2016 12:35 AM
Heptachlor	ND		0.050	µg/L	1	9/24/2016 12:35 AM
Heptachlor epoxide	ND		0.050	µg/L	1	9/24/2016 12:35 AM
Methoxychlor	ND		0.20	µg/L	1	9/24/2016 12:35 AM
Toxaphene	ND		10	µg/L	1	9/24/2016 12:35 AM
Surr: Decachlorobiphenyl	68.0		42-119	%REC	1	9/24/2016 12:35 AM
Surr: Tetrachloro-m-xylene	55.0		32-104	%REC	1	9/24/2016 12:35 AM
<b>TCLP MERCURY BY CVAA</b>						
			<b>SW7470A</b>		Prep: SW7470 / 9/21/16	Analyst: <b>LR</b>
Mercury	ND		0.0020	mg/L	1	9/21/2016 08:44 PM
<b>TCLP METALS ANALYSIS BY ICP-MS</b>						
			<b>SW6020A</b>		Prep: SW3005A / 9/22/16	Analyst: <b>ML</b>
Arsenic	ND		0.050	mg/L	1	9/23/2016 02:53 AM
Barium	4.8		0.050	mg/L	1	9/23/2016 02:53 AM
Cadmium	0.16		0.0020	mg/L	1	9/23/2016 02:53 AM
Chromium	ND		0.050	mg/L	1	9/23/2016 02:53 AM
Copper	120		0.50	mg/L	10	9/23/2016 11:52 AM
Lead	78	*	0.50	mg/L	10	9/23/2016 11:52 AM
Selenium	ND		0.050	mg/L	1	9/23/2016 02:53 AM
Silver	ND		0.050	mg/L	1	9/23/2016 02:53 AM
Zinc	30		1.0	mg/L	10	9/23/2016 11:52 AM
<b>TCLP SEMI-VOLATILE ORGANICS</b>						
			<b>SW8270D</b>		Prep: SW3510 / 9/21/16	Analyst: <b>RM</b>
1,4-Dichlorobenzene	ND		100	µg/L	1	9/23/2016 06:44 AM
2,4,5-Trichlorophenol	ND		100	µg/L	1	9/23/2016 06:44 AM
2,4,6-Trichlorophenol	ND		100	µg/L	1	9/23/2016 06:44 AM
2,4-Dinitrotoluene	ND		100	µg/L	1	9/23/2016 06:44 AM
Hexachloro-1,3-butadiene	ND		100	µg/L	1	9/23/2016 06:44 AM
Hexachlorobenzene	ND		100	µg/L	1	9/23/2016 06:44 AM
Hexachloroethane	ND		100	µg/L	1	9/23/2016 06:44 AM
m-Cresol	ND		100	µg/L	1	9/23/2016 06:44 AM
Nitrobenzene	ND		100	µg/L	1	9/23/2016 06:44 AM
o-Cresol	ND		100	µg/L	1	9/23/2016 06:44 AM
p-Cresol	ND		100	µg/L	1	9/23/2016 06:44 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6 TCLP  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-03  
**Matrix:** TCLP EXTRACT

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Pentachlorophenol	ND		100	µg/L	1	9/23/2016 06:44 AM
Pyridine	ND		200	µg/L	1	9/23/2016 06:44 AM
Surr: 2,4,6-Tribromophenol	76.6		38-115	%REC	1	9/23/2016 06:44 AM
Surr: 2-Fluorobiphenyl	65.6		32-100	%REC	1	9/23/2016 06:44 AM
Surr: 2-Fluorophenol	40.4		22-59	%REC	1	9/23/2016 06:44 AM
Surr: 4-Terphenyl-d14	75.5		23-112	%REC	1	9/23/2016 06:44 AM
Surr: Nitrobenzene-d5	60.1		31-93	%REC	1	9/23/2016 06:44 AM
Surr: Phenol-d6	23.7		13-36	%REC	1	9/23/2016 06:44 AM
<b>TCLP VOLATILE ORGANICS</b>			<b>SW8260B</b>		Leachate: SW1311 / 9/20/16	Analyst: <b>AK</b>
1,1-Dichloroethene	ND		20	µg/L	20	9/21/2016 07:37 PM
1,2-Dichloroethane	ND		20	µg/L	20	9/21/2016 07:37 PM
2-Butanone	ND		100	µg/L	20	9/21/2016 07:37 PM
Benzene	ND		20	µg/L	20	9/21/2016 07:37 PM
Carbon tetrachloride	ND		20	µg/L	20	9/21/2016 07:37 PM
Chlorobenzene	ND		20	µg/L	20	9/21/2016 07:37 PM
Chloroform	ND		20	µg/L	20	9/21/2016 07:37 PM
Tetrachloroethene	ND		20	µg/L	20	9/21/2016 07:37 PM
Trichloroethene	ND		20	µg/L	20	9/21/2016 07:37 PM
Vinyl chloride	ND		20	µg/L	20	9/21/2016 07:37 PM
Surr: 1,2-Dichloroethane-d4	95.6		70-130	%REC	20	9/21/2016 07:37 PM
Surr: 4-Bromofluorobenzene	96.6		70-130	%REC	20	9/21/2016 07:37 PM
Surr: Dibromofluoromethane	92.0		70-130	%REC	20	9/21/2016 07:37 PM
Surr: Toluene-d8	97.8		70-130	%REC	20	9/21/2016 07:37 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.



# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>HERBICIDES</b>						
			<b>SW8151</b>		Prep: SW8151M / 9/19/16	Analyst: <b>KYM</b>
2,4,5-T	ND		1.2	µg/Kg-dry	1	9/22/2016 07:25 AM
<b>2,4,5-TP (Silvex)</b>	<b>7.8</b>		<b>1.2</b>	<b>µg/Kg-dry</b>	1	9/22/2016 07:25 AM
2,4-D	ND		1.2	µg/Kg-dry	1	9/22/2016 07:25 AM
Surr: DCAA	34.4		10-150	%REC	1	9/22/2016 07:25 AM
<b>PCBS</b>						
			<b>SW8082</b>		Prep: SW3546 / 9/26/16	Analyst: <b>EB</b>
Aroclor 1016	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
Aroclor 1221	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
Aroclor 1232	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
Aroclor 1242	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
Aroclor 1248	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
<b>Aroclor 1254</b>	<b>1,800</b>		<b>110</b>	<b>µg/Kg-dry</b>	1	9/26/2016 11:00 PM
Aroclor 1260	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
Surr: Decachlorobiphenyl	75.1		40-140	%REC	1	9/26/2016 11:00 PM
Surr: Tetrachloro-m-xylene	79.1		45-124	%REC	1	9/26/2016 11:00 PM
<b>PESTICIDES</b>						
			<b>SW8081</b>		Prep: SW3546 / 9/22/16	Analyst: <b>BLM</b>
4,4'-DDD	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
4,4'-DDE	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
4,4'-DDT	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Aldrin	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
alpha-BHC	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
alpha-Chlordane	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
beta-BHC	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Chlordane, Technical	ND		370	µg/Kg-dry	10	9/25/2016 11:55 PM
delta-BHC	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Dieldrin	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endosulfan I	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endosulfan II	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endosulfan sulfate	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endrin	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endrin aldehyde	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endrin ketone	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
gamma-BHC (Lindane)	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
gamma-Chlordane	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Heptachlor	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Heptachlor epoxide	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Methoxychlor	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Toxaphene	ND		890	µg/Kg-dry	10	9/25/2016 11:55 PM
Surr: Decachlorobiphenyl	100		45-135	%REC	10	9/25/2016 11:55 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<i>Surr: Tetrachloro-m-xylene</i>	90.1		45-124	%REC	10	9/25/2016 11:55 PM
<b>MERCURY BY CVAA</b>			<b>SW7471B</b>		Prep: SW7471 / 9/25/16	Analyst: <b>LR</b>
<b>Mercury</b>	<b>0.97</b>		<b>0.21</b>	<b>mg/Kg-dry</b>	10	9/27/2016 10:25 AM
<b>METALS BY ICP-MS</b>			<b>SW6020A</b>		Prep: SW3050B / 9/23/16	Analyst: <b>ML</b>
<b>Arsenic</b>	<b>150</b>		<b>41</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
<b>Barium</b>	<b>850</b>		<b>41</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
<b>Cadmium</b>	<b>54</b>		<b>17</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
<b>Chromium</b>	<b>130</b>		<b>41</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
<b>Copper</b>	<b>29,000</b>		<b>410</b>	<b>mg/Kg-dry</b>	1000	9/24/2016 11:01 PM
<b>Lead</b>	<b>8,600</b>		<b>41</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
Selenium	ND		41	mg/Kg-dry	100	9/23/2016 10:53 PM
Silver	ND		41	mg/Kg-dry	100	9/23/2016 10:53 PM
<b>Zinc</b>	<b>4,100</b>		<b>83</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3546 / 9/22/16	Analyst: <b>RS</b>
1,1'-Biphenyl	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,2'-Oxybis(1-chloropropane)	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4,5-Trichlorophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4,6-Trichlorophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4-Dichlorophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4-Dimethylphenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4-Dinitrophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4-Dinitrotoluene	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,6-Dinitrotoluene	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2-Chloronaphthalene	ND		80	µg/Kg-dry	5	9/26/2016 11:38 PM
2-Chlorophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>2-Methylnaphthalene</b>	<b>430</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
2-Methylphenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2-Nitroaniline	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2-Nitrophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
3&4-Methylphenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
3,3'-Dichlorobenzidine	ND		2,000	µg/Kg-dry	5	9/26/2016 11:38 PM
3-Nitroaniline	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
4,6-Dinitro-2-methylphenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Bromophenyl phenyl ether	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Chloro-3-methylphenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Chloroaniline	ND		800	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Chlorophenyl phenyl ether	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Nitroaniline	ND		2,000	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Nitrophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Acenaphthene	ND		80	µg/Kg-dry	5	9/26/2016 11:38 PM
Acenaphthylene	ND		80	µg/Kg-dry	5	9/26/2016 11:38 PM
Acetophenone	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Anthracene</b>	<b>280</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Atrazine	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Benzaldehyde	ND		800	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Benzo(a)anthracene</b>	<b>710</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
<b>Benzo(a)pyrene</b>	<b>640</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
<b>Benzo(b)fluoranthene</b>	<b>1,200</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
<b>Benzo(g,h,i)perylene</b>	<b>360</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
<b>Benzo(k)fluoranthene</b>	<b>440</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Bis(2-chloroethoxy)methane	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Bis(2-chloroethyl)ether	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Bis(2-ethylhexyl)phthalate	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Butyl benzyl phthalate	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Caprolactam	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Carbazole	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Chrysene</b>	<b>640</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Dibenzo(a,h)anthracene	ND		80	µg/Kg-dry	5	9/26/2016 11:38 PM
Dibenzofuran	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Diethyl phthalate	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Dimethyl phthalate	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Di-n-butyl phthalate</b>	<b>700</b>		<b>400</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Di-n-octyl phthalate	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Fluoranthene</b>	<b>1,400</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Fluorene	ND		80	µg/Kg-dry	5	9/26/2016 11:38 PM
Hexachlorobenzene	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Hexachlorobutadiene	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Hexachlorocyclopentadiene	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Hexachloroethane	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Indeno(1,2,3-cd)pyrene</b>	<b>440</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Isophorone	ND		2,000	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Naphthalene</b>	<b>350</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Nitrobenzene	ND		2,000	µg/Kg-dry	5	9/26/2016 11:38 PM
N-Nitrosodimethylamine	ND		2,000	µg/Kg-dry	5	9/26/2016 11:38 PM
N-Nitrosodi-n-propylamine	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Pentachlorophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Phenanthrene</b>	<b>860</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Phenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Pyrene</b>	<b>1,100</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<i>Surr: 2,4,6-Tribromophenol</i>	102		34-140	%REC	5	9/26/2016 11:38 PM
<i>Surr: 2-Fluorobiphenyl</i>	77.1		12-100	%REC	5	9/26/2016 11:38 PM
<i>Surr: 2-Fluorophenol</i>	70.7		33-117	%REC	5	9/26/2016 11:38 PM
<i>Surr: 4-Terphenyl-d14</i>	92.2		25-137	%REC	5	9/26/2016 11:38 PM
<i>Surr: Nitrobenzene-d5</i>	70.6		37-107	%REC	5	9/26/2016 11:38 PM
<i>Surr: Phenol-d6</i>	68.1		40-106	%REC	5	9/26/2016 11:38 PM
<b>VOLATILE ORGANIC COMPOUNDS</b>			<b>SW8260B</b>	Prep: SW5035 / 9/20/16		
						Analyst: <b>LSY</b>
1,1,1,2-Tetrachloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1,1-Trichloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1,2,2-Tetrachloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1,2-Trichloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1,2-Trichlorotrifluoroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1-Dichloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1-Dichloroethene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2,3-Trichloropropane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2,4-Trichlorobenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2,4-Trimethylbenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2-Dibromo-3-chloropropane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2-Dibromoethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2-Dichlorobenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2-Dichloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2-Dichloropropane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,3,5-Trimethylbenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,3-Dichlorobenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,4-Dichlorobenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
2-Butanone	ND		200	µg/Kg	1	9/24/2016 09:30 PM
2-Hexanone	ND		30	µg/Kg	1	9/24/2016 09:30 PM
<b>2-Methylnaphthalene</b>	<b>130</b>		<b>100</b>	<b>µg/Kg</b>	1	9/24/2016 09:30 PM
4-Methyl-2-pentanone	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Acetone	ND		100	µg/Kg	1	9/24/2016 09:30 PM
Acrylonitrile	ND		100	µg/Kg	1	9/24/2016 09:30 PM
Benzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Bromochloromethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Bromodichloromethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Bromoform	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Bromomethane	ND		75	µg/Kg	1	9/24/2016 09:30 PM
Carbon disulfide	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Carbon tetrachloride	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Chlorobenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Chloroethane	ND		100	µg/Kg	1	9/24/2016 09:30 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Chloroform	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Chloromethane	ND		100	µg/Kg	1	9/24/2016 09:30 PM
cis-1,2-Dichloroethene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
cis-1,3-Dichloropropene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Dibromochloromethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Dibromomethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Dichlorodifluoromethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Diethyl ether	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Ethylbenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Hexachloroethane	ND		100	µg/Kg	1	9/24/2016 09:30 PM
Isopropylbenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
m,p-Xylene	ND		60	µg/Kg	1	9/24/2016 09:30 PM
Methyl iodide	ND		75	µg/Kg	1	9/24/2016 09:30 PM
Methyl tert-butyl ether	ND		30	µg/Kg	1	9/24/2016 09:30 PM
<b>Methylene chloride</b>	<b>130</b>		<b>30</b>	<b>µg/Kg</b>	1	9/24/2016 09:30 PM
<b>Naphthalene</b>	<b>110</b>		<b>100</b>	<b>µg/Kg</b>	1	9/24/2016 09:30 PM
n-Propylbenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
o-Xylene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Styrene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Tetrachloroethene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
<b>Toluene</b>	<b>38</b>		<b>30</b>	<b>µg/Kg</b>	1	9/24/2016 09:30 PM
trans-1,2-Dichloroethene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
trans-1,3-Dichloropropene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
trans-1,4-Dichloro-2-butene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Trichloroethene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Trichlorofluoromethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Vinyl acetate	ND		250	µg/Kg	1	9/24/2016 09:30 PM
Vinyl chloride	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Xylenes, Total	ND		90	µg/Kg	1	9/24/2016 09:30 PM
Surr: 1,2-Dichloroethane-d4	105		70-130	%REC	1	9/24/2016 09:30 PM
Surr: 4-Bromofluorobenzene	96.7		70-130	%REC	1	9/24/2016 09:30 PM
Surr: Dibromofluoromethane	95.5		70-130	%REC	1	9/24/2016 09:30 PM
Surr: Toluene-d8	97.8		70-130	%REC	1	9/24/2016 09:30 PM
<b>CYANIDE, REACTIVE</b>			<b>SW7.3.3.2</b>			Analyst: <b>EE</b>
Cyanide, Reactive	ND		120	mg/Kg-dry	1	9/23/2016 01:00 PM
<b>FLASHPOINT/IGNITABILITY ANALYSIS</b>			<b>SW1010A</b>			Analyst: <b>STP</b>
Flashpoint/Ignitability	>200			°F	1	9/20/2016 10:47 AM
<b>PAINT FILTER (FREE LIQUIDS)</b>			<b>SW9095B</b>			Analyst: <b>KF</b>
Free Liquids	Absent			none	1	9/20/2016 10:34 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

**ALS Group USA, Corp****Date:** 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>MOISTURE</b>			<b>SW3550C</b>			Analyst: <b>LW</b>
Moisture	20		0.050	% of sample	1	9/23/2016 07:00 PM
<b>PH</b>			<b>SW9045D</b>		Prep: EXTRACT / 9/17/16	Analyst: <b>EDL</b>
pH	7.2			s.u.	1	9/17/2016 03:30 PM
<b>SULFIDE, REACTIVE</b>			<b>SW7.3.4.2</b>			Analyst: <b>EE</b>
Sulfide, Reactive	ND		120	mg/Kg-dry	1	9/23/2016 01:00 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

**QC BATCH REPORT**

Batch ID: **91556** Instrument ID **GC7** Method: **SW8151**

<b>MBLK</b>		Sample ID: <b>HBLKS1-91556-91556</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/20/2016 12:32 PM</b>		
Client ID:		Run ID: <b>GC7_160919C</b>				SeqNo: <b>4041673</b>		Prep Date: <b>9/19/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-T	ND	1.0								
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	1.0								
Surr: DCAA	10.7	0	50	0	21.4	10-150	0			

<b>LCS</b>		Sample ID: <b>HLCSDS1-91556-91556</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/20/2016 01:49 PM</b>		
Client ID:		Run ID: <b>GC7_160919C</b>				SeqNo: <b>4041675</b>		Prep Date: <b>9/19/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-T	1.379	0.98	4.924	0	28	10-150	0			
2,4,5-TP (Silvex)	2.167	0.98	4.924	0	44	10-150	0			
2,4-D	13.1	0.98	49.24	0	26.6	10-130	0			
Surr: DCAA	14.08	0	49.24	0	28.6	10-150	0			

<b>LCS</b>		Sample ID: <b>HLCSDS1-91556-91556</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/20/2016 02:08 PM</b>		
Client ID:		Run ID: <b>GC7_160919C</b>				SeqNo: <b>4041676</b>		Prep Date: <b>9/19/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-T	0.8864	0.98	4.924	0	18	10-150	1.379	0		J
2,4,5-TP (Silvex)	2.364	0.98	4.924	0	48	10-150	2.167	0		
2,4-D	10.83	0.98	49.24	0	22	10-130	13.1	0		
Surr: DCAA	11.82	0	49.24	0	24	10-150	14.08	0		

<b>MS</b>		Sample ID: <b>1609939-05A MS</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/20/2016 02:27 PM</b>		
Client ID:		Run ID: <b>GC7_160919C</b>				SeqNo: <b>4041677</b>		Prep Date: <b>9/19/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-T	1.479	0.99	4.93	0	30	10-150	0			
2,4,5-TP (Silvex)	2.465	0.99	4.93	0	50	10-150	0			
2,4-D	23.67	0.99	49.3	0	48	10-130	0			
Surr: DCAA	13.31	0	49.3	0	27	10-150	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91556** Instrument ID **GC7** Method: **SW8151**

MSD		Sample ID: 1609939-05A MSD				Units: µg/Kg		Analysis Date: 9/20/2016 02:46 PM		
Client ID:		Run ID: GC7_160919C				SeqNo: 4041678		Prep Date: 9/19/2016		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-T	1.588	0.99	4.962	0	32	10-150	1.479	7.08	50	
2,4,5-TP (Silvex)	2.382	0.99	4.962	0	48	10-150	2.465	3.45	50	
2,4-D	31.65	0.99	49.62	0	63.8	10-130	23.67	28.9	50	
Surr: DCAA	15.88	0	49.62	0	32	10-150	13.31	17.6	50	

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91705A** Instrument ID **GC12** Method: **SW8081**

MBLK		Sample ID: <b>PBLKW1-91705-91705A</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/23/2016 11:23 PM</b>		
Client ID:		Run ID: <b>GC12_160923A</b>				SeqNo: <b>4046881</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chlordane, Technical	ND	0.50								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.010								
Heptachlor	ND	0.010								
Heptachlor epoxide	ND	0.010								
Methoxychlor	ND	0.040								
Toxaphene	ND	2.0								
Surr: Decachlorobiphenyl	0.068	0	0.1	0	68	42-119	0			
Surr: Tetrachloro-m-xylene	0.054	0	0.1	0	54	32-104	0			

LCS		Sample ID: <b>PLCSW1-91705-91705A</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/23/2016 11:41 PM</b>		
Client ID:		Run ID: <b>GC12_160923A</b>				SeqNo: <b>4046882</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Endrin	0.077	0.020	0.1	0	77	39-123	0			
gamma-BHC (Lindane)	0.055	0.010	0.1	0	55	32-114	0			
Heptachlor	0.04	0.010	0.1	0	40	34-112	0			
Heptachlor epoxide	0.063	0.010	0.1	0	63	36-109	0			
Methoxychlor	0.079	0.040	0.1	0	79	44-133	0			
Surr: Decachlorobiphenyl	0.07	0	0.1	0	70	42-119	0			
Surr: Tetrachloro-m-xylene	0.056	0	0.1	0	56	32-104	0			

MS		Sample ID: <b>1609985-01A MS</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/24/2016 12:17 AM</b>		
Client ID: <b>CHTC-WC01-0-6 TCLP</b>		Run ID: <b>GC12_160923A</b>				SeqNo: <b>4046884</b>		Prep Date: <b>9/22/2016</b>		DF: <b>5</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Endrin	0.35	0.50	0.5	0	70	39-123	0			J
gamma-BHC (Lindane)	0.475	0.25	0.5	0	95	32-114	0			
Heptachlor	0.275	0.25	0.5	0	55	34-112	0			
Heptachlor epoxide	0.275	0.25	0.5	0	55	36-109	0			
Methoxychlor	0.3	1.0	0.5	0	60	44-133	0			J
Surr: Decachlorobiphenyl	0.25	0	0.5	0	50	42-119	0			
Surr: Tetrachloro-m-xylene	0.325	0	0.5	0	65	32-104	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91705A** Instrument ID **GC12** Method: **SW8081**

DUP				Sample ID: 1609985-03A DUP			Units: µg/L		Analysis Date: 9/24/2016 12:52 AM		
Client ID: CHLL-WC02-0-6 TCLP			Run ID: GC12_160923A			SeqNo: 4046886		Prep Date: 9/22/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chlordane, Technical	ND	2.5	0	0	0	0-0	0	0	20		
Endrin	ND	0.10	0	0	0	0-0	0	0	20		
gamma-BHC (Lindane)	ND	0.050	0	0	0	0-0	0	0	20		
Heptachlor	ND	0.050	0	0	0	0-0	0	0	20		
Heptachlor epoxide	ND	0.050	0	0	0	0-0	0	0	20		
Methoxychlor	ND	0.20	0	0	0	0-0	0	0	20		
Toxaphene	ND	10	0	0	0	0-0	0	0	20		
Surr: Decachlorobiphenyl	0.3	0	0.5	0	60	42-119	0.34	12.5	20		
Surr: Tetrachloro-m-xylene	0.27	0	0.5	0	54	32-104	0.275	1.83	20		

The following samples were analyzed in this batch:

1609985-01A 1609985-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91707** Instrument ID **GC7** Method: **SW8151**

<b>MBLK</b>		Sample ID: <b>HBLKW1-91707-91707</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 06:56 PM</b>		
Client ID:		Run ID: <b>GC7_160922A</b>				SeqNo: <b>4042757</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-TP (Silvex)	ND	5.0								
2,4-D	ND	5.0								
Surr: DCAA	15	0	50	0	30	30-150	0			

<b>LCS</b>		Sample ID: <b>HLCSW1-91707-91707</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 07:16 PM</b>		
Client ID:		Run ID: <b>GC7_160922A</b>				SeqNo: <b>4042758</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-TP (Silvex)	8.7	5.0	10	0	87	50-150	0			
2,4-D	95.8	5.0	100	0	95.8	50-150	0			
Surr: DCAA	15.2	0	50	0	30.4	30-150	0			

<b>MS</b>		Sample ID: <b>16091019-02A MS</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 07:35 PM</b>		
Client ID:		Run ID: <b>GC7_160922A</b>				SeqNo: <b>4042759</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-TP (Silvex)	9.5	5.0	10	0	95	50-150	0			
2,4-D	108.3	5.0	100	0	108	50-150	0			
Surr: DCAA	15.1	0	50	0	30.2	30-150	0			

<b>MSD</b>		Sample ID: <b>16091019-02A MSD</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 07:54 PM</b>		
Client ID:		Run ID: <b>GC7_160922A</b>				SeqNo: <b>4042760</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-TP (Silvex)	9.9	5.0	10	0	99	50-150	9.5	4.12	30	
2,4-D	113.3	5.0	100	0	113	50-150	108.3	4.51	30	
Surr: DCAA	15.5	0	50	0	31	30-150	15.1	2.61	30	

The following samples were analyzed in this batch:

1609985-01A 1609985-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91791** Instrument ID **GC12** Method: **SW8081**

MBLK		Sample ID: <b>PBLKS1-91791-91791</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/25/2016 09:56 PM</b>		
Client ID:		Run ID: <b>GC12_160925A</b>				SeqNo: <b>4047974</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
4,4'-DDD	ND	10								
4,4'-DDE	ND	10								
4,4'-DDT	ND	10								
Aldrin	ND	10								
alpha-BHC	ND	10								
alpha-Chlordane	ND	10								
beta-BHC	ND	10								
Chlordane, Technical	ND	25								
delta-BHC	ND	10								
Dieldrin	ND	10								
Endosulfan I	ND	10								
Endosulfan II	ND	10								
Endosulfan sulfate	ND	10								
Endrin	ND	10								
Endrin aldehyde	ND	10								
Endrin ketone	ND	10								
gamma-BHC (Lindane)	ND	10								
gamma-Chlordane	ND	10								
Heptachlor	ND	10								
Heptachlor epoxide	ND	10								
Methoxychlor	ND	10								
Toxaphene	ND	60								
Surr: Decachlorobiphenyl	29.33	0	33.3	0	88.1	45-135	0			
Surr: Tetrachloro-m-xylene	25	0	33.3	0	75.1	45-124	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91791** Instrument ID **GC12** Method: **SW8081**

LCS		Sample ID: <b>PLCSS1-91791-91791</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/25/2016 10:13 PM</b>		
Client ID:		Run ID: <b>GC12_160925A</b>				SeqNo: <b>4047975</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
4,4'-DDD	23	10	33.33	0	69	30-135	0			
4,4'-DDE	23.67	10	33.33	0	71	70-125	0			
4,4'-DDT	26.33	10	33.33	0	79	45-140	0			
Aldrin	23	10	33.33	0	69	45-140	0			
alpha-BHC	22.33	10	33.33	0	67	60-125	0			
alpha-Chlordane	23.33	10	33.33	0	70	50-150	0			
beta-BHC	23	10	33.33	0	69	60-125	0			
delta-BHC	23	10	33.33	0	69	55-130	0			
Dieldrin	23.33	10	33.33	0	70	65-125	0			
Endosulfan I	23.67	10	33.33	0	71	15-135	0			
Endosulfan II	23.33	10	33.33	0	70	35-140	0			
Endosulfan sulfate	23	10	33.33	0	69	60-135	0			
Endrin	27.67	10	33.33	0	83	60-135	0			
Endrin aldehyde	22	10	33.33	0	66	35-145	0			
Endrin ketone	23.33	10	33.33	0	70	50-150	0			
gamma-BHC (Lindane)	22.67	10	33.33	0	68	60-125	0			
gamma-Chlordane	20.67	10	33.33	0	62	50-150	0			
Heptachlor	24.33	10	33.33	0	73	50-140	0			
Heptachlor epoxide	23.67	10	33.33	0	71	65-130	0			
Methoxychlor	26.67	10	33.33	0	80	55-145	0			
Surr: Decachlorobiphenyl	28	0	33.3	0	84.1	45-135	0			
Surr: Tetrachloro-m-xylene	25	0	33.3	0	75.1	45-124	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91791** Instrument ID **GC12** Method: **SW8081**

MS				Sample ID: 16091132-02C MS			Units: µg/Kg		Analysis Date: 9/25/2016 10:49 PM		
Client ID:			Run ID: GC12_160925A			SeqNo: 4047977		Prep Date: 9/22/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
4,4´-DDD	26.47	9.6	31.89	0	83	30-135	0				
4,4´-DDE	28.06	9.6	31.89	0	88	70-125	0				
4,4´-DDT	31.25	9.6	31.89	0	98	45-140	0				
Aldrin	27.11	9.6	31.89	0	85	45-140	0				
alpha-BHC	26.79	9.6	31.89	0	84	60-125	0				
alpha-Chlordane	27.11	9.6	31.89	0	85	50-150	0				
beta-BHC	27.11	9.6	31.89	0	85	60-125	0				
delta-BHC	28.38	9.6	31.89	0	89	55-130	0				
Dieldrin	27.43	9.6	31.89	0	86	65-125	0				
Endosulfan I	27.74	9.6	31.89	0	87	15-135	0				
Endosulfan II	26.79	9.6	31.89	0	84	35-140	0				
Endosulfan sulfate	26.15	9.6	31.89	0	82	60-135	0				
Endrin	34.44	9.6	31.89	0	108	60-135	0				
Endrin aldehyde	21.69	9.6	31.89	0	68	35-145	0				
Endrin ketone	25.51	9.6	31.89	0	80	50-150	0				
gamma-BHC (Lindane)	27.11	9.6	31.89	0	85	60-125	0				
gamma-Chlordane	23.92	9.6	31.89	0	75	50-150	0				
Heptachlor	29.02	9.6	31.89	0	91	50-140	0				
Heptachlor epoxide	27.43	9.6	31.89	0	86	65-130	0				
Methoxychlor	29.98	9.6	31.89	0	94	55-145	0				
Surr: Decachlorobiphenyl	27.74	0	31.86	0	87.1	45-135	0				
Surr: Tetrachloro-m-xylene	28.7	0	31.86	0	90.1	45-124	0				

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91791** Instrument ID **GC12** Method: **SW8081**

MSD				Sample ID: 16091132-02C MSD			Units: µg/Kg		Analysis Date: 9/25/2016 11:05 PM		
Client ID:			Run ID: GC12_160925A			SeqNo: 4047978		Prep Date: 9/22/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
4,4´-DDD	22.26	9.8	32.73	0	68	30-135	26.47	17.3	35		
4,4´-DDE	22.91	9.8	32.73	0	70	70-125	28.06	20.2	35		
4,4´-DDT	25.53	9.8	32.73	0	78	45-140	31.25	20.1	35		
Aldrin	21.28	9.8	32.73	0	65	45-140	27.11	24.1	35		
alpha-BHC	20.62	9.8	32.73	0	63	60-125	26.79	26	35		
alpha-Chlordane	22.26	9.8	32.73	0	68	50-150	27.11	19.6	35		
beta-BHC	21.93	9.8	32.73	0	67	60-125	27.11	21.1	35		
delta-BHC	22.59	9.8	32.73	0	69	55-130	28.38	22.7	35		
Dieldrin	22.26	9.8	32.73	0	68	65-125	27.43	20.8	35		
Endosulfan I	22.59	9.8	32.73	0	69	15-135	27.74	20.5	35		
Endosulfan II	22.26	9.8	32.73	0	68	35-140	26.79	18.5	35		
Endosulfan sulfate	21.93	9.8	32.73	0	67	60-135	26.15	17.5	35		
Endrin	27.82	9.8	32.73	0	85	60-135	34.44	21.3	35		
Endrin aldehyde	18.33	9.8	32.73	0	56	35-145	21.69	16.8	35		
Endrin ketone	21.6	9.8	32.73	0	66	50-150	25.51	16.6	35		
gamma-BHC (Lindane)	20.95	9.8	32.73	0	64	60-125	27.11	25.6	35		
gamma-Chlordane	19.97	9.8	32.73	0	61	50-150	23.92	18	35		
Heptachlor	22.59	9.8	32.73	0	69	50-140	29.02	24.9	35		
Heptachlor epoxide	22.26	9.8	32.73	0	68	65-130	27.43	20.8	35		
Methoxychlor	25.53	9.8	32.73	0	78	55-145	29.98	16	35		
Surr: Decachlorobiphenyl	24.55	0	32.7	0	75.1	45-135	27.74	12.2	35		
Surr: Tetrachloro-m-xylene	21.93	0	32.7	0	67.1	45-124	28.7	26.7	35		

The following samples were analyzed in this batch:

1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91892** Instrument ID **GC14** Method: **SW8082**

MBLK				Sample ID: PBLKS1-91892-91892				Units: µg/Kg		Analysis Date: 9/26/2016 10:58 AM	
Client ID:			Run ID: GC14_160926A			SeqNo: 4047782		Prep Date: 9/26/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Aroclor 1016	ND	83									
Aroclor 1221	ND	83									
Aroclor 1232	ND	83									
Aroclor 1242	ND	83									
Aroclor 1248	ND	83									
Aroclor 1254	ND	83									
Aroclor 1260	ND	83									
Surr: Decachlorobiphenyl	29	0	33.3	0	87.1	40-140		0			
Surr: Tetrachloro-m-xylene	29.33	0	33.3	0	88.1	45-124		0			

LCS				Sample ID: <b>PLCSS1-91892-91892</b>				Units: <b>µg/Kg</b>			Analysis Date: <b>9/26/2016 11:16 AM</b>			
Client ID:				Run ID: <b>GC14_160926A</b>				SeqNo: <b>4047783</b>			Prep Date: <b>9/26/2016</b>		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
Aroclor 1016	948.3	83	833	0	114	50-130	0							
Aroclor 1260	882.3	83	833	0	106	50-130	0							
<i>Surr: Decachlorobiphenyl</i>	30.33	0	33.3	0	91.1	40-140	0							
<i>Surr: Tetrachloro-m-xylene</i>	30	0	33.3	0	90.1	45-124	0							

MS				Sample ID: 16091086-27B MS				Units: µg/Kg		Analysis Date: 9/26/2016 10:25 PM	
Client ID:			Run ID: GC14_160926A			SeqNo: 4049472		Prep Date: 9/26/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Aroclor 1016	962	82	823.3	0	117	40-140	0				
Aroclor 1260	881.3	82	823.3	0	107	40-140	0				
Surr: Decachlorobiphenyl	30.31	0	32.91	0	92.1	40-140	0				
Surr: Tetrachloro-m-xylene	29.98	0	32.91	0	91.1	45-124	0				

MSD				Sample ID: 16091086-27B MSD				Units: µg/Kg		Analysis Date: 9/26/2016 10:42 PM	
Client ID:			Run ID: GC14_160926A			SeqNo: 4049475		Prep Date: 9/26/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Aroclor 1016	904	80	801.6	0	113	40-140	962	6.22	50		
Aroclor 1260	849.1	80	801.6	0	106	40-140	881.3	3.72	50		
Surr: Decachlorobiphenyl	29.51	0	32.05	0	92.1	40-140	30.31	2.67	50		
Surr: Tetrachloro-m-xylene	28.87	0	32.05	0	90.1	45-124	29.98	3.77	50		

The following samples were analyzed in this batch: 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91927A** Instrument ID **GC14** Method: **SW8082**

MBLK		Sample ID: <b>MBLK-91927-91927A</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/26/2016 01:01 PM</b>		
Client ID:		Run ID: <b>GC14_160926A</b>				SeqNo: <b>4047901</b>		Prep Date: <b>9/26/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aroclor 1016	ND	1.0								
Aroclor 1221	ND	1.0								
Aroclor 1232	ND	1.0								
Aroclor 1242	ND	1.0								
Aroclor 1248	ND	1.0								
Aroclor 1254	ND	1.0								
Aroclor 1260	ND	1.0								
<i>Surr: Decachlorobiphenyl</i>	<i>1.01</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>101</i>	<i>50-130</i>	<i>0</i>			
<i>Surr: Tetrachloro-m-xylene</i>	<i>1.05</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>105</i>	<i>50-130</i>	<i>0</i>			

LCS		Sample ID: <b>LCS-91927-91927A</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/26/2016 01:19 PM</b>		
Client ID:		Run ID: <b>GC14_160926A</b>				SeqNo: <b>4047902</b>		Prep Date: <b>9/26/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aroclor 1016	57.94	1.0	50	0	116	50-130	0			
Aroclor 1260	55.12	1.0	50	0	110	50-130	0			
<i>Surr: Decachlorobiphenyl</i>	<i>1.14</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>114</i>	<i>50-130</i>	<i>0</i>			
<i>Surr: Tetrachloro-m-xylene</i>	<i>1.11</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>111</i>	<i>50-130</i>	<i>0</i>			

The following samples were analyzed in this batch:

1609985-02A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **92007** Instrument ID **GC12** Method: **SW8081**

MBLK		Sample ID: <b>MBLK-92007-92007</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/27/2016 01:31 PM</b>		
Client ID:		Run ID: <b>GC12_160927A</b>				SeqNo: <b>4052918</b>		Prep Date: <b>9/27/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
4,4'-DDD	ND	0.20								
4,4'-DDE	ND	0.20								
4,4'-DDT	ND	0.20								
Aldrin	ND	0.20								
alpha-BHC	ND	0.20								
alpha-Chlordane	ND	0.20								
beta-BHC	ND	0.20								
Chlordane, Technical	ND	25								
delta-BHC	ND	0.20								
Dieldrin	ND	0.20								
Endosulfan I	ND	0.20								
Endosulfan II	ND	0.20								
Endosulfan sulfate	ND	0.20								
Endrin	ND	0.20								
Endrin aldehyde	ND	0.20								
Endrin ketone	ND	0.20								
gamma-BHC (Lindane)	ND	0.20								
gamma-Chlordane	ND	0.20								
Heptachlor	ND	0.20								
Heptachlor epoxide	ND	0.20								
Methoxychlor	ND	0.40								
Toxaphene	ND	25								
Surr: Decachlorobiphenyl	1210	0	1000	0	121	30-135	0			
Surr: Tetrachloro-m-xylene	1140	0	1000	0	114	25-140	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **92007** Instrument ID **GC12** Method: **SW8081**

LCS		Sample ID: <b>LCS-92007-92007</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/27/2016 01:49 PM</b>		
Client ID:		Run ID: <b>GC12_160927A</b>				SeqNo: <b>4052919</b>		Prep Date: <b>9/27/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
4,4'-DDD	970	0.20	1000	0	97	25-150	0			
4,4'-DDE	950	0.20	1000	0	95	35-140	0			
4,4'-DDT	1010	0.20	1000	0	101	45-140	0			
Aldrin	910	0.20	1000	0	91	25-140	0			
alpha-BHC	840	0.20	1000	0	84	60-130	0			
alpha-Chlordane	930	0.20	1000	0	93	50-150	0			
beta-BHC	880	0.20	1000	0	88	65-125	0			
delta-BHC	890	0.20	1000	0	89	45-135	0			
Dieldrin	950	0.20	1000	0	95	60-130	0			
Endosulfan I	950	0.20	1000	0	95	50-110	0			
Endosulfan II	970	0.20	1000	0	97	30-130	0			
Endosulfan sulfate	930	0.20	1000	0	93	55-135	0			
Endrin	1020	0.20	1000	0	102	55-135	0			
Endrin aldehyde	970	0.20	1000	0	97	55-135	0			
Endrin ketone	1070	0.20	1000	0	107	50-150	0			
gamma-BHC (Lindane)	890	0.20	1000	0	89	25-135	0			
gamma-Chlordane	780	0.20	1000	0	78	50-150	0			
Heptachlor	910	0.20	1000	0	91	40-130	0			
Heptachlor epoxide	990	0.20	1000	0	99	60-130	0			
Methoxychlor	1060	0.40	1000	0	106	55-150	0			
Surr: Decachlorobiphenyl	1190	0	1000	0	119	30-135	0			
Surr: Tetrachloro-m-xylene	940	0	1000	0	94	25-140	0			

The following samples were analyzed in this batch:

1609985-02A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91744** Instrument ID **HG1** Method: **SW7470A**

<b>MBLK</b>		Sample ID: <b>MBLK-91744-91744</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/21/2016 07:42 PM</b>		
Client ID:		Run ID: <b>HG1_160921A</b>				SeqNo: <b>4040347</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury ND 0.00020

<b>LCS</b>		Sample ID: <b>LCS-91744-91744</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/21/2016 07:45 PM</b>		
Client ID:		Run ID: <b>HG1_160921A</b>				SeqNo: <b>4040348</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.00203 0.00020 0.002 0 102 80-120 0

<b>MS</b>		Sample ID: <b>16091011-02CMS</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/21/2016 08:10 PM</b>		
Client ID:		Run ID: <b>HG1_160921A</b>				SeqNo: <b>4040382</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.00192 0.00020 0.002 -0.000008 96.4 75-125 0

<b>MSD</b>		Sample ID: <b>16091011-02CMSD</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/21/2016 08:13 PM</b>		
Client ID:		Run ID: <b>HG1_160921A</b>				SeqNo: <b>4040383</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.00194 0.00020 0.002 -0.000008 97.4 75-125 0.00192 1.04 20

The following samples were analyzed in this batch:

1609985-01A 1609985-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91897** Instrument ID **HG1** Method: **SW7471B**

MBLK		Sample ID: MBLK-91897-91897					Units: mg/Kg		Analysis Date: 9/25/2016 09:35 PM		
Client ID:			Run ID: HG1_160925A				SeqNo: 4046247		Prep Date: 9/25/2016		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Mercury ND 0.020

LCS		Sample ID: LCS-91897-91897				Units: mg/Kg		Analysis Date: 9/25/2016 09:45 PM		
Client ID:			Run ID: HG1_160925A			SeqNo: 4046255		Prep Date: 9/25/2016		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.175 0.020 0.1665 0 105 80-120 0

MS		Sample ID: 16091127-01CMS				Units: mg/Kg		Analysis Date: 9/25/2016 10:06 PM		
Client ID:			Run ID: HG1_160925A			SeqNo: 4046271		Prep Date: 9/25/2016		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.1453 0.014 0.1199 0.01854 106 75-125 0

MSD		Sample ID: 16091127-01CMSD				Units: mg/Kg		Analysis Date: 9/25/2016 10:08 PM		
Client ID:		Run ID: HG1_160925A			SeqNo: 4046273		Prep Date: 9/25/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.1483 0.014 0.1199 0.01854 108 75-125 0.1453 2.04 35

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91776** Instrument ID **ICPMS2** Method: **SW6020A**

MBLK		Sample ID: <b>MBLK-91776-91776</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/22/2016 11:01 PM</b>		
Client ID:		Run ID: <b>ICPMS2_160922A</b>				SeqNo: <b>4042051</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Cadmium	ND	0.0020								
Chromium	ND	0.0050								
Copper	ND	0.0050								
Lead	ND	0.0050								
Selenium	ND	0.0050								
Silver	ND	0.0050								
Zinc	ND	0.010								

LCS		Sample ID: <b>LCS-91776-91776</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/22/2016 11:07 PM</b>		
Client ID:		Run ID: <b>ICPMS2_160922A</b>				SeqNo: <b>4042052</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.09845	0.0050	0.1	0	98.4	80-120	0			
Barium	0.09226	0.0050	0.1	0	92.3	80-120	0			
Cadmium	0.09393	0.0020	0.1	0	93.9	80-120	0			
Chromium	0.09353	0.0050	0.1	0	93.5	80-120	0			
Copper	0.09475	0.0050	0.1	0	94.8	80-120	0			
Lead	0.09289	0.0050	0.1	0	92.9	80-120	0			
Selenium	0.0962	0.0050	0.1	0	96.2	80-120	0			
Silver	0.08014	0.0050	0.1	0	80.1	80-120	0			
Zinc	0.09607	0.010	0.1	0	96.1	80-120	0			

MS		Sample ID: <b>16091127-02CMS</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/23/2016 12:44 AM</b>		
Client ID:		Run ID: <b>ICPMS2_160922A</b>				SeqNo: <b>4042069</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.096	0.0050	0.1	-0.0002868	96.3	75-125	0			
Barium	0.1766	0.0050	0.1	0.08204	94.6	75-125	0			
Cadmium	0.09059	0.0020	0.1	0.0001881	90.4	75-125	0			
Chromium	0.08892	0.0050	0.1	0.00003087	88.9	75-125	0			
Copper	0.08904	0.0050	0.1	0.001767	87.3	75-125	0			
Lead	0.09363	0.0050	0.1	0.000124	93.5	75-125	0			
Selenium	0.09289	0.0050	0.1	0.0007928	92.1	75-125	0			
Silver	0.07408	0.0050	0.1	-2.336E-05	74.1	75-125	0			S
Zinc	0.09387	0.010	0.1	0.008012	85.9	75-125	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91776** Instrument ID **ICPMS2** Method: **SW6020A**

MSD		Sample ID: <b>16091127-02CMSD</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/23/2016 12:49 AM</b>		
Client ID:		Run ID: <b>ICPMS2_160922A</b>				SeqNo: <b>4042070</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.09923	0.0050	0.1	-0.0002868	99.5	75-125	0.096	3.31	20	
Barium	0.1768	0.0050	0.1	0.08204	94.8	75-125	0.1766	0.113	20	
Cadmium	0.09297	0.0020	0.1	0.0001881	92.8	75-125	0.09059	2.59	20	
Chromium	0.09181	0.0050	0.1	0.00003087	91.8	75-125	0.08892	3.2	20	
Copper	0.09058	0.0050	0.1	0.001767	88.8	75-125	0.08904	1.71	20	
Lead	0.09614	0.0050	0.1	0.000124	96	75-125	0.09363	2.65	20	
Selenium	0.0953	0.0050	0.1	0.0007928	94.5	75-125	0.09289	2.56	20	
Silver	0.07555	0.0050	0.1	-2.336E-05	75.6	75-125	0.07408	1.96	20	
Zinc	0.09426	0.010	0.1	0.008012	86.2	75-125	0.09387	0.415	20	

The following samples were analyzed in this batch:

1609985-01A 1609985-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91843** Instrument ID **ICPMS1** Method: **SW6020A**

<b>MBLK</b>		Sample ID: <b>MBLK-91843-91843</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 07:46 PM</b>		
Client ID:		Run ID: <b>ICPMS1_160923A</b>				SeqNo: <b>4044877</b>		Prep Date: <b>9/23/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.25								
Barium	ND	0.25								
Cadmium	0.01472	0.10								J
Chromium	0.01666	0.25								J
Copper	ND	0.25								
Lead	ND	0.25								
Selenium	ND	0.25								
Silver	ND	0.25								
Zinc	ND	0.50								

<b>LCS</b>		Sample ID: <b>LCS-91843-91843</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 07:52 PM</b>		
Client ID:		Run ID: <b>ICPMS1_160923A</b>				SeqNo: <b>4044878</b>		Prep Date: <b>9/23/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	4.562	0.25	5	0	91.2	80-120	0			
Barium	4.57	0.25	5	0	91.4	80-120	0			
Cadmium	4.526	0.10	5	0	90.5	80-120	0			
Chromium	4.678	0.25	5	0	93.6	80-120	0			
Copper	4.58	0.25	5	0	91.6	80-120	0			
Lead	4.57	0.25	5	0	91.4	80-120	0			
Selenium	4.506	0.25	5	0	90.1	80-120	0			
Silver	4.708	0.25	5	0	94.2	80-120	0			
Zinc	4.492	0.50	5	0	89.8	80-120	0			

<b>MS</b>		Sample ID: <b>16091317-02AMS</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 09:19 PM</b>		
Client ID:		Run ID: <b>ICPMS1_160923A</b>				SeqNo: <b>4044892</b>		Prep Date: <b>9/23/2016</b>		DF: <b>4</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	7.895	1.5	7.74	0.3763	97.1	75-125	0			
Barium	10.55	1.5	7.74	2.783	100	75-125	0			
Cadmium	7.567	0.62	7.74	0.04396	97.2	75-125	0			
Chromium	8.412	1.5	7.74	0.9516	96.4	75-125	0			
Copper	8.031	1.5	7.74	0.6955	94.8	75-125	0			
Lead	8.923	1.5	7.74	1.546	95.3	75-125	0			
Selenium	7.307	1.5	7.74	0.1859	92	75-125	0			
Silver	7.585	1.5	7.74	0.007841	97.9	75-125	0			
Zinc	11.5	3.1	7.74	3.95	97.5	75-125	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91843** Instrument ID **ICPMS1** Method: **SW6020A**

MSD		Sample ID: 16091317-02AMSD				Units: mg/Kg		Analysis Date: 9/23/2016 09:25 PM		
Client ID:		Run ID: ICPMS1_160923A				SeqNo: 4044893		Prep Date: 9/23/2016		DF: 4
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	8.534	1.5	7.716	0.3763	106	75-125	7.895	7.78	20	
Barium	11.34	1.5	7.716	2.783	111	75-125	10.55	7.17	20	
Cadmium	7.932	0.62	7.716	0.04396	102	75-125	7.567	4.72	20	
Chromium	9.022	1.5	7.716	0.9516	105	75-125	8.412	7	20	
Copper	8.556	1.5	7.716	0.6955	102	75-125	8.031	6.33	20	
Lead	9.343	1.5	7.716	1.546	101	75-125	8.923	4.6	20	
Selenium	7.744	1.5	7.716	0.1859	98	75-125	7.307	5.81	20	
Silver	8.062	1.5	7.716	0.007841	104	75-125	7.585	6.09	20	
Zinc	11.92	3.1	7.716	3.95	103	75-125	11.5	3.65	20	

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91700** Instrument ID **SVMS5** Method: **SW8270D**

MBLK				Sample ID: SBLKW1-91700-91700				Units: µg/L			Analysis Date: 9/22/2016 11:00 AM			
Client ID:				Run ID: SVMS5_160922A				SeqNo: 4043335			Prep Date: 9/21/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
1,4-Dichlorobenzene	ND	5.0												
2,4,5-Trichlorophenol	ND	5.0												
2,4,6-Trichlorophenol	ND	5.0												
2,4-Dinitrotoluene	ND	5.0												
Hexachloro-1,3-butadiene	ND	5.0												
Hexachlorobenzene	ND	5.0												
Hexachloroethane	ND	5.0												
m-Cresol	ND	5.0												
Nitrobenzene	ND	5.0												
o-Cresol	ND	5.0												
p-Cresol	ND	5.0												
Pentachlorophenol	ND	5.0												
Pyridine	ND	10												
Surr: 2,4,6-Tribromophenol	29.17	0	50	0	58.3	38-115		0						
Surr: 2-Fluorobiphenyl	28.78	0	50	0	57.6	32-100		0						
Surr: 2-Fluorophenol	19.02	0	50	0	38	22-59		0						
Surr: 4-Terphenyl-d14	36.96	0	50	0	73.9	23-112		0						
Surr: Nitrobenzene-d5	26.82	0	50	0	53.6	31-93		0						
Surr: Phenol-d6	10.01	0	50	0	20	13-36		0						

LCS				Sample ID: <b>SLCSW1-91700-91700</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/23/2016 05:50 PM</b>	
Client ID:			Run ID: <b>SVMS4_160923A</b>			SeqNo: <b>4048258</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
1,4-Dichlorobenzene	13.42	5.0	20	0	67.1	30-110	0				
2,4,5-Trichlorophenol	15.41	5.0	20	0	77	50-110	0				
2,4,6-Trichlorophenol	16.47	5.0	20	0	82.4	50-115	0				
2,4-Dinitrotoluene	18.54	5.0	20	0	92.7	50-120	0				
Hexachloro-1,3-butadiene	14.35	5.0	20	0	71.8	25-105	0				
Hexachlorobenzene	14.47	5.0	20	0	72.4	50-110	0				
Hexachloroethane	13.25	5.0	20	0	66.2	30-95	0				
Nitrobenzene	14.7	5.0	20	0	73.5	45-110	0				
o-Cresol	11.64	5.0	20	0	58.2	40-110	0				
Pentachlorophenol	14.82	5.0	20	0	74.1	40-115	0				
Pyridine	6.5	10	20	0	32.5	10-71	0			J	
Surr: 2,4,6-Tribromophenol	36.47	0	50	0	72.9	38-115	0				
Surr: 2-Fluorobiphenyl	36.72	0	50	0	73.4	32-100	0				
Surr: 2-Fluorophenol	19.16	0	50	0	38.3	22-59	0				
Surr: 4-Terphenyl-d14	36.22	0	50	0	72.4	23-112	0				
Surr: Nitrobenzene-d5	33.74	0	50	0	67.5	31-93	0				
Surr: Phenol-d6	13.28	0	50	0	26.6	13-36	0				

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91700** Instrument ID **SVMS5** Method: **SW8270D**

MS				Sample ID: <b>16091019-02A MS</b>			Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 02:18 PM</b>	
Client ID:				Run ID: <b>SVMS5_160922A</b>			SeqNo: <b>4043337</b>		Prep Date: <b>9/21/2016</b>	
							DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,4-Dichlorobenzene	178.6	100	400	0	44.6	30-110	0			
2,4,5-Trichlorophenol	280.4	100	400	0	70.1	50-110	0			
2,4,6-Trichlorophenol	241.2	100	400	0	60.3	50-115	0			
2,4-Dinitrotoluene	303.2	100	400	0	75.8	50-120	0			
Hexachloro-1,3-butadiene	181.2	100	400	0	45.3	25-105	0			
Hexachlorobenzene	274	100	400	0	68.5	50-110	0			
Hexachloroethane	173.6	100	400	0	43.4	30-95	0			
m-Cresol	192.4	100	400	0	48.1	30-110	0			
Nitrobenzene	219.2	100	400	0	54.8	45-110	0			
o-Cresol	194	100	400	0	48.5	40-110	0			
p-Cresol	192	100	400	0	48	30-110	0			
Pentachlorophenol	288.8	100	400	0	72.2	40-115	0			
Pyridine	122.6	200	400	0	30.6	10-80	0			J
Surr: 2,4,6-Tribromophenol	680.8	0	1000	0	68.1	38-115	0			
Surr: 2-Fluorobiphenyl	618.6	0	1000	0	61.9	32-100	0			
Surr: 2-Fluorophenol	309	0	1000	0	30.9	22-59	0			
Surr: 4-Terphenyl-d14	753.6	0	1000	0	75.4	23-112	0			
Surr: Nitrobenzene-d5	520.6	0	1000	0	52.1	31-93	0			
Surr: Phenol-d6	190.2	0	1000	0	19	13-36	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91700** Instrument ID **SVMS5** Method: **SW8270D**

MSD				Sample ID: 16091019-02A MSD				Units: µg/L		Analysis Date: 9/22/2016 02:42 PM	
Client ID:			Run ID: SVMS5_160922A			SeqNo: 4043338		Prep Date: 9/21/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
1,4-Dichlorobenzene	256	100	400	0	64	30-110	178.6	35.6	30	R	
2,4,5-Trichlorophenol	297	100	400	0	74.2	50-110	280.4	5.75	30		
2,4,6-Trichlorophenol	260.4	100	400	0	65.1	50-115	241.2	7.66	30		
2,4-Dinitrotoluene	311.8	100	400	0	78	50-120	303.2	2.8	30		
Hexachloro-1,3-butadiene	249.8	100	400	0	62.4	25-105	181.2	31.8	30	R	
Hexachlorobenzene	271.6	100	400	0	67.9	50-110	274	0.88	30		
Hexachloroethane	271.4	100	400	0	67.8	30-95	173.6	44	30	R	
m-Cresol	222	100	400	0	55.5	30-110	192.4	14.3	30		
Nitrobenzene	262.4	100	400	0	65.6	45-110	219.2	17.9	30		
o-Cresol	238.6	100	400	0	59.6	40-110	194	20.6	30		
p-Cresol	222.4	100	400	0	55.6	30-110	192	14.7	30		
Pentachlorophenol	294.4	100	400	0	73.6	40-115	288.8	1.92	30		
Pyridine	124.2	200	400	0	31	10-80	122.6	0	30	J	
Surr: 2,4,6-Tribromophenol	698.2	0	1000	0	69.8	38-115	680.8	2.52	0		
Surr: 2-Fluorobiphenyl	707.4	0	1000	0	70.7	32-100	618.6	13.4	0		
Surr: 2-Fluorophenol	404.4	0	1000	0	40.4	22-59	309	26.7	0		
Surr: 4-Terphenyl-d14	744.6	0	1000	0	74.5	23-112	753.6	1.2	0		
Surr: Nitrobenzene-d5	626.2	0	1000	0	62.6	31-93	520.6	18.4	0		
Surr: Phenol-d6	243.4	0	1000	0	24.3	13-36	190.2	24.5	0		

The following samples were analyzed in this batch:

1609985-01A 1609985-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91739** Instrument ID **SVMS5** Method: **SW846 8270D**

MBLK		Sample ID: <b>SBLKS1-91739-91739</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/22/2016 10:14 AM</b>		
Client ID:		Run ID: <b>SVMS5_160922A</b>				SeqNo: <b>4042976</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1'-Biphenyl	ND	66								
2,2'-Oxybis(1-chloropropane)	ND	66								
2,4,5-Trichlorophenol	ND	66								
2,4,6-Trichlorophenol	ND	66								
2,4-Dichlorophenol	ND	66								
2,4-Dimethylphenol	ND	66								
2,4-Dinitrophenol	ND	66								
2,4-Dinitrotoluene	ND	66								
2,6-Dinitrotoluene	ND	66								
2-Chloronaphthalene	ND	13								
2-Chlorophenol	ND	66								
2-Methylnaphthalene	ND	13								
2-Methylphenol	ND	66								
2-Nitroaniline	ND	66								
2-Nitrophenol	ND	66								
3&4-Methylphenol	ND	66								
3,3'-Dichlorobenzidine	ND	330								
3-Nitroaniline	ND	66								
4,6-Dinitro-2-methylphenol	ND	66								
4-Bromophenyl phenyl ether	ND	66								
4-Chloro-3-methylphenol	ND	66								
4-Chloroaniline	ND	130								
4-Chlorophenyl phenyl ether	ND	66								
4-Nitroaniline	ND	330								
4-Nitrophenol	ND	66								
Acenaphthene	ND	13								
Acenaphthylene	ND	13								
Acetophenone	ND	66								
Anthracene	ND	13								
Atrazine	ND	66								
Benzaldehyde	ND	130								
Benzo(a)anthracene	ND	13								
Benzo(a)pyrene	ND	13								
Benzo(b)fluoranthene	ND	13								
Benzo(g,h,i)perylene	ND	13								
Benzo(k)fluoranthene	ND	13								
Bis(2-chloroethoxy)methane	ND	66								
Bis(2-chloroethyl)ether	ND	66								
Bis(2-ethylhexyl)phthalate	ND	66								
Butyl benzyl phthalate	ND	66								
Caprolactam	ND	66								
Carbazole	ND	66								

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91739</b>	Instrument ID <b>SVMS5</b>	Method: <b>SW846 8270D</b>						
Chrysene	ND	13						
Dibenzo(a,h)anthracene	ND	13						
Dibenzofuran	ND	66						
Diethyl phthalate	ND	66						
Dimethyl phthalate	ND	66						
Di-n-butyl phthalate	ND	66						
Di-n-octyl phthalate	ND	66						
Fluoranthene	ND	13						
Fluorene	ND	13						
Hexachlorobenzene	ND	66						
Hexachlorobutadiene	ND	66						
Hexachlorocyclopentadiene	ND	66						
Hexachloroethane	ND	66						
Indeno(1,2,3-cd)pyrene	ND	13						
Isophorone	ND	330						
Naphthalene	ND	13						
Nitrobenzene	ND	330						
N-Nitrosodimethylamine	ND	330						
N-Nitrosodi-n-propylamine	ND	66						
Pentachlorophenol	ND	66						
Phenanthrene	ND	13						
Phenol	ND	66						
Pyrene	ND	13						
<i>Surr: 2,4,6-Tribromophenol</i>	<i>2110</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>63.3</i>	<i>34-140</i>	<i>0</i>	
<i>Surr: 2-Fluorobiphenyl</i>	<i>2513</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>75.4</i>	<i>12-100</i>	<i>0</i>	
<i>Surr: 2-Fluorophenol</i>	<i>2643</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>79.3</i>	<i>33-117</i>	<i>0</i>	
<i>Surr: 4-Terphenyl-d14</i>	<i>2763</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>82.9</i>	<i>25-137</i>	<i>0</i>	
<i>Surr: Nitrobenzene-d5</i>	<i>2239</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>67.2</i>	<i>37-107</i>	<i>0</i>	
<i>Surr: Phenol-d6</i>	<i>2287</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>68.6</i>	<i>40-106</i>	<i>0</i>	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91739** Instrument ID **SVMS5** Method: **SW846 8270D**

LCS		Sample ID: <b>SLCSS1-91739-91739</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/26/2016 04:18 PM</b>		
Client ID:		Run ID: <b>SVMS4_160926A</b>				SeqNo: <b>4048265</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1'-Biphenyl	1013	66	1333	0	75.9	30-120	0			
2,2'-Oxybis(1-chloropropane)	986.7	66	1333	0	74	20-115	0			
2,4,5-Trichlorophenol	1009	66	1333	0	75.7	50-110	0			
2,4,6-Trichlorophenol	1055	66	1333	0	79.1	45-110	0			
2,4-Dichlorophenol	922.7	66	1333	0	69.2	45-110	0			
2,4-Dimethylphenol	858	66	1333	0	64.3	30-105	0			
2,4-Dinitrophenol	522	66	1333	0	39.1	15-130	0			
2,4-Dinitrotoluene	1246	66	1333	0	93.4	50-115	0			
2,6-Dinitrotoluene	1007	66	1333	0	75.5	50-110	0			
2-Chloronaphthalene	992	13	1333	0	74.4	45-105	0			
2-Chlorophenol	950.7	66	1333	0	71.3	45-105	0			
2-Methylnaphthalene	992.7	13	1333	0	74.4	45-105	0			
2-Methylphenol	960	66	1333	0	72	40-105	0			
2-Nitroaniline	950.7	66	1333	0	71.3	45-120	0			
2-Nitrophenol	976.7	66	1333	0	73.2	40-110	0			
3&4-Methylphenol	858.7	66	1333	0	64.4	40-105	0			
3,3'-Dichlorobenzidine	1108	330	1333	0	83.1	30-120	0			
3-Nitroaniline	899.3	66	1333	0	67.4	25-150	0			
4,6-Dinitro-2-methylphenol	1166	66	1333	0	87.4	40-130	0			
4-Bromophenyl phenyl ether	1102	66	1333	0	82.6	45-115	0			
4-Chloro-3-methylphenol	1003	66	1333	0	75.2	45-115	0			
4-Chloroaniline	975.3	130	1333	0	73.1	15-110	0			
4-Chlorophenyl phenyl ether	1085	66	1333	0	81.4	45-110	0			
4-Nitroaniline	706	330	1333	0	52.9	35-150	0			
4-Nitrophenol	1175	66	1333	0	88.1	15-140	0			
Acenaphthene	1005	13	1333	0	75.3	45-110	0			
Acenaphthylene	1149	13	1333	0	86.1	45-105	0			
Acetophenone	969.3	66	1333	0	72.7	30-120	0			
Anthracene	1140	13	1333	0	85.5	55-105	0			
Atrazine	1363	66	1333	0	102	30-120	0			
Benzaldehyde	436	130	1333	0	32.7	30-120	0			
Benzo(a)anthracene	1122	13	1333	0	84.1	50-110	0			
Benzo(a)pyrene	1196	13	1333	0	89.7	50-110	0			
Benzo(b)fluoranthene	1222	13	1333	0	91.6	45-115	0			
Benzo(g,h,i)perylene	1215	13	1333	0	91.1	40-125	0			
Benzo(k)fluoranthene	1164	13	1333	0	87.3	45-115	0			
Bis(2-chloroethoxy)methane	960.7	66	1333	0	72	45-110	0			
Bis(2-chloroethyl)ether	1075	66	1333	0	80.6	40-105	0			
Bis(2-ethylhexyl)phthalate	1205	66	1333	0	90.3	45-125	0			
Butyl benzyl phthalate	1091	66	1333	0	81.8	50-125	0			
Caprolactam	858	66	1333	0	64.3	30-120	0			
Carbazole	1083	66	1333	0	81.2	50-150	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91739</b>		Instrument ID <b>SVMS5</b>		Method: <b>SW846 8270D</b>			
Chrysene	1153	13	1333	0	86.4	55-110	0
Dibenzo(a,h)anthracene	1173	13	1333	0	87.9	40-125	0
Dibenzofuran	1011	66	1333	0	75.8	50-105	0
Diethyl phthalate	1105	66	1333	0	82.8	50-115	0
Dimethyl phthalate	1071	66	1333	0	80.3	50-110	0
Di-n-butyl phthalate	1223	66	1333	0	91.7	55-110	0
Di-n-octyl phthalate	1129	66	1333	0	84.7	40-130	0
Fluoranthene	1171	13	1333	0	87.8	55-115	0
Fluorene	1045	13	1333	0	78.4	50-110	0
Hexachlorobenzene	1115	66	1333	0	83.6	45-120	0
Hexachlorobutadiene	1070	66	1333	0	80.2	40-115	0
Hexachlorocyclopentadiene	1298	66	1333	0	97.3	40-115	0
Hexachloroethane	1072	66	1333	0	80.4	35-110	0
Indeno(1,2,3-cd)pyrene	1265	13	1333	0	94.9	40-120	0
Isophorone	999.3	330	1333	0	74.9	45-110	0
Naphthalene	989.3	13	1333	0	74.2	40-105	0
Nitrobenzene	1016	330	1333	0	76.2	40-115	0
N-Nitrosodimethylamine	954.7	330	1333	0	71.6	20-115	0
N-Nitrosodi-n-propylamine	1019	66	1333	0	76.4	40-115	0
Pentachlorophenol	1007	66	1333	0	75.5	25-120	0
Phenanthrene	1089	13	1333	0	81.7	50-110	0
Phenol	888.7	66	1333	0	66.6	40-100	0
Pyrene	1117	13	1333	0	83.7	45-125	0
Surr: 2,4,6-Tribromophenol	2734	0	3333	0	82	34-140	0
Surr: 2-Fluorobiphenyl	2503	0	3333	0	75.1	12-100	0
Surr: 2-Fluorophenol	2149	0	3333	0	64.5	33-117	0
Surr: 4-Terphenyl-d14	2638	0	3333	0	79.1	25-137	0
Surr: Nitrobenzene-d5	2334	0	3333	0	70	37-107	0
Surr: Phenol-d6	2175	0	3333	0	65.3	40-106	0

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**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91739** Instrument ID **SVMS5** Method: **SW846 8270D**

MS				Sample ID: <b>1609941-17A MS</b>			Units: <b>µg/Kg</b>		Analysis Date: <b>9/22/2016 01:09 PM</b>	
Client ID:				Run ID: <b>SVMS5_160922A</b>			SeqNo: <b>4042980</b>		Prep Date: <b>9/22/2016</b>	
							DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1'-Biphenyl	1037	62	1260	0	82.3	30-120	0			
2,4,5-Trichlorophenol	998.9	62	1260	0	79.2	50-110	0			
2,4,6-Trichlorophenol	913.2	62	1260	0	72.4	45-110	0			
2,4-Dichlorophenol	911.9	62	1260	0	72.3	45-110	0			
2,4-Dimethylphenol	647.8	62	1260	0	51.4	30-105	0			
2,4-Dinitrophenol	562.1	62	1260	0	44.6	15-130	0			
2,4-Dinitrotoluene	1052	62	1260	0	83.4	50-115	0			
2,6-Dinitrotoluene	1052	62	1260	0	83.4	50-110	0			
2-Chloronaphthalene	1043	13	1260	0	82.7	45-105	0			
2-Chlorophenol	1033	62	1260	0	81.9	45-105	0			
2-Methylnaphthalene	986.9	13	1260	0	78.3	45-105	0			
2-Methylphenol	898.7	62	1260	0	71.3	40-105	0			
2-Nitroaniline	979.3	62	1260	0	77.7	45-120	0			
2-Nitrophenol	955.4	62	1260	0	75.8	40-110	0			
3&4-Methylphenol	966.7	62	1260	0	76.7	40-105	0			
3,3'-Dichlorobenzidine	983.7	320	1260	0	78	30-120	0			
3-Nitroaniline	713.4	62	1260	0	56.6	25-150	0			
4,6-Dinitro-2-methylphenol	959.2	62	1260	0	76.1	40-130	0			
4-Bromophenyl phenyl ether	974.3	62	1260	0	77.3	45-115	0			
4-Chloro-3-methylphenol	971.8	62	1260	0	77.1	45-115	0			
4-Chloroaniline	1097	130	1260	0	87	15-110	0			
4-Chlorophenyl phenyl ether	1056	62	1260	0	83.8	45-110	0			
4-Nitroaniline	827.5	320	1260	0	65.6	35-150	0			
4-Nitrophenol	819.9	62	1260	0	65	15-140	0			
Acenaphthene	1031	13	1260	0	81.8	45-110	0			
Acenaphthylene	1199	13	1260	0	95.1	45-105	0			
Acetophenone	1151	62	1260	0	91.3	30-120	0			
Anthracene	1120	13	1260	0	88.9	55-105	0			
Atrazine	1364	62	1260	0	108	30-120	0			
Benzaldehyde	545.8	130	1260	0	43.3	30-120	0			
Benzo(a)anthracene	1047	13	1260	0	83	50-110	0			
Benzo(a)pyrene	1065	13	1260	0	84.5	50-110	0			
Benzo(b)fluoranthene	984.4	13	1260	0	78.1	45-115	0			
Benzo(g,h,i)perylene	1107	13	1260	0	87.8	40-125	0			
Benzo(k)fluoranthene	1152	13	1260	0	91.4	45-115	0			
Bis(2-chloroethoxy)methane	1039	62	1260	0	82.4	45-110	0			
Bis(2-chloroethyl)ether	1177	62	1260	0	93.3	40-105	0			
Bis(2-ethylhexyl)phthalate	1138	62	1260	0	90.2	45-125	0			
Butyl benzyl phthalate	1051	62	1260	0	83.4	50-125	0			
Caprolactam	983.1	62	1260	0	78	30-120	0			
Carbazole	1098	62	1260	0	87.1	50-150	0			
Chrysene	1165	13	1260	0	92.4	55-110	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91739</b>		Instrument ID <b>SVMS5</b>		Method: <b>SW846 8270D</b>				
Dibenzo(a,h)anthracene	1098	13	1260	0	87.1	40-125	0	
Dibenzofuran	1067	62	1260	0	84.6	50-105	0	
Diethyl phthalate	1146	62	1260	0	90.9	50-115	0	
Dimethyl phthalate	1109	62	1260	0	87.9	50-110	0	
Di-n-butyl phthalate	1153	62	1260	0	91.5	55-110	0	
Di-n-octyl phthalate	1030	62	1260	0	81.7	40-130	0	
Fluoranthene	1098	13	1260	0	87.1	55-115	0	
Fluorene	1063	13	1260	0	84.3	50-110	0	
Hexachlorobenzene	969.9	62	1260	0	76.9	45-120	0	
Hexachlorobutadiene	955.4	62	1260	0	75.8	40-115	0	
Hexachlorocyclopentadiene	1126	62	1260	0	89.3	40-115	0	
Hexachloroethane	1093	62	1260	0	86.7	35-110	0	
Indeno(1,2,3-cd)pyrene	1244	13	1260	0	98.7	40-120	0	
Isophorone	1095	320	1260	0	86.8	45-110	0	
Naphthalene	977.4	13	1260	0	77.5	40-105	0	
Nitrobenzene	971.8	320	1260	0	77.1	40-115	0	
N-Nitrosodimethylamine	955.4	320	1260	0	75.8	20-115	0	
N-Nitrosodi-n-propylamine	1182	62	1260	0	93.8	40-115	0	
Pentachlorophenol	989.4	62	1260	0	78.5	25-120	0	
Phenanthrene	1060	13	1260	0	84.1	50-110	0	
Phenol	835	62	1260	0	66.2	40-100	0	
Pyrene	1089	13	1260	0	86.4	45-125	0	
<i>Surr: 2,4,6-Tribromophenol</i>	<i>2406</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>76.4</i>	<i>34-140</i>	<i>0</i>	
<i>Surr: 2-Fluorobiphenyl</i>	<i>2616</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>83</i>	<i>12-100</i>	<i>0</i>	
<i>Surr: 2-Fluorophenol</i>	<i>2565</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>81.4</i>	<i>33-117</i>	<i>0</i>	
<i>Surr: 4-Terphenyl-d14</i>	<i>2620</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>83.2</i>	<i>25-137</i>	<i>0</i>	
<i>Surr: Nitrobenzene-d5</i>	<i>2395</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>76</i>	<i>37-107</i>	<i>0</i>	
<i>Surr: Phenol-d6</i>	<i>2467</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>78.3</i>	<i>40-106</i>	<i>0</i>	

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**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91739** Instrument ID **SVMS5** Method: **SW846 8270D**

MSD				Sample ID: <b>1609941-17A MSD</b>			Units: <b>µg/Kg</b>		Analysis Date: <b>9/22/2016 01:32 PM</b>	
Client ID:				Run ID: <b>SVMS5_160922A</b>			SeqNo: <b>4042981</b>		Prep Date: <b>9/22/2016</b>	
							DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1'-Biphenyl	1118	65	1321	0	84.6	30-120	1037	7.51	30	
2,4,5-Trichlorophenol	1136	65	1321	0	86	50-110	998.9	12.9	30	
2,4,6-Trichlorophenol	972.9	65	1321	0	73.6	45-110	913.2	6.34	30	
2,4-Dichlorophenol	1011	65	1321	0	76.5	45-110	911.9	10.3	30	
2,4-Dimethylphenol	673.7	65	1321	0	51	30-105	647.8	3.91	30	
2,4-Dinitrophenol	788.6	65	1321	0	59.7	15-130	562.1	33.5	30	R
2,4-Dinitrotoluene	1143	65	1321	0	86.5	50-115	1052	8.28	30	
2,6-Dinitrotoluene	1143	65	1321	0	86.5	50-110	1052	8.28	30	
2-Chloronaphthalene	1122	13	1321	0	84.9	45-105	1043	7.32	30	
2-Chlorophenol	1116	65	1321	0	84.5	45-105	1033	7.76	30	
2-Methylnaphthalene	1097	13	1321	0	83	45-105	986.9	10.6	30	
2-Methylphenol	967	65	1321	0	73.2	40-105	898.7	7.32	30	
2-Nitroaniline	1038	65	1321	0	78.5	45-120	979.3	5.78	30	
2-Nitrophenol	1072	65	1321	0	81.1	40-110	955.4	11.5	30	
3&4-Methylphenol	1042	65	1321	0	78.8	40-105	966.7	7.46	30	
3,3'-Dichlorobenzidine	974.9	330	1321	0	73.8	30-120	983.7	0.903	30	
3-Nitroaniline	761.6	65	1321	0	57.6	25-110	713.4	6.53	30	
4,6-Dinitro-2-methylphenol	1088	65	1321	0	82.3	40-130	959.2	12.6	30	
4-Bromophenyl phenyl ether	1032	65	1321	0	78.1	45-115	974.3	5.79	30	
4-Chloro-3-methylphenol	1049	65	1321	0	79.4	45-115	971.8	7.63	30	
4-Chloroaniline	1219	130	1321	0	92.3	15-110	1097	10.5	30	
4-Chlorophenyl phenyl ether	1127	65	1321	0	85.3	45-110	1056	6.53	30	
4-Nitroaniline	895	330	1321	0	67.7	35-150	827.5	7.84	30	
4-Nitrophenol	893	65	1321	0	67.6	15-140	819.9	8.54	30	
Acenaphthene	1118	13	1321	0	84.6	45-110	1031	8.06	30	
Acenaphthylene	1278	13	1321	0	96.7	45-105	1199	6.36	30	
Acetophenone	1260	65	1321	0	95.3	30-120	1151	8.98	30	
Anthracene	1188	13	1321	0	89.9	55-105	1120	5.87	30	
Atrazine	1472	65	1321	0	111	30-120	1364	7.61	30	
Benzaldehyde	642	130	1321	0	48.6	30-120	545.8	16.2	30	
Benzo(a)anthracene	1114	13	1321	0	84.3	50-110	1047	6.25	30	
Benzo(a)pyrene	1128	13	1321	0	85.4	50-110	1065	5.75	30	
Benzo(b)fluoranthene	1014	13	1321	0	76.7	45-115	984.4	2.95	30	
Benzo(g,h,i)perylene	1184	13	1321	0	89.6	40-125	1107	6.72	30	
Benzo(k)fluoranthene	1228	13	1321	0	92.9	45-115	1152	6.38	30	
Bis(2-chloroethoxy)methane	1143	65	1321	0	86.5	45-110	1039	9.55	30	
Bis(2-chloroethyl)ether	1273	65	1321	0	96.3	40-105	1177	7.86	30	
Bis(2-ethylhexyl)phthalate	1208	65	1321	0	91.4	45-125	1138	6.02	30	
Butyl benzyl phthalate	1129	65	1321	0	85.4	50-125	1051	7.12	30	
Caprolactam	1077	65	1321	0	81.5	30-120	983.1	9.08	30	
Carbazole	1171	65	1321	0	88.6	50-150	1098	6.4	30	
Chrysene	1233	13	1321	0	93.3	55-110	1165	5.72	30	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91739</b>		Instrument ID <b>SVMS5</b>		Method: <b>SW846 8270D</b>					
Dibenzo(a,h)anthracene	1205	13	1321	0	91.2	40-125	1098	9.29	30
Dibenzofuran	1134	65	1321	0	85.8	50-105	1067	6.1	30
Diethyl phthalate	1241	65	1321	0	93.9	50-115	1146	7.99	30
Dimethyl phthalate	1187	65	1321	0	89.8	50-110	1109	6.83	30
Di-n-butyl phthalate	1238	65	1321	0	93.7	55-110	1153	7.12	30
Di-n-octyl phthalate	1087	65	1321	0	82.2	40-130	1030	5.3	30
Fluoranthene	1170	13	1321	0	88.5	55-115	1098	6.35	30
Fluorene	1140	13	1321	0	86.3	50-110	1063	6.98	30
Hexachlorobenzene	1040	65	1321	0	78.7	45-120	969.9	6.94	30
Hexachlorobutadiene	1077	65	1321	0	81.5	40-115	955.4	11.9	30
Hexachlorocyclopentadiene	1296	65	1321	0	98.1	40-115	1126	14.1	30
Hexachloroethane	1220	65	1321	0	92.3	35-110	1093	11	30
Indeno(1,2,3-cd)pyrene	811.8	13	1321	0	61.4	40-120	1244	42.1	30 R
Isophorone	1209	330	1321	0	91.5	45-110	1095	9.9	30
Naphthalene	1100	13	1321	0	83.2	40-105	977.4	11.8	30
Nitrobenzene	1079	330	1321	0	81.7	40-115	971.8	10.5	30
N-Nitrosodimethylamine	1085	330	1321	0	82.1	20-115	955.4	12.7	30
N-Nitrosodi-n-propylamine	1287	65	1321	0	97.4	40-115	1182	8.51	30
Pentachlorophenol	1059	65	1321	0	80.1	25-120	989.4	6.77	30
Phenanthrene	1127	13	1321	0	85.3	50-110	1060	6.11	30
Phenol	931.3	65	1321	0	70.5	40-100	835	10.9	30
Pyrene	1172	13	1321	0	88.7	45-125	1089	7.32	30
Surr: 2,4,6-Tribromophenol	2512	0	3303	0	76.1	34-140	2406	4.3	40
Surr: 2-Fluorobiphenyl	2758	0	3303	0	83.5	12-100	2616	5.3	40
Surr: 2-Fluorophenol	2686	0	3303	0	81.3	33-117	2565	4.6	40
Surr: 4-Terphenyl-d14	2736	0	3303	0	82.9	25-137	2620	4.33	40
Surr: Nitrobenzene-d5	2632	0	3303	0	79.7	37-107	2395	9.42	40
Surr: Phenol-d6	2678	0	3303	0	81.1	40-106	2467	8.21	40

The following samples were analyzed in this batch:

1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91663** Instrument ID **VMS7** Method: **SW8260B**

MBLK		Sample ID: <b>MBLK-91663-91663</b>				Units: <b>µg/Kg-dry</b>		Analysis Date: <b>9/20/2016 10:38 PM</b>		
Client ID:		Run ID: <b>VMS7_160920B</b>				SeqNo: <b>4038211</b>		Prep Date: <b>9/20/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	ND	30								
1,1,1-Trichloroethane	ND	30								
1,1,2,2-Tetrachloroethane	ND	30								
1,1,2-Trichloroethane	ND	30								
1,1,2-Trichlorotrifluoroethane	ND	30								
1,1-Dichloroethane	ND	30								
1,1-Dichloroethene	ND	30								
1,2,3-Trichloropropane	ND	30								
1,2,4-Trichlorobenzene	ND	30								
1,2,4-Trimethylbenzene	ND	30								
1,2-Dibromo-3-chloropropane	ND	30								
1,2-Dibromoethane	ND	30								
1,2-Dichlorobenzene	ND	30								
1,2-Dichloroethane	ND	30								
1,2-Dichloropropane	ND	30								
1,3,5-Trimethylbenzene	ND	30								
1,3-Dichlorobenzene	ND	30								
1,4-Dichlorobenzene	ND	30								
2-Butanone	ND	200								
2-Hexanone	ND	30								
2-Methylnaphthalene	ND	100								
4-Methyl-2-pentanone	ND	30								
Acetone	ND	100								
Acrylonitrile	ND	100								
Benzene	ND	30								
Bromochloromethane	ND	30								
Bromodichloromethane	ND	30								
Bromoform	ND	30								
Bromomethane	ND	75								
Carbon disulfide	ND	30								
Carbon tetrachloride	ND	30								
Chlorobenzene	ND	30								
Chloroethane	ND	100								
Chloroform	ND	30								
Chloromethane	ND	100								
cis-1,2-Dichloroethene	ND	30								
cis-1,3-Dichloropropene	ND	30								
Dibromochloromethane	ND	30								
Dibromomethane	ND	30								
Dichlorodifluoromethane	ND	30								
Diethyl ether	ND	30								
Ethylbenzene	ND	30								

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91663</b>	Instrument ID <b>VMS7</b>	Method: <b>SW8260B</b>						
Hexachloroethane	ND	100						
Isopropylbenzene	ND	30						
m,p-Xylene	ND	60						
Methyl iodide	ND	75						
Methyl tert-butyl ether	ND	30						
Methylene chloride	ND	30						
Naphthalene	ND	100						
n-Propylbenzene	ND	30						
o-Xylene	ND	30						
Styrene	ND	30						
Tetrachloroethene	ND	30						
Toluene	ND	30						
trans-1,2-Dichloroethene	ND	30						
trans-1,3-Dichloropropene	ND	30						
trans-1,4-Dichloro-2-butene	ND	30						
Trichloroethene	ND	30						
Trichlorofluoromethane	ND	30						
Vinyl acetate	ND	250						
Vinyl chloride	ND	30						
Xylenes, Total	ND	90						
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>990</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>99</i>	<i>70-130</i>	<i>0</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>963</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>96.3</i>	<i>70-130</i>	<i>0</i>	
<i>Surr: Dibromofluoromethane</i>	<i>901.5</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>90.2</i>	<i>70-130</i>	<i>0</i>	
<i>Surr: Toluene-d8</i>	<i>1005</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>100</i>	<i>70-130</i>	<i>0</i>	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91663** Instrument ID **VMS7** Method: **SW8260B**

LCS		Sample ID: <b>LCS-91663-91663</b>				Units: <b>µg/Kg-dry</b>		Analysis Date: <b>9/20/2016 09:29 PM</b>		
Client ID:		Run ID: <b>VMS7_160920B</b>				SeqNo: <b>4038210</b>		Prep Date: <b>9/20/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	923.5	30	1000	0	92.4	75-125	0			
1,1,1-Trichloroethane	953	30	1000	0	95.3	70-135	0			
1,1,2,2-Tetrachloroethane	952.5	30	1000	0	95.2	55-130	0			
1,1,2-Trichloroethane	932.5	30	1000	0	93.2	60-125	0			
1,1-Dichloroethane	976	30	1000	0	97.6	75-125	0			
1,1-Dichloroethene	1000	30	1000	0	100	65-135	0			
1,2,3-Trichloropropane	935.5	30	1000	0	93.6	65-130	0			
1,2,4-Trichlorobenzene	923.5	30	1000	0	92.4	65-130	0			
1,2,4-Trimethylbenzene	924	30	1000	0	92.4	65-135	0			
1,2-Dibromo-3-chloropropane	855.5	30	1000	0	85.6	40-135	0			
1,2-Dibromoethane	1688	30	1000	0	169	75-125	0			S
1,2-Dichlorobenzene	951.5	30	1000	0	95.2	75-120	0			
1,2-Dichloroethane	911.5	30	1000	0	91.2	70-135	0			
1,2-Dichloropropane	923	30	1000	0	92.3	70-120	0			
1,3,5-Trimethylbenzene	951.5	30	1000	0	95.2	65-135	0			
1,3-Dichlorobenzene	955	30	1000	0	95.5	70-125	0			
1,4-Dichlorobenzene	927	30	1000	0	92.7	70-125	0			
2-Butanone	1066	200	1000	0	107	30-160	0			
2-Hexanone	987	30	1000	0	98.7	45-145	0			
4-Methyl-2-pentanone	1165	30	1000	0	116	74-176	0			
Acetone	1124	100	1000	0	112	20-160	0			
Acrylonitrile	979.5	100	1000	0	98	70-135	0			
Benzene	949	30	1000	0	94.9	75-125	0			
Bromochloromethane	974	30	1000	0	97.4	70-125	0			
Bromodichloromethane	899	30	1000	0	89.9	70-130	0			
Bromoform	785	30	1000	0	78.5	55-135	0			
Bromomethane	905	75	1000	0	90.5	30-160	0			
Carbon disulfide	931	30	1000	0	93.1	45-160	0			
Carbon tetrachloride	967	30	1000	0	96.7	65-135	0			
Chlorobenzene	917.5	30	1000	0	91.8	75-125	0			
Chloroethane	981.5	100	1000	0	98.2	40-155	0			
Chloroform	962.5	30	1000	0	96.2	70-125	0			
Chloromethane	862.5	100	1000	0	86.2	50-130	0			
cis-1,2-Dichloroethene	926	30	1000	0	92.6	65-125	0			
cis-1,3-Dichloropropene	919	30	1000	0	91.9	70-125	0			
Dibromochloromethane	789	30	1000	0	78.9	65-135	0			
Dibromomethane	953.5	30	1000	0	95.4	75-130	0			
Dichlorodifluoromethane	643.5	30	1000	0	64.4	35-135	0			
Ethylbenzene	957.5	30	1000	0	95.8	75-125	0			
Hexachloroethane	777.5	100	1000	0	77.8	53-112	0			
Isopropylbenzene	947.5	30	1000	0	94.8	75-130	0			
m,p-Xylene	1896	60	2000	0	94.8	80-125	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91663</b>	Instrument ID <b>VMS7</b>		Method: <b>SW8260B</b>						
Methyl iodide	1562	75	1000	0	156	64-145	0		S
Methyl tert-butyl ether	1033	30	1000	0	103	75-125	0		
Methylene chloride	1052	30	1000	0	105	55-145	0		
Naphthalene	959.5	100	1000	0	96	40-140	0		
n-Propylbenzene	932.5	30	1000	0	93.2	65-135	0		
o-Xylene	954.5	30	1000	0	95.4	75-125	0		
Styrene	981.5	30	1000	0	98.2	75-125	0		
Tetrachloroethene	1116	30	1000	0	112	64-140	0		
Toluene	952.5	30	1000	0	95.2	70-125	0		
trans-1,2-Dichloroethene	969	30	1000	0	96.9	65-135	0		
trans-1,3-Dichloropropene	896.5	30	1000	0	89.6	65-125	0		
trans-1,4-Dichloro-2-butene	767.5	30	1000	0	76.8	62-112	0		
Trichloroethene	928	30	1000	0	92.8	75-125	0		
Trichlorofluoromethane	895.5	30	1000	0	89.6	25-185	0		
Vinyl chloride	896.5	30	1000	0	89.6	60-125	0		
Xylenes, Total	2850	90	3000	0	95	75-125	0		
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>1018</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>102</i>	<i>70-130</i>	<i>0</i>		
<i>Surr: 4-Bromofluorobenzene</i>	<i>998.5</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>99.8</i>	<i>70-130</i>	<i>0</i>		
<i>Surr: Dibromofluoromethane</i>	<i>1020</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>102</i>	<i>70-130</i>	<i>0</i>		
<i>Surr: Toluene-d8</i>	<i>996</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>99.6</i>	<i>70-130</i>	<i>0</i>		

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91663** Instrument ID **VMS7** Method: **SW8260B**

MS Sample ID: <b>1609987-12A MS</b>				Units: <b>µg/Kg-dry</b>			Analysis Date: <b>9/24/2016 06:00 AM</b>			
Client ID:		Run ID: <b>VMS7_160923B</b>		SeqNo: <b>4044264</b>		Prep Date: <b>9/20/2016</b>		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	1027	40	1326	0	77.5	75-125	0			
1,1,1-Trichloroethane	1150	40	1326	0	86.8	70-135	0			
1,1,2,2-Tetrachloroethane	636.9	40	1326	0	48	55-130	0			S
1,1,2-Trichloroethane	1092	40	1326	0	82.4	60-125	0			
1,1-Dichloroethane	1298	40	1326	0	97.9	75-125	0			
1,1-Dichloroethene	1382	40	1326	0	104	65-135	0			
1,2,3-Trichloropropane	1067	40	1326	0	80.5	65-130	0			
1,2,4-Trichlorobenzene	1168	40	1326	0	88.1	65-130	0			
1,2,4-Trimethylbenzene	1271	40	1326	0	95.9	65-135	0			
1,2-Dibromo-3-chloropropane	729.7	40	1326	0	55	40-135	0			
1,2-Dibromoethane	1854	40	1326	0	140	75-125	0			S
1,2-Dichlorobenzene	1150	40	1326	0	86.8	75-120	0			
1,2-Dichloroethane	1172	40	1326	0	88.4	70-135	0			
1,2-Dichloropropane	1165	40	1326	0	87.8	70-120	0			
1,3,5-Trimethylbenzene	1218	40	1326	0	91.8	65-135	0			
1,3-Dichlorobenzene	1165	40	1326	0	87.9	70-125	0			
1,4-Dichlorobenzene	1143	40	1326	0	86.2	70-125	0			
2-Butanone	2083	270	1326	0	157	30-160	0			
2-Hexanone	1582	40	1326	0	119	45-145	0			
4-Methyl-2-pentanone	1204	40	1326	0	90.8	74-176	0			
Acetone	3169	130	1326	0	239	20-160	0			S
Acrylonitrile	1212	130	1326	0	91.4	70-135	0			
Benzene	1202	40	1326	0	90.6	75-125	0			
Bromochloromethane	1288	40	1326	0	97.2	70-125	0			
Bromodichloromethane	1026	40	1326	0	77.4	70-130	0			
Bromoform	720.5	40	1326	0	54.4	55-135	0			S
Bromomethane	381.1	99	1326	0	28.8	30-160	0			S
Carbon disulfide	1002	40	1326	0	75.6	45-160	0			
Carbon tetrachloride	1141	40	1326	0	86.1	65-135	0			
Chlorobenzene	1154	40	1326	0	87	75-125	0			
Chloroethane	1086	130	1326	0	81.9	40-155	0			
Chloroform	1239	40	1326	0	93.5	70-125	0			
Chloromethane	1197	130	1326	0	90.3	50-130	0			
cis-1,2-Dichloroethene	1210	40	1326	0	91.2	65-125	0			
cis-1,3-Dichloropropene	1023	40	1326	0	77.2	70-125	0			
Dibromochloromethane	808.6	40	1326	0	61	65-135	0			S
Dibromomethane	1171	40	1326	0	88.4	75-130	0			
Dichlorodifluoromethane	907.4	40	1326	0	68.4	35-135	0			
Ethylbenzene	1229	40	1326	0	92.7	75-125	0			
Hexachloroethane	873.6	130	1326	0	65.9	53-112	0			
Isopropylbenzene	1205	40	1326	0	90.9	75-130	0			
m,p-Xylene	2497	80	2651	0	94.2	80-125	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91663</b>	Instrument ID <b>VMS7</b>		Method: <b>SW8260B</b>				
Methyl iodide	896.8	99	1326	0	67.6	30-105	0
Methyl tert-butyl ether	1314	40	1326	0	99.1	75-125	0
Methylene chloride	1306	40	1326	0	98.5	55-145	0
Naphthalene	1055	130	1326	0	79.6	40-140	0
n-Propylbenzene	1210	40	1326	0	91.2	65-135	0
o-Xylene	1221	40	1326	0	92.1	75-125	0
Styrene	1187	40	1326	0	89.6	75-125	0
Tetrachloroethene	2326	40	1326	1047	96.4	64-140	0
Toluene	1202	40	1326	0	90.7	70-125	0
trans-1,2-Dichloroethene	1286	40	1326	0	97	65-135	0
trans-1,3-Dichloropropene	920.6	40	1326	0	69.4	65-125	0
trans-1,4-Dichloro-2-butene	736.4	40	1326	0	55.6	45-86	0
Trichloroethene	1463	40	1326	0	110	75-125	0
Trichlorofluoromethane	1188	40	1326	0	89.6	25-185	0
Vinyl chloride	1175	40	1326	0	88.6	60-125	0
Xylenes, Total	3718	120	3977	0	93.5	75-125	0
<i>Surr: 1,2-Dichloroethane-d4</i>	1408	0	1326	0	106	70-130	0
<i>Surr: 4-Bromofluorobenzene</i>	1323	0	1326	0	99.8	70-130	0
<i>Surr: Dibromofluoromethane</i>	1290	0	1326	0	97.4	70-130	0
<i>Surr: Toluene-d8</i>	1324	0	1326	0	99.9	70-130	0

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91663** Instrument ID **VMS7** Method: **SW8260B**

MSD				Sample ID: 1609987-12A MSD			Units: µg/Kg-dry		Analysis Date: 9/24/2016 06:23 AM		
Client ID:		Run ID: VMS7_160923B			SeqNo: 4044265		Prep Date: 9/20/2016		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
1,1,1,2-Tetrachloroethane	1040	40	1326	0	78.4	75-125	1027	1.22	30		
1,1,1-Trichloroethane	1153	40	1326	0	87	70-135	1150	0.23	30		
1,1,2,2-Tetrachloroethane	562.7	40	1326	0	42.4	55-130	636.9	12.4	30	S	
1,1,2-Trichloroethane	1118	40	1326	0	84.4	60-125	1092	2.4	30		
1,1-Dichloroethane	1269	40	1326	0	95.8	75-125	1298	2.22	30		
1,1-Dichloroethene	1341	40	1326	0	101	65-135	1382	3.02	30		
1,2,3-Trichloropropane	1052	40	1326	0	79.4	65-130	1067	1.44	30		
1,2,4-Trichlorobenzene	1112	40	1326	0	83.9	65-130	1168	4.88	30		
1,2,4-Trimethylbenzene	1180	40	1326	0	89	65-135	1271	7.46	30		
1,2-Dibromo-3-chloropropane	780.1	40	1326	0	58.8	40-135	729.7	6.67	30		
1,2-Dibromoethane	1910	40	1326	0	144	75-125	1854	2.92	30	S	
1,2-Dichlorobenzene	1149	40	1326	0	86.7	75-120	1150	0.0577	30		
1,2-Dichloroethane	1165	40	1326	0	87.9	70-135	1172	0.624	30		
1,2-Dichloropropane	1176	40	1326	0	88.8	70-120	1165	1.02	30		
1,3,5-Trimethylbenzene	1198	40	1326	0	90.4	65-135	1218	1.59	30		
1,3-Dichlorobenzene	1165	40	1326	0	87.8	70-125	1165	0.0569	30		
1,4-Dichlorobenzene	1131	40	1326	0	85.4	70-125	1143	0.991	30		
2-Butanone	2037	270	1326	0	154	30-160	2083	2.25	30		
2-Hexanone	1514	40	1326	0	114	45-145	1582	4.37	30		
4-Methyl-2-pentanone	1223	40	1326	0	92.2	74-176	1204	1.58	30		
Acetone	3024	130	1326	0	228	20-160	3169	4.69	30	S	
Acrylonitrile	1229	130	1326	0	92.7	70-135	1212	1.36	30		
Benzene	1196	40	1326	0	90.2	75-125	1202	0.442	30		
Bromochloromethane	1269	40	1326	0	95.7	70-125	1288	1.5	30		
Bromodichloromethane	1024	40	1326	0	77.2	70-130	1026	0.194	30		
Bromoform	758.2	40	1326	0	57.2	55-135	720.5	5.11	30		
Bromomethane	292.3	99	1326	0	22	30-160	381.1	26.4	30	S	
Carbon disulfide	1009	40	1326	0	76.2	45-160	1002	0.725	30		
Carbon tetrachloride	1151	40	1326	0	86.8	65-135	1141	0.867	30		
Chlorobenzene	1159	40	1326	0	87.4	75-125	1154	0.458	30		
Chloroethane	1048	130	1326	0	79	40-155	1086	3.54	30		
Chloroform	1240	40	1326	0	93.6	70-125	1239	0.0535	30		
Chloromethane	1185	130	1326	0	89.4	50-130	1197	1	30		
cis-1,2-Dichloroethene	1200	40	1326	0	90.6	65-125	1210	0.77	30		
cis-1,3-Dichloropropene	1025	40	1326	0	77.3	70-125	1023	0.129	30		
Dibromochloromethane	830.5	40	1326	0	62.6	65-135	808.6	2.67	30	S	
Dibromomethane	1161	40	1326	0	87.6	75-130	1171	0.853	30		
Dichlorodifluoromethane	794	40	1326	0	59.9	35-135	907.4	13.3	30		
Ethylbenzene	1236	40	1326	0	93.2	75-125	1229	0.592	30		
Hexachloroethane	859.6	130	1326	0	64.8	53-112	873.6	1.61	30		
Isopropylbenzene	1221	40	1326	0	92.1	75-130	1205	1.31	30		
m,p-Xylene	2441	80	2651	0	92.1	80-125	2497	2.28	30		

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91663</b>	Instrument ID <b>VMS7</b>			Method: <b>SW8260B</b>					
Methyl iodide	1197	99	1326	0	90.3	30-105	896.8	28.7	30
Methyl tert-butyl ether	1304	40	1326	0	98.4	75-125	1314	0.709	30
Methylene chloride	1274	40	1326	0	96.1	55-145	1306	2.47	30
Naphthalene	1062	130	1326	0	80.1	40-140	1055	0.626	30
n-Propylbenzene	1206	40	1326	0	91	65-135	1210	0.274	30
o-Xylene	1217	40	1326	0	91.8	75-125	1221	0.326	30
Styrene	1227	40	1326	0	92.6	75-125	1187	3.29	30
Tetrachloroethene	2732	40	1326	1047	127	64-140	2326	16.1	30
Toluene	1240	40	1326	0	93.6	70-125	1202	3.09	30
trans-1,2-Dichloroethene	1265	40	1326	0	95.4	65-135	1286	1.61	30
trans-1,3-Dichloropropene	977.6	40	1326	0	73.8	65-125	920.6	6.01	30
trans-1,4-Dichloro-2-butene	729.1	40	1326	0	55	45-86	736.4	0.995	30
Trichloroethene	1528	40	1326	0	115	75-125	1463	4.34	30
Trichlorofluoromethane	1150	40	1326	0	86.8	25-185	1188	3.29	30
Vinyl chloride	1123	40	1326	0	84.7	60-125	1175	4.56	30
Xylenes, Total	3658	120	3977	0	92	75-125	3718	1.64	30
<i>Surr: 1,2-Dichloroethane-d4</i>	1376	0	1326	0	104	70-130	1408	2.33	30
<i>Surr: 4-Bromofluorobenzene</i>	1349	0	1326	0	102	70-130	1323	1.98	30
<i>Surr: Dibromofluoromethane</i>	1274	0	1326	0	96.1	70-130	1290	1.29	30
<i>Surr: Toluene-d8</i>	1335	0	1326	0	101	70-130	1324	0.798	30

The following samples were analyzed in this batch:

1609985-02B	1609985-04B
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**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Michigan Dept.of Environmental Quality  
 Work Order: 1609985  
 Project: Abandoned Mining Wastes - Torch Lake

# QC BATCH REPORT

Batch ID: **R196197A** Instrument ID **VMS6** Method: **SW8260B**

MBLK				Sample ID: VBLKW1-160921-R196197A				Units: µg/L			Analysis Date: 9/21/2016 02:24 PM		
Client ID:			Run ID: VMS6_160921A				SeqNo: 4039170			Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			
1,1-Dichloroethene	ND	1.0											
1,2-Dichloroethane	ND	1.0											
2-Butanone	ND	5.0											
Benzene	ND	1.0											
Carbon tetrachloride	ND	1.0											
Chlorobenzene	ND	1.0											
Chloroform	ND	1.0											
Tetrachloroethene	ND	1.0											
Trichloroethene	ND	1.0											
Vinyl chloride	ND	1.0											
Surr: 1,2-Dichloroethane-d4	19.31	0	20	0	96.6	75-120		0					
Surr: 4-Bromofluorobenzene	18.97	0	20	0	94.8	80-110		0					
Surr: Dibromofluoromethane	19	0	20	0	95	85-115		0					
Surr: Toluene-d8	19.59	0	20	0	98	85-110		0					

LCS				Sample ID: VLCSW1-160921-R196197A				Units: µg/L		Analysis Date: 9/21/2016 01:31 PM	
Client ID:			Run ID: VMS6_160921A			SeqNo: 4039169		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
1,1-Dichloroethene	20.97	1.0	20	0	105	70-145	0				
1,2-Dichloroethane	18.33	1.0	20	0	91.6	78-125	0				
2-Butanone	18.05	5.0	20	0	90.2	55-150	0				
Benzene	20.15	1.0	20	0	101	85-125	0				
Carbon tetrachloride	17.15	1.0	20	0	85.8	65-140	0				
Chlorobenzene	19.13	1.0	20	0	95.6	80-120	0				
Chloroform	19.44	1.0	20	0	97.2	80-130	0				
Tetrachloroethene	20.03	1.0	20	0	100	77-138	0				
Trichloroethene	19.75	1.0	20	0	98.8	84-130	0				
Vinyl chloride	16.59	1.0	20	0	83	50-136	0				
Surr: 1,2-Dichloroethane-d4	19.4	0	20	0	97	75-120	0				
Surr: 4-Bromofluorobenzene	19.78	0	20	0	98.9	80-110	0				
Surr: Dibromofluoromethane	20.03	0	20	0	100	85-115	0				
Surr: Toluene-d8	19.95	0	20	0	99.8	85-110	0				

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196197A** Instrument ID **VMS6** Method: **SW8260B**

MS				Sample ID: 16091057-01A MS			Units: µg/L		Analysis Date: 9/21/2016 11:05 PM	
Client ID:				Run ID: VMS6_160921A			SeqNo: 4040256		Prep Date:	
									DF: 200	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	4450	200	4000	0	111	70-145	0			
1,2-Dichloroethane	3636	200	4000	0	90.9	78-125	0			
2-Butanone	5834	1,000	4000	2458	84.4	55-150	0			
Benzene	4060	200	4000	0	102	85-125	0			
Carbon tetrachloride	3562	200	4000	0	89	65-140	0			
Chlorobenzene	3840	200	4000	0	96	80-120	0			
Chloroform	3818	200	4000	0	95.4	80-130	0			
Tetrachloroethene	4186	200	4000	0	105	77-138	0			
Trichloroethene	4076	200	4000	0	102	84-130	0			
Vinyl chloride	3630	200	4000	0	90.8	50-136	0			
Surr: 1,2-Dichloroethane-d4	3916	0	4000	0	97.9	75-120	0			
Surr: 4-Bromofluorobenzene	4030	0	4000	0	101	80-110	0			
Surr: Dibromofluoromethane	3960	0	4000	0	99	85-115	0			
Surr: Toluene-d8	3988	0	4000	0	99.7	85-110	0			

MSD				Sample ID: 16091057-01A MSD			Units: µg/L		Analysis Date: 9/21/2016 11:32 PM	
Client ID:				Run ID: VMS6_160921A			SeqNo: 4040257		Prep Date:	
									DF: 200	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	4478	200	4000	0	112	70-145	4450	0.627	30	
1,2-Dichloroethane	3760	200	4000	0	94	78-125	3636	3.35	30	
2-Butanone	6230	1,000	4000	2458	94.3	55-150	5834	6.56	30	
Benzene	4182	200	4000	0	105	85-125	4060	2.96	30	
Carbon tetrachloride	3786	200	4000	0	94.6	65-140	3562	6.1	30	
Chlorobenzene	3862	200	4000	0	96.6	80-120	3840	0.571	30	
Chloroform	3866	200	4000	0	96.6	80-130	3818	1.25	30	
Tetrachloroethene	4238	200	4000	0	106	77-138	4186	1.23	30	
Trichloroethene	4114	200	4000	0	103	84-130	4076	0.928	30	
Vinyl chloride	3764	200	4000	0	94.1	50-136	3630	3.62	30	
Surr: 1,2-Dichloroethane-d4	3942	0	4000	0	98.6	75-120	3916	0.662	30	
Surr: 4-Bromofluorobenzene	3974	0	4000	0	99.4	80-110	4030	1.4	30	
Surr: Dibromofluoromethane	4018	0	4000	0	100	85-115	3960	1.45	30	
Surr: Toluene-d8	4008	0	4000	0	100	85-110	3988	0.5	30	

The following samples were analyzed in this batch:

1609985-01B 1609985-03B

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91542** Instrument ID **WETCHEM** Method: **SW9045D**

LCS		Sample ID: LCS-91542-91542				Units: s.u.		Analysis Date: 9/17/2016 03:30 PM		
Client ID:		Run ID: WETCHEM_160917E				SeqNo: 4031378		Prep Date: 9/17/2016		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

pH 4.02 0 4 0 100 90-110 0

DUP		Sample ID: 1609827-01B DUP					Units: s.u.		Analysis Date: 9/17/2016 03:30 PM		
Client ID:			Run ID: WETCHEM_160917E			SeqNo: 4031386		Prep Date: 9/17/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

pH 8.26 0 0 0 0 0-0 8.41 1.8 20

DUP				Sample ID: 1609985-04A DUP				Units: s.u.			Analysis Date: 9/17/2016 03:30 PM			
Client ID: CHLL-WC02-0-6				Run ID: WETCHEM_160917E				SeqNo: 4031392			Prep Date: 9/17/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				

pH 7.46 0 0 0 0 0-0 7.15 4.24 20

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196107** Instrument ID **WETCHEM** Method: **SW1010A**

LCS				Sample ID: LCS-R196107-R196107				Units: °F			Analysis Date: 9/20/2016 10:47 AM		
Client ID:				Run ID: WETCHEM_160920H				SeqNo: 4035890		Prep Date:		DF: 1	
Analyte				Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Flashpoint/Ignitability	83	0	81	0	102	97-103	0			
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DUP		Sample ID: 16091054-01A DUP					Units: °F		Analysis Date: 9/20/2016 10:47 AM		
Client ID:		Run ID: WETCHEM_160920H			SeqNo: 4035892		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Flashpoint/Ignitability	ND	0	0	0	0	0-0	0	0	10	
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The following samples were analyzed in this batch:

1609985-02A	1609985-04A
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**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196402** Instrument ID **MOIST** Method: **SW3550C**

MBLK		Sample ID: WBLKS-R196402				Units: % of sample		Analysis Date: 9/22/2016 01:50 PM		
Client ID:		Run ID: MOIST_160922B				SeqNo: 4043077		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Moisture ND 0.050

LCS		Sample ID: LCS-R196402					Units: % of sample		Analysis Date: 9/22/2016 01:50 PM		
Client ID:			Run ID: MOIST_160922B			SeqNo: 4043076		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Moisture 100 0.050 100 0 100 99.5-100.5 0

<b>DUP</b>				Sample ID: <b>16091251-01B DUP</b>				Units: <b>% of sample</b>			Analysis Date: <b>9/22/2016 01:50 PM</b>			
Client ID:				Run ID: <b>MOIST_160922B</b>				SeqNo: <b>4043063</b>			Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			

Moisture 64.14 0.050 0 0 0 64.11 0.0468 20

<b>DUP</b>				Sample ID: <b>1609994-02B DUP</b>				Units: % of sample			Analysis Date: <b>9/22/2016 01:50 PM</b>			
Client ID:				Run ID: <b>MOIST_160922B</b>				SeqNo: <b>4043072</b>			Prep Date:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				

Moisture 7.84 0.050 0 0 0 8.52 8.31 20

The following samples were analyzed in this batch:

1609985-02A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196437** Instrument ID **WETCHEM** Method: **SW7.3.4.2**

<b>MBLK</b>		Sample ID: <b>MB-R196437-R196437</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID:		Run ID: <b>WETCHEM_160923H</b>		SeqNo: <b>4043914</b>		Prep Date:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide, Reactive	ND	100								

<b>LCS</b>		Sample ID: <b>LCS-R196437-R196437</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID:		Run ID: <b>WETCHEM_160923H</b>		SeqNo: <b>4043915</b>		Prep Date:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide, Reactive	1584	100	2149	0	73.7	60-120	0			

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196438** Instrument ID **WETCHEM** Method: **SW7.3.3.2**

<b>MBLK</b>		Sample ID: <b>MB-R196438-R196438</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID:		Run ID: <b>WETCHEM_160923I</b>		SeqNo: <b>4043959</b>		Prep Date:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Cyanide, Reactive ND 100

<b>LCS</b>		Sample ID: <b>LCS-R196438-R196438</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID:		Run ID: <b>WETCHEM_160923I</b>		SeqNo: <b>4043960</b>		Prep Date:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Cyanide, Reactive 124.8 100 125 0 99.8 75-125 0

<b>MS</b>		Sample ID: <b>1609985-04A MS</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID: <b>CHLL-WC02-0-6</b>		Run ID: <b>WETCHEM_160923I</b>		SeqNo: <b>4043965</b>		Prep Date:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Cyanide, Reactive 233.9 100 250 0 93.6 50-150 0

<b>MSD</b>		Sample ID: <b>1609985-04A MSD</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID: <b>CHLL-WC02-0-6</b>		Run ID: <b>WETCHEM_160923I</b>		SeqNo: <b>4043966</b>		Prep Date:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Cyanide, Reactive 233.9 100 250 0 93.6 50-150 233.9 0 35

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196465** Instrument ID **MOIST** Method: **SW3550C**

MBLK		Sample ID: WBLKS-R196465					Units: % of sample		Analysis Date: 9/23/2016 07:00 PM		
Client ID:			Run ID: MOIST_160923E			SeqNo: 4044522		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Moisture ND 0.050

LCS		Sample ID: LCS-R196465				Units: % of sample		Analysis Date: 9/23/2016 07:00 PM		
Client ID:		Run ID: MOIST_160923E				SeqNo: 4044521		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Moisture 100 0.050 100 0 100 99.5-100.5 0

DUP				Sample ID: 16091144-02A DUP				Units: % of sample			Analysis Date: 9/23/2016 07:00 PM			
Client ID:				Run ID: MOIST_160923E				SeqNo: 4044509			Prep Date:		DF: 1	
Analyte				Result		PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Moisture 14.74 0.050 0 0 0 14.74 0 20

DUP				Sample ID: 1609985-04A DUP				Units: % of sample			Analysis Date: 9/23/2016 07:00 PM			
Client ID: CHLL-WC02-0-6				Run ID: MOIST_160923E				SeqNo: 4044520			Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				

Moisture 19.49 0.050 0 0 0 19.53 0.205 20

The following samples were analyzed in this batch:

1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



☐ ALS Environmental  
10450 Stancliff Rd. #210  
Houston, Texas 77099  
(Tel) 281.530.5656  
(Fax) 281.530.5887

## Chain of Custody Form

Page 1 of 1

☒ ALS Environmental  
3352 128th Avenue  
Holland, Michigan 49424  
(Tel) 616.399.6070  
(Fax) 616.399.6185

Customer Information			Project Information				Parameter/Method Request for Analysis											
Purchase Order		Project Name	Abandoned Mining Wastes- Torch Lake			A	TCLP VOCs-SVOA-PEST-HERB-METALS											
Work Order		Project Number	31000098			B	Cyanide, Reactive/SW7.3.3.2											
Company Name	Mannik & Smith Group	Bill To Company	MDEQ-RRD			C	Sulfide, Reactive/SW7.3.4.2											
Send Report To	Jeff Binkley	Invoice Attn	Tracey Curtis			D	pH/SW9045D											
Address	200 Michigan St, Suite 705	Address	Constitution Hall 5th Floor South 525 West Allegan Street			E	Flashpoint-Ignitability Analysis/SW1010A											
City/State/Zip	Hancock, MI 49930	City/State/Zip	Lansing/MI/48909			F	PCBs/SW8082											
Phone	906-281-3404	Phone	517-284-5176			G	Moisture/SW3550C											
DEQ PM address	keranena@michigan.gov	Fax				H	Paint Filter (Free Liquids)/SW9095B											
e-Mail Address	jbinkley@manna-smithgroup.com	accounting #s	16 31100 29634 100081 16			I	Total VOC/8260B-SVOC/8270D-PEST/8081-HERB/8151-Metals/8010C/7471B											
						J	NOTE - POTENTIALLY HIGH CONCENTRATIONS											
No.	Sample Description	Date	Time	Matrix	Pres. Key Numbers	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold	
1	CHTC-WC01-0-6"	9-10-16	1428	waste		5	X	X	X	X	X	X	X	X	X			
2	CHLL-WC02-0-6"	9-12-16	1354	waste		5	X	X	X	X	X	X	X	X	X			
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
Sampler(s): Please Print & Sign			Shipment Method:		Turnaround Time in Business Days (BD):				<input type="checkbox"/> Other				Results Due Date:					
					<input checked="" type="checkbox"/> 10 BD <input type="checkbox"/> 5 BD <input type="checkbox"/> 3 BD <input type="checkbox"/> 2 BD <input type="checkbox"/> 1 BD													
Relinquished by:		Date:	Time:	Received by:		Date:	Time:	Notes:										
		9-14-16	9:09			9/14/16	0909	Rec'd by Lab: MB Breaux 9/17/16 800										
Relinquished by:		Date:	Time:	Received by (Laboratory):		Date:	Time:	ALS Cooler ID	Cooler Temp	QC Package: (Check Box Below)								
		9-16-16	9:16			9-16-16	0910		2.4	<input checked="" type="checkbox"/> Level II: Standard QC <input type="checkbox"/> Level III: Raw Data								
Logged by (Laboratory):		Date:	Time:	Checked by (Laboratory):						<input type="checkbox"/> TRRP LRC <input type="checkbox"/> TRRP Level IV								
MB		9/17/16	930							<input type="checkbox"/> Level IV: SW846 Methods/CLP like								
										<input type="checkbox"/> Other: Page 69 of 70								

Preservative Key: 1-HCl 2-HNO<sub>3</sub> 3-H<sub>2</sub>SO<sub>4</sub> 4-NaOH 5-Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> 6-NaHSO<sub>4</sub> 7-Other 8-None/4<sup>th</sup> Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS.

Sample Receipt Checklist

Client Name: **MDEQ**

Date/Time Received: **17-Sep-16 08:00**

Work Order: **1609985**

Received by: **MBB**

Checklist completed by Alex Coaszar  
eSignature

17-Sep-16  
Date

Reviewed by: Alex Coaszar  
eSignature

17-Sep-16  
Date

Matrices: **waste**

Carrier name: **Courier**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	<u>2.4 / 2.4 degrees C</u>		<u>SR2</u>
Cooler(s)/Kit(s):	<u></u>		
Date/Time sample(s) sent to storage:	<u>9/17/16 10:00am</u>		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	<u>-</u>		

Login Notes:

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Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:

## APPENDIX D

### Soil Erosion and Sedimentation Control Permit and Release





# HOUGHTON COUNTY DRAIN COMMISSIONER

401 E. HOUGHTON AVENUE

HOUGHTON, MI 49931

Phone (906) 482-4491 FAX (906) 482-7238

jpekkala@houghtoncounty.net

April 10, 2017

Rick Riedy  
UP Environmental Services, Inc.  
P.O. Box 127  
1315 US Hwy 2 & 41  
Bark River, MI 49807

RE: Soil Erosion and Sedimentation Control Permit No. 17-943-SE

Dear Mr. Riedy:

Enclosed, please find a Soil Erosion and Sedimentation Control (SESC) Permit for the proposed earth change at the location specified on the permit. The SESC Site Plan that was submitted has been approved and is on file at the Houghton County Drain Commissioner's Office. Please notify my office 48 hours prior to commencing the earth change.

If you have any questions, feel free to contact me.

Sincerely,



John Pekkala, Drain Commissioner  
County Enforcing Agent for  
Soil Erosion and Sedimentation Control

(issued under the authority of part 91, Soil Erosion and Sedimentation Control,  
of the Natural Resources and Environmental Protection Act,  
1994 PA 451, as amended)

Permit No.:	17-943-SE
Issued:	04-10-17
Expires:	04-10-18
Extended:	

**THIS PERMIT MUST BE POSTED AT THE PROJECT SITE.**

Permit Number: 17-943-SE

## General Conditions:

In accordance with rule 1709 promulgated under the authority of part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and in addition to the information on the attached plan(s) and special conditions, the following general conditions apply to the earth change authorized by this permit:

- Design, construct, and complete the earth change in a manner that limits the exposed area of disturbed land for the shortest period of time.
- Remove sediment caused by accelerated soil erosion from runoff water before it leaves the site of the earth change.
- Temporary or permanent control measures shall be designed and installed to convey water around, through, or from the earth change at a non-erosive velocity.
- Install temporary soil erosion and sedimentation control measures before or upon commencement of the earth change activity and maintain the measures on a daily basis. Remove temporary soil erosion and sedimentation control measures after permanent soil erosion measures are in place and the area is stabilized. (Stabilized means the establishment of vegetation or the proper placement, grading; or covering of soil to ensure its resistance to soil erosion, sliding, or other earth movement.)
- Complete permanent soil erosion control measures for the earth change within five calendar days after final grading or upon completion of the final earth change. If it is not possible to permanently stabilize the earth changes, then maintain temporary soil erosion and sedimentation control measures until permanent soil erosion control measures are in place and the area is stabilized.

## SPECIFIC CONDITIONS

48 hours notice prior to earth change

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# SOIL EROSION AND SEDIMENTATION POLLUTION CONTROL APPLICATION

Part 91, P.A. 451 of 1994

**Houghton County Drain Commissioner**

401 E. Houghton Avenue

Houghton, MI 49931

(906) 482-4491

Permit Number **17-943-SE**

Date Issued **4-10-17**

Expiration Date **4-10-18**

Permit Fee \$ **200.00**

*For Questions, please call: John Pekkala -Office (906) 482-4491*

*Home (906) 482-0765*

*Receipt # 168427*

<b>1. APPLICANT</b> (Please check if the applicant is the landowner or designated agent*) <input type="checkbox"/> Landowner <input type="checkbox"/> Designated Agent						
Name U. P. Environmental Services, Inc.				Address P.O. Box 127/1315 US Hwy. 2 & 41		
City Bark River				State MI	Zip 40907	Area Code/Telephone 906-466-9900
<b>2. LOCATION</b>	Section 13	Town T55N	Range R33W	Lot No(s)	Township Osceola	Street Address: M-26
City/Village Tamarack City, MI					Property ID # or Attach Property Legal Description: See attached consent with IDS	
<b>3. PROPOSED EARTH CHANGE</b>		Project Type: <input type="checkbox"/> Residential <input type="checkbox"/> Multi-Family <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Land Balancing <input checked="" type="checkbox"/> Other				
Describe Project Conduct test pit excavation and potentially remove and dispose of underlying material to a depth not to exceed 8' below grade.						Size of Earth Change (Acres or Square Feet) 4000 SF
Distance to Nearest Lake, Stream or Dam 350 ft.		Watercourse(s) Affected: Torch Lake		Project Start Date: May 1, 2017		Project Complete Date: May 26, 2017
<b>4. SOIL EROSION AND SEDIMENT POLLUTION CONTROL PLAN</b> (Note: Two (2) sets of complete plans must be attached.)						
Estimated Cost of Erosion & Sedimentation Control \$ 500.			Plan Preparer's Name and Telephone Number: Rick Riedy Area Code (906 ) 466-9900			
<b>5. PARTIES RESPONSIBLE FOR EARTH CHANGE:</b> Property Owner of Record (If not provided in Box No.1 above) NAME: Torch Lake Area Sewage Authority						
Address 20 Gregory Street			City Lake Linden		State MI	Zip 49945 Area Code/Telephone 906-296-8721
<b>6. Name of Individual "On Site" Responsible for Earth Change</b>					Company Name	
Address			City		State	Zip Area Code/Telephone

I (we) affirm that the above information is accurate and that I (we) will conduct the above described earth change in accordance with Part 91, Soil Erosion and Sedimentation Control, of the Natural Resource and Environmental Protection Act, 1994 PA 451, as amended, applicable local ordinances, and the documents accompanying this application.

Landowner's Signature

Date:

Designated Agents Signature\*

Date: 4-6-17

\* Designated agent must have a written statement from landowner authorizing him/her to secure a permit in the landowner's name

## Jeff Binkley

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**From:** Jeff Binkley  
**Sent:** Thursday, October 05, 2017 11:01 AM  
**To:** KERANENA@michigan.gov  
**Subject:** Smelter Drum IR and Tamarack Sands Area Seep IR Soil Erosion and Sedimentation Control Permits Closeout

Fyi – will be included in the IR reports as well.

For the smelter drum area we decided to leave the silt fence that UPES installed in place since we had simply replaced a section of Koppers existing silt fence.

---

**From:** Rick Riedy [mailto:rick@upenvironmental.com]  
**Sent:** Thursday, October 05, 2017 11:31 AM  
**To:** Jed Chrestensen <JChrestensen@manniksmithgroup.com>; Jeff Binkley <JBinkley@manniksmithgroup.com>  
**Cc:** 'Wayne Stenberg' <wayne@stenbergs.us>  
**Subject:** FW: Hubbell and Tamarack City Soil Erosion Applications

Jeff,

Here is the email from John that he closed out both soil erosion permits for Hubbell and Tamarack City.

We will send you the final invoices for this project.

Thanks,

Rick Riedy  
UP Environmental Services, Inc.  
Phone (906) 466-9900  
Fax (906) 466-2641

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**From:** John Pekkala [mailto:jpekkala@houghtoncounty.net]  
**Sent:** Thursday, October 05, 2017 10:06 AM  
**To:** Rick Riedy  
**Subject:** Re: Hubbell and Tamarack City Soil Erosion Applications

Hi Rick,

I inspected both sites this morning October 5th and verified that they are adequately stabilized. I am closing out the SESC permit for each site. The permit number's are 17-942-SE and 17-943-SE.

FYI - the silt fence has been removed at the Tamarack Sands site but not at the Hubbell site. The man gate was locked behind the Kopper's facility.

If you have any questions, please contact me.

Thanks,

John Pekkala, Drain Commissioner  
County Enforcing Agent for  
Soil Erosion and Sedimentation Control

401 E. Houghton Avenue  
Houghton, MI 49931  
Phone: [906-482-4491](tel:906-482-4491)  
Fax: [906-482-7238](tel:906-482-7238)

On Wed, Oct 4, 2017 at 3:23 PM, Rick Riedy <[rick@upenvironmental.com](mailto:rick@upenvironmental.com)> wrote:

Thanks!

Rick Riedy

UP Environmental Services, Inc.

Phone [\(906\) 466-9900](tel:906-466-9900)

Fax [\(906\) 466-2641](tel:906-466-2641)

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**From:** John Pekkala [mailto:[jpekkala@houghtoncounty.net](mailto:jpekkala@houghtoncounty.net)]  
**Sent:** Wednesday, October 04, 2017 2:33 PM

**To:** Rick Riedy  
**Subject:** Re: Hubbell and Tamarack City Soil Erosion Applications

Rick,

I plan to inspect both sites later today or tomorrow morning. I will email a response after the inspections.

John

On Wed, Oct 4, 2017 at 8:54 AM, Rick Riedy <[rick@upenvironmental.com](mailto:rick@upenvironmental.com)> wrote:

John,

We are removing the silt fence today.

Please provide us with a closed out response as soon as you are able.

Thanks,

Rick Riedy

UP Environmental Services, Inc.

Phone [\(906\) 466-9900](tel:(906)466-9900)

Fax [\(906\) 466-2641](tel:(906)466-2641)

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**From:** John Pekkala [mailto:[jpekkala@houghtoncounty.net](mailto:jpekkala@houghtoncounty.net)]

**Sent:** Tuesday, October 03, 2017 4:40 PM

**To:** Rick Riedy

**Subject:** Re: Hubbell and Tamarack City Soil Erosion Applications

Hi Rick,

Go ahead and tell your crew to remove the silt fence and both sites. I have a hearing all day tomorrow October 4th in my office. It's okay to call me though. I can do a final inspection at both sites this Thursday, assuming I can get through the gates. Let me know if you or anybody else needs a response from me that both SESC permits have been "closed out".

Thanks, John

John Pekkala, Drain Commissioner

County Enforcing Agent for  
Soil Erosion and Sedimentation Control  
[401 E. Houghton Avenue](#)  
[Houghton, MI 49931](#)  
Phone: [906-482-4491](#)

Fax: [906-482-7238](#)

On Tue, Oct 3, 2017 at 10:39 AM, Rick Riedy <[rick@upenvironmental.com](mailto:rick@upenvironmental.com)> wrote:

Hi John,

I am requested that you do an inspection on this one and if it is ok we can close this project out.

Our crew is working at MTU right now and would have time to remove any silt fence this afternoon or tomorrow if this is acceptable with you.

I don't know what your work load is right now but I am asking.

Thanks,

Rick Riedy

UP Environmental Services, Inc.

Phone [\(906\) 466-9900](#)

Fax [\(906\) 466-2641](#)



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**From:** John Pekkala [mailto:[jpekkala@houghtoncounty.net](mailto:jpekkala@houghtoncounty.net)]

**Sent:** Wednesday, June 28, 2017 2:31 PM

**To:** Rick Riedy

**Subject:** Re: Hubbell and Tamarack City Soil Erosion Applications

Hi Rick,

Thanks for letting me know the anticipated start date for the Hubbell project. I plan to contact you the week of July 10th for project status and site inspection.

Have a nice day.

John

On Wed, Jun 28, 2017 at 2:41 PM, Rick Riedy <[rick@upenvironmental.com](mailto:rick@upenvironmental.com)> wrote:

John,

THIS SOIL EROSION CONTROL PERMIT 17-942-SE GOT POSTPONED DUE TO AREA WAS TOO WET. WE PLAND ON STARTING JULY 10, 2017.

AND TAMARACK PERMIT 17-943-SE WILL BE RIGHT AFTER WE COMPLETE THE HUBBLE ONE.

PLEASE LET ME KNOW IF THERE IS ANY THING ELSE THAT WE NEED TO DO.

Thanks,

Rick Riedy

UP Environmental Services, Inc.

Phone [\(906\) 466-9900](tel:(906)466-9900)

Fax [\(906\) 466-2641](tel:(906)466-2641)

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**From:** Rick Riedy [mailto:[rick@upenvironmental.com](mailto:rick@upenvironmental.com)]  
**Sent:** Thursday, April 06, 2017 3:42 PM  
**To:** 'John Pekkala'  
**Subject:** RE: Hubbell and Tamarack City Soil Erosion Applications

John,

Attached are the signed electronic copies.

The check for \$ 400 is being mailed out today.

Thanks,

Rick Riedy

UP Environmental Services, Inc.

Phone [\(906\) 466-9900](tel:(906)466-9900)

Fax [\(906\) 466-2641](tel:(906)466-2641)

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**From:** John Pekkala [mailto:[jpekkala@houghtoncounty.net](mailto:jpekkala@houghtoncounty.net)]  
**Sent:** Thursday, April 06, 2017 2:38 PM  
**To:** Rick Riedy

---

**Subject:** Re: Hubbell and Tamarack City Soil Erosion Applications

An electronic copy is fine. I will mail the permits as soon as I receive the check.

Thanks, John

On Thu, Apr 6, 2017 at 3:11 PM, Rick Riedy <[rick@upenvironmental.com](mailto:rick@upenvironmental.com)> wrote:

John,

Do you need one original in the mail or can I sign and scan and email back to you and mail you the check?

Thanks,

Rick Riedy

UP Environmental Services, Inc.

Phone [\(906\) 466-9900](tel:(906)466-9900)

Fax [\(906\) 466-2641](tel:(906)466-2641)

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**From:** John Pekkala [mailto:[jpekkala@houghtoncounty.net](mailto:jpekkala@houghtoncounty.net)]  
**Sent:** Thursday, April 06, 2017 2:20 PM  
**To:** Jed Chrestensen  
**Cc:** Rick Riedy; Keranen, Amy (DEQ); Jeff Binkley  
**Subject:** Re: Hubbell and Tamarack City Soil Erosion Applications

Jed,

I totally missed the email that follows the expired access agreement. Sorry about that. I can accept that "undertake response activities" means including landowner authorization for contractors to sign permit applications. Please have your contractor(s) sign the application and submit the fee so I can issue the SESC permits.

Thanks,

John

On Thu, Apr 6, 2017 at 12:42 PM, Jed Chrestensen <[JChrestensen@manniksmithgroup.com](mailto:JChrestensen@manniksmithgroup.com)> wrote:

John,

The work is being conducted under the "undertake response activities" component of the access agreements. The work is being conducted by MDEQ and its contractors so we have been obtaining the permits and the contractors have been signing the applications. The Tamarack Sands access was extended through 2018 per the email that follows the original access agreement in the .pdf packet that was attached. Koppers and TLSWA are both aware of what we're planning and the schedule. Hopefully this answers your questions.

Thank you,

Jed

**From:** John Pekkala [mailto:[jpekkala@houghtoncounty.net](mailto:jpekkala@houghtoncounty.net)]  
**Sent:** Thursday, April 06, 2017 12:24 PM  
**To:** Rick Riedy <[rick@upenvironmental.com](mailto:rick@upenvironmental.com)>; Jed Chrestensen <[JChrestensen@manniksmithgroup.com](mailto:JChrestensen@manniksmithgroup.com)>  
**Cc:** Keranen, Amy (DEQ) <[KERANENA@michigan.gov](mailto:KERANENA@michigan.gov)>  
**Subject:** Fwd: Hubbell and Tamarack City Soil Erosion Applications

Hi Rick & Jed,

It looks like the entry authorization has expired for the Tamarack City job. On both authorizations the landowners give consent to enter the property, but neither authorization says anything about who is authorized to pull the SESC permit? Maybe you want to talk to Amy K. about this technicality. I know both landowners. I don't think they really care who signs the SESC permit application. Do you want me to call them?

John

John Pekkala, Drain Commissioner

County Enforcing Agent for  
Soil Erosion and Sedimentation Control  
[401 E. Houghton Avenue](#)  
[Houghton, MI 49931](#)  
Phone: [906-482-4491](#)

Fax: [906-482-7238](#)

On Thu, Apr 6, 2017 at 9:03 AM, Rick Riedy <[rick@upenvironmental.com](mailto:rick@upenvironmental.com)> wrote:

John and Jed,

Please review the Soil Erosion Applications for Hubbell and Tamarack City and let me know if there is anything else that you need.

Jed, can you sign this or do we sign this.

Thanks,

Rick Riedy

UP Environmental Services, Inc.

Phone [\(906\) 466-9900](#)

Fax [\(906\) 466-2641](#)

CONFIDENTIALITY NOTICE

The information contained in this communication and its attachment(s) is intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is prohibited. If you have received this communication in error, please notify [postmaster@manniksmithgroup.com](mailto:postmaster@manniksmithgroup.com) and delete the communication without retaining any copies. Thank you.



## APPENDIX E

### Waste Management Records





Requested Facility: K & W Landfill ☐ Unsure Profile Number: \_\_\_\_\_  
☐ Multiple Generator Locations (Attach Locations) ☐ Request Certificate of Disposal ☐ Renewal? Original Profile Number: \_\_\_\_\_

**A. GENERATOR INFORMATION (MATERIAL ORIGIN)**

1. Generator Name: Michigan Depart. of Environmental Quality  
2. Site Address: Highway M-26  
(City, State, ZIP) Hubbell, MI 49934  
3. County: Houghton  
4. Contact Name: Amy Keranen  
5. Email: KERANENA@michigan.gov  
6. Phone: 906-337-0389 7. Fax: \_\_\_\_\_  
8. Generator EPA ID: \_\_\_\_\_ ☒ N/A  
9. State ID: \_\_\_\_\_ ☒ N/A

**C. MATERIAL INFORMATION**

1. Common Name: Non-Hazardous Contaminated Soils  
Describe Process Generating Material: ☐ See Attached

Cleanup of Seeps from ground consisting of Unknown Contaminated Soils

2. Material Composition and Contaminants: ☐ See Attached

1. Non--Hazardous Contaminated Soil	0 - 100 %
2.	
3.	
4.	
Total comp. must be equal to or greater than 100%	≥100%

3. State Waste Codes: \_\_\_\_\_ ☒ N/A  
4. Color: Various  
5. Physical State at 70°F: ☒ Solid ☐ Liquid ☐ Other: \_\_\_\_\_  
6. Free Liquid Range Percentage: \_\_\_\_\_ to \_\_\_\_\_ ☒ N/A  
7. pH: \_\_\_\_\_ to \_\_\_\_\_ ☒ N/A  
8. Strong Odor: ☐ Yes ☒ No Describe: \_\_\_\_\_  
9. Flash Point: ☐ <140°F ☐ 140°-199°F ☒ ≥200° ☐ N/A

**E. ANALYTICAL AND OTHER REPRESENTATIVE INFORMATION**

1. Analytical attached ☒ Yes  
Please identify applicable samples and/or lab reports:

1609985-01 and 1609985-02

2. Other information attached (such as MSDS)? ☐ Yes

**G. GENERATOR CERTIFICATION (PLEASE READ AND CERTIFY BY SIGNATURE)**

By signing this EZ Profile™ form, I hereby certify that all information submitted in this and all attached documents contain true and accurate descriptions of this material, and that all relevant information necessary for proper material characterization and to identify known and suspected hazards has been provided. Any analytical data attached was derived from a sample that is representative as defined in 40 CFR 261 - Appendix 1 or by using an equivalent method. All changes occurring in the character of the material (i.e., changes in the process or new analytical) will be identified by the Generator and be disclosed to Waste Management prior to providing the material to Waste Management.

If I am an agent signing on behalf of the Generator, I have confirmed with the Generator that information contained in this Profile is accurate and complete.

Name (Print): Amy Keranen Date: 4-5-17  
Title: Environmental Quality Analyst  
Company: Michigan DEQ

**B. BILLING INFORMATION**

☐ SAME AS GENERATOR

1. Billing Name: UP Environmental Services, Inc.  
2. Billing Address: P.O. Box 127  
(City, State, ZIP) Bark River, MI 49807  
3. Contact Name: Rick Riedy or Wayne Stenberg  
4. Email: rick@upenvironmental.com  
5. Phone: 906-466-9900 6. Fax: 906-466-2641  
7. WM Hauled? ☐ Yes ☒ No  
8. P.O. Number: verbal Rick  
9. Payment Method: ☐ Credit Account ☐ Cash ☒ Credit Card

**D. REGULATORY INFORMATION**

1. EPA Hazardous Waste? ☐ Yes\* ☒ No  
Code: \_\_\_\_\_  
2. State Hazardous Waste? ☐ Yes ☒ No  
Code: \_\_\_\_\_  
3. Is this material non-hazardous due to Treatment, Delisting, or an Exclusion? ☐ Yes\* ☒ No  
4. Contains Underlying Hazardous Constituents? ☐ Yes\* ☒ No  
5. From an industry regulated under Benzene NESHA? ☐ Yes\* ☒ No  
6. Facility remediation subject to 40 CFR 63 GGGGG? ☐ Yes\* ☒ No  
7. CERCLA or State-mandated clean-up? ☐ Yes\* ☒ No  
8. NRC or State-regulated radioactive or NORM waste? ☐ Yes\* ☒ No  
\*If Yes, see Addendum (page 2) for additional questions and space.  
9. Contains PCBs? → If Yes, answer a, b and c. ☐ Yes ☒ No  
a. Regulated by 40 CFR 761? ☐ Yes ☒ No  
b. Remediation under 40 CFR 761.61 (a)? ☐ Yes ☒ No  
c. Were PCB imported into the US? ☐ Yes ☒ No  
10. Regulated and/or Untreated Medical/Infectious Waste? ☐ Yes ☒ No  
11. Contains Asbestos? ☐ Yes ☒ No  
→ If Yes: ☐ Non-Friable ☐ Non-Friable - Regulated ☐ Friable

**F. SHIPPING AND DOT INFORMATION**

1. ☒ One-Time Event ☐ Repeat Event/Ongoing Business  
2. Estimated Quantity/Unit of Measure: 400  
☒ Tons ☐ Yards ☐ Drums ☐ Gallons ☐ Other: \_\_\_\_\_  
3. Container Type and Size: Dump Truck 50 Ton  
4. USDOT Proper Shipping Name: ☒ N/A

Certification Signature

Amy Keranen





28-Sep-2016

Amy Keranen  
Michigan Dept.of Environmental Quality  
3350 N. Martin Luther King Jr. Blvd.  
Building #44, 3rd Floor  
Lansing, MI 48906

Re: **Abandoned Mining Wastes - Torch Lake**

Work Order: **1609985**

Dear Amy,

ALS Environmental received 4 samples on 17-Sep-2016 08:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with NELAP standard requirements and QC results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is .

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Alex Csaszar".

Electronically approved by: Alex Csaszar

Alex Csaszar  
Project Manager



Certificate No: MI: 0022

## Report of Laboratory Analysis

ADDRESS 3352 128th Avenue Holland, Michigan 49424-9263 | PHONE (616) 399-6070 | FAX (616) 399-6185

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Environmental The ALS logo, a stylized blue triangle with a yellow flame-like shape inside.

[www.alsglobal.com](http://www.alsglobal.com)

RIGHT SOLUTIONS RIGHT PARTNER

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Work Order:** 1609985

## Work Order Sample Summary

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
1609985-01	CHTC-WC01-0-6 TCLP	Tclp Extract		9/10/2016 14:28	9/17/2016 08:00	<input type="checkbox"/>
1609985-02	CHTC-WC01-0-6	Waste		9/10/2016 14:28	9/17/2016 08:00	<input type="checkbox"/>
1609985-03	CHLL-WC02-0-6 TCLP	Tclp Extract		9/12/2016 13:54	9/17/2016 08:00	<input type="checkbox"/>
1609985-04	CHLL-WC02-0-6	Waste		9/12/2016 13:54	9/17/2016 08:00	<input type="checkbox"/>

---

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Work Order:** 1609985

---

**Case Narrative**

Samples for the above noted Work Order were received on 09/17/2016. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting.

With the following exceptions, all sample analyses achieved analytical criteria.

**Volatile Organics:**

Batch 91663, Method VOC\_8260\_S, Sample 1609985-02B: This sample ran at dilution due to an extremely foamy matrix.

Batch 91663, Method VOC\_8260\_S, Sample LCS-91663: The LCS recoveries were above the upper control limits for 1,2-Dibromoethane and Methyl iodide. All sample results in the batch were non-detect. No qualification is necessary for these analytes.

**Extractable Organics:**

Batch 91791, Method PEST\_8081\_S, Sample 1609985-04A: The reporting limit is elevated due to dilution needed to eliminate matrix-related interference for this analyte: Pesticides - Sample required dilution due to the yellow color of the sample extract.

Batch 91791, Method PEST\_8081\_S, Sample 1609985-04A: The reporting limit is elevated due to dilution needed to eliminate matrix-related interference for this analyte.

**Metals:**

No other deviations or anomalies were noted.

**Wet Chemistry:**

No other deviations or anomalies were noted.

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**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**WorkOrder:** 1609985

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**QUALIFIERS,  
ACRONYMS, UNITS**

<b><u>Qualifier</u></b>	<b><u>Description</u></b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<b><u>Acronym</u></b>	<b><u>Description</u></b>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<b><u>Units Reported</u></b>	<b><u>Description</u></b>
% of sample	Percent of Sample
°F	Degrees Fahrenheit
µg/Kg	Micrograms per Kilogram
µg/Kg-dry	Micrograms per Kilogram Dry Weight
µg/L	Micrograms per Liter
mg/Kg	Milligrams per Kilogram
mg/Kg-dry	Milligrams per Kilogram Dry Weight
mg/L	Milligrams per Liter

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none	
s.u.	Standard Units

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6 TCLP  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-01  
**Matrix:** TCLP EXTRACT

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TCLP HERBICIDES</b>						
			<b>SW8151</b>		Prep: SW8151M / 9/22/16	Analyst: <b>KYM</b>
2,4,5-TP (Silvex)	ND		5.0	µg/L	1	9/22/2016 08:32 PM
2,4-D	ND		5.0	µg/L	1	9/22/2016 08:32 PM
Surr: DCAA	30.8		30-150	%REC	1	9/22/2016 08:32 PM
<b>TCLP PESTICIDES</b>						
			<b>SW8081</b>			Analyst: <b>BLM</b>
Chlordane, Technical	ND		12	µg/L	5	9/23/2016 11:59 PM
Endrin	ND		0.50	µg/L	5	9/23/2016 11:59 PM
gamma-BHC (Lindane)	ND		0.25	µg/L	5	9/23/2016 11:59 PM
Heptachlor	ND		0.25	µg/L	5	9/23/2016 11:59 PM
Heptachlor epoxide	ND		0.25	µg/L	5	9/23/2016 11:59 PM
Methoxychlor	ND		1.0	µg/L	5	9/23/2016 11:59 PM
Toxaphene	ND		50	µg/L	5	9/23/2016 11:59 PM
Surr: Decachlorobiphenyl	55.0		42-119	%REC	5	9/23/2016 11:59 PM
Surr: Tetrachloro-m-xylene	75.0		32-104	%REC	5	9/23/2016 11:59 PM
<b>TCLP MERCURY BY CVAA</b>						
			<b>SW7470A</b>		Prep: SW7470 / 9/21/16	Analyst: <b>LR</b>
Mercury	ND		0.0020	mg/L	1	9/21/2016 08:41 PM
<b>TCLP METALS ANALYSIS BY ICP-MS</b>						
			<b>SW6020A</b>		Prep: SW3005A / 9/22/16	Analyst: <b>ML</b>
Arsenic	ND		0.050	mg/L	1	9/23/2016 02:47 AM
<b>Barium</b>	<b>0.085</b>		<b>0.050</b>	<b>mg/L</b>	1	9/23/2016 02:47 AM
Cadmium	ND		0.0020	mg/L	1	9/23/2016 02:47 AM
Chromium	ND		0.050	mg/L	1	9/23/2016 02:47 AM
<b>Copper</b>	<b>0.24</b>		<b>0.050</b>	<b>mg/L</b>	1	9/23/2016 02:47 AM
<b>Lead</b>	<b>0.077</b>		<b>0.050</b>	<b>mg/L</b>	1	9/23/2016 02:47 AM
Selenium	ND		0.050	mg/L	1	9/23/2016 02:47 AM
Silver	ND		0.050	mg/L	1	9/23/2016 02:47 AM
Zinc	ND		0.10	mg/L	1	9/23/2016 02:47 AM
<b>TCLP SEMI-VOLATILE ORGANICS</b>						
			<b>SW8270D</b>		Prep: SW3510 / 9/21/16	Analyst: <b>RM</b>
1,4-Dichlorobenzene	ND		100	µg/L	1	9/23/2016 06:24 AM
2,4,5-Trichlorophenol	ND		100	µg/L	1	9/23/2016 06:24 AM
2,4,6-Trichlorophenol	ND		100	µg/L	1	9/23/2016 06:24 AM
2,4-Dinitrotoluene	ND		100	µg/L	1	9/23/2016 06:24 AM
Hexachloro-1,3-butadiene	ND		100	µg/L	1	9/23/2016 06:24 AM
Hexachlorobenzene	ND		100	µg/L	1	9/23/2016 06:24 AM
Hexachloroethane	ND		100	µg/L	1	9/23/2016 06:24 AM
m-Cresol	ND		100	µg/L	1	9/23/2016 06:24 AM
Nitrobenzene	ND		100	µg/L	1	9/23/2016 06:24 AM
o-Cresol	ND		100	µg/L	1	9/23/2016 06:24 AM
p-Cresol	ND		100	µg/L	1	9/23/2016 06:24 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6 TCLP  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-01  
**Matrix:** TCLP EXTRACT

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Pentachlorophenol	ND		100	µg/L	1	9/23/2016 06:24 AM
Pyridine	ND		200	µg/L	1	9/23/2016 06:24 AM
Surr: 2,4,6-Tribromophenol	76.5		38-115	%REC	1	9/23/2016 06:24 AM
Surr: 2-Fluorobiphenyl	68.0		32-100	%REC	1	9/23/2016 06:24 AM
Surr: 2-Fluorophenol	35.9		22-59	%REC	1	9/23/2016 06:24 AM
Surr: 4-Terphenyl-d14	69.1		23-112	%REC	1	9/23/2016 06:24 AM
Surr: Nitrobenzene-d5	57.4		31-93	%REC	1	9/23/2016 06:24 AM
Surr: Phenol-d6	22.5		13-36	%REC	1	9/23/2016 06:24 AM
<b>TCLP VOLATILE ORGANICS</b>			<b>SW8260B</b>		Leachate: SW1311 / 9/20/16	Analyst: <b>AK</b>
1,1-Dichloroethene	ND		20	µg/L	20	9/21/2016 07:11 PM
1,2-Dichloroethane	ND		20	µg/L	20	9/21/2016 07:11 PM
2-Butanone	ND		100	µg/L	20	9/21/2016 07:11 PM
<b>Benzene</b>	<b>39</b>		<b>20</b>	<b>µg/L</b>	20	9/21/2016 07:11 PM
Carbon tetrachloride	ND		20	µg/L	20	9/21/2016 07:11 PM
Chlorobenzene	ND		20	µg/L	20	9/21/2016 07:11 PM
Chloroform	ND		20	µg/L	20	9/21/2016 07:11 PM
Tetrachloroethene	ND		20	µg/L	20	9/21/2016 07:11 PM
Trichloroethene	ND		20	µg/L	20	9/21/2016 07:11 PM
Vinyl chloride	ND		20	µg/L	20	9/21/2016 07:11 PM
Surr: 1,2-Dichloroethane-d4	96.4		70-130	%REC	20	9/21/2016 07:11 PM
Surr: 4-Bromofluorobenzene	94.0		70-130	%REC	20	9/21/2016 07:11 PM
Surr: Dibromofluoromethane	90.2		70-130	%REC	20	9/21/2016 07:11 PM
Surr: Toluene-d8	97.1		70-130	%REC	20	9/21/2016 07:11 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.



# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-02  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>HERBICIDES</b>						
			<b>SW8151</b>		Prep: SW8151M / 9/19/16	Analyst: <b>KYM</b>
2,4,5-T	ND		2.0	µg/Kg-dry	1	9/22/2016 07:06 AM
2,4,5-TP (Silvex)	ND		2.0	µg/Kg-dry	1	9/22/2016 07:06 AM
2,4-D	ND		2.0	µg/Kg-dry	1	9/22/2016 07:06 AM
Surr: DCAA	27.6		10-150	%REC	1	9/22/2016 07:06 AM
<b>PCBS</b>						
			<b>SW8082</b>			Analyst: <b>EB</b>
Aroclor 1016	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1221	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1232	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1242	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1248	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1254	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Aroclor 1260	ND		1.3	mg/Kg-dry	1	9/27/2016 01:56 AM
Surr: Decachlorobiphenyl	126		40-140	%REC	1	9/27/2016 01:56 AM
Surr: Tetrachloro-m-xylene	134		40-140	%REC	1	9/27/2016 01:56 AM
<b>PESTICIDES</b>						
			<b>SW8081</b>		Prep: SW3580 / 9/27/16	Analyst: <b>BLM</b>
4,4'-DDD	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
4,4'-DDE	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
4,4'-DDT	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Aldrin	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
alpha-BHC	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
alpha-Chlordane	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
beta-BHC	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Chlordane, Technical	ND		33	µg/Kg-dry	1	9/27/2016 02:07 PM
delta-BHC	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Dieldrin	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endosulfan I	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endosulfan II	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endosulfan sulfate	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endrin	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endrin aldehyde	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Endrin ketone	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
gamma-BHC (Lindane)	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
gamma-Chlordane	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Heptachlor	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Heptachlor epoxide	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Methoxychlor	ND		13	µg/Kg-dry	1	9/27/2016 02:07 PM
Toxaphene	ND		78	µg/Kg-dry	1	9/27/2016 02:07 PM
Surr: Decachlorobiphenyl	96.0		30-145	%REC	1	9/27/2016 02:07 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-02  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<i>Surr: Tetrachloro-m-xylene</i>	78.0		25-140	%REC	1	9/27/2016 02:07 PM
<b>MERCURY BY CVAA</b>			<b>SW7471B</b>		Prep: SW7471 / 9/25/16	Analyst: <b>LR</b>
Mercury	ND		0.021	mg/Kg-dry	1	9/25/2016 10:54 PM
<b>METALS BY ICP-MS</b>			<b>SW6020A</b>		Prep: SW3050B / 9/23/16	Analyst: <b>ML</b>
Arsenic	ND		5.1	mg/Kg-dry	10	9/23/2016 10:46 PM
<b>Barium</b>	<b>19</b>		<b>5.1</b>	<b>mg/Kg-dry</b>	10	9/23/2016 10:46 PM
Cadmium	ND		2.1	mg/Kg-dry	10	9/23/2016 10:46 PM
Chromium	ND		5.1	mg/Kg-dry	10	9/23/2016 10:46 PM
Lead	ND		5.1	mg/Kg-dry	10	9/23/2016 10:46 PM
Selenium	ND		5.1	mg/Kg-dry	10	9/23/2016 10:46 PM
Silver	ND		5.1	mg/Kg-dry	10	9/23/2016 10:46 PM
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3580 / 9/23/16	Analyst: <b>RS</b>
1,1'-Biphenyl	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,2'-Oxybis(1-chloropropane)	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4,5-Trichlorophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4,6-Trichlorophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4-Dichlorophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4-Dimethylphenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4-Dinitrophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,4-Dinitrotoluene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2,6-Dichlorophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2-Chloronaphthalene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
2-Chlorophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2-Methylnaphthalene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
2-Methylphenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2-Nitroaniline	ND		100	mg/Kg	10	9/25/2016 03:34 PM
2-Nitrophenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
3&4-Methylphenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
3,3'-Dichlorobenzidine	ND		500	mg/Kg	10	9/25/2016 03:34 PM
3-Nitroaniline	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4,6-Dinitro-2-methylphenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Bromophenyl phenyl ether	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Chloro-3-methylphenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Chloroaniline	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Chlorophenyl phenyl ether	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Nitroaniline	ND		100	mg/Kg	10	9/25/2016 03:34 PM
4-Nitrophenol	ND		500	mg/Kg	10	9/25/2016 03:34 PM
Acenaphthene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Acenaphthylene	ND		10	mg/Kg	10	9/25/2016 03:34 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-02  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Acetophenone	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Anthracene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Atrazine	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Benzaldehyde	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Benzo(a)anthracene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Benzo(a)pyrene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Benzo(b)fluoranthene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Benzo(g,h,i)perylene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Benzo(k)fluoranthene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Bis(2-chloroethoxy)methane	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Bis(2-chloroethyl)ether	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Bis(2-ethylhexyl)phthalate	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Butyl benzyl phthalate	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Caprolactam	ND		500	mg/Kg	10	9/25/2016 03:34 PM
Carbazole	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Chrysene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Dibenzo(a,h)anthracene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Dibenzofuran	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Diethyl phthalate	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Dimethyl phthalate	ND		100	mg/Kg	10	9/25/2016 03:34 PM
<b>Di-n-butyl phthalate</b>	<b>48,000</b>		<b>2,500</b>	<b>mg/Kg</b>	250	9/25/2016 04:01 PM
Di-n-octyl phthalate	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Fluoranthene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Fluorene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Hexachlorobenzene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Hexachlorobutadiene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Hexachlorocyclopentadiene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Hexachloroethane	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Indeno(1,2,3-cd)pyrene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Isophorone	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Naphthalene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Nitrobenzene	ND		100	mg/Kg	10	9/25/2016 03:34 PM
N-Nitrosodimethylamine	ND		100	mg/Kg	10	9/25/2016 03:34 PM
N-Nitrosodi-n-propylamine	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Pentachlorophenol	ND		500	mg/Kg	10	9/25/2016 03:34 PM
Phenanthrene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Phenol	ND		100	mg/Kg	10	9/25/2016 03:34 PM
Pyrene	ND		10	mg/Kg	10	9/25/2016 03:34 PM
Surr: 2,4,6-Tribromophenol	0		38-115	%REC	10	9/25/2016 03:34 PM
Surr: 2-Fluorobiphenyl	0		32-100	%REC	10	9/25/2016 03:34 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-02  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Surr: 2-Fluorophenol	0		22-59	%REC	10	9/25/2016 03:34 PM
Surr: 4-Terphenyl-d14	0		23-112	%REC	10	9/25/2016 03:34 PM
Surr: Nitrobenzene-d5	0		31-93	%REC	10	9/25/2016 03:34 PM
Surr: Phenol-d6	0		13-36	%REC	10	9/25/2016 03:34 PM
<b>VOLATILE ORGANIC COMPOUNDS</b>			<b>SW8260B</b>	Prep: SW5035 / 9/20/16 Analyst: <b>LSY</b>		
1,1,1,2-Tetrachloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1,1-Trichloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1,2,2-Tetrachloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1,2-Trichloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1,2-Trichlorotrifluoroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1-Dichloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,1-Dichloroethene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2,3-Trichloropropane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2,4-Trichlorobenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2,4-Trimethylbenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2-Dibromo-3-chloropropane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2-Dibromoethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2-Dichlorobenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2-Dichloroethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,2-Dichloropropane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,3,5-Trimethylbenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,3-Dichlorobenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
1,4-Dichlorobenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
2-Butanone	ND		63,000	µg/Kg	100	9/25/2016 01:13 AM
2-Hexanone	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
2-Methylnaphthalene	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
4-Methyl-2-pentanone	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Acetone	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
Acrylonitrile	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
Benzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Bromochloromethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Bromodichloromethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Bromoform	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Bromomethane	ND		24,000	µg/Kg	100	9/25/2016 01:13 AM
Carbon disulfide	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Carbon tetrachloride	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Chlorobenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Chloroethane	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
Chloroform	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Chloromethane	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHTC-WC01-0-6  
**Collection Date:** 9/10/2016 02:28 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-02  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
cis-1,2-Dichloroethene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
cis-1,3-Dichloropropene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Dibromochloromethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Dibromomethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Dichlorodifluoromethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Diethyl ether	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Ethylbenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Hexachloroethane	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
Isopropylbenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
m,p-Xylene	ND		19,000	µg/Kg	100	9/25/2016 01:13 AM
Methyl iodide	ND		24,000	µg/Kg	100	9/25/2016 01:13 AM
Methyl tert-butyl ether	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Methylene chloride	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Naphthalene	ND		32,000	µg/Kg	100	9/25/2016 01:13 AM
n-Propylbenzene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
o-Xylene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Styrene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
<b>Tetrachloroethene</b>	<b>27,000</b>		<b>9,500</b>	<b>µg/Kg</b>	100	9/25/2016 01:13 AM
Toluene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
trans-1,2-Dichloroethene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
trans-1,3-Dichloropropene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
trans-1,4-Dichloro-2-butene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Trichloroethene	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Trichlorofluoromethane	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Vinyl acetate	ND		79,000	µg/Kg	100	9/25/2016 01:13 AM
Vinyl chloride	ND		9,500	µg/Kg	100	9/25/2016 01:13 AM
Xylenes, Total	ND		28,000	µg/Kg	100	9/25/2016 01:13 AM
Surr: 1,2-Dichloroethane-d4	100		70-130	%REC	100	9/25/2016 01:13 AM
Surr: 4-Bromofluorobenzene	97.0		70-130	%REC	100	9/25/2016 01:13 AM
Surr: Dibromofluoromethane	95.2		70-130	%REC	100	9/25/2016 01:13 AM
Surr: Toluene-d8	99.8		70-130	%REC	100	9/25/2016 01:13 AM
<b>CYANIDE, REACTIVE</b>			<b>SW7.3.3.2</b>			Analyst: <b>EE</b>
Cyanide, Reactive	ND		130	mg/Kg-dry	1	9/23/2016 01:00 PM
<b>FLASHPOINT/IGNITABILITY ANALYSIS</b>			<b>SW1010A</b>			Analyst: <b>STP</b>
Flashpoint/Ignitability	>200			°F	1	9/20/2016 10:47 AM
<b>PAINT FILTER (FREE LIQUIDS)</b>			<b>SW9095B</b>			Analyst: <b>KF</b>
Free Liquids	Absent			none	1	9/20/2016 10:34 AM
<b>MOISTURE</b>			<b>SW3550C</b>			Analyst: <b>LW</b>

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

**ALS Group USA, Corp****Date:** 28-Sep-16**Client:** Michigan Dept.of Environmental Quality**Project:** Abandoned Mining Wastes - Torch Lake**Sample ID:** CHTC-WC01-0-6**Collection Date:** 9/10/2016 02:28 PM**Work Order:** 1609985**Lab ID:** 1609985-02**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Moisture	24		0.050	% of sample	1	9/22/2016 01:50 PM
PH			SW9045D		Prep: EXTRACT / 9/17/16	Analyst: EDL
pH	3.0			s.u.	1	9/17/2016 03:30 PM
SULFIDE, REACTIVE			SW7.3.4.2			Analyst: EE
Sulfide, Reactive	ND		130	mg/Kg-dry	1	9/23/2016 01:00 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6 TCLP  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-03  
**Matrix:** TCLP EXTRACT

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TCLP HERBICIDES</b>						
			<b>SW8151</b>		Prep: SW8151M / 9/22/16	Analyst: <b>KYM</b>
2,4,5-TP (Silvex)	ND		5.0	µg/L	1	9/22/2016 08:51 PM
2,4-D	ND		5.0	µg/L	1	9/22/2016 08:51 PM
Surr: DCAA	30.8		30-150	%REC	1	9/22/2016 08:51 PM
<b>TCLP PESTICIDES</b>						
			<b>SW8081</b>			Analyst: <b>BLM</b>
Chlordane, Technical	ND		2.5	µg/L	1	9/24/2016 12:35 AM
Endrin	ND		0.10	µg/L	1	9/24/2016 12:35 AM
gamma-BHC (Lindane)	ND		0.050	µg/L	1	9/24/2016 12:35 AM
Heptachlor	ND		0.050	µg/L	1	9/24/2016 12:35 AM
Heptachlor epoxide	ND		0.050	µg/L	1	9/24/2016 12:35 AM
Methoxychlor	ND		0.20	µg/L	1	9/24/2016 12:35 AM
Toxaphene	ND		10	µg/L	1	9/24/2016 12:35 AM
Surr: Decachlorobiphenyl	68.0		42-119	%REC	1	9/24/2016 12:35 AM
Surr: Tetrachloro-m-xylene	55.0		32-104	%REC	1	9/24/2016 12:35 AM
<b>TCLP MERCURY BY CVAA</b>						
			<b>SW7470A</b>		Prep: SW7470 / 9/21/16	Analyst: <b>LR</b>
Mercury	ND		0.0020	mg/L	1	9/21/2016 08:44 PM
<b>TCLP METALS ANALYSIS BY ICP-MS</b>						
			<b>SW6020A</b>		Prep: SW3005A / 9/22/16	Analyst: <b>ML</b>
Arsenic	ND		0.050	mg/L	1	9/23/2016 02:53 AM
Barium	4.8		0.050	mg/L	1	9/23/2016 02:53 AM
Cadmium	0.16		0.0020	mg/L	1	9/23/2016 02:53 AM
Chromium	ND		0.050	mg/L	1	9/23/2016 02:53 AM
Copper	120		0.50	mg/L	10	9/23/2016 11:52 AM
Lead	78	*	0.50	mg/L	10	9/23/2016 11:52 AM
Selenium	ND		0.050	mg/L	1	9/23/2016 02:53 AM
Silver	ND		0.050	mg/L	1	9/23/2016 02:53 AM
Zinc	30		1.0	mg/L	10	9/23/2016 11:52 AM
<b>TCLP SEMI-VOLATILE ORGANICS</b>						
			<b>SW8270D</b>		Prep: SW3510 / 9/21/16	Analyst: <b>RM</b>
1,4-Dichlorobenzene	ND		100	µg/L	1	9/23/2016 06:44 AM
2,4,5-Trichlorophenol	ND		100	µg/L	1	9/23/2016 06:44 AM
2,4,6-Trichlorophenol	ND		100	µg/L	1	9/23/2016 06:44 AM
2,4-Dinitrotoluene	ND		100	µg/L	1	9/23/2016 06:44 AM
Hexachloro-1,3-butadiene	ND		100	µg/L	1	9/23/2016 06:44 AM
Hexachlorobenzene	ND		100	µg/L	1	9/23/2016 06:44 AM
Hexachloroethane	ND		100	µg/L	1	9/23/2016 06:44 AM
m-Cresol	ND		100	µg/L	1	9/23/2016 06:44 AM
Nitrobenzene	ND		100	µg/L	1	9/23/2016 06:44 AM
o-Cresol	ND		100	µg/L	1	9/23/2016 06:44 AM
p-Cresol	ND		100	µg/L	1	9/23/2016 06:44 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6 TCLP  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-03  
**Matrix:** TCLP EXTRACT

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Pentachlorophenol	ND		100	µg/L	1	9/23/2016 06:44 AM
Pyridine	ND		200	µg/L	1	9/23/2016 06:44 AM
Surr: 2,4,6-Tribromophenol	76.6		38-115	%REC	1	9/23/2016 06:44 AM
Surr: 2-Fluorobiphenyl	65.6		32-100	%REC	1	9/23/2016 06:44 AM
Surr: 2-Fluorophenol	40.4		22-59	%REC	1	9/23/2016 06:44 AM
Surr: 4-Terphenyl-d14	75.5		23-112	%REC	1	9/23/2016 06:44 AM
Surr: Nitrobenzene-d5	60.1		31-93	%REC	1	9/23/2016 06:44 AM
Surr: Phenol-d6	23.7		13-36	%REC	1	9/23/2016 06:44 AM
<b>TCLP VOLATILE ORGANICS</b>			<b>SW8260B</b>	Leachate: SW1311 / 9/20/16		Analyst: <b>AK</b>
1,1-Dichloroethene	ND		20	µg/L	20	9/21/2016 07:37 PM
1,2-Dichloroethane	ND		20	µg/L	20	9/21/2016 07:37 PM
2-Butanone	ND		100	µg/L	20	9/21/2016 07:37 PM
Benzene	ND		20	µg/L	20	9/21/2016 07:37 PM
Carbon tetrachloride	ND		20	µg/L	20	9/21/2016 07:37 PM
Chlorobenzene	ND		20	µg/L	20	9/21/2016 07:37 PM
Chloroform	ND		20	µg/L	20	9/21/2016 07:37 PM
Tetrachloroethene	ND		20	µg/L	20	9/21/2016 07:37 PM
Trichloroethene	ND		20	µg/L	20	9/21/2016 07:37 PM
Vinyl chloride	ND		20	µg/L	20	9/21/2016 07:37 PM
Surr: 1,2-Dichloroethane-d4	95.6		70-130	%REC	20	9/21/2016 07:37 PM
Surr: 4-Bromofluorobenzene	96.6		70-130	%REC	20	9/21/2016 07:37 PM
Surr: Dibromofluoromethane	92.0		70-130	%REC	20	9/21/2016 07:37 PM
Surr: Toluene-d8	97.8		70-130	%REC	20	9/21/2016 07:37 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.



# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>HERBICIDES</b>						
			<b>SW8151</b>		Prep: SW8151M / 9/19/16	Analyst: <b>KYM</b>
2,4,5-T	ND		1.2	µg/Kg-dry	1	9/22/2016 07:25 AM
<b>2,4,5-TP (Silvex)</b>	<b>7.8</b>		<b>1.2</b>	<b>µg/Kg-dry</b>	1	9/22/2016 07:25 AM
2,4-D	ND		1.2	µg/Kg-dry	1	9/22/2016 07:25 AM
Surr: DCAA	34.4		10-150	%REC	1	9/22/2016 07:25 AM
<b>PCBS</b>						
			<b>SW8082</b>		Prep: SW3546 / 9/26/16	Analyst: <b>EB</b>
Aroclor 1016	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
Aroclor 1221	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
Aroclor 1232	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
Aroclor 1242	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
Aroclor 1248	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
<b>Aroclor 1254</b>	<b>1,800</b>		<b>110</b>	<b>µg/Kg-dry</b>	1	9/26/2016 11:00 PM
Aroclor 1260	ND		110	µg/Kg-dry	1	9/26/2016 11:00 PM
Surr: Decachlorobiphenyl	75.1		40-140	%REC	1	9/26/2016 11:00 PM
Surr: Tetrachloro-m-xylene	79.1		45-124	%REC	1	9/26/2016 11:00 PM
<b>PESTICIDES</b>						
			<b>SW8081</b>		Prep: SW3546 / 9/22/16	Analyst: <b>BLM</b>
4,4'-DDD	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
4,4'-DDE	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
4,4'-DDT	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Aldrin	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
alpha-BHC	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
alpha-Chlordane	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
beta-BHC	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Chlordane, Technical	ND		370	µg/Kg-dry	10	9/25/2016 11:55 PM
delta-BHC	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Dieldrin	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endosulfan I	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endosulfan II	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endosulfan sulfate	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endrin	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endrin aldehyde	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Endrin ketone	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
gamma-BHC (Lindane)	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
gamma-Chlordane	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Heptachlor	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Heptachlor epoxide	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Methoxychlor	ND		150	µg/Kg-dry	10	9/25/2016 11:55 PM
Toxaphene	ND		890	µg/Kg-dry	10	9/25/2016 11:55 PM
Surr: Decachlorobiphenyl	100		45-135	%REC	10	9/25/2016 11:55 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<i>Surr: Tetrachloro-m-xylene</i>	90.1		45-124	%REC	10	9/25/2016 11:55 PM
<b>MERCURY BY CVAA</b>			<b>SW7471B</b>		Prep: SW7471 / 9/25/16	Analyst: <b>LR</b>
<b>Mercury</b>	<b>0.97</b>		<b>0.21</b>	<b>mg/Kg-dry</b>	10	9/27/2016 10:25 AM
<b>METALS BY ICP-MS</b>			<b>SW6020A</b>		Prep: SW3050B / 9/23/16	Analyst: <b>ML</b>
<b>Arsenic</b>	<b>150</b>		<b>41</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
<b>Barium</b>	<b>850</b>		<b>41</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
<b>Cadmium</b>	<b>54</b>		<b>17</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
<b>Chromium</b>	<b>130</b>		<b>41</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
<b>Copper</b>	<b>29,000</b>		<b>410</b>	<b>mg/Kg-dry</b>	1000	9/24/2016 11:01 PM
<b>Lead</b>	<b>8,600</b>		<b>41</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
Selenium	ND		41	mg/Kg-dry	100	9/23/2016 10:53 PM
Silver	ND		41	mg/Kg-dry	100	9/23/2016 10:53 PM
<b>Zinc</b>	<b>4,100</b>		<b>83</b>	<b>mg/Kg-dry</b>	100	9/23/2016 10:53 PM
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3546 / 9/22/16	Analyst: <b>RS</b>
1,1'-Biphenyl	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,2'-Oxybis(1-chloropropane)	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4,5-Trichlorophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4,6-Trichlorophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4-Dichlorophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4-Dimethylphenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4-Dinitrophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,4-Dinitrotoluene	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2,6-Dinitrotoluene	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2-Chloronaphthalene	ND		80	µg/Kg-dry	5	9/26/2016 11:38 PM
2-Chlorophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>2-Methylnaphthalene</b>	<b>430</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
2-Methylphenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2-Nitroaniline	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
2-Nitrophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
3&4-Methylphenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
3,3'-Dichlorobenzidine	ND		2,000	µg/Kg-dry	5	9/26/2016 11:38 PM
3-Nitroaniline	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
4,6-Dinitro-2-methylphenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Bromophenyl phenyl ether	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Chloro-3-methylphenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Chloroaniline	ND		800	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Chlorophenyl phenyl ether	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Nitroaniline	ND		2,000	µg/Kg-dry	5	9/26/2016 11:38 PM
4-Nitrophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Acenaphthene	ND		80	µg/Kg-dry	5	9/26/2016 11:38 PM
Acenaphthylene	ND		80	µg/Kg-dry	5	9/26/2016 11:38 PM
Acetophenone	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Anthracene</b>	<b>280</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Atrazine	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Benzaldehyde	ND		800	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Benzo(a)anthracene</b>	<b>710</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
<b>Benzo(a)pyrene</b>	<b>640</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
<b>Benzo(b)fluoranthene</b>	<b>1,200</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
<b>Benzo(g,h,i)perylene</b>	<b>360</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
<b>Benzo(k)fluoranthene</b>	<b>440</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Bis(2-chloroethoxy)methane	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Bis(2-chloroethyl)ether	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Bis(2-ethylhexyl)phthalate	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Butyl benzyl phthalate	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Caprolactam	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Carbazole	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Chrysene</b>	<b>640</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Dibenzo(a,h)anthracene	ND		80	µg/Kg-dry	5	9/26/2016 11:38 PM
Dibenzofuran	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Diethyl phthalate	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Dimethyl phthalate	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Di-n-butyl phthalate</b>	<b>700</b>		<b>400</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Di-n-octyl phthalate	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Fluoranthene</b>	<b>1,400</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Fluorene	ND		80	µg/Kg-dry	5	9/26/2016 11:38 PM
Hexachlorobenzene	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Hexachlorobutadiene	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Hexachlorocyclopentadiene	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Hexachloroethane	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Indeno(1,2,3-cd)pyrene</b>	<b>440</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Isophorone	ND		2,000	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Naphthalene</b>	<b>350</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Nitrobenzene	ND		2,000	µg/Kg-dry	5	9/26/2016 11:38 PM
N-Nitrosodimethylamine	ND		2,000	µg/Kg-dry	5	9/26/2016 11:38 PM
N-Nitrosodi-n-propylamine	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
Pentachlorophenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Phenanthrene</b>	<b>860</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM
Phenol	ND		400	µg/Kg-dry	5	9/26/2016 11:38 PM
<b>Pyrene</b>	<b>1,100</b>		<b>80</b>	<b>µg/Kg-dry</b>	5	9/26/2016 11:38 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Surr: 2,4,6-Tribromophenol	102		34-140	%REC	5	9/26/2016 11:38 PM
Surr: 2-Fluorobiphenyl	77.1		12-100	%REC	5	9/26/2016 11:38 PM
Surr: 2-Fluorophenol	70.7		33-117	%REC	5	9/26/2016 11:38 PM
Surr: 4-Terphenyl-d14	92.2		25-137	%REC	5	9/26/2016 11:38 PM
Surr: Nitrobenzene-d5	70.6		37-107	%REC	5	9/26/2016 11:38 PM
Surr: Phenol-d6	68.1		40-106	%REC	5	9/26/2016 11:38 PM

## VOLATILE ORGANIC COMPOUNDS

SW8260B

Prep: SW5035 / 9/20/16

Analyst: LSY

1,1,1,2-Tetrachloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1,1-Trichloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1,2,2-Tetrachloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1,2-Trichloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1,2-Trichlorotrifluoroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1-Dichloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,1-Dichloroethene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2,3-Trichloropropane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2,4-Trichlorobenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2,4-Trimethylbenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2-Dibromo-3-chloropropane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2-Dibromoethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2-Dichlorobenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2-Dichloroethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,2-Dichloropropane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,3,5-Trimethylbenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,3-Dichlorobenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
1,4-Dichlorobenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
2-Butanone	ND		200	µg/Kg	1	9/24/2016 09:30 PM
2-Hexanone	ND		30	µg/Kg	1	9/24/2016 09:30 PM
<b>2-Methylnaphthalene</b>	<b>130</b>		<b>100</b>	<b>µg/Kg</b>	1	9/24/2016 09:30 PM
4-Methyl-2-pentanone	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Acetone	ND		100	µg/Kg	1	9/24/2016 09:30 PM
Acrylonitrile	ND		100	µg/Kg	1	9/24/2016 09:30 PM
Benzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Bromochloromethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Bromodichloromethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Bromoform	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Bromomethane	ND		75	µg/Kg	1	9/24/2016 09:30 PM
Carbon disulfide	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Carbon tetrachloride	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Chlorobenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Chloroethane	ND		100	µg/Kg	1	9/24/2016 09:30 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 28-Sep-16

**Client:** Michigan Dept.of Environmental Quality  
**Project:** Abandoned Mining Wastes - Torch Lake  
**Sample ID:** CHLL-WC02-0-6  
**Collection Date:** 9/12/2016 01:54 PM

**Work Order:** 1609985  
**Lab ID:** 1609985-04  
**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Chloroform	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Chloromethane	ND		100	µg/Kg	1	9/24/2016 09:30 PM
cis-1,2-Dichloroethene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
cis-1,3-Dichloropropene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Dibromochloromethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Dibromomethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Dichlorodifluoromethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Diethyl ether	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Ethylbenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Hexachloroethane	ND		100	µg/Kg	1	9/24/2016 09:30 PM
Isopropylbenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
m,p-Xylene	ND		60	µg/Kg	1	9/24/2016 09:30 PM
Methyl iodide	ND		75	µg/Kg	1	9/24/2016 09:30 PM
Methyl tert-butyl ether	ND		30	µg/Kg	1	9/24/2016 09:30 PM
<b>Methylene chloride</b>	<b>130</b>		<b>30</b>	<b>µg/Kg</b>	1	9/24/2016 09:30 PM
<b>Naphthalene</b>	<b>110</b>		<b>100</b>	<b>µg/Kg</b>	1	9/24/2016 09:30 PM
n-Propylbenzene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
o-Xylene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Styrene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Tetrachloroethene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
<b>Toluene</b>	<b>38</b>		<b>30</b>	<b>µg/Kg</b>	1	9/24/2016 09:30 PM
trans-1,2-Dichloroethene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
trans-1,3-Dichloropropene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
trans-1,4-Dichloro-2-butene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Trichloroethene	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Trichlorofluoromethane	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Vinyl acetate	ND		250	µg/Kg	1	9/24/2016 09:30 PM
Vinyl chloride	ND		30	µg/Kg	1	9/24/2016 09:30 PM
Xylenes, Total	ND		90	µg/Kg	1	9/24/2016 09:30 PM
Surr: 1,2-Dichloroethane-d4	105		70-130	%REC	1	9/24/2016 09:30 PM
Surr: 4-Bromofluorobenzene	96.7		70-130	%REC	1	9/24/2016 09:30 PM
Surr: Dibromofluoromethane	95.5		70-130	%REC	1	9/24/2016 09:30 PM
Surr: Toluene-d8	97.8		70-130	%REC	1	9/24/2016 09:30 PM
<b>CYANIDE, REACTIVE</b>			<b>SW7.3.3.2</b>			Analyst: <b>EE</b>
Cyanide, Reactive	ND		120	mg/Kg-dry	1	9/23/2016 01:00 PM
<b>FLASHPOINT/IGNITABILITY ANALYSIS</b>			<b>SW1010A</b>			Analyst: <b>STP</b>
Flashpoint/Ignitability	>200			°F	1	9/20/2016 10:47 AM
<b>PAINT FILTER (FREE LIQUIDS)</b>			<b>SW9095B</b>			Analyst: <b>KF</b>
Free Liquids	Absent			none	1	9/20/2016 10:34 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

**ALS Group USA, Corp****Date:** 28-Sep-16**Client:** Michigan Dept.of Environmental Quality**Project:** Abandoned Mining Wastes - Torch Lake**Sample ID:** CHLL-WC02-0-6**Collection Date:** 9/12/2016 01:54 PM**Work Order:** 1609985**Lab ID:** 1609985-04**Matrix:** WASTE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>MOISTURE</b>			<b>SW3550C</b>			Analyst: <b>LW</b>
Moisture	20		0.050	% of sample	1	9/23/2016 07:00 PM
<b>PH</b>			<b>SW9045D</b>		Prep: EXTRACT / 9/17/16	Analyst: <b>EDL</b>
pH	7.2			s.u.	1	9/17/2016 03:30 PM
<b>SULFIDE, REACTIVE</b>			<b>SW7.3.4.2</b>			Analyst: <b>EE</b>
Sulfide, Reactive	ND		120	mg/Kg-dry	1	9/23/2016 01:00 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

**QC BATCH REPORT**

Batch ID: **91556** Instrument ID **GC7** Method: **SW8151**

<b>MBLK</b>		Sample ID: <b>HBLKS1-91556-91556</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/20/2016 12:32 PM</b>		
Client ID:		Run ID: <b>GC7_160919C</b>				SeqNo: <b>4041673</b>		Prep Date: <b>9/19/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-T	ND	1.0								
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	1.0								
Surr: DCAA	10.7	0	50	0	21.4	10-150	0			

<b>LCS</b>		Sample ID: <b>HLCSDS1-91556-91556</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/20/2016 01:49 PM</b>		
Client ID:		Run ID: <b>GC7_160919C</b>				SeqNo: <b>4041675</b>		Prep Date: <b>9/19/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-T	1.379	0.98	4.924	0	28	10-150	0			
2,4,5-TP (Silvex)	2.167	0.98	4.924	0	44	10-150	0			
2,4-D	13.1	0.98	49.24	0	26.6	10-130	0			
Surr: DCAA	14.08	0	49.24	0	28.6	10-150	0			

<b>LCS</b>		Sample ID: <b>HLCSDS1-91556-91556</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/20/2016 02:08 PM</b>		
Client ID:		Run ID: <b>GC7_160919C</b>				SeqNo: <b>4041676</b>		Prep Date: <b>9/19/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-T	0.8864	0.98	4.924	0	18	10-150	1.379	0		J
2,4,5-TP (Silvex)	2.364	0.98	4.924	0	48	10-150	2.167	0		
2,4-D	10.83	0.98	49.24	0	22	10-130	13.1	0		
Surr: DCAA	11.82	0	49.24	0	24	10-150	14.08	0		

<b>MS</b>		Sample ID: <b>1609939-05A MS</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/20/2016 02:27 PM</b>		
Client ID:		Run ID: <b>GC7_160919C</b>				SeqNo: <b>4041677</b>		Prep Date: <b>9/19/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-T	1.479	0.99	4.93	0	30	10-150	0			
2,4,5-TP (Silvex)	2.465	0.99	4.93	0	50	10-150	0			
2,4-D	23.67	0.99	49.3	0	48	10-130	0			
Surr: DCAA	13.31	0	49.3	0	27	10-150	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91556** Instrument ID **GC7** Method: **SW8151**

MSD		Sample ID: <b>1609939-05A MSD</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/20/2016 02:46 PM</b>		
Client ID:		Run ID: <b>GC7_160919C</b>				SeqNo: <b>4041678</b>		Prep Date: <b>9/19/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-T	1.588	0.99	4.962	0	32	10-150	1.479	7.08	50	
2,4,5-TP (Silvex)	2.382	0.99	4.962	0	48	10-150	2.465	3.45	50	
2,4-D	31.65	0.99	49.62	0	63.8	10-130	23.67	28.9	50	
Surr: DCAA	15.88	0	49.62	0	32	10-150	13.31	17.6	50	

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91705A** Instrument ID **GC12** Method: **SW8081**

<b>MBLK</b>		Sample ID: <b>PBLKW1-91705-91705A</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/23/2016 11:23 PM</b>		
Client ID:		Run ID: <b>GC12_160923A</b>				SeqNo: <b>4046881</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chlordane, Technical	ND	0.50								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.010								
Heptachlor	ND	0.010								
Heptachlor epoxide	ND	0.010								
Methoxychlor	ND	0.040								
Toxaphene	ND	2.0								
Surr: Decachlorobiphenyl	0.068	0	0.1	0	68	42-119	0			
Surr: Tetrachloro-m-xylene	0.054	0	0.1	0	54	32-104	0			

<b>LCS</b>		Sample ID: <b>PLCSW1-91705-91705A</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/23/2016 11:41 PM</b>		
Client ID:		Run ID: <b>GC12_160923A</b>				SeqNo: <b>4046882</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Endrin	0.077	0.020	0.1	0	77	39-123	0			
gamma-BHC (Lindane)	0.055	0.010	0.1	0	55	32-114	0			
Heptachlor	0.04	0.010	0.1	0	40	34-112	0			
Heptachlor epoxide	0.063	0.010	0.1	0	63	36-109	0			
Methoxychlor	0.079	0.040	0.1	0	79	44-133	0			
Surr: Decachlorobiphenyl	0.07	0	0.1	0	70	42-119	0			
Surr: Tetrachloro-m-xylene	0.056	0	0.1	0	56	32-104	0			

<b>MS</b>		Sample ID: <b>1609985-01A MS</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/24/2016 12:17 AM</b>		
Client ID: <b>CHTC-WC01-0-6 TCLP</b>		Run ID: <b>GC12_160923A</b>				SeqNo: <b>4046884</b>		Prep Date: <b>9/22/2016</b>		DF: <b>5</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Endrin	0.35	0.50	0.5	0	70	39-123	0			J
gamma-BHC (Lindane)	0.475	0.25	0.5	0	95	32-114	0			
Heptachlor	0.275	0.25	0.5	0	55	34-112	0			
Heptachlor epoxide	0.275	0.25	0.5	0	55	36-109	0			
Methoxychlor	0.3	1.0	0.5	0	60	44-133	0			J
Surr: Decachlorobiphenyl	0.25	0	0.5	0	50	42-119	0			
Surr: Tetrachloro-m-xylene	0.325	0	0.5	0	65	32-104	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91705A** Instrument ID **GC12** Method: **SW8081**

DUP				Sample ID: 1609985-03A DUP			Units: µg/L		Analysis Date: 9/24/2016 12:52 AM		
Client ID: CHLL-WC02-0-6 TCLP			Run ID: GC12_160923A			SeqNo: 4046886		Prep Date: 9/22/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chlordane, Technical	ND	2.5	0	0	0	0-0	0	0	20		
Endrin	ND	0.10	0	0	0	0-0	0	0	20		
gamma-BHC (Lindane)	ND	0.050	0	0	0	0-0	0	0	20		
Heptachlor	ND	0.050	0	0	0	0-0	0	0	20		
Heptachlor epoxide	ND	0.050	0	0	0	0-0	0	0	20		
Methoxychlor	ND	0.20	0	0	0	0-0	0	0	20		
Toxaphene	ND	10	0	0	0	0-0	0	0	20		
Surr: Decachlorobiphenyl	0.3	0	0.5	0	60	42-119	0.34	12.5	20		
Surr: Tetrachloro-m-xylene	0.27	0	0.5	0	54	32-104	0.275	1.83	20		

The following samples were analyzed in this batch:

1609985-01A 1609985-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91707** Instrument ID **GC7** Method: **SW8151**

<b>MBLK</b>		Sample ID: <b>HBLKW1-91707-91707</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 06:56 PM</b>		
Client ID:		Run ID: <b>GC7_160922A</b>				SeqNo: <b>4042757</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-TP (Silvex)	ND	5.0								
2,4-D	ND	5.0								
Surr: DCAA	15	0	50	0	30	30-150	0			

<b>LCS</b>		Sample ID: <b>HLCSW1-91707-91707</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 07:16 PM</b>		
Client ID:		Run ID: <b>GC7_160922A</b>				SeqNo: <b>4042758</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-TP (Silvex)	8.7	5.0	10	0	87	50-150	0			
2,4-D	95.8	5.0	100	0	95.8	50-150	0			
Surr: DCAA	15.2	0	50	0	30.4	30-150	0			

<b>MS</b>		Sample ID: <b>16091019-02A MS</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 07:35 PM</b>		
Client ID:		Run ID: <b>GC7_160922A</b>				SeqNo: <b>4042759</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-TP (Silvex)	9.5	5.0	10	0	95	50-150	0			
2,4-D	108.3	5.0	100	0	108	50-150	0			
Surr: DCAA	15.1	0	50	0	30.2	30-150	0			

<b>MSD</b>		Sample ID: <b>16091019-02A MSD</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 07:54 PM</b>		
Client ID:		Run ID: <b>GC7_160922A</b>				SeqNo: <b>4042760</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-TP (Silvex)	9.9	5.0	10	0	99	50-150	9.5	4.12	30	
2,4-D	113.3	5.0	100	0	113	50-150	108.3	4.51	30	
Surr: DCAA	15.5	0	50	0	31	30-150	15.1	2.61	30	

The following samples were analyzed in this batch:

1609985-01A 1609985-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91791** Instrument ID **GC12** Method: **SW8081**

MBLK		Sample ID: <b>PBLKS1-91791-91791</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/25/2016 09:56 PM</b>		
Client ID:		Run ID: <b>GC12_160925A</b>				SeqNo: <b>4047974</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
4,4'-DDD	ND	10								
4,4'-DDE	ND	10								
4,4'-DDT	ND	10								
Aldrin	ND	10								
alpha-BHC	ND	10								
alpha-Chlordane	ND	10								
beta-BHC	ND	10								
Chlordane, Technical	ND	25								
delta-BHC	ND	10								
Dieldrin	ND	10								
Endosulfan I	ND	10								
Endosulfan II	ND	10								
Endosulfan sulfate	ND	10								
Endrin	ND	10								
Endrin aldehyde	ND	10								
Endrin ketone	ND	10								
gamma-BHC (Lindane)	ND	10								
gamma-Chlordane	ND	10								
Heptachlor	ND	10								
Heptachlor epoxide	ND	10								
Methoxychlor	ND	10								
Toxaphene	ND	60								
Surr: Decachlorobiphenyl	29.33	0	33.3	0	88.1	45-135	0			
Surr: Tetrachloro-m-xylene	25	0	33.3	0	75.1	45-124	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91791** Instrument ID **GC12** Method: **SW8081**

LCS		Sample ID: <b>PLCSS1-91791-91791</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/25/2016 10:13 PM</b>		
Client ID:		Run ID: <b>GC12_160925A</b>				SeqNo: <b>4047975</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
4,4'-DDD	23	10	33.33	0	69	30-135	0			
4,4'-DDE	23.67	10	33.33	0	71	70-125	0			
4,4'-DDT	26.33	10	33.33	0	79	45-140	0			
Aldrin	23	10	33.33	0	69	45-140	0			
alpha-BHC	22.33	10	33.33	0	67	60-125	0			
alpha-Chlordane	23.33	10	33.33	0	70	50-150	0			
beta-BHC	23	10	33.33	0	69	60-125	0			
delta-BHC	23	10	33.33	0	69	55-130	0			
Dieldrin	23.33	10	33.33	0	70	65-125	0			
Endosulfan I	23.67	10	33.33	0	71	15-135	0			
Endosulfan II	23.33	10	33.33	0	70	35-140	0			
Endosulfan sulfate	23	10	33.33	0	69	60-135	0			
Endrin	27.67	10	33.33	0	83	60-135	0			
Endrin aldehyde	22	10	33.33	0	66	35-145	0			
Endrin ketone	23.33	10	33.33	0	70	50-150	0			
gamma-BHC (Lindane)	22.67	10	33.33	0	68	60-125	0			
gamma-Chlordane	20.67	10	33.33	0	62	50-150	0			
Heptachlor	24.33	10	33.33	0	73	50-140	0			
Heptachlor epoxide	23.67	10	33.33	0	71	65-130	0			
Methoxychlor	26.67	10	33.33	0	80	55-145	0			
Surr: Decachlorobiphenyl	28	0	33.3	0	84.1	45-135	0			
Surr: Tetrachloro-m-xylene	25	0	33.3	0	75.1	45-124	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91791** Instrument ID **GC12** Method: **SW8081**

MS				Sample ID: 16091132-02C MS			Units: µg/Kg		Analysis Date: 9/25/2016 10:49 PM		
Client ID:			Run ID: GC12_160925A			SeqNo: 4047977		Prep Date: 9/22/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
4,4´-DDD	26.47	9.6	31.89	0	83	30-135	0				
4,4´-DDE	28.06	9.6	31.89	0	88	70-125	0				
4,4´-DDT	31.25	9.6	31.89	0	98	45-140	0				
Aldrin	27.11	9.6	31.89	0	85	45-140	0				
alpha-BHC	26.79	9.6	31.89	0	84	60-125	0				
alpha-Chlordane	27.11	9.6	31.89	0	85	50-150	0				
beta-BHC	27.11	9.6	31.89	0	85	60-125	0				
delta-BHC	28.38	9.6	31.89	0	89	55-130	0				
Dieldrin	27.43	9.6	31.89	0	86	65-125	0				
Endosulfan I	27.74	9.6	31.89	0	87	15-135	0				
Endosulfan II	26.79	9.6	31.89	0	84	35-140	0				
Endosulfan sulfate	26.15	9.6	31.89	0	82	60-135	0				
Endrin	34.44	9.6	31.89	0	108	60-135	0				
Endrin aldehyde	21.69	9.6	31.89	0	68	35-145	0				
Endrin ketone	25.51	9.6	31.89	0	80	50-150	0				
gamma-BHC (Lindane)	27.11	9.6	31.89	0	85	60-125	0				
gamma-Chlordane	23.92	9.6	31.89	0	75	50-150	0				
Heptachlor	29.02	9.6	31.89	0	91	50-140	0				
Heptachlor epoxide	27.43	9.6	31.89	0	86	65-130	0				
Methoxychlor	29.98	9.6	31.89	0	94	55-145	0				
Surr: Decachlorobiphenyl	27.74	0	31.86	0	87.1	45-135	0				
Surr: Tetrachloro-m-xylene	28.7	0	31.86	0	90.1	45-124	0				

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91791** Instrument ID **GC12** Method: **SW8081**

MSD				Sample ID: 16091132-02C MSD			Units: µg/Kg		Analysis Date: 9/25/2016 11:05 PM		
Client ID:			Run ID: GC12_160925A			SeqNo: 4047978		Prep Date: 9/22/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
4,4´-DDD	22.26	9.8	32.73	0	68	30-135	26.47	17.3	35		
4,4´-DDE	22.91	9.8	32.73	0	70	70-125	28.06	20.2	35		
4,4´-DDT	25.53	9.8	32.73	0	78	45-140	31.25	20.1	35		
Aldrin	21.28	9.8	32.73	0	65	45-140	27.11	24.1	35		
alpha-BHC	20.62	9.8	32.73	0	63	60-125	26.79	26	35		
alpha-Chlordane	22.26	9.8	32.73	0	68	50-150	27.11	19.6	35		
beta-BHC	21.93	9.8	32.73	0	67	60-125	27.11	21.1	35		
delta-BHC	22.59	9.8	32.73	0	69	55-130	28.38	22.7	35		
Dieldrin	22.26	9.8	32.73	0	68	65-125	27.43	20.8	35		
Endosulfan I	22.59	9.8	32.73	0	69	15-135	27.74	20.5	35		
Endosulfan II	22.26	9.8	32.73	0	68	35-140	26.79	18.5	35		
Endosulfan sulfate	21.93	9.8	32.73	0	67	60-135	26.15	17.5	35		
Endrin	27.82	9.8	32.73	0	85	60-135	34.44	21.3	35		
Endrin aldehyde	18.33	9.8	32.73	0	56	35-145	21.69	16.8	35		
Endrin ketone	21.6	9.8	32.73	0	66	50-150	25.51	16.6	35		
gamma-BHC (Lindane)	20.95	9.8	32.73	0	64	60-125	27.11	25.6	35		
gamma-Chlordane	19.97	9.8	32.73	0	61	50-150	23.92	18	35		
Heptachlor	22.59	9.8	32.73	0	69	50-140	29.02	24.9	35		
Heptachlor epoxide	22.26	9.8	32.73	0	68	65-130	27.43	20.8	35		
Methoxychlor	25.53	9.8	32.73	0	78	55-145	29.98	16	35		
Surr: Decachlorobiphenyl	24.55	0	32.7	0	75.1	45-135	27.74	12.2	35		
Surr: Tetrachloro-m-xylene	21.93	0	32.7	0	67.1	45-124	28.7	26.7	35		

The following samples were analyzed in this batch:

1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91892** Instrument ID **GC14** Method: **SW8082**

MBLK				Sample ID: PBLKS1-91892-91892				Units: µg/Kg			Analysis Date: 9/26/2016 10:58 AM		
Client ID:			Run ID: GC14_160926A				SeqNo: 4047782			Prep Date: 9/26/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			
Aroclor 1016	ND	83											
Aroclor 1221	ND	83											
Aroclor 1232	ND	83											
Aroclor 1242	ND	83											
Aroclor 1248	ND	83											
Aroclor 1254	ND	83											
Aroclor 1260	ND	83											
Surr: Decachlorobiphenyl	29	0	33.3	0	87.1	40-140		0					
Surr: Tetrachloro-m-xylene	29.33	0	33.3	0	88.1	45-124		0					

LCS				Sample ID: <b>PLCSS1-91892-91892</b>				Units: <b>µg/Kg</b>			Analysis Date: <b>9/26/2016 11:16 AM</b>			
Client ID:				Run ID: <b>GC14_160926A</b>				SeqNo: <b>4047783</b>			Prep Date: <b>9/26/2016</b>		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
Aroclor 1016	948.3	83	833	0	114	50-130	0							
Aroclor 1260	882.3	83	833	0	106	50-130	0							
<i>Surr: Decachlorobiphenyl</i>	30.33	0	33.3	0	91.1	40-140	0							
<i>Surr: Tetrachloro-m-xylene</i>	30	0	33.3	0	90.1	45-124	0							

MS				Sample ID: 16091086-27B MS				Units: µg/Kg		Analysis Date: 9/26/2016 10:25 PM	
Client ID:			Run ID: GC14_160926A			SeqNo: 4049472		Prep Date: 9/26/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Aroclor 1016	962	82	823.3	0	117	40-140	0				
Aroclor 1260	881.3	82	823.3	0	107	40-140	0				
Surr: Decachlorobiphenyl	30.31	0	32.91	0	92.1	40-140	0				
Surr: Tetrachloro-m-xylene	29.98	0	32.91	0	91.1	45-124	0				

MSD				Sample ID: 16091086-27B MSD				Units: µg/Kg		Analysis Date: 9/26/2016 10:42 PM	
Client ID:			Run ID: GC14_160926A			SeqNo: 4049475		Prep Date: 9/26/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Aroclor 1016	904	80	801.6	0	113	40-140	962	6.22	50		
Aroclor 1260	849.1	80	801.6	0	106	40-140	881.3	3.72	50		
Surr: Decachlorobiphenyl	29.51	0	32.05	0	92.1	40-140	30.31	2.67	50		
Surr: Tetrachloro-m-xylene	28.87	0	32.05	0	90.1	45-124	29.98	3.77	50		

The following samples were analyzed in this batch: 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91927A** Instrument ID **GC14** Method: **SW8082**

MBLK		Sample ID: <b>MBLK-91927-91927A</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/26/2016 01:01 PM</b>		
Client ID:		Run ID: <b>GC14_160926A</b>				SeqNo: <b>4047901</b>		Prep Date: <b>9/26/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aroclor 1016	ND	1.0								
Aroclor 1221	ND	1.0								
Aroclor 1232	ND	1.0								
Aroclor 1242	ND	1.0								
Aroclor 1248	ND	1.0								
Aroclor 1254	ND	1.0								
Aroclor 1260	ND	1.0								
<i>Surr: Decachlorobiphenyl</i>	<i>1.01</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>101</i>	<i>50-130</i>	<i>0</i>			
<i>Surr: Tetrachloro-m-xylene</i>	<i>1.05</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>105</i>	<i>50-130</i>	<i>0</i>			

LCS		Sample ID: <b>LCS-91927-91927A</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/26/2016 01:19 PM</b>		
Client ID:		Run ID: <b>GC14_160926A</b>				SeqNo: <b>4047902</b>		Prep Date: <b>9/26/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aroclor 1016	57.94	1.0	50	0	116	50-130	0			
Aroclor 1260	55.12	1.0	50	0	110	50-130	0			
<i>Surr: Decachlorobiphenyl</i>	<i>1.14</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>114</i>	<i>50-130</i>	<i>0</i>			
<i>Surr: Tetrachloro-m-xylene</i>	<i>1.11</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>111</i>	<i>50-130</i>	<i>0</i>			

The following samples were analyzed in this batch:

1609985-02A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **92007** Instrument ID **GC12** Method: **SW8081**

MBLK		Sample ID: <b>MBLK-92007-92007</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/27/2016 01:31 PM</b>		
Client ID:		Run ID: <b>GC12_160927A</b>				SeqNo: <b>4052918</b>		Prep Date: <b>9/27/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
4,4'-DDD	ND	0.20								
4,4'-DDE	ND	0.20								
4,4'-DDT	ND	0.20								
Aldrin	ND	0.20								
alpha-BHC	ND	0.20								
alpha-Chlordane	ND	0.20								
beta-BHC	ND	0.20								
Chlordane, Technical	ND	25								
delta-BHC	ND	0.20								
Dieldrin	ND	0.20								
Endosulfan I	ND	0.20								
Endosulfan II	ND	0.20								
Endosulfan sulfate	ND	0.20								
Endrin	ND	0.20								
Endrin aldehyde	ND	0.20								
Endrin ketone	ND	0.20								
gamma-BHC (Lindane)	ND	0.20								
gamma-Chlordane	ND	0.20								
Heptachlor	ND	0.20								
Heptachlor epoxide	ND	0.20								
Methoxychlor	ND	0.40								
Toxaphene	ND	25								
Surr: Decachlorobiphenyl	1210	0	1000	0	121	30-135	0			
Surr: Tetrachloro-m-xylene	1140	0	1000	0	114	25-140	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **92007** Instrument ID **GC12** Method: **SW8081**

LCS		Sample ID: <b>LCS-92007-92007</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/27/2016 01:49 PM</b>		
Client ID:		Run ID: <b>GC12_160927A</b>				SeqNo: <b>4052919</b>		Prep Date: <b>9/27/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
4,4'-DDD	970	0.20	1000	0	97	25-150	0			
4,4'-DDE	950	0.20	1000	0	95	35-140	0			
4,4'-DDT	1010	0.20	1000	0	101	45-140	0			
Aldrin	910	0.20	1000	0	91	25-140	0			
alpha-BHC	840	0.20	1000	0	84	60-130	0			
alpha-Chlordane	930	0.20	1000	0	93	50-150	0			
beta-BHC	880	0.20	1000	0	88	65-125	0			
delta-BHC	890	0.20	1000	0	89	45-135	0			
Dieldrin	950	0.20	1000	0	95	60-130	0			
Endosulfan I	950	0.20	1000	0	95	50-110	0			
Endosulfan II	970	0.20	1000	0	97	30-130	0			
Endosulfan sulfate	930	0.20	1000	0	93	55-135	0			
Endrin	1020	0.20	1000	0	102	55-135	0			
Endrin aldehyde	970	0.20	1000	0	97	55-135	0			
Endrin ketone	1070	0.20	1000	0	107	50-150	0			
gamma-BHC (Lindane)	890	0.20	1000	0	89	25-135	0			
gamma-Chlordane	780	0.20	1000	0	78	50-150	0			
Heptachlor	910	0.20	1000	0	91	40-130	0			
Heptachlor epoxide	990	0.20	1000	0	99	60-130	0			
Methoxychlor	1060	0.40	1000	0	106	55-150	0			
Surr: Decachlorobiphenyl	1190	0	1000	0	119	30-135	0			
Surr: Tetrachloro-m-xylene	940	0	1000	0	94	25-140	0			

The following samples were analyzed in this batch:

1609985-02A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91744** Instrument ID **HG1** Method: **SW7470A**

<b>MBLK</b>		Sample ID: <b>MBLK-91744-91744</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/21/2016 07:42 PM</b>		
Client ID:		Run ID: <b>HG1_160921A</b>				SeqNo: <b>4040347</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury ND 0.00020

<b>LCS</b>		Sample ID: <b>LCS-91744-91744</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/21/2016 07:45 PM</b>		
Client ID:		Run ID: <b>HG1_160921A</b>				SeqNo: <b>4040348</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.00203 0.00020 0.002 0 102 80-120 0

<b>MS</b>		Sample ID: <b>16091011-02CMS</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/21/2016 08:10 PM</b>		
Client ID:		Run ID: <b>HG1_160921A</b>				SeqNo: <b>4040382</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.00192 0.00020 0.002 -0.000008 96.4 75-125 0

<b>MSD</b>		Sample ID: <b>16091011-02CMSD</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/21/2016 08:13 PM</b>		
Client ID:		Run ID: <b>HG1_160921A</b>				SeqNo: <b>4040383</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.00194 0.00020 0.002 -0.000008 97.4 75-125 0.00192 1.04 20

The following samples were analyzed in this batch:

1609985-01A 1609985-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91897** Instrument ID **HG1** Method: **SW7471B**

MBLK		Sample ID: MBLK-91897-91897					Units: mg/Kg		Analysis Date: 9/25/2016 09:35 PM		
Client ID:			Run ID: HG1_160925A				SeqNo: 4046247		Prep Date: 9/25/2016		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Mercury ND 0.020

LCS		Sample ID: LCS-91897-91897				Units: mg/Kg		Analysis Date: 9/25/2016 09:45 PM		
Client ID:			Run ID: HG1_160925A			SeqNo: 4046255		Prep Date: 9/25/2016		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.175 0.020 0.1665 0 105 80-120 0

MS		Sample ID: 16091127-01CMS				Units: mg/Kg		Analysis Date: 9/25/2016 10:06 PM		
Client ID:			Run ID: HG1_160925A			SeqNo: 4046271		Prep Date: 9/25/2016		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.1453 0.014 0.1199 0.01854 106 75-125 0

MSD		Sample ID: 16091127-01CMSD				Units: mg/Kg		Analysis Date: 9/25/2016 10:08 PM		
Client ID:		Run ID: HG1_160925A			SeqNo: 4046273		Prep Date: 9/25/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Mercury 0.1483 0.014 0.1199 0.01854 108 75-125 0.1453 2.04 35

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91776** Instrument ID **ICPMS2** Method: **SW6020A**

<b>MBLK</b>		Sample ID: <b>MBLK-91776-91776</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/22/2016 11:01 PM</b>		
Client ID:		Run ID: <b>ICPMS2_160922A</b>				SeqNo: <b>4042051</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Cadmium	ND	0.0020								
Chromium	ND	0.0050								
Copper	ND	0.0050								
Lead	ND	0.0050								
Selenium	ND	0.0050								
Silver	ND	0.0050								
Zinc	ND	0.010								

<b>LCS</b>		Sample ID: <b>LCS-91776-91776</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/22/2016 11:07 PM</b>		
Client ID:		Run ID: <b>ICPMS2_160922A</b>				SeqNo: <b>4042052</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.09845	0.0050	0.1	0	98.4	80-120	0			
Barium	0.09226	0.0050	0.1	0	92.3	80-120	0			
Cadmium	0.09393	0.0020	0.1	0	93.9	80-120	0			
Chromium	0.09353	0.0050	0.1	0	93.5	80-120	0			
Copper	0.09475	0.0050	0.1	0	94.8	80-120	0			
Lead	0.09289	0.0050	0.1	0	92.9	80-120	0			
Selenium	0.0962	0.0050	0.1	0	96.2	80-120	0			
Silver	0.08014	0.0050	0.1	0	80.1	80-120	0			
Zinc	0.09607	0.010	0.1	0	96.1	80-120	0			

<b>MS</b>		Sample ID: <b>16091127-02CMS</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/23/2016 12:44 AM</b>		
Client ID:		Run ID: <b>ICPMS2_160922A</b>				SeqNo: <b>4042069</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.096	0.0050	0.1	-0.0002868	96.3	75-125	0			
Barium	0.1766	0.0050	0.1	0.08204	94.6	75-125	0			
Cadmium	0.09059	0.0020	0.1	0.0001881	90.4	75-125	0			
Chromium	0.08892	0.0050	0.1	0.00003087	88.9	75-125	0			
Copper	0.08904	0.0050	0.1	0.001767	87.3	75-125	0			
Lead	0.09363	0.0050	0.1	0.000124	93.5	75-125	0			
Selenium	0.09289	0.0050	0.1	0.0007928	92.1	75-125	0			
Silver	0.07408	0.0050	0.1	-2.336E-05	74.1	75-125	0			S
Zinc	0.09387	0.010	0.1	0.008012	85.9	75-125	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91776** Instrument ID **ICPMS2** Method: **SW6020A**

MSD		Sample ID: <b>16091127-02CMSD</b>				Units: <b>mg/L</b>		Analysis Date: <b>9/23/2016 12:49 AM</b>		
Client ID:		Run ID: <b>ICPMS2_160922A</b>				SeqNo: <b>4042070</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.09923	0.0050	0.1	-0.0002868	99.5	75-125	0.096	3.31	20	
Barium	0.1768	0.0050	0.1	0.08204	94.8	75-125	0.1766	0.113	20	
Cadmium	0.09297	0.0020	0.1	0.0001881	92.8	75-125	0.09059	2.59	20	
Chromium	0.09181	0.0050	0.1	0.00003087	91.8	75-125	0.08892	3.2	20	
Copper	0.09058	0.0050	0.1	0.001767	88.8	75-125	0.08904	1.71	20	
Lead	0.09614	0.0050	0.1	0.000124	96	75-125	0.09363	2.65	20	
Selenium	0.0953	0.0050	0.1	0.0007928	94.5	75-125	0.09289	2.56	20	
Silver	0.07555	0.0050	0.1	-2.336E-05	75.6	75-125	0.07408	1.96	20	
Zinc	0.09426	0.010	0.1	0.008012	86.2	75-125	0.09387	0.415	20	

The following samples were analyzed in this batch:

1609985-01A 1609985-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91843** Instrument ID **ICPMS1** Method: **SW6020A**

<b>MBLK</b>		Sample ID: <b>MBLK-91843-91843</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 07:46 PM</b>		
Client ID:		Run ID: <b>ICPMS1_160923A</b>				SeqNo: <b>4044877</b>		Prep Date: <b>9/23/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.25								
Barium	ND	0.25								
Cadmium	0.01472	0.10								J
Chromium	0.01666	0.25								J
Copper	ND	0.25								
Lead	ND	0.25								
Selenium	ND	0.25								
Silver	ND	0.25								
Zinc	ND	0.50								

<b>LCS</b>		Sample ID: <b>LCS-91843-91843</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 07:52 PM</b>		
Client ID:		Run ID: <b>ICPMS1_160923A</b>				SeqNo: <b>4044878</b>		Prep Date: <b>9/23/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	4.562	0.25	5	0	91.2	80-120	0			
Barium	4.57	0.25	5	0	91.4	80-120	0			
Cadmium	4.526	0.10	5	0	90.5	80-120	0			
Chromium	4.678	0.25	5	0	93.6	80-120	0			
Copper	4.58	0.25	5	0	91.6	80-120	0			
Lead	4.57	0.25	5	0	91.4	80-120	0			
Selenium	4.506	0.25	5	0	90.1	80-120	0			
Silver	4.708	0.25	5	0	94.2	80-120	0			
Zinc	4.492	0.50	5	0	89.8	80-120	0			

<b>MS</b>		Sample ID: <b>16091317-02AMS</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 09:19 PM</b>		
Client ID:		Run ID: <b>ICPMS1_160923A</b>				SeqNo: <b>4044892</b>		Prep Date: <b>9/23/2016</b>		DF: <b>4</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	7.895	1.5	7.74	0.3763	97.1	75-125	0			
Barium	10.55	1.5	7.74	2.783	100	75-125	0			
Cadmium	7.567	0.62	7.74	0.04396	97.2	75-125	0			
Chromium	8.412	1.5	7.74	0.9516	96.4	75-125	0			
Copper	8.031	1.5	7.74	0.6955	94.8	75-125	0			
Lead	8.923	1.5	7.74	1.546	95.3	75-125	0			
Selenium	7.307	1.5	7.74	0.1859	92	75-125	0			
Silver	7.585	1.5	7.74	0.007841	97.9	75-125	0			
Zinc	11.5	3.1	7.74	3.95	97.5	75-125	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91843** Instrument ID **ICPMS1** Method: **SW6020A**

MSD		Sample ID: 16091317-02AMSD				Units: mg/Kg		Analysis Date: 9/23/2016 09:25 PM		
Client ID:		Run ID: ICPMS1_160923A				SeqNo: 4044893		Prep Date: 9/23/2016		DF: 4
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	8.534	1.5	7.716	0.3763	106	75-125	7.895	7.78	20	
Barium	11.34	1.5	7.716	2.783	111	75-125	10.55	7.17	20	
Cadmium	7.932	0.62	7.716	0.04396	102	75-125	7.567	4.72	20	
Chromium	9.022	1.5	7.716	0.9516	105	75-125	8.412	7	20	
Copper	8.556	1.5	7.716	0.6955	102	75-125	8.031	6.33	20	
Lead	9.343	1.5	7.716	1.546	101	75-125	8.923	4.6	20	
Selenium	7.744	1.5	7.716	0.1859	98	75-125	7.307	5.81	20	
Silver	8.062	1.5	7.716	0.007841	104	75-125	7.585	6.09	20	
Zinc	11.92	3.1	7.716	3.95	103	75-125	11.5	3.65	20	

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91700** Instrument ID **SVMS5** Method: **SW8270D**

MBLK		Sample ID: <b>SBLKW1-91700-91700</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 11:00 AM</b>		
Client ID:		Run ID: <b>SVMS5_160922A</b>				SeqNo: <b>4043335</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,4-Dichlorobenzene	ND	5.0								
2,4,5-Trichlorophenol	ND	5.0								
2,4,6-Trichlorophenol	ND	5.0								
2,4-Dinitrotoluene	ND	5.0								
Hexachloro-1,3-butadiene	ND	5.0								
Hexachlorobenzene	ND	5.0								
Hexachloroethane	ND	5.0								
m-Cresol	ND	5.0								
Nitrobenzene	ND	5.0								
o-Cresol	ND	5.0								
p-Cresol	ND	5.0								
Pentachlorophenol	ND	5.0								
Pyridine	ND	10								
Surr: 2,4,6-Tribromophenol	29.17	0	50	0	58.3	38-115	0			
Surr: 2-Fluorobiphenyl	28.78	0	50	0	57.6	32-100	0			
Surr: 2-Fluorophenol	19.02	0	50	0	38	22-59	0			
Surr: 4-Terphenyl-d14	36.96	0	50	0	73.9	23-112	0			
Surr: Nitrobenzene-d5	26.82	0	50	0	53.6	31-93	0			
Surr: Phenol-d6	10.01	0	50	0	20	13-36	0			

LCS		Sample ID: <b>SLCSW1-91700-91700</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/23/2016 05:50 PM</b>		
Client ID:		Run ID: <b>SVMS4_160923A</b>				SeqNo: <b>4048258</b>		Prep Date: <b>9/21/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,4-Dichlorobenzene	13.42	5.0	20	0	67.1	30-110	0			
2,4,5-Trichlorophenol	15.41	5.0	20	0	77	50-110	0			
2,4,6-Trichlorophenol	16.47	5.0	20	0	82.4	50-115	0			
2,4-Dinitrotoluene	18.54	5.0	20	0	92.7	50-120	0			
Hexachloro-1,3-butadiene	14.35	5.0	20	0	71.8	25-105	0			
Hexachlorobenzene	14.47	5.0	20	0	72.4	50-110	0			
Hexachloroethane	13.25	5.0	20	0	66.2	30-95	0			
Nitrobenzene	14.7	5.0	20	0	73.5	45-110	0			
o-Cresol	11.64	5.0	20	0	58.2	40-110	0			
Pentachlorophenol	14.82	5.0	20	0	74.1	40-115	0			
Pyridine	6.5	10	20	0	32.5	10-71	0			J
Surr: 2,4,6-Tribromophenol	36.47	0	50	0	72.9	38-115	0			
Surr: 2-Fluorobiphenyl	36.72	0	50	0	73.4	32-100	0			
Surr: 2-Fluorophenol	19.16	0	50	0	38.3	22-59	0			
Surr: 4-Terphenyl-d14	36.22	0	50	0	72.4	23-112	0			
Surr: Nitrobenzene-d5	33.74	0	50	0	67.5	31-93	0			
Surr: Phenol-d6	13.28	0	50	0	26.6	13-36	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91700** Instrument ID **SVMS5** Method: **SW8270D**

MS				Sample ID: <b>16091019-02A MS</b>			Units: <b>µg/L</b>		Analysis Date: <b>9/22/2016 02:18 PM</b>	
Client ID:				Run ID: <b>SVMS5_160922A</b>			SeqNo: <b>4043337</b>		Prep Date: <b>9/21/2016</b>	
							DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,4-Dichlorobenzene	178.6	100	400	0	44.6	30-110	0			
2,4,5-Trichlorophenol	280.4	100	400	0	70.1	50-110	0			
2,4,6-Trichlorophenol	241.2	100	400	0	60.3	50-115	0			
2,4-Dinitrotoluene	303.2	100	400	0	75.8	50-120	0			
Hexachloro-1,3-butadiene	181.2	100	400	0	45.3	25-105	0			
Hexachlorobenzene	274	100	400	0	68.5	50-110	0			
Hexachloroethane	173.6	100	400	0	43.4	30-95	0			
m-Cresol	192.4	100	400	0	48.1	30-110	0			
Nitrobenzene	219.2	100	400	0	54.8	45-110	0			
o-Cresol	194	100	400	0	48.5	40-110	0			
p-Cresol	192	100	400	0	48	30-110	0			
Pentachlorophenol	288.8	100	400	0	72.2	40-115	0			
Pyridine	122.6	200	400	0	30.6	10-80	0			J
Surr: 2,4,6-Tribromophenol	680.8	0	1000	0	68.1	38-115	0			
Surr: 2-Fluorobiphenyl	618.6	0	1000	0	61.9	32-100	0			
Surr: 2-Fluorophenol	309	0	1000	0	30.9	22-59	0			
Surr: 4-Terphenyl-d14	753.6	0	1000	0	75.4	23-112	0			
Surr: Nitrobenzene-d5	520.6	0	1000	0	52.1	31-93	0			
Surr: Phenol-d6	190.2	0	1000	0	19	13-36	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91700** Instrument ID **SVMS5** Method: **SW8270D**

MSD				Sample ID: 16091019-02A MSD			Units: µg/L		Analysis Date: 9/22/2016 02:42 PM		
Client ID:		Run ID: SVMS5_160922A			SeqNo: 4043338		Prep Date: 9/21/2016		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
1,4-Dichlorobenzene	256	100	400	0	64	30-110	178.6	35.6	30	R	
2,4,5-Trichlorophenol	297	100	400	0	74.2	50-110	280.4	5.75	30		
2,4,6-Trichlorophenol	260.4	100	400	0	65.1	50-115	241.2	7.66	30		
2,4-Dinitrotoluene	311.8	100	400	0	78	50-120	303.2	2.8	30		
Hexachloro-1,3-butadiene	249.8	100	400	0	62.4	25-105	181.2	31.8	30	R	
Hexachlorobenzene	271.6	100	400	0	67.9	50-110	274	0.88	30		
Hexachloroethane	271.4	100	400	0	67.8	30-95	173.6	44	30	R	
m-Cresol	222	100	400	0	55.5	30-110	192.4	14.3	30		
Nitrobenzene	262.4	100	400	0	65.6	45-110	219.2	17.9	30		
o-Cresol	238.6	100	400	0	59.6	40-110	194	20.6	30		
p-Cresol	222.4	100	400	0	55.6	30-110	192	14.7	30		
Pentachlorophenol	294.4	100	400	0	73.6	40-115	288.8	1.92	30		
Pyridine	124.2	200	400	0	31	10-80	122.6	0	30	J	
Surr: 2,4,6-Tribromophenol	698.2	0	1000	0	69.8	38-115	680.8	2.52	0		
Surr: 2-Fluorobiphenyl	707.4	0	1000	0	70.7	32-100	618.6	13.4	0		
Surr: 2-Fluorophenol	404.4	0	1000	0	40.4	22-59	309	26.7	0		
Surr: 4-Terphenyl-d14	744.6	0	1000	0	74.5	23-112	753.6	1.2	0		
Surr: Nitrobenzene-d5	626.2	0	1000	0	62.6	31-93	520.6	18.4	0		
Surr: Phenol-d6	243.4	0	1000	0	24.3	13-36	190.2	24.5	0		

The following samples were analyzed in this batch:

1609985-01A 1609985-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91739** Instrument ID **SVMS5** Method: **SW846 8270D**

MBLK		Sample ID: <b>SBLKS1-91739-91739</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/22/2016 10:14 AM</b>		
Client ID:		Run ID: <b>SVMS5_160922A</b>				SeqNo: <b>4042976</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1'-Biphenyl	ND	66								
2,2'-Oxybis(1-chloropropane)	ND	66								
2,4,5-Trichlorophenol	ND	66								
2,4,6-Trichlorophenol	ND	66								
2,4-Dichlorophenol	ND	66								
2,4-Dimethylphenol	ND	66								
2,4-Dinitrophenol	ND	66								
2,4-Dinitrotoluene	ND	66								
2,6-Dinitrotoluene	ND	66								
2-Chloronaphthalene	ND	13								
2-Chlorophenol	ND	66								
2-Methylnaphthalene	ND	13								
2-Methylphenol	ND	66								
2-Nitroaniline	ND	66								
2-Nitrophenol	ND	66								
3&4-Methylphenol	ND	66								
3,3'-Dichlorobenzidine	ND	330								
3-Nitroaniline	ND	66								
4,6-Dinitro-2-methylphenol	ND	66								
4-Bromophenyl phenyl ether	ND	66								
4-Chloro-3-methylphenol	ND	66								
4-Chloroaniline	ND	130								
4-Chlorophenyl phenyl ether	ND	66								
4-Nitroaniline	ND	330								
4-Nitrophenol	ND	66								
Acenaphthene	ND	13								
Acenaphthylene	ND	13								
Acetophenone	ND	66								
Anthracene	ND	13								
Atrazine	ND	66								
Benzaldehyde	ND	130								
Benzo(a)anthracene	ND	13								
Benzo(a)pyrene	ND	13								
Benzo(b)fluoranthene	ND	13								
Benzo(g,h,i)perylene	ND	13								
Benzo(k)fluoranthene	ND	13								
Bis(2-chloroethoxy)methane	ND	66								
Bis(2-chloroethyl)ether	ND	66								
Bis(2-ethylhexyl)phthalate	ND	66								
Butyl benzyl phthalate	ND	66								
Caprolactam	ND	66								
Carbazole	ND	66								

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91739</b>	Instrument ID <b>SVMS5</b>	Method: <b>SW846 8270D</b>						
Chrysene	ND	13						
Dibenzo(a,h)anthracene	ND	13						
Dibenzofuran	ND	66						
Diethyl phthalate	ND	66						
Dimethyl phthalate	ND	66						
Di-n-butyl phthalate	ND	66						
Di-n-octyl phthalate	ND	66						
Fluoranthene	ND	13						
Fluorene	ND	13						
Hexachlorobenzene	ND	66						
Hexachlorobutadiene	ND	66						
Hexachlorocyclopentadiene	ND	66						
Hexachloroethane	ND	66						
Indeno(1,2,3-cd)pyrene	ND	13						
Isophorone	ND	330						
Naphthalene	ND	13						
Nitrobenzene	ND	330						
N-Nitrosodimethylamine	ND	330						
N-Nitrosodi-n-propylamine	ND	66						
Pentachlorophenol	ND	66						
Phenanthrene	ND	13						
Phenol	ND	66						
Pyrene	ND	13						
<i>Surr: 2,4,6-Tribromophenol</i>	<i>2110</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>63.3</i>	<i>34-140</i>	<i>0</i>	
<i>Surr: 2-Fluorobiphenyl</i>	<i>2513</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>75.4</i>	<i>12-100</i>	<i>0</i>	
<i>Surr: 2-Fluorophenol</i>	<i>2643</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>79.3</i>	<i>33-117</i>	<i>0</i>	
<i>Surr: 4-Terphenyl-d14</i>	<i>2763</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>82.9</i>	<i>25-137</i>	<i>0</i>	
<i>Surr: Nitrobenzene-d5</i>	<i>2239</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>67.2</i>	<i>37-107</i>	<i>0</i>	
<i>Surr: Phenol-d6</i>	<i>2287</i>	<i>0</i>	<i>3333</i>	<i>0</i>	<i>68.6</i>	<i>40-106</i>	<i>0</i>	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91739** Instrument ID **SVMS5** Method: **SW846 8270D**

LCS		Sample ID: <b>SLCSS1-91739-91739</b>				Units: <b>µg/Kg</b>		Analysis Date: <b>9/26/2016 04:18 PM</b>		
Client ID:		Run ID: <b>SVMS4_160926A</b>				SeqNo: <b>4048265</b>		Prep Date: <b>9/22/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1'-Biphenyl	1013	66	1333	0	75.9	30-120	0			
2,2'-Oxybis(1-chloropropane)	986.7	66	1333	0	74	20-115	0			
2,4,5-Trichlorophenol	1009	66	1333	0	75.7	50-110	0			
2,4,6-Trichlorophenol	1055	66	1333	0	79.1	45-110	0			
2,4-Dichlorophenol	922.7	66	1333	0	69.2	45-110	0			
2,4-Dimethylphenol	858	66	1333	0	64.3	30-105	0			
2,4-Dinitrophenol	522	66	1333	0	39.1	15-130	0			
2,4-Dinitrotoluene	1246	66	1333	0	93.4	50-115	0			
2,6-Dinitrotoluene	1007	66	1333	0	75.5	50-110	0			
2-Chloronaphthalene	992	13	1333	0	74.4	45-105	0			
2-Chlorophenol	950.7	66	1333	0	71.3	45-105	0			
2-Methylnaphthalene	992.7	13	1333	0	74.4	45-105	0			
2-Methylphenol	960	66	1333	0	72	40-105	0			
2-Nitroaniline	950.7	66	1333	0	71.3	45-120	0			
2-Nitrophenol	976.7	66	1333	0	73.2	40-110	0			
3&4-Methylphenol	858.7	66	1333	0	64.4	40-105	0			
3,3'-Dichlorobenzidine	1108	330	1333	0	83.1	30-120	0			
3-Nitroaniline	899.3	66	1333	0	67.4	25-150	0			
4,6-Dinitro-2-methylphenol	1166	66	1333	0	87.4	40-130	0			
4-Bromophenyl phenyl ether	1102	66	1333	0	82.6	45-115	0			
4-Chloro-3-methylphenol	1003	66	1333	0	75.2	45-115	0			
4-Chloroaniline	975.3	130	1333	0	73.1	15-110	0			
4-Chlorophenyl phenyl ether	1085	66	1333	0	81.4	45-110	0			
4-Nitroaniline	706	330	1333	0	52.9	35-150	0			
4-Nitrophenol	1175	66	1333	0	88.1	15-140	0			
Acenaphthene	1005	13	1333	0	75.3	45-110	0			
Acenaphthylene	1149	13	1333	0	86.1	45-105	0			
Acetophenone	969.3	66	1333	0	72.7	30-120	0			
Anthracene	1140	13	1333	0	85.5	55-105	0			
Atrazine	1363	66	1333	0	102	30-120	0			
Benzaldehyde	436	130	1333	0	32.7	30-120	0			
Benzo(a)anthracene	1122	13	1333	0	84.1	50-110	0			
Benzo(a)pyrene	1196	13	1333	0	89.7	50-110	0			
Benzo(b)fluoranthene	1222	13	1333	0	91.6	45-115	0			
Benzo(g,h,i)perylene	1215	13	1333	0	91.1	40-125	0			
Benzo(k)fluoranthene	1164	13	1333	0	87.3	45-115	0			
Bis(2-chloroethoxy)methane	960.7	66	1333	0	72	45-110	0			
Bis(2-chloroethyl)ether	1075	66	1333	0	80.6	40-105	0			
Bis(2-ethylhexyl)phthalate	1205	66	1333	0	90.3	45-125	0			
Butyl benzyl phthalate	1091	66	1333	0	81.8	50-125	0			
Caprolactam	858	66	1333	0	64.3	30-120	0			
Carbazole	1083	66	1333	0	81.2	50-150	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91739</b>		Instrument ID <b>SVMS5</b>		Method: <b>SW846 8270D</b>			
Chrysene	1153	13	1333	0	86.4	55-110	0
Dibenzo(a,h)anthracene	1173	13	1333	0	87.9	40-125	0
Dibenzofuran	1011	66	1333	0	75.8	50-105	0
Diethyl phthalate	1105	66	1333	0	82.8	50-115	0
Dimethyl phthalate	1071	66	1333	0	80.3	50-110	0
Di-n-butyl phthalate	1223	66	1333	0	91.7	55-110	0
Di-n-octyl phthalate	1129	66	1333	0	84.7	40-130	0
Fluoranthene	1171	13	1333	0	87.8	55-115	0
Fluorene	1045	13	1333	0	78.4	50-110	0
Hexachlorobenzene	1115	66	1333	0	83.6	45-120	0
Hexachlorobutadiene	1070	66	1333	0	80.2	40-115	0
Hexachlorocyclopentadiene	1298	66	1333	0	97.3	40-115	0
Hexachloroethane	1072	66	1333	0	80.4	35-110	0
Indeno(1,2,3-cd)pyrene	1265	13	1333	0	94.9	40-120	0
Isophorone	999.3	330	1333	0	74.9	45-110	0
Naphthalene	989.3	13	1333	0	74.2	40-105	0
Nitrobenzene	1016	330	1333	0	76.2	40-115	0
N-Nitrosodimethylamine	954.7	330	1333	0	71.6	20-115	0
N-Nitrosodi-n-propylamine	1019	66	1333	0	76.4	40-115	0
Pentachlorophenol	1007	66	1333	0	75.5	25-120	0
Phenanthrene	1089	13	1333	0	81.7	50-110	0
Phenol	888.7	66	1333	0	66.6	40-100	0
Pyrene	1117	13	1333	0	83.7	45-125	0
Surr: 2,4,6-Tribromophenol	2734	0	3333	0	82	34-140	0
Surr: 2-Fluorobiphenyl	2503	0	3333	0	75.1	12-100	0
Surr: 2-Fluorophenol	2149	0	3333	0	64.5	33-117	0
Surr: 4-Terphenyl-d14	2638	0	3333	0	79.1	25-137	0
Surr: Nitrobenzene-d5	2334	0	3333	0	70	37-107	0
Surr: Phenol-d6	2175	0	3333	0	65.3	40-106	0

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91739** Instrument ID **SVMS5** Method: **SW846 8270D**

MS				Sample ID: <b>1609941-17A MS</b>			Units: <b>µg/Kg</b>		Analysis Date: <b>9/22/2016 01:09 PM</b>	
Client ID:				Run ID: <b>SVMS5_160922A</b>			SeqNo: <b>4042980</b>		Prep Date: <b>9/22/2016</b>	
							DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1'-Biphenyl	1037	62	1260	0	82.3	30-120	0			
2,4,5-Trichlorophenol	998.9	62	1260	0	79.2	50-110	0			
2,4,6-Trichlorophenol	913.2	62	1260	0	72.4	45-110	0			
2,4-Dichlorophenol	911.9	62	1260	0	72.3	45-110	0			
2,4-Dimethylphenol	647.8	62	1260	0	51.4	30-105	0			
2,4-Dinitrophenol	562.1	62	1260	0	44.6	15-130	0			
2,4-Dinitrotoluene	1052	62	1260	0	83.4	50-115	0			
2,6-Dinitrotoluene	1052	62	1260	0	83.4	50-110	0			
2-Chloronaphthalene	1043	13	1260	0	82.7	45-105	0			
2-Chlorophenol	1033	62	1260	0	81.9	45-105	0			
2-Methylnaphthalene	986.9	13	1260	0	78.3	45-105	0			
2-Methylphenol	898.7	62	1260	0	71.3	40-105	0			
2-Nitroaniline	979.3	62	1260	0	77.7	45-120	0			
2-Nitrophenol	955.4	62	1260	0	75.8	40-110	0			
3&4-Methylphenol	966.7	62	1260	0	76.7	40-105	0			
3,3'-Dichlorobenzidine	983.7	320	1260	0	78	30-120	0			
3-Nitroaniline	713.4	62	1260	0	56.6	25-150	0			
4,6-Dinitro-2-methylphenol	959.2	62	1260	0	76.1	40-130	0			
4-Bromophenyl phenyl ether	974.3	62	1260	0	77.3	45-115	0			
4-Chloro-3-methylphenol	971.8	62	1260	0	77.1	45-115	0			
4-Chloroaniline	1097	130	1260	0	87	15-110	0			
4-Chlorophenyl phenyl ether	1056	62	1260	0	83.8	45-110	0			
4-Nitroaniline	827.5	320	1260	0	65.6	35-150	0			
4-Nitrophenol	819.9	62	1260	0	65	15-140	0			
Acenaphthene	1031	13	1260	0	81.8	45-110	0			
Acenaphthylene	1199	13	1260	0	95.1	45-105	0			
Acetophenone	1151	62	1260	0	91.3	30-120	0			
Anthracene	1120	13	1260	0	88.9	55-105	0			
Atrazine	1364	62	1260	0	108	30-120	0			
Benzaldehyde	545.8	130	1260	0	43.3	30-120	0			
Benzo(a)anthracene	1047	13	1260	0	83	50-110	0			
Benzo(a)pyrene	1065	13	1260	0	84.5	50-110	0			
Benzo(b)fluoranthene	984.4	13	1260	0	78.1	45-115	0			
Benzo(g,h,i)perylene	1107	13	1260	0	87.8	40-125	0			
Benzo(k)fluoranthene	1152	13	1260	0	91.4	45-115	0			
Bis(2-chloroethoxy)methane	1039	62	1260	0	82.4	45-110	0			
Bis(2-chloroethyl)ether	1177	62	1260	0	93.3	40-105	0			
Bis(2-ethylhexyl)phthalate	1138	62	1260	0	90.2	45-125	0			
Butyl benzyl phthalate	1051	62	1260	0	83.4	50-125	0			
Caprolactam	983.1	62	1260	0	78	30-120	0			
Carbazole	1098	62	1260	0	87.1	50-150	0			
Chrysene	1165	13	1260	0	92.4	55-110	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91739</b>		Instrument ID <b>SVMS5</b>		Method: <b>SW846 8270D</b>				
Dibenzo(a,h)anthracene	1098	13	1260	0	87.1	40-125	0	
Dibenzofuran	1067	62	1260	0	84.6	50-105	0	
Diethyl phthalate	1146	62	1260	0	90.9	50-115	0	
Dimethyl phthalate	1109	62	1260	0	87.9	50-110	0	
Di-n-butyl phthalate	1153	62	1260	0	91.5	55-110	0	
Di-n-octyl phthalate	1030	62	1260	0	81.7	40-130	0	
Fluoranthene	1098	13	1260	0	87.1	55-115	0	
Fluorene	1063	13	1260	0	84.3	50-110	0	
Hexachlorobenzene	969.9	62	1260	0	76.9	45-120	0	
Hexachlorobutadiene	955.4	62	1260	0	75.8	40-115	0	
Hexachlorocyclopentadiene	1126	62	1260	0	89.3	40-115	0	
Hexachloroethane	1093	62	1260	0	86.7	35-110	0	
Indeno(1,2,3-cd)pyrene	1244	13	1260	0	98.7	40-120	0	
Isophorone	1095	320	1260	0	86.8	45-110	0	
Naphthalene	977.4	13	1260	0	77.5	40-105	0	
Nitrobenzene	971.8	320	1260	0	77.1	40-115	0	
N-Nitrosodimethylamine	955.4	320	1260	0	75.8	20-115	0	
N-Nitrosodi-n-propylamine	1182	62	1260	0	93.8	40-115	0	
Pentachlorophenol	989.4	62	1260	0	78.5	25-120	0	
Phenanthrene	1060	13	1260	0	84.1	50-110	0	
Phenol	835	62	1260	0	66.2	40-100	0	
Pyrene	1089	13	1260	0	86.4	45-125	0	
<i>Surr: 2,4,6-Tribromophenol</i>	<i>2406</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>76.4</i>	<i>34-140</i>	<i>0</i>	
<i>Surr: 2-Fluorobiphenyl</i>	<i>2616</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>83</i>	<i>12-100</i>	<i>0</i>	
<i>Surr: 2-Fluorophenol</i>	<i>2565</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>81.4</i>	<i>33-117</i>	<i>0</i>	
<i>Surr: 4-Terphenyl-d14</i>	<i>2620</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>83.2</i>	<i>25-137</i>	<i>0</i>	
<i>Surr: Nitrobenzene-d5</i>	<i>2395</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>76</i>	<i>37-107</i>	<i>0</i>	
<i>Surr: Phenol-d6</i>	<i>2467</i>	<i>0</i>	<i>3151</i>	<i>0</i>	<i>78.3</i>	<i>40-106</i>	<i>0</i>	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91739** Instrument ID **SVMS5** Method: **SW846 8270D**

MSD				Sample ID: <b>1609941-17A MSD</b>			Units: <b>µg/Kg</b>		Analysis Date: <b>9/22/2016 01:32 PM</b>	
Client ID:				Run ID: <b>SVMS5_160922A</b>			SeqNo: <b>4042981</b>		Prep Date: <b>9/22/2016</b>	
							DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1'-Biphenyl	1118	65	1321	0	84.6	30-120	1037	7.51	30	
2,4,5-Trichlorophenol	1136	65	1321	0	86	50-110	998.9	12.9	30	
2,4,6-Trichlorophenol	972.9	65	1321	0	73.6	45-110	913.2	6.34	30	
2,4-Dichlorophenol	1011	65	1321	0	76.5	45-110	911.9	10.3	30	
2,4-Dimethylphenol	673.7	65	1321	0	51	30-105	647.8	3.91	30	
2,4-Dinitrophenol	788.6	65	1321	0	59.7	15-130	562.1	33.5	30	R
2,4-Dinitrotoluene	1143	65	1321	0	86.5	50-115	1052	8.28	30	
2,6-Dinitrotoluene	1143	65	1321	0	86.5	50-110	1052	8.28	30	
2-Chloronaphthalene	1122	13	1321	0	84.9	45-105	1043	7.32	30	
2-Chlorophenol	1116	65	1321	0	84.5	45-105	1033	7.76	30	
2-Methylnaphthalene	1097	13	1321	0	83	45-105	986.9	10.6	30	
2-Methylphenol	967	65	1321	0	73.2	40-105	898.7	7.32	30	
2-Nitroaniline	1038	65	1321	0	78.5	45-120	979.3	5.78	30	
2-Nitrophenol	1072	65	1321	0	81.1	40-110	955.4	11.5	30	
3&4-Methylphenol	1042	65	1321	0	78.8	40-105	966.7	7.46	30	
3,3'-Dichlorobenzidine	974.9	330	1321	0	73.8	30-120	983.7	0.903	30	
3-Nitroaniline	761.6	65	1321	0	57.6	25-110	713.4	6.53	30	
4,6-Dinitro-2-methylphenol	1088	65	1321	0	82.3	40-130	959.2	12.6	30	
4-Bromophenyl phenyl ether	1032	65	1321	0	78.1	45-115	974.3	5.79	30	
4-Chloro-3-methylphenol	1049	65	1321	0	79.4	45-115	971.8	7.63	30	
4-Chloroaniline	1219	130	1321	0	92.3	15-110	1097	10.5	30	
4-Chlorophenyl phenyl ether	1127	65	1321	0	85.3	45-110	1056	6.53	30	
4-Nitroaniline	895	330	1321	0	67.7	35-150	827.5	7.84	30	
4-Nitrophenol	893	65	1321	0	67.6	15-140	819.9	8.54	30	
Acenaphthene	1118	13	1321	0	84.6	45-110	1031	8.06	30	
Acenaphthylene	1278	13	1321	0	96.7	45-105	1199	6.36	30	
Acetophenone	1260	65	1321	0	95.3	30-120	1151	8.98	30	
Anthracene	1188	13	1321	0	89.9	55-105	1120	5.87	30	
Atrazine	1472	65	1321	0	111	30-120	1364	7.61	30	
Benzaldehyde	642	130	1321	0	48.6	30-120	545.8	16.2	30	
Benzo(a)anthracene	1114	13	1321	0	84.3	50-110	1047	6.25	30	
Benzo(a)pyrene	1128	13	1321	0	85.4	50-110	1065	5.75	30	
Benzo(b)fluoranthene	1014	13	1321	0	76.7	45-115	984.4	2.95	30	
Benzo(g,h,i)perylene	1184	13	1321	0	89.6	40-125	1107	6.72	30	
Benzo(k)fluoranthene	1228	13	1321	0	92.9	45-115	1152	6.38	30	
Bis(2-chloroethoxy)methane	1143	65	1321	0	86.5	45-110	1039	9.55	30	
Bis(2-chloroethyl)ether	1273	65	1321	0	96.3	40-105	1177	7.86	30	
Bis(2-ethylhexyl)phthalate	1208	65	1321	0	91.4	45-125	1138	6.02	30	
Butyl benzyl phthalate	1129	65	1321	0	85.4	50-125	1051	7.12	30	
Caprolactam	1077	65	1321	0	81.5	30-120	983.1	9.08	30	
Carbazole	1171	65	1321	0	88.6	50-150	1098	6.4	30	
Chrysene	1233	13	1321	0	93.3	55-110	1165	5.72	30	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91739</b>		Instrument ID <b>SVMS5</b>		Method: <b>SW846 8270D</b>					
Dibenzo(a,h)anthracene	1205	13	1321	0	91.2	40-125	1098	9.29	30
Dibenzofuran	1134	65	1321	0	85.8	50-105	1067	6.1	30
Diethyl phthalate	1241	65	1321	0	93.9	50-115	1146	7.99	30
Dimethyl phthalate	1187	65	1321	0	89.8	50-110	1109	6.83	30
Di-n-butyl phthalate	1238	65	1321	0	93.7	55-110	1153	7.12	30
Di-n-octyl phthalate	1087	65	1321	0	82.2	40-130	1030	5.3	30
Fluoranthene	1170	13	1321	0	88.5	55-115	1098	6.35	30
Fluorene	1140	13	1321	0	86.3	50-110	1063	6.98	30
Hexachlorobenzene	1040	65	1321	0	78.7	45-120	969.9	6.94	30
Hexachlorobutadiene	1077	65	1321	0	81.5	40-115	955.4	11.9	30
Hexachlorocyclopentadiene	1296	65	1321	0	98.1	40-115	1126	14.1	30
Hexachloroethane	1220	65	1321	0	92.3	35-110	1093	11	30
Indeno(1,2,3-cd)pyrene	811.8	13	1321	0	61.4	40-120	1244	42.1	30 R
Isophorone	1209	330	1321	0	91.5	45-110	1095	9.9	30
Naphthalene	1100	13	1321	0	83.2	40-105	977.4	11.8	30
Nitrobenzene	1079	330	1321	0	81.7	40-115	971.8	10.5	30
N-Nitrosodimethylamine	1085	330	1321	0	82.1	20-115	955.4	12.7	30
N-Nitrosodi-n-propylamine	1287	65	1321	0	97.4	40-115	1182	8.51	30
Pentachlorophenol	1059	65	1321	0	80.1	25-120	989.4	6.77	30
Phenanthrene	1127	13	1321	0	85.3	50-110	1060	6.11	30
Phenol	931.3	65	1321	0	70.5	40-100	835	10.9	30
Pyrene	1172	13	1321	0	88.7	45-125	1089	7.32	30
Surr: 2,4,6-Tribromophenol	2512	0	3303	0	76.1	34-140	2406	4.3	40
Surr: 2-Fluorobiphenyl	2758	0	3303	0	83.5	12-100	2616	5.3	40
Surr: 2-Fluorophenol	2686	0	3303	0	81.3	33-117	2565	4.6	40
Surr: 4-Terphenyl-d14	2736	0	3303	0	82.9	25-137	2620	4.33	40
Surr: Nitrobenzene-d5	2632	0	3303	0	79.7	37-107	2395	9.42	40
Surr: Phenol-d6	2678	0	3303	0	81.1	40-106	2467	8.21	40

The following samples were analyzed in this batch:

1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91663** Instrument ID **VMS7** Method: **SW8260B**

MBLK		Sample ID: <b>MBLK-91663-91663</b>				Units: <b>µg/Kg-dry</b>		Analysis Date: <b>9/20/2016 10:38 PM</b>		
Client ID:		Run ID: <b>VMS7_160920B</b>				SeqNo: <b>4038211</b>		Prep Date: <b>9/20/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	ND	30								
1,1,1-Trichloroethane	ND	30								
1,1,2,2-Tetrachloroethane	ND	30								
1,1,2-Trichloroethane	ND	30								
1,1,2-Trichlorotrifluoroethane	ND	30								
1,1-Dichloroethane	ND	30								
1,1-Dichloroethene	ND	30								
1,2,3-Trichloropropane	ND	30								
1,2,4-Trichlorobenzene	ND	30								
1,2,4-Trimethylbenzene	ND	30								
1,2-Dibromo-3-chloropropane	ND	30								
1,2-Dibromoethane	ND	30								
1,2-Dichlorobenzene	ND	30								
1,2-Dichloroethane	ND	30								
1,2-Dichloropropane	ND	30								
1,3,5-Trimethylbenzene	ND	30								
1,3-Dichlorobenzene	ND	30								
1,4-Dichlorobenzene	ND	30								
2-Butanone	ND	200								
2-Hexanone	ND	30								
2-Methylnaphthalene	ND	100								
4-Methyl-2-pentanone	ND	30								
Acetone	ND	100								
Acrylonitrile	ND	100								
Benzene	ND	30								
Bromochloromethane	ND	30								
Bromodichloromethane	ND	30								
Bromoform	ND	30								
Bromomethane	ND	75								
Carbon disulfide	ND	30								
Carbon tetrachloride	ND	30								
Chlorobenzene	ND	30								
Chloroethane	ND	100								
Chloroform	ND	30								
Chloromethane	ND	100								
cis-1,2-Dichloroethene	ND	30								
cis-1,3-Dichloropropene	ND	30								
Dibromochloromethane	ND	30								
Dibromomethane	ND	30								
Dichlorodifluoromethane	ND	30								
Diethyl ether	ND	30								
Ethylbenzene	ND	30								

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91663</b>	Instrument ID <b>VMS7</b>	Method: <b>SW8260B</b>						
Hexachloroethane	ND	100						
Isopropylbenzene	ND	30						
m,p-Xylene	ND	60						
Methyl iodide	ND	75						
Methyl tert-butyl ether	ND	30						
Methylene chloride	ND	30						
Naphthalene	ND	100						
n-Propylbenzene	ND	30						
o-Xylene	ND	30						
Styrene	ND	30						
Tetrachloroethene	ND	30						
Toluene	ND	30						
trans-1,2-Dichloroethene	ND	30						
trans-1,3-Dichloropropene	ND	30						
trans-1,4-Dichloro-2-butene	ND	30						
Trichloroethene	ND	30						
Trichlorofluoromethane	ND	30						
Vinyl acetate	ND	250						
Vinyl chloride	ND	30						
Xylenes, Total	ND	90						
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>990</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>99</i>	<i>70-130</i>	<i>0</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>963</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>96.3</i>	<i>70-130</i>	<i>0</i>	
<i>Surr: Dibromofluoromethane</i>	<i>901.5</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>90.2</i>	<i>70-130</i>	<i>0</i>	
<i>Surr: Toluene-d8</i>	<i>1005</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>100</i>	<i>70-130</i>	<i>0</i>	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91663** Instrument ID **VMS7** Method: **SW8260B**

LCS		Sample ID: <b>LCS-91663-91663</b>				Units: <b>µg/Kg-dry</b>		Analysis Date: <b>9/20/2016 09:29 PM</b>		
Client ID:		Run ID: <b>VMS7_160920B</b>				SeqNo: <b>4038210</b>		Prep Date: <b>9/20/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	923.5	30	1000	0	92.4	75-125	0			
1,1,1-Trichloroethane	953	30	1000	0	95.3	70-135	0			
1,1,2,2-Tetrachloroethane	952.5	30	1000	0	95.2	55-130	0			
1,1,2-Trichloroethane	932.5	30	1000	0	93.2	60-125	0			
1,1-Dichloroethane	976	30	1000	0	97.6	75-125	0			
1,1-Dichloroethene	1000	30	1000	0	100	65-135	0			
1,2,3-Trichloropropane	935.5	30	1000	0	93.6	65-130	0			
1,2,4-Trichlorobenzene	923.5	30	1000	0	92.4	65-130	0			
1,2,4-Trimethylbenzene	924	30	1000	0	92.4	65-135	0			
1,2-Dibromo-3-chloropropane	855.5	30	1000	0	85.6	40-135	0			
1,2-Dibromoethane	1688	30	1000	0	169	75-125	0			S
1,2-Dichlorobenzene	951.5	30	1000	0	95.2	75-120	0			
1,2-Dichloroethane	911.5	30	1000	0	91.2	70-135	0			
1,2-Dichloropropane	923	30	1000	0	92.3	70-120	0			
1,3,5-Trimethylbenzene	951.5	30	1000	0	95.2	65-135	0			
1,3-Dichlorobenzene	955	30	1000	0	95.5	70-125	0			
1,4-Dichlorobenzene	927	30	1000	0	92.7	70-125	0			
2-Butanone	1066	200	1000	0	107	30-160	0			
2-Hexanone	987	30	1000	0	98.7	45-145	0			
4-Methyl-2-pentanone	1165	30	1000	0	116	74-176	0			
Acetone	1124	100	1000	0	112	20-160	0			
Acrylonitrile	979.5	100	1000	0	98	70-135	0			
Benzene	949	30	1000	0	94.9	75-125	0			
Bromochloromethane	974	30	1000	0	97.4	70-125	0			
Bromodichloromethane	899	30	1000	0	89.9	70-130	0			
Bromoform	785	30	1000	0	78.5	55-135	0			
Bromomethane	905	75	1000	0	90.5	30-160	0			
Carbon disulfide	931	30	1000	0	93.1	45-160	0			
Carbon tetrachloride	967	30	1000	0	96.7	65-135	0			
Chlorobenzene	917.5	30	1000	0	91.8	75-125	0			
Chloroethane	981.5	100	1000	0	98.2	40-155	0			
Chloroform	962.5	30	1000	0	96.2	70-125	0			
Chloromethane	862.5	100	1000	0	86.2	50-130	0			
cis-1,2-Dichloroethene	926	30	1000	0	92.6	65-125	0			
cis-1,3-Dichloropropene	919	30	1000	0	91.9	70-125	0			
Dibromochloromethane	789	30	1000	0	78.9	65-135	0			
Dibromomethane	953.5	30	1000	0	95.4	75-130	0			
Dichlorodifluoromethane	643.5	30	1000	0	64.4	35-135	0			
Ethylbenzene	957.5	30	1000	0	95.8	75-125	0			
Hexachloroethane	777.5	100	1000	0	77.8	53-112	0			
Isopropylbenzene	947.5	30	1000	0	94.8	75-130	0			
m,p-Xylene	1896	60	2000	0	94.8	80-125	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91663</b>	Instrument ID <b>VMS7</b>		Method: <b>SW8260B</b>						
Methyl iodide	1562	75	1000	0	156	64-145	0		S
Methyl tert-butyl ether	1033	30	1000	0	103	75-125	0		
Methylene chloride	1052	30	1000	0	105	55-145	0		
Naphthalene	959.5	100	1000	0	96	40-140	0		
n-Propylbenzene	932.5	30	1000	0	93.2	65-135	0		
o-Xylene	954.5	30	1000	0	95.4	75-125	0		
Styrene	981.5	30	1000	0	98.2	75-125	0		
Tetrachloroethene	1116	30	1000	0	112	64-140	0		
Toluene	952.5	30	1000	0	95.2	70-125	0		
trans-1,2-Dichloroethene	969	30	1000	0	96.9	65-135	0		
trans-1,3-Dichloropropene	896.5	30	1000	0	89.6	65-125	0		
trans-1,4-Dichloro-2-butene	767.5	30	1000	0	76.8	62-112	0		
Trichloroethene	928	30	1000	0	92.8	75-125	0		
Trichlorofluoromethane	895.5	30	1000	0	89.6	25-185	0		
Vinyl chloride	896.5	30	1000	0	89.6	60-125	0		
Xylenes, Total	2850	90	3000	0	95	75-125	0		
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>1018</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>102</i>	<i>70-130</i>	<i>0</i>		
<i>Surr: 4-Bromofluorobenzene</i>	<i>998.5</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>99.8</i>	<i>70-130</i>	<i>0</i>		
<i>Surr: Dibromofluoromethane</i>	<i>1020</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>102</i>	<i>70-130</i>	<i>0</i>		
<i>Surr: Toluene-d8</i>	<i>996</i>	<i>0</i>	<i>1000</i>	<i>0</i>	<i>99.6</i>	<i>70-130</i>	<i>0</i>		

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91663** Instrument ID **VMS7** Method: **SW8260B**

MS				Sample ID: <b>1609987-12A MS</b>			Units: <b>µg/Kg-dry</b>		Analysis Date: <b>9/24/2016 06:00 AM</b>	
Client ID:				Run ID: <b>VMS7_160923B</b>			SeqNo: <b>4044264</b>		Prep Date: <b>9/20/2016</b>	
							DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	1027	40	1326	0	77.5	75-125	0			
1,1,1-Trichloroethane	1150	40	1326	0	86.8	70-135	0			
1,1,2,2-Tetrachloroethane	636.9	40	1326	0	48	55-130	0			S
1,1,2-Trichloroethane	1092	40	1326	0	82.4	60-125	0			
1,1-Dichloroethane	1298	40	1326	0	97.9	75-125	0			
1,1-Dichloroethene	1382	40	1326	0	104	65-135	0			
1,2,3-Trichloropropane	1067	40	1326	0	80.5	65-130	0			
1,2,4-Trichlorobenzene	1168	40	1326	0	88.1	65-130	0			
1,2,4-Trimethylbenzene	1271	40	1326	0	95.9	65-135	0			
1,2-Dibromo-3-chloropropane	729.7	40	1326	0	55	40-135	0			
1,2-Dibromoethane	1854	40	1326	0	140	75-125	0			S
1,2-Dichlorobenzene	1150	40	1326	0	86.8	75-120	0			
1,2-Dichloroethane	1172	40	1326	0	88.4	70-135	0			
1,2-Dichloropropane	1165	40	1326	0	87.8	70-120	0			
1,3,5-Trimethylbenzene	1218	40	1326	0	91.8	65-135	0			
1,3-Dichlorobenzene	1165	40	1326	0	87.9	70-125	0			
1,4-Dichlorobenzene	1143	40	1326	0	86.2	70-125	0			
2-Butanone	2083	270	1326	0	157	30-160	0			
2-Hexanone	1582	40	1326	0	119	45-145	0			
4-Methyl-2-pentanone	1204	40	1326	0	90.8	74-176	0			
Acetone	3169	130	1326	0	239	20-160	0			S
Acrylonitrile	1212	130	1326	0	91.4	70-135	0			
Benzene	1202	40	1326	0	90.6	75-125	0			
Bromochloromethane	1288	40	1326	0	97.2	70-125	0			
Bromodichloromethane	1026	40	1326	0	77.4	70-130	0			
Bromoform	720.5	40	1326	0	54.4	55-135	0			S
Bromomethane	381.1	99	1326	0	28.8	30-160	0			S
Carbon disulfide	1002	40	1326	0	75.6	45-160	0			
Carbon tetrachloride	1141	40	1326	0	86.1	65-135	0			
Chlorobenzene	1154	40	1326	0	87	75-125	0			
Chloroethane	1086	130	1326	0	81.9	40-155	0			
Chloroform	1239	40	1326	0	93.5	70-125	0			
Chloromethane	1197	130	1326	0	90.3	50-130	0			
cis-1,2-Dichloroethene	1210	40	1326	0	91.2	65-125	0			
cis-1,3-Dichloropropene	1023	40	1326	0	77.2	70-125	0			
Dibromochloromethane	808.6	40	1326	0	61	65-135	0			S
Dibromomethane	1171	40	1326	0	88.4	75-130	0			
Dichlorodifluoromethane	907.4	40	1326	0	68.4	35-135	0			
Ethylbenzene	1229	40	1326	0	92.7	75-125	0			
Hexachloroethane	873.6	130	1326	0	65.9	53-112	0			
Isopropylbenzene	1205	40	1326	0	90.9	75-130	0			
m,p-Xylene	2497	80	2651	0	94.2	80-125	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91663</b>	Instrument ID <b>VMS7</b>		Method: <b>SW8260B</b>				
Methyl iodide	896.8	99	1326	0	67.6	30-105	0
Methyl tert-butyl ether	1314	40	1326	0	99.1	75-125	0
Methylene chloride	1306	40	1326	0	98.5	55-145	0
Naphthalene	1055	130	1326	0	79.6	40-140	0
n-Propylbenzene	1210	40	1326	0	91.2	65-135	0
o-Xylene	1221	40	1326	0	92.1	75-125	0
Styrene	1187	40	1326	0	89.6	75-125	0
Tetrachloroethene	2326	40	1326	1047	96.4	64-140	0
Toluene	1202	40	1326	0	90.7	70-125	0
trans-1,2-Dichloroethene	1286	40	1326	0	97	65-135	0
trans-1,3-Dichloropropene	920.6	40	1326	0	69.4	65-125	0
trans-1,4-Dichloro-2-butene	736.4	40	1326	0	55.6	45-86	0
Trichloroethene	1463	40	1326	0	110	75-125	0
Trichlorofluoromethane	1188	40	1326	0	89.6	25-185	0
Vinyl chloride	1175	40	1326	0	88.6	60-125	0
Xylenes, Total	3718	120	3977	0	93.5	75-125	0
<i>Surr: 1,2-Dichloroethane-d4</i>	1408	0	1326	0	106	70-130	0
<i>Surr: 4-Bromofluorobenzene</i>	1323	0	1326	0	99.8	70-130	0
<i>Surr: Dibromofluoromethane</i>	1290	0	1326	0	97.4	70-130	0
<i>Surr: Toluene-d8</i>	1324	0	1326	0	99.9	70-130	0

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91663** Instrument ID **VMS7** Method: **SW8260B**

MSD				Sample ID: 1609987-12A MSD			Units: µg/Kg-dry		Analysis Date: 9/24/2016 06:23 AM		
Client ID:		Run ID: VMS7_160923B			SeqNo: 4044265		Prep Date: 9/20/2016		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
1,1,1,2-Tetrachloroethane	1040	40	1326	0	78.4	75-125	1027	1.22	30		
1,1,1-Trichloroethane	1153	40	1326	0	87	70-135	1150	0.23	30		
1,1,2,2-Tetrachloroethane	562.7	40	1326	0	42.4	55-130	636.9	12.4	30	S	
1,1,2-Trichloroethane	1118	40	1326	0	84.4	60-125	1092	2.4	30		
1,1-Dichloroethane	1269	40	1326	0	95.8	75-125	1298	2.22	30		
1,1-Dichloroethene	1341	40	1326	0	101	65-135	1382	3.02	30		
1,2,3-Trichloropropane	1052	40	1326	0	79.4	65-130	1067	1.44	30		
1,2,4-Trichlorobenzene	1112	40	1326	0	83.9	65-130	1168	4.88	30		
1,2,4-Trimethylbenzene	1180	40	1326	0	89	65-135	1271	7.46	30		
1,2-Dibromo-3-chloropropane	780.1	40	1326	0	58.8	40-135	729.7	6.67	30		
1,2-Dibromoethane	1910	40	1326	0	144	75-125	1854	2.92	30	S	
1,2-Dichlorobenzene	1149	40	1326	0	86.7	75-120	1150	0.0577	30		
1,2-Dichloroethane	1165	40	1326	0	87.9	70-135	1172	0.624	30		
1,2-Dichloropropane	1176	40	1326	0	88.8	70-120	1165	1.02	30		
1,3,5-Trimethylbenzene	1198	40	1326	0	90.4	65-135	1218	1.59	30		
1,3-Dichlorobenzene	1165	40	1326	0	87.8	70-125	1165	0.0569	30		
1,4-Dichlorobenzene	1131	40	1326	0	85.4	70-125	1143	0.991	30		
2-Butanone	2037	270	1326	0	154	30-160	2083	2.25	30		
2-Hexanone	1514	40	1326	0	114	45-145	1582	4.37	30		
4-Methyl-2-pentanone	1223	40	1326	0	92.2	74-176	1204	1.58	30		
Acetone	3024	130	1326	0	228	20-160	3169	4.69	30	S	
Acrylonitrile	1229	130	1326	0	92.7	70-135	1212	1.36	30		
Benzene	1196	40	1326	0	90.2	75-125	1202	0.442	30		
Bromochloromethane	1269	40	1326	0	95.7	70-125	1288	1.5	30		
Bromodichloromethane	1024	40	1326	0	77.2	70-130	1026	0.194	30		
Bromoform	758.2	40	1326	0	57.2	55-135	720.5	5.11	30		
Bromomethane	292.3	99	1326	0	22	30-160	381.1	26.4	30	S	
Carbon disulfide	1009	40	1326	0	76.2	45-160	1002	0.725	30		
Carbon tetrachloride	1151	40	1326	0	86.8	65-135	1141	0.867	30		
Chlorobenzene	1159	40	1326	0	87.4	75-125	1154	0.458	30		
Chloroethane	1048	130	1326	0	79	40-155	1086	3.54	30		
Chloroform	1240	40	1326	0	93.6	70-125	1239	0.0535	30		
Chloromethane	1185	130	1326	0	89.4	50-130	1197	1	30		
cis-1,2-Dichloroethene	1200	40	1326	0	90.6	65-125	1210	0.77	30		
cis-1,3-Dichloropropene	1025	40	1326	0	77.3	70-125	1023	0.129	30		
Dibromochloromethane	830.5	40	1326	0	62.6	65-135	808.6	2.67	30	S	
Dibromomethane	1161	40	1326	0	87.6	75-130	1171	0.853	30		
Dichlorodifluoromethane	794	40	1326	0	59.9	35-135	907.4	13.3	30		
Ethylbenzene	1236	40	1326	0	93.2	75-125	1229	0.592	30		
Hexachloroethane	859.6	130	1326	0	64.8	53-112	873.6	1.61	30		
Isopropylbenzene	1221	40	1326	0	92.1	75-130	1205	1.31	30		
m,p-Xylene	2441	80	2651	0	92.1	80-125	2497	2.28	30		

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: <b>91663</b>	Instrument ID <b>VMS7</b>			Method: <b>SW8260B</b>					
Methyl iodide	1197	99	1326	0	90.3	30-105	896.8	28.7	30
Methyl tert-butyl ether	1304	40	1326	0	98.4	75-125	1314	0.709	30
Methylene chloride	1274	40	1326	0	96.1	55-145	1306	2.47	30
Naphthalene	1062	130	1326	0	80.1	40-140	1055	0.626	30
n-Propylbenzene	1206	40	1326	0	91	65-135	1210	0.274	30
o-Xylene	1217	40	1326	0	91.8	75-125	1221	0.326	30
Styrene	1227	40	1326	0	92.6	75-125	1187	3.29	30
Tetrachloroethene	2732	40	1326	1047	127	64-140	2326	16.1	30
Toluene	1240	40	1326	0	93.6	70-125	1202	3.09	30
trans-1,2-Dichloroethene	1265	40	1326	0	95.4	65-135	1286	1.61	30
trans-1,3-Dichloropropene	977.6	40	1326	0	73.8	65-125	920.6	6.01	30
trans-1,4-Dichloro-2-butene	729.1	40	1326	0	55	45-86	736.4	0.995	30
Trichloroethene	1528	40	1326	0	115	75-125	1463	4.34	30
Trichlorofluoromethane	1150	40	1326	0	86.8	25-185	1188	3.29	30
Vinyl chloride	1123	40	1326	0	84.7	60-125	1175	4.56	30
Xylenes, Total	3658	120	3977	0	92	75-125	3718	1.64	30
<i>Surr: 1,2-Dichloroethane-d4</i>	1376	0	1326	0	104	70-130	1408	2.33	30
<i>Surr: 4-Bromofluorobenzene</i>	1349	0	1326	0	102	70-130	1323	1.98	30
<i>Surr: Dibromofluoromethane</i>	1274	0	1326	0	96.1	70-130	1290	1.29	30
<i>Surr: Toluene-d8</i>	1335	0	1326	0	101	70-130	1324	0.798	30

The following samples were analyzed in this batch:

1609985-02B	1609985-04B
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**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196197A** Instrument ID **VMS6** Method: **SW8260B**

MBLK		Sample ID: <b>VLKW1-160921-R196197A</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/21/2016 02:24 PM</b>		
Client ID:		Run ID: <b>VMS6_160921A</b>				SeqNo: <b>4039170</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	ND	1.0								
1,2-Dichloroethane	ND	1.0								
2-Butanone	ND	5.0								
Benzene	ND	1.0								
Carbon tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroform	ND	1.0								
Tetrachloroethene	ND	1.0								
Trichloroethene	ND	1.0								
Vinyl chloride	ND	1.0								
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>19.31</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>96.6</i>	<i>75-120</i>	<i>0</i>			
<i>Surr: 4-Bromofluorobenzene</i>	<i>18.97</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>94.8</i>	<i>80-110</i>	<i>0</i>			
<i>Surr: Dibromofluoromethane</i>	<i>19</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>95</i>	<i>85-115</i>	<i>0</i>			
<i>Surr: Toluene-d8</i>	<i>19.59</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>98</i>	<i>85-110</i>	<i>0</i>			

LCS		Sample ID: <b>VLCSW1-160921-R196197A</b>				Units: <b>µg/L</b>		Analysis Date: <b>9/21/2016 01:31 PM</b>		
Client ID:		Run ID: <b>VMS6_160921A</b>				SeqNo: <b>4039169</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	20.97	1.0	20	0	105	70-145	0			
1,2-Dichloroethane	18.33	1.0	20	0	91.6	78-125	0			
2-Butanone	18.05	5.0	20	0	90.2	55-150	0			
Benzene	20.15	1.0	20	0	101	85-125	0			
Carbon tetrachloride	17.15	1.0	20	0	85.8	65-140	0			
Chlorobenzene	19.13	1.0	20	0	95.6	80-120	0			
Chloroform	19.44	1.0	20	0	97.2	80-130	0			
Tetrachloroethene	20.03	1.0	20	0	100	77-138	0			
Trichloroethene	19.75	1.0	20	0	98.8	84-130	0			
Vinyl chloride	16.59	1.0	20	0	83	50-136	0			
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>19.4</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>97</i>	<i>75-120</i>	<i>0</i>			
<i>Surr: 4-Bromofluorobenzene</i>	<i>19.78</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>98.9</i>	<i>80-110</i>	<i>0</i>			
<i>Surr: Dibromofluoromethane</i>	<i>20.03</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>100</i>	<i>85-115</i>	<i>0</i>			
<i>Surr: Toluene-d8</i>	<i>19.95</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>99.8</i>	<i>85-110</i>	<i>0</i>			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196197A** Instrument ID **VMS6** Method: **SW8260B**

MS				Sample ID: 16091057-01A MS			Units: µg/L		Analysis Date: 9/21/2016 11:05 PM	
Client ID:				Run ID: VMS6_160921A			SeqNo: 4040256		Prep Date:	
									DF: 200	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	4450	200	4000	0	111	70-145	0			
1,2-Dichloroethane	3636	200	4000	0	90.9	78-125	0			
2-Butanone	5834	1,000	4000	2458	84.4	55-150	0			
Benzene	4060	200	4000	0	102	85-125	0			
Carbon tetrachloride	3562	200	4000	0	89	65-140	0			
Chlorobenzene	3840	200	4000	0	96	80-120	0			
Chloroform	3818	200	4000	0	95.4	80-130	0			
Tetrachloroethene	4186	200	4000	0	105	77-138	0			
Trichloroethene	4076	200	4000	0	102	84-130	0			
Vinyl chloride	3630	200	4000	0	90.8	50-136	0			
Surr: 1,2-Dichloroethane-d4	3916	0	4000	0	97.9	75-120	0			
Surr: 4-Bromofluorobenzene	4030	0	4000	0	101	80-110	0			
Surr: Dibromofluoromethane	3960	0	4000	0	99	85-115	0			
Surr: Toluene-d8	3988	0	4000	0	99.7	85-110	0			

MSD				Sample ID: 16091057-01A MSD			Units: µg/L		Analysis Date: 9/21/2016 11:32 PM	
Client ID:				Run ID: VMS6_160921A			SeqNo: 4040257		Prep Date:	
									DF: 200	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	4478	200	4000	0	112	70-145	4450	0.627	30	
1,2-Dichloroethane	3760	200	4000	0	94	78-125	3636	3.35	30	
2-Butanone	6230	1,000	4000	2458	94.3	55-150	5834	6.56	30	
Benzene	4182	200	4000	0	105	85-125	4060	2.96	30	
Carbon tetrachloride	3786	200	4000	0	94.6	65-140	3562	6.1	30	
Chlorobenzene	3862	200	4000	0	96.6	80-120	3840	0.571	30	
Chloroform	3866	200	4000	0	96.6	80-130	3818	1.25	30	
Tetrachloroethene	4238	200	4000	0	106	77-138	4186	1.23	30	
Trichloroethene	4114	200	4000	0	103	84-130	4076	0.928	30	
Vinyl chloride	3764	200	4000	0	94.1	50-136	3630	3.62	30	
Surr: 1,2-Dichloroethane-d4	3942	0	4000	0	98.6	75-120	3916	0.662	30	
Surr: 4-Bromofluorobenzene	3974	0	4000	0	99.4	80-110	4030	1.4	30	
Surr: Dibromofluoromethane	4018	0	4000	0	100	85-115	3960	1.45	30	
Surr: Toluene-d8	4008	0	4000	0	100	85-110	3988	0.5	30	

The following samples were analyzed in this batch:

1609985-01B 1609985-03B

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **91542** Instrument ID **WETCHEM** Method: **SW9045D**

LCS		Sample ID: LCS-91542-91542				Units: s.u.		Analysis Date: 9/17/2016 03:30 PM		
Client ID:		Run ID: WETCHEM_160917E				SeqNo: 4031378		Prep Date: 9/17/2016		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	4.02	0	4	0	100	90-110	0			

DUP				Sample ID: 1609827-01B DUP				Units: s.u.		Analysis Date: 9/17/2016 03:30 PM	
Client ID:			Run ID: WETCHEM_160917E			SeqNo: 4031386		Prep Date: 9/17/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
pH	8.26	0	0	0	0	0-0	8.41	1.8	20		

DUP				Sample ID: 1609985-04A DUP				Units: s.u.			Analysis Date: 9/17/2016 03:30 PM			
Client ID: CHLL-WC02-0-6				Run ID: WETCHEM_160917E				SeqNo: 4031392			Prep Date: 9/17/2016		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
pH	7.46	0	0	0	0	0-0	7.15	4.24	20					

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196107** Instrument ID **WETCHEM** Method: **SW1010A**

LCS				Sample ID: LCS-R196107-R196107				Units: °F			Analysis Date: 9/20/2016 10:47 AM		
Client ID:				Run ID: WETCHEM_160920H				SeqNo: 4035890		Prep Date:		DF: 1	
Analyte				Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Flashpoint/Ignitability	83	0	81	0	102	97-103	0			
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DUP		Sample ID: 16091054-01A DUP					Units: °F		Analysis Date: 9/20/2016 10:47 AM		
Client ID:		Run ID: WETCHEM_160920H			SeqNo: 4035892		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Flashpoint/Ignitability	ND	0	0	0	0	0-0	0	0	10	
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The following samples were analyzed in this batch:

1609985-02A	1609985-04A
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**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196402** Instrument ID **MOIST** Method: **SW3550C**

MBLK		Sample ID: WBLKS-R196402				Units: % of sample		Analysis Date: 9/22/2016 01:50 PM		
Client ID:		Run ID: MOIST_160922B				SeqNo: 4043077		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Moisture ND 0.050

LCS		Sample ID: LCS-R196402					Units: % of sample		Analysis Date: 9/22/2016 01:50 PM		
Client ID:			Run ID: MOIST_160922B			SeqNo: 4043076		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Moisture 100 0.050 100 0 100 99.5-100.5 0

<b>DUP</b>				Sample ID: <b>16091251-01B DUP</b>				Units: <b>% of sample</b>			Analysis Date: <b>9/22/2016 01:50 PM</b>			
Client ID:				Run ID: <b>MOIST_160922B</b>				SeqNo: <b>4043063</b>			Prep Date:		DF: <b>1</b>	
Analyte				Result		PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Moisture 64.14 0.050 0 0 0 64.11 0.0468 20

<b>DUP</b>				Sample ID: <b>1609994-02B DUP</b>				Units: % of sample			Analysis Date: <b>9/22/2016 01:50 PM</b>			
Client ID:				Run ID: <b>MOIST_160922B</b>				SeqNo: <b>4043072</b>			Prep Date:		DF: <b>1</b>	
Analyte				Result		PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Moisture 7.84 0.050 0 0 0 8.52 8.31 20

The following samples were analyzed in this batch:

1609985-02A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196437** Instrument ID **WETCHEM** Method: **SW7.3.4.2**

<b>MBLK</b>		Sample ID: <b>MB-R196437-R196437</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID:		Run ID: <b>WETCHEM_160923H</b>		SeqNo: <b>4043914</b>		Prep Date:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide, Reactive	ND	100								

<b>LCS</b>		Sample ID: <b>LCS-R196437-R196437</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID:		Run ID: <b>WETCHEM_160923H</b>		SeqNo: <b>4043915</b>		Prep Date:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide, Reactive	1584	100	2149	0	73.7	60-120	0			

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196438** Instrument ID **WETCHEM** Method: **SW7.3.3.2**

<b>MBLK</b>		Sample ID: <b>MB-R196438-R196438</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID:		Run ID: <b>WETCHEM_160923I</b>				SeqNo: <b>4043959</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Cyanide, Reactive ND 100

<b>LCS</b>		Sample ID: <b>LCS-R196438-R196438</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID:		Run ID: <b>WETCHEM_160923I</b>				SeqNo: <b>4043960</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Cyanide, Reactive 124.8 100 125 0 99.8 75-125 0

<b>MS</b>		Sample ID: <b>1609985-04A MS</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID: <b>CHLL-WC02-0-6</b>		Run ID: <b>WETCHEM_160923I</b>				SeqNo: <b>4043965</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Cyanide, Reactive 233.9 100 250 0 93.6 50-150 0

<b>MSD</b>		Sample ID: <b>1609985-04A MSD</b>				Units: <b>mg/Kg</b>		Analysis Date: <b>9/23/2016 01:00 PM</b>		
Client ID: <b>CHLL-WC02-0-6</b>		Run ID: <b>WETCHEM_160923I</b>				SeqNo: <b>4043966</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Cyanide, Reactive 233.9 100 250 0 93.6 50-150 233.9 0 35

The following samples were analyzed in this batch:

1609985-02A 1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Michigan Dept.of Environmental Quality  
**Work Order:** 1609985  
**Project:** Abandoned Mining Wastes - Torch Lake

## QC BATCH REPORT

Batch ID: **R196465** Instrument ID **MOIST** Method: **SW3550C**

MBLK		Sample ID: WBLKS-R196465				Units: % of sample		Analysis Date: 9/23/2016 07:00 PM		
Client ID:		Run ID: MOIST_160923E				SeqNo: 4044522		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Moisture ND 0.050

LCS		Sample ID: LCS-R196465					Units: % of sample		Analysis Date: 9/23/2016 07:00 PM		
Client ID:			Run ID: MOIST_160923E			SeqNo: 4044521		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Moisture 100 0.050 100 0 100 99.5-100.5 0

DUP				Sample ID: 16091144-02A DUP				Units: % of sample			Analysis Date: 9/23/2016 07:00 PM			
Client ID:				Run ID: MOIST_160923E				SeqNo: 4044509			Prep Date:		DF: 1	
Analyte				Result		PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Moisture 14.74 0.050 0 0 0 14.74 0 20

DUP				Sample ID: 1609985-04A DUP				Units: % of sample			Analysis Date: 9/23/2016 07:00 PM			
Client ID: CHLL-WC02-0-6				Run ID: MOIST_160923E				SeqNo: 4044520			Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				

Moisture 19.49 0.050 0 0 0 19.53 0.205 20

The following samples were analyzed in this batch:

1609985-04A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



☐ ALS Environmental  
10450 Stancliff Rd. #210  
Houston, Texas 77099  
(Tel) 281.530.5656  
(Fax) 281.530.5887

## Chain of Custody Form

Page 1 of 1

☒ ALS Environmental  
3352 128th Avenue  
Holland, Michigan 49424  
(Tel) 616.399.6070  
(Fax) 616.399.6185

Customer Information			Project Information				Parameter/Method Request for Analysis											
Purchase Order	Project Name	Project Number	A		TCLP VOCs-SVOA-PEST-HERB-METALS													
Work Order	Project Name	Project Number	B		Cyanide, Reactive/SW7.3.3.2													
Company Name	Project Name	Project Number	C		Sulfide, Reactive/SW7.3.4.2													
Send Report To	Project Name	Project Number	D		pH/SW9045D													
Address	Project Name	Project Number	E		Flashpoint-Ignitability Analysis/SW1010A													
City/State/Zip	Project Name	Project Number	F		PCBs/SW8082													
Phone	Project Name	Project Number	G		Moisture/SW3550C													
DEQ PM address	Project Name	Project Number	H		Paint Filter (Free Liquids)/SW9095B													
e-Mail Address	Project Name	Project Number	I		Total VOC/8260B-SVOC/8270D-PEST/8081-HERB/8151-Metals/8010C/7471B													
Accounting #s			J		NOTE - POTENTIALLY HIGH CONCENTRATIONS													
No.	Sample Description	Date	Time	Matrix	Pres. Key Numbers	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold	
1	CHTC-WC01-0-6"	9-10-16	1428	waste		5	X	X	X	X	X	X	X	X	X			
2	CHLL-WC02-0-6"	9-12-16	1354	waste		5	X	X	X	X	X	X	X	X	X			
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Sampler(s): Please Print & Sign			Shipment Method:		Turnaround Time in Business Days (BD):				Results Due Date:	
					<input checked="" type="checkbox"/> 10 BD <input type="checkbox"/> 5 BD <input type="checkbox"/> 3 BD <input type="checkbox"/> 2 BD <input type="checkbox"/> 1 BD					

Relinquished by:		Date:	Time:	Received by:		Date:	Time:	Notes:	
		9-14-16	9:09			9/14/16	0909	Rec'd by Lab: MB Bread 9/17/16 800	
Relinquished by:		Date:	Time:	Received by (Laboratory):		Date:	Time:	QC Package: (Check Box Below)	
		9-16-16	9:16			9-16-16	0910	<input checked="" type="checkbox"/> Level II: Standard Qc <input type="checkbox"/> Level III: Raw Data	
Logged by (Laboratory):		Date:	Time:	Checked by (Laboratory):				<input type="checkbox"/> TRRP LRC <input type="checkbox"/> TRRP Level IV	
MB		9/17/16	930					<input type="checkbox"/> Level IV: SW846 Methods/CLP like	
								<input type="checkbox"/> Other: Page 69 of 70	

Preservative Key: 1-HCl 2-HNO<sub>3</sub> 3-H<sub>2</sub>SO<sub>4</sub> 4-NaOH 5-Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> 6-NaHSO<sub>4</sub> 7-Other 8-None/4<sup>th</sup> Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS.

Sample Receipt Checklist

Client Name: **MDEQ**

Date/Time Received: **17-Sep-16 08:00**

Work Order: **1609985**

Received by: **MBB**

Checklist completed by Alex Coaszar  
eSignature

17-Sep-16  
Date

Reviewed by: Alex Coaszar  
eSignature

17-Sep-16  
Date

Matrices: **waste**

Carrier name: **Courier**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	<u>2.4 / 2.4 degrees C</u>		<u>SR2</u>
Cooler(s)/Kit(s):	<u></u>		
Date/Time sample(s) sent to storage:	<u>9/17/16 10:00am</u>		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	<u>-</u>		

Login Notes:

-----

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:



# Non-Hazardous WAM Approval

Requested Management Facility: K&W Landfill

Profile Number: 120115MI Waste Approval Expiration Date: 04/05/2018

## APPROVAL DETAILS

Approval Decision: ☒ Approved ☐ Not Approved

Profile Renewal: ☐ Yes ☒ No

Management Method: Direct Landfill

Generator Name: Michigan Department of Environmental Quality


Material Name: Non-Hazardous Contaminated Soils

Management Facility Precautions, Special Handling Procedures or Limitation on approval:

### Generator Conditions

- Shipment must be scheduled into the disposal facility at least 24 hours in advance. Contact information will be provided by your TSR.
- The waste profile number must appear on the shipping papers.

WM Authorization Name: Ben Dahlby Title: Waste Approval Manager

WM Authorization Signature:  Date: 04/05/2017

Agency Authorization (if Required): \_\_\_\_\_ Date: \_\_\_\_\_

**THINK GREEN:**

**QUESTIONS? CALL 800 963 4776 FOR ASSISTANCE**

Last Revised April 11, 2014  
©2014 Waste Management





# NON-HAZARDOUS MANIFEST

NON-HAZARDOUS MANIFEST		1. Generator's US EPA ID No.		Manifest Doc No.		2. Page 1 of 1					
3. Generator's Mailing Address: MI DEPT OF ENVIRONMENTAL QUALITY 55195 US 41 CALUMET, MI 49913 4. Generator's Phone 906-377-0389		Generator's Site Address (If different than mailing): MI DEPT OF ENVIRONMENTAL QUALITY HIGHWAY M-26 HUBBELL, MI 49934		A. Manifest Number WMNA T 619285		B. State Generator's ID					
5. Transporter 1 Company Name UP Environmental Services, Inc.		6. US EPA ID Number		C. State Transporter's ID		D. Transporter's Phone 906-466-8900					
7. Transporter 2 Company Name		8. US EPA ID Number		E. State Transporter's ID		F. Transporter's Phone					
9. Designated Facility Name and Site Address K&W Landfill 11877 State Highway M38 Ontonagon, MI 49953		10. US EPA ID Number		G. State Facility ID		H. State Facility Phone 906-383-3504					
GENERATOR	11. Description of Waste Materials		12. Containers		13. Total Quantity	14. Unit Wt./Vol.	I. Misc. Comments				
	a. Non-Hazardous Contaminated Soils WM Profile # 120115MI		No.	Type							
	b.		1	DT	20	cu yds	4.38 tons				
	c.										
	d.										
	e.										
J. Additional Descriptions for Materials Listed Above		K. Disposal Location									
15. Special Handling Instructions and Additional Information											
Purchase Order #		EMERGENCY CONTACT / PHONE NO.: Amy Keranen 906-377-0389									
16. GENERATOR'S CERTIFICATE: I hereby certify that the above-described materials are not hazardous wastes as defined by CFR Part 261 or any applicable state law, have been fully and accurately described, classified and packaged and are in proper condition for transportation according to applicable regulations.											
Printed Name Amy Keranen		Signature "On behalf of" State of Michigan - DEQ				Month 7	Day 13	Year 17			
TRANSPORTER	17. Transporter 1 Acknowledgement of Receipt of Materials		Printed Name Adam Shiverski				Signature [Signature]		Month 7	Day 14	Year 17
	18. Transporter 2 Acknowledgement of Receipt of Materials		Printed Name				Signature		Month	Day	Year
FACILITY	19. Certificate of Final Treatment/Disposal I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the dates listed above.										
	20. Facility Owner or Operator: Certification of receipt of non-hazardous materials covered by this manifest.										
	Printed Name Linda Thoreson operations specialist		Signature Linda Thoreson				Month 7	Day 14	Year 17		
White- TREATMENT, STORAGE, DISPOSAL FACILITY COPY											
Pink- FACILITY USE ONLY											
Blue- GENERATOR #2 COPY											
Yellow- GENERATOR #1 COPY											





# NON-HAZARDOUS MANIFEST

NON-HAZARDOUS MANIFEST		1. Generator's US EPA ID No.		Manifest Doc No.		2. Page 1 of 1			
3. Generator's Mailing Address: MI DEPT OF ENVIRONMENTAL QUALITY 55195 US 41 CALUMET, MI 49913		Generator's Site Address (If different than mailing): MI DEPT OF ENVIRONMENTAL QUALITY HIGHWAY M-26 HUBBELL, MI 49934		A. Manifest Number WMNA		T 619286			
4. Generator's Phone 906-377-0389				B. State Generator's ID					
5. Transporter 1 Company Name UP Environmental Services, Inc.		6. US EPA ID Number		C. State Transporter's ID					
7. Transporter 2 Company Name		8. US EPA ID Number		D. Transporter's Phone 906-466-8800					
9. Designated Facility Name and Site Address K&W Landfill 11877 State Highway M38 Ontonagon, MI 49953		10. US EPA ID Number		E. State Transporter's ID					
				F. Transporter's Phone					
				G. State Facility ID					
				H. State Facility Phone 906-883-3504					
GENERATOR	11. Description of Waste Materials			12. Containers		13. Total Quantity	14. Unit Wt./Vol.	I. Misc. Comments	
	a. Non-Hazardous Contaminated Soils WM Profile # 120115MI			No.	Type				
				1	DT	20	T	14.91 Tons	
	b.								
	WM Profile #								
	c.								
TRANSPORTER	WM Profile #								
	d.								
	WM Profile #								
	J. Additional Descriptions for Materials Listed Above			K. Disposal Location					
			Cell				Level		
			Grid						
15. Special Handling Instructions and Additional Information									
Purchase Order #				EMERGENCY CONTACT / PHONE NO.: Amy Karanen 906-377-0389					
16. GENERATOR'S CERTIFICATE: I hereby certify that the above-described materials are not hazardous wastes as defined by CFR Part 261 or any applicable state law, have been fully and accurately described, classified and packaged and are in proper condition for transportation according to applicable regulations.									
Printed Name Amy Karanen				Signature "On behalf of" State of Michigan - DEQ			Month 7	Day 13	Year 17
FACILITY	17. Transporter 1 Acknowledgement of Receipt of Materials								
	Printed Name Adam Shrivastava		Signature				Month 7	Day 14	Year 17
	18. Transporter 2 Acknowledgement of Receipt of Materials								
	Printed Name		Signature				Month	Day	Year
19. Certificate of Final Treatment/Disposal I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the dates listed above.									
20. Facility Owner or Operator: Certification of receipt of non-hazardous materials covered by this manifest.									
Printed Name Linda Thoreson Operations Specialist				Signature Linda Thoreson			Month 7	Day 14	Year 17

White- TREATMENT, STORAGE, DISPOSAL FACILITY COPY

Pink- FACILITY USE ONLY

Blue- GENERATOR #2 COPY

Gold- TRANSPORTER #1 COPY

Yellow- GENERATOR #1 COPY

## APPENDIX F

### Photographic Log







Photo 1: View of Anomaly #3 during excavation. Photo taken July 12, 2017.



Photo 2: View of Seep #3 during hand excavation. Photos taken July 12, 2017.



Photo 3: View of excavated test pit at Anomaly #1. Photo taken July 13, 2017



Photo 4: View of excavated test pit at Anomaly #2. Photo taken July 13, 2017.



Photo 5: View of Seep #1 prior to excavation activities. Photo taken July 13, 2017.



Photo 6: View of Seep #2 prior to excavation activities. Photo taken July 13, 2017.





Photo 7: View of waste material removed from Seep #1 test pit during excavation. Photo taken July 13, 2017.



Photo 8: View of plastic drum liner and seep material during excavation of Seep #2. Photo taken on July 13, 2017.



Photo 9: View of test pits at Seep #1 and #2 following backfilling and topsoil application with covered seep material on liner and silt fencing in the background. Photo taken July 13, 2017.



Photo 10: Seep material and excavated soil being loaded for transport and disposal. Photo taken July 14, 2017.



Photo 11: View looking north following completed site restoration at Anomaly #3 area. Photo taken July 14, 2017.



Photo 12: View looking north following completed site restoration at Seep #1, #2, #3, Anomaly #1 and #2 areas. Photo taken July 14, 2017.

