Site Sampling Technical Memorandum, Munger Landing Sediment Characterization, St. Louis River AOC, Minnesota and Wisconsin

Task Order No. 68HE0518F0693, Contract No. EP-R5-11-09

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Introduction

This technical memorandum summarizes the objectives, procedures, and results of the site characterization conducted at the Munger Landing Sediment Characterization Site within the St. Louis River Area of Concern (AOC) in Minnesota and Wisconsin. The investigation was conducted for the U.S. Environmental Protection Agency (EPA) Great Lakes National Program Office in accordance with Task Order No. 68HE0518F0693, Contract No. EP-R5-11-09. Sampling activities were performed in October 2018.

The Munger Landing site located in Duluth, Minnesota, is approximately 7 miles upstream (south) of Lake Superior within the St. Louis River AOC. Munger Landing is a cutoff channel, separated from the navigation channel in the St. Louis River by an island. The Munger Landing boat launch is located on the west side of the site and serves as the nearest identifiable landmark. The site extends east across the state line into Wisconsin and across the navigation channel to a marsh on the west shore of Clough Island. Stewart Creek and Snively Creek, located on the west bank of the channel, flow from west to east into the Stewart Creek Wetlands, which empty into the St. Louis River just south of the Munger Landing boat launch. The creeks flow along the north and south sides of a suspected upland source area, the former Westinghouse Electric Corp. repair facility. The contaminants of concern at the Munger Landing site are polychlorinated biphenyls (PCBs), dioxins and furans, and mercury. Figure 1 shows sample locations.

The site characterization consisted of site access negotiation, a public utility locate, sediment characterization and sampling, as well as investigative-derived waste (IDW) management. Due to an expedited project schedule, the fieldwork was performed from October 14 through 20, 2018, under draft Data Quality Objectives (DQO; CH2M 2018a) and Health and Safety Plan (HASP; CH2M 2018b). Prior to field activities, the draft DQO was conditionally approved by EPA Great Lakes National Program Office (GLNPO) on October 11, 2018. Following field activities, comments received on the draft DQO document were incorporated into the Field Sampling and Quality Assurance Project Plan (QAPP; CH2M 2018c) and submitted to EPA GLNPO as final on November 16, 2018.

Field Objectives

The primary objectives for the Munger Landing site characterization were to collect data to determine if either Snively Creek or Stewart Creek may be ongoing contaminant sources to the Munger Landing sediments, and to collect additional data within Munger Landing to fill data gaps at the site. This information will be used to help identify areas that may require further investigation or remedial action.

The following field activities were conducted to achieve the objectives for this investigation:

- Completed a public utility locate to identify and locate underground utilities within the project area.
- Conducted sediment sampling at 40 locations to gain an understanding of the nature and extent of contamination for some or all of the following: dioxin and furan congeners, mercury, methyl mercury, and PCB Aroclors.
- Analyze samples for total organic carbon (TOC) to assess the cohesion and potential bioavailability of contaminants to receptors.
- Surveyed *x, y* coordinates of each sample location and collected water elevation data.
- Collected field observations, including visual observations, photoionization detector (PID) readings, and photographic documentation of sample processing and field activities.

Field Investigation Activities

Utility Locate

Before initiating intrusive subsurface activities, CH2M contacted Minnesota's Gopher One Call and Wisconsin's Digger's Hotline utility locate to identify and locate underground utilities within the project area. Exhibit 1 describes utilities identified that cross the river and creeks within the project area. CH2M reviewed utility maps and navigation charts before sampling activities to determine if proposed locations conflicted with known utilities. Figure 1 shows the underground utilities identified within the project area.

Exhibit 1. Utility Locate Summary
Munger Landing Sediment Site Characterization
St. Louis River AOC, Minnesota and Wisconsin

Channel near Munger Landing	No utility owners responded with utility locations within the channel.
Stewart Creek	City of Duluth • Sewer – 3 creek crossings
	Western Lake Superior Sanitary District • Sanitation – 1 creek crossing
Snively Creek	No utility owners responded with utility locations within the creek.

Surveying

The survey activities were performed following the procedures outlined in the QAPP (CH2M 2018c). The following summarizes survey activities performed during the sampling event:

- Sediment vibracore sample location coordinates were surveyed by the EPA Research Vessel (R/V) Mudpuppy II using differential global positioning system (GPS) receivers capable of submeter accuracy. Samples were collected in latitude and longitude, North American Datum of 1983. Water depth *x, y* coordinate measurements were collected before sediment coring to the nearest 0.1 foot at each location using a surveyor's rod outfitted with a 6-inch-diameter plate or a surveyor's tape outfitted with a sounding disc per U.S. Army Corps of Engineers guidance (2013).
- Manual sediment cores and Ponar samples were surveyed by CH2M using a differential GPS receiver capable of submeter accuracy. *X, y* coordinates were collected in latitude and longitude, North

American Datum of 1983. Water-depth measurements were collected before sediment coring to the nearest 0.1 foot at each location using a surveyor's rod.

- Water elevation data was collected for vibracore sediment locations and Ponar samples from the National Oceanic and Atmospheric Administration (NOAA) gauge station #9099064. Elevations are reported in International Great Lakes Datum 1985 (IGLD1985) US Survey feet.
- Sediment elevation was calculated by subtracting water depth from the water surface elevation reported from NOAA gauge station #9099064. If refusal was encountered, refusal elevation was calculated by subtracting the refusal depth from the sediment elevation.
- There are no known staff gauges within Snively Creek and Stewart Creek; therefore, water elevation data were not available for the manual core locations located in the creeks.

Sediment Sampling

Mobilization, sampling, and demobilization was completed in 7 days from October 14 through 20, 2018. The field team consisted of four CH2M staff from Milwaukee, Wisconsin, and Chicago, Illinois. Prior to sample collection, manual sediment poling was conducted at each proposed location to verify if available sediment was present for the collection.

Manual Core Sediment Sampling

The sediment cores from Snively Creek and Stewart Creek were collected using manual coring methods. CH2M walked to the eight sampling locations as they were inaccessible by boat.

Vibracore Sediment Sampling

Under separate contract with EPA, three staff from Cetacean Marine collected sediment core samples from 28 locations in the river channel using vibracore methods aboard the EPA's R/V Mudpuppy II. CH2M and EPA staff performed oversite of sample collection operations onboard the R/V Mudpuppy II.

Ponar Sediment Sampling

One staff from CH2M and one staff from the Wisconsin Department of Natural Resources collected four sediment locations along Clough Island using a petite Ponar sampler.

Sample Processing

Sediment cores retrieved from manual coring and vibracore collection were kept intact and transported to the processing area. Ponar samples were placed into aluminum pans upon collection, transferred into resealable plastic bags, and transported onshore for further sample processing. The sediment cores were placed on a decontaminated table and split lengthwise for visual characterization and sampling by the field team. Sediment cores were photographed and described with respect to general stratigraphy, sediment type, apparent grain size, color, odor, plasticity, consistency, density, moisture, and notable characteristics, such as visible evidence of staining or contaminant impacts. A PID was used to screen every 1-foot interval of the sediment cores. The material from each sample interval was transferred into disposable aluminum pans and homogenized until uniform texture and color were achieved.
The homogenate was then transferred to analyte-specific bottleware and labeled. The laboratory samples and respective analysis were recorded in the Scribe database.

Sample Analysis

In accordance with the QAPP (CH2M 2018c), the sediment samples were collected for one or more of the following analyses: PCB Aroclors, dioxin and furan congeners, mercury, methyl mercury, and TOC. The top one or two intervals per location were submitted for laboratory analysis (71 samples and 7 field duplicates), and remaining sample intervals were collected and placed on hold at the laboratory (171

samples and 17 field duplicates). Upon review of the preliminary data by EPA, Minnesota Pollution Control Agency, and the Wisconsin Department of Natural Resources, 15 samples and 2 field duplicates originally placed on hold were selected for laboratory analysis, resulting in 86 samples and 9 field duplicates analyzed. Table 1 presents the parameters collected at each location, along with the description of the sediment characteristics.

Two equipment blanks were collected from nondisposable equipment (stainless-steel spoons and petite Ponar) used to collect surface grab samples. The equipment blank samples were analyzed for dioxin and furan congeners, PCB Aroclors, mercury, and methyl mercury.

One composite sample was collected from IDW for waste characterization.

PCB Aroclors, mercury, and TOC were analyzed by Pace Analytical's laboratory in Green Bay, Wisconsin. Dioxin and furan congeners were analyzed by Pace Analytical's laboratory in Minneapolis, Minnesota, and methyl mercury were analyzed by the Duluth, Minnesota, facility.

Samples were collected and processed with few minor deviations as discussed in the following section.

Deviation Summary

The following summarizes minor deviations associated with sample locations, sample processing, and sample analysis.

Sediment Sampling

- Vibracore locations SD-27 and SD-28 were offset 130 feet to the northwest and 47 feet southeast, respectively, of the proposed location due to physical obstructions that included research fishnets and anchors.
- Dioxin and furan congeners and total PCBs composite samples were collected from sediment waste material and submitted for analysis.
- A subset of field duplicates for TOC analyses were inadvertently not collected at a frequency of 10 percent.

Summary of Investigation Results

Sediment samples were collected at 40 locations. Figure 1 shows the as-collected sample locations. Tables 1 and 2 summarize field information and preliminary analytical results, respectively, as follows:

- Table 1 Sample Location Summary
  - Location identification, sample date, and coordinates
  - Measurements and elevations of core penetration, recovery, refusal, water, and native material
  - Visual sample observation and PID readings
  - Summary of designated analysis
- Table 2 Preliminary Unvalidated Analytical Results

Attachments 1 through 4 contain field documentation as follows:

- Attachment 1 Sediment Core Logs
- Attachment 2 Sediment Sampling and Processing Photograph Logs
- Attachment 3 IDW Waste Profile and Manifest
- Attachment 4 IDW Analytical Data

Sediment Core Observations

Faint to light sheen was observed during processing at locations SD-07 and SD-39 within the project area. Sheen was observed during sediment processing at location SD-07 in Munger Landing, and location SD-39 in Snively Creek. Odor was also observed during processing location SD-39. Table 1 summarizes observations for potentially impacted material at each core location, along with the associated maximum PID readings measured. Individual sample interval PID readings and descriptions of potentially impacted material are recorded within sediment core and photo logs (Attachment 1 and 2, respectively).

Analytical Results

A total of 242 sediment samples and 24 field duplicate samples was collected from 40 locations; of these, 86 samples and 9 field duplicates were analyzed by the laboratory. The remaining 156 samples and 15 field duplicates were placed on hold at the laboratory and were not selected for analysis. Table 1 summarizes the analysis performed by location. Total sample counts are summarized as follows:

- 86 sediment samples and 3 field duplicate samples were analyzed for total organic carbon
- 84 sediment samples and 9 field duplicate samples were analyzed for dioxin and furan congeners
- 74 sediment samples and 9 field duplicate samples were analyzed for PCB Aroclors
- 44 sediment samples and 4 field duplicate samples were analyzed for mercury
- 20 sediment samples and 2 field duplicate samples were analyzed for methyl mercury

Summation

Total PCB concentrations in the preliminary unvalidated data (Table 2) were calculated by the laboratory by summing the detected Aroclors. Laboratory analysis includes the following individual Aroclors:

- Aroclor 1016
- Aroclor 1221
- Aroclor 1232
- Aroclor 1242
- Aroclor 1248
- Aroclor 1254
- Aroclor 1260
- Aroclor 1262
- Aroclor 1268

Dioxin and furan homologue totals in the preliminary data (Table 2) were calculated by the laboratory summing all of the 2,3,7,8-substituted and non-2,3,7,8 congeners in a given sample.

Dioxin and furan toxicity equivalency (TEQ) values were calculated by multiplying the congener concentration by its corresponding toxicity equivalency factor, producing a congener-specific TEQ concentration. The TEQ concentrations for each of the detected congeners were summed to determine the total TEQ for each sample. Nondetected results were not included in the sum.

Investigation-Derived Waste Characterization

One composite sample of sediment representative of the project area was collected and analyzed for the following:

- Toxicity Characteristic Leaching Procedure (TCLP) volatile organic compounds by EPA SW-846 Methods 1311/8260B
- TCLP semivolatile organic compounds by EPA SW-846 Methods 1311/8270C
- TCLP pesticides by EPA SW-846 Methods 1311/8081B
- TCLP herbicides by EPA SW-846 Methods 1311/8151A
- TCLP metals by EPA SW-846 Methods 1311/6010B/7470A
- Total PCBs by EPA SW-846 Method 8082A
- Dioxin and furan congeners by EPA Method 1613B

- Flashpoint by EPA SW-846 Method 1020B
- pH by EPA SW-846 Method 9040 (solids)

The composite and in situ sediment sample results were used to characterize the waste. The waste was determined to be classified and disposed of as non-TSCA regulated, Resource Conservation and Recovery Act nonhazardous. Six IDW drums containing solid waste and personal protective equipment were removed from the staging facility and disposed of on November 30, 2018. IDW waste profile and manifest Attachment 3, and Attachment 4 contains IDW analytical data.

References

CH2M HILL (CH2M). 2018a. *Draft Data Quality Objectives, Munger Landing Sediment Characterization, St. Louis River AOC, Minnesota and Wisconsin Site Characterization*. October.

CH2M HILL (CH2M). 2018b. *Health and Safety Plan, Munger Landing Sediment Characterization, St. Louis River AOC, Minnesota and Wisconsin.* October.

CH2M HILL (CH2M). 2018c. *Field Sampling and Quality Assurance Project Plan, Munger Landing Sediment Characterization, St. Louis River AOC, Minnesota and Wisconsin Site Characterization.* November.

U.S. Army Corps of Engineers. 2013. *US Army Corps of Engineers Hydrographic Surveying Manual (No. 1110-2-1003, Appendix B – Manual Depth Measurement Techniques*. November. Accessed April 2015. http://www.publications.usace.army.mil/ Portals /76/Publications/EngineerManuals/EM_1110-2-1003.pdf.

Tables

Table 1. Sample Location Summary

Munger Landing Sediment Site Characterization, Milwaukee Estuary AOC, Milwaukee, Wisconsin

														Observations				Analysis Summary				
Location ID	Latitude[a]	Longitude[a]	Date	Penetration Depth (ft bss)	Recovery (ft bss)	Recovery (%)	Water Surface Elevation[b]	Water Depth (ft)	Sediment Surface Elevation[b]	Depth to Native Clay (ft bss)	Refusal Depth (ft bss)	Native Clay Elevation[b]	Refusal Elevation[b]	Staining	Sheen	Odor	PID Max[d]	PCB Aroclors	Dioxin/Furan	Mercury	Methyl Mercury	TOC
ML-SD-01	46.7053330	-92.2027790	10/15/18	10.0	8.1	81%	603.08	18.0	585.08	--	>10[c]	--	--				0.0	X	X	X	X	X
ML-SD-02	46.7052280	-92.2027020	10/15/18	5.3	4.7	89%	603.04	18.7	584.34	--	5.3	--	579.04				0.0	X	X	X	X	X
ML-SD-03	46.7048090	-92.2027250	10/15/18	10.0	9.7	97%	603.05	3.5	599.55	--	>10[c]	--	--				0.0	X	X	X	X	X
ML-SD-04	46.7052850	-92.2038290	10/15/18	10.0	8.7	87%	603.05	6.0	597.05	--	>10[c]	--	--				0.0		X			X
ML-SD-05	46.7048010	-92.2038150	10/15/18	10.0	7.0	70%	603.07	5.1	597.97	--	>10[c]	--	--				0.0	X	X			X
ML-SD-06	46.7047970	-92.2043590	10/15/18	10.0	7.0	70%	602.93	8.1	594.83	--	>10[c]	--	--				0.0		X			X
ML-SD-07	46.7045280	-92.2050830	10/15/18	10.0	8.7	87%	602.90	9.2	593.70	--	>10[c]	--	--		X		0.0		X	X		X
ML-SD-08	46.7040150	-92.2044170	10/15/18	7.2	7.0	97%	602.91	2.9	600.01	--	7.2	--	592.81				0.0	X	X	X	X	X
ML-SD-09	46.7039230	-92.2053170	10/15/18	7.5	5.2	69%	602.99	8.0	594.99	--	7.5	--	587.49				0.0		X	X		X
ML-SD-10	46.7035740	-92.2056700	10/15/18	10.0	8.6	86%	603.03	7.6	595.43	--	>10[c]	--	--				0.0	X	X	X		X
ML-SD-11	46.7034820	-92.2063190	10/15/18	6.0	6.0	100%	603.09	4.6	598.49	--	6.0	--	592.49				0.0	X	X	X		X
ML-SD-12	46.7028900	-92.2052440	10/16/18	10.0	9.8	98%	603.13	2.5	600.63	--	>10[c]	--	--				0.0	X	X	X	X	X
ML-SD-13	46.7029400	-92.2063870	10/15/18	5.0	4.9	98%	603.18	4.5	598.68	--	5.0	--	593.68				0.0	X	X			X
ML-SD-14	46.7021820	-92.2064370	10/16/18	10	9.4	94%	603.17	8.4	594.77	--	>10[c]	--	--				0.0	X	X			X
ML-SD-15	46.7022460	-92.2054510	10/16/18	9.3	9.0	97%	603.03	4.0	599.03	--	9.3	--	589.73				0.0	X	X			X
ML-SD-16	46.7015050	-92.2057790	10/16/18	10.0	10.0	100%	602.85	5.2	597.65	--	>10[c]	--	--				0.0	X	X	X	X	X
ML-SD-17	46.7004580	-92.2070480	10/16/18	3.0	3.0	100%	603.06	4.5	598.56	--	3.0	--	595.56				0.0	X	X			X
ML-SD-18	46.7006930	-92.2054020	10/16/18	9.5	9.2	97%	602.88	3.4	599.48	--	9.5	--	589.98				1.1	X	X	X	X	X
ML-SD-19	46.6997950	-92.2050630	10/16/18	10.0	10.0	100%	602.93	3.3	599.63	--	>10[c]	--	--				0.9	X	X	X	X	X
ML-SD-20	46.7022780	-92.2050030	10/16/18	10.0	10.0	100%	603.16	2.4	600.76	--	>10[c]	--	--				0.0	X	X			X
ML-SD-21	46.7015340	-92.2051390	10/16/18	10.0	10.0	100%	603.13	3.0	600.13	--	>10[c]	--	--				0.0	X	X	X	X	X
ML-SD-22	46.7006560	-92.2048780	10/16/18	9.0	9.0	100%	602.97	3.6	599.37	--	9.0	--	590.37				0.0	X	X	X	X	X
ML-SD-23	46.6985560	-92.2044820	10/17/18	10.0	9.8	98%	603.14	6.2	596.94	--	>10[c]	--	--				0.0	X	X			X
ML-SD-24	46.6981520	-92.2047850	10/17/18	10.0	9.4	94%	603.22	8.6	594.62	--	>10[c]	--	--				0.0	X	X			X
ML-SD-25	46.6988620	-92.2055370	10/17/18	10.0	7.8	78%	602.93	7.5	595.43	--	>10[c]	--	--				0.0	X	X			X
ML-SD-26	46.6985590	-92.2050680	10/17/18	10.0	10.0	100%	603.02	8.0	595.02	--	>10[c]	--	--				0.0	X	X			X
ML-SD-27	46.6968530	-92.2065840	10/17/18	5.3	3.7	70%	603.23	3.3	599.93	--	5.3	--	594.63				0.0	X	X			X
ML-SD-28	46.6965850	-92.2050160	10/17/18	9.3	8.4	91%	603.12	4.3	598.82	--	9.3	--	589.52				0.0	X	X			X
ML-SD-29	46.7002170	-92.1947400	10/15/18	0.3	0.3	100%	603.17	1.0	602.17	--	--	--	--				0.0		X			X
ML-SD-30	46.6988170	-92.1943610	10/15/18	0.3	0.3	100%	603.05	4.1	598.95	--	--	--	--				0.0		X			X
ML-SD-31	46.6980030	-92.1945390	10/15/18	0.3	0.3	100%	603.04	4.0	599.04	--	--	--	--				0.0		X			X
ML-SD-32	46.6978550	-92.1936770	10/15/18	0.3	0.3	100%	603.05	3.2	599.85	--	--	--	--				0.0		X			X
ML-SD-33	46.6992900	-92.2139090	10/18/18	1.9	1.2	63%	N/A	0.2	N/A	--	1.9	--	N/A				0.0	X	X	X		X
ML-SD-34	46.6992960	-92.2117220	10/18/18	2.2	1.8	82%	N/A	0.2	N/A	--	2.2	--	N/A				0.0	X	X	X		X
ML-SD-35	46.6995140	-92.2107540	10/18/18	2.0	1.3	65%	N/A	0.5	N/A	--	2.0	--	N/A				0.0	X	X	X		X
ML-SD-36	46.6991770	-92.2097600	10/18/18	1.9	1.6	84%	N/A	2.1	N/A	--	1.9	--	N/A				0.0	X	X	X		X
ML-SD-37	46.6977530	-92.2158470	10/19/18	1.4	1.2	86%	N/A	0.5	N/A	--	1.4	--	N/A				0.0	X	X	X		X
ML-SD-38	46.6978490	-92.2151790	10/19/18	2.5	1.7	68%	N/A	0.3	N/A	--	2.5	--	N/A	X		X	0.4	X	X	X		X
ML-SD-39	46.6976450	-92.2141190	10/19/18	2.4	1.9	79%	N/A	0.2	N/A	--	2.4	--	N/A				0.0	X	X	X		X
ML-SD-40	46.6976480	-92.2110050	10/18/18	3.5	2.3	66%	N/A	0.3	N/A	--	3.5	--	N/A				0.0	X	X	X		X

[a] Latitude and longitude coordinates are in decimal degree format, North American Datum of 1983 .

[b] Elevations are reported in International Great Lakes Datum 1985 US Survey feet. Elevation data is not available for Snively and Stewart Creeks.

[c] Refusal not reached, refusal depth exceeds the maximum core tube length of 10 ft.

[d] PID Max readings represent the max value observed. Individual PID readings are included within core logs.

ft = feet; bss = below sediment surface; % = percent; N/A= not applicable; PCB = polychlorinated biphenyl; TOC = Total Organic Carbon

Table 2. Preliminary Unvalidated Analytical Results

Munger Landing Sediment Site Characterization, Milwaukee Estuary AOC, Milwaukee, Wisconsin

ANALYTIC METHOD:		D2937	Lloyd Kahn	SW7471	E1630	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082			E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		Moisture	Total Organic Carbon	Mercury	Methyl Mercury	PCB, Total[1]	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Fish TEQ[2,3]	Mammal TEQ[2,4]	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD
REPORT RESULT UNIT:		%	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:				0.64		60										3							
SAMPLE ID	SAMPLE DATE																						
ML-SD-01-0.0/1.0	15 Oct 2018	40	23,800	0.38	1.46 U	382	41.7 U	41.7 U	41.7 U	41.7 U	41.7 U	41.7 U	382	41.7 U	41.7 U	34.5	45.0	3.4	6.9	7.8	46	40	630
ML-SD-01-0.0/1.0-FD	15 Oct 2018	40.7	-	0.57	1.45 U	491	42.2 U	42.2 U	42.2 U	42.2 U	42.2 U	42.2 U	491	42.2 U	42.2 U	33.0	43.5	4.2	6.1	7.7	46	30	670
ML-SD-01-1.0/2.0	15 Oct 2018	31.3	13,300	0.05 U	1.6 U	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U	0.201	0.332	0.2 U	0.42 U	0.29 U	0.59 J	0.4 IJ	3.9 J
ML-SD-01-2.0/3.0	15 Oct 2018	32.1	15,000	-	-	36.8 U	36.8 U	36.8 U	36.8 U	36.8 U	36.8 U	36.8 U	36.8 U	36.8 U	36.8 U	0.279	0.287	0.31 U	0.16 U	0.35 U	0.22 U	0.47 U	4.7 J
ML-SD-01-3.0/4.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-01-4.0/5.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-01-4.0/5.0-FD	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-01-5.0/6.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-01-6.0/7.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-01-7.0/8.1	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-02-0.0/1.0	15 Oct 2018	55.4	35,400	0.2 J	2.52 U	178	56 U	56 U	56 U	56 U	56 U	56 U	178	56 U	56 U	16.8	21.8	2.2	2.3 J	3.9 J	20	11	380
ML-SD-02-1.0/2.0	15 Oct 2018	55.8	53,900	0.89	3 J	805	56.5 U	56.5 U	56.5 U	56.5 U	56.5 U	56.5 U	805	56.5 U	56.5 U	49.6	73.7	7.5	7.8	12	86	46	1600
ML-SD-02-2.0/3.0	15 Oct 2018	31.5	14,200	0.31	-	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	3.02	3.56	0.31 U	0.64 J	0.35 U	3.5 J	1.5 IJ	23
ML-SD-02-3.0/4.0	15 Oct 2018	24	6,710	0.046 U	-	32.9 U	32.9 U	32.9 U	32.9 U	32.9 U	32.9 U	32.9 U	32.9 U	32.9 U	32.9 U	0.844	1.05	0.31 U	0.21 IJ	0.35 U	1.2 IJ	0.56 IJ	8.4
ML-SD-02-4.0/4.7	15 Oct 2018	18.8	2,100	0.04 U	-	30.8 U	30.8 U	30.8 U	30.8 U	30.8 U	30.8 U	30.8 U	30.8 U	30.8 U	30.8 U	0.0153	0.0266	0.31 U	0.15 U	0.35 U	0.22 U	0.47 U	0.94 IJ
ML-SD-03-0.0/1.0	16 Oct 2018	27.7	15,000	0.047 U	1.2 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	0.00707	0.0126	0.32 U	0.16 U	0.37 U	0.24 U	0.49 U	0.57 J
ML-SD-03-1.0/2.0	16 Oct 2018	38.7	22,700	0.052 U	1.16 U	40.8 U	40.8 U	40.8 U	40.8 U	40.8 U	40.8 U	40.8 U	40.8 U	40.8 U	40.8 U	ND	ND	0.38 U	0.19 U	0.43 U	0.28 U	0.57 U	0.56 U
ML-SD-03-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-2.0/3.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-6.0/7.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-7.0/8.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-7.0/8.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-8.0/9.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-9.0/9.7	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-0.0/1.0	16 Oct 2018	36.1	11,400	-	-	-	-	-	-	-	-	-	-	-	-	0.0455	0.0708	0.34 U	0.17 U	0.39 U	0.25 U	0.52 U	1.2 J
ML-SD-04-1.0/2.0	16 Oct 2018	26.4	3,750	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND	0.32 U	0.16 U	0.36 U	0.23 U	0.48 U	0.47 U
ML-SD-04-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-6.0/7.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-7.0/8.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-8.0/8.7	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-0.0/1.0	15 Oct 2018	34.7	15,700	-	-	38.3 U	38.3 U	38.3 U	38.3 U	38.3 U	38.3 U	38.3 U	38.3 U	38.3 U	38.3 U	0.00015	0.00045	0.31 U	0.51 U	0.61 U	0.39 U	0.39 U	0.67 U
ML-SD-05-0.0/1.0-FD	15 Oct 2018	33	-	-	-	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	0.0122	0.0195	0.15 U	0.27 U	0.24 U	0.17 U	0.2 U	0.7 J
ML-SD-05-1.0/2.0	15 Oct 2018	27.7	12,800	-	-	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	34.6 U	0.000045	0.000135	0.11 U	0.25 U	0.12 U	0.12 U	0.12 U	0.25 U
ML-SD-05-2.0/3.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-3.0/4.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-4.0/5.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-4.0/5.0-FD	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-5.0/6.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-6.0/7.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-06-0.0/1.0	16 Oct 2018	39.4	17,500	-	-	-	-	-	-	-	-	-	-	-	-	0.251	0.326	0.35 U	0.18 U	0.4 U	0.26 U	0.53 U	5.6 J
ML-SD-06-1.0/2.0	16 Oct 2018	40.2	19,600	-	-	-	-	-	-	-	-	-	-	-	-	0.0664	0.0933	0.38 U	0.19 U	0.44 U	0.28 U	0.58 U	1.8 J
ML-SD-06-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-06-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-06-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-06-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-06-6.0/7.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Preliminary Unvalidated Analytical Results

Munger Landing Sediment Site Characterization, Milwaukee Estuary AOC, Milwaukee, Wisconsin

ANALYTIC METHOD:		D2937	Lloyd Kahn	SW7471	E1630	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082			E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		Moisture	Total Organic Carbon	Mercury	Methyl Mercury	PCB, Total[1]	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Fish TEQ[2,3]	Mammal TEQ[2,4]	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD
REPORT RESULT UNIT:		%	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:				0.64		60										3							
SAMPLE ID	SAMPLE DATE																						
ML-SD-07-0.0/1.0	16 Oct 2018	41.7	20,000	0.11 J	-	-	-	-	-	-	-	-	-	-	-	22.4	25.3	1.1	3.5 J	3.3 J	22	11	190
ML-SD-07-1.0/2.0	16 Oct 2018	36.1	12,200	0.051 U	-	-	-	-	-	-	-	-	-	-	-	0.0924	0.123	0.36 U	0.18 U	0.41 U	0.26 U	0.54 U	2.8 J
ML-SD-07-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-3.0/4.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-6.0/7.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-7.0/8.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-8.0/8.9	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-0.0/1.0	16 Oct 2018	29.3	11,700	0.088 J	1.06 U	52.2 J	35.4 U	35.4 U	35.4 U	35.4 U	35.4 U	35.4 U	52.2 J	35.4 U	35.4 U	0.898	1.22	0.34 U	0.17 U	0.39 U	1.6 J	0.52 U	16
ML-SD-08-1.0/2.0	16 Oct 2018	30.1	14,300	0.044 U	1.4 U	35.8 U	35.8 U	35.8 U	35.8 U	35.8 U	35.8 U	35.8 U	35.8 U	35.8 U	35.8 U	0.00043	0.00129	0.36 U	0.18 U	0.41 U	0.26 U	0.54 U	0.52 U
ML-SD-08-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-5.0/6.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-6.0/7.2	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-09-0.0/1.0	16 Oct 2018	22.8	672	0.043 U	-	-	-	-	-	-	-	-	-	-	-	0.0293	0.0319	0.33 U	0.17 U	0.38 U	0.24 U	0.51 U	0.49 U
ML-SD-09-1.0/2.0	16 Oct 2018	21.6	660	0.042 U	-	-	-	-	-	-	-	-	-	-	-	0.0266	0.0451	0.33 U	0.16 U	0.38 U	0.24 U	0.5 U	1.9 J
ML-SD-09-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-09-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-09-3.0/4.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-09-4.0/5.2	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-0.0/1.0	16 Oct 2018	42.1	24,400	0.057 U	-	43.2 U	43.2 U	43.2 U	43.2 U	43.2 U	43.2 U	43.2 U	43.2 U	43.2 U	43.2 U	0.0367	0.0382	0.37 U	0.18 U	0.42 U	0.27 U	0.56 U	0.54 U
ML-SD-10-0.0/1.0-FD	16 Oct 2018	39.9	-	0.058 U	-	41.6 U	41.6 U	41.6 U	41.6 U	41.6 U	41.6 U	41.6 U	41.6 U	41.6 U	41.6 U	0.0277	0.0436	0.34 U	0.17 U	0.39 U	0.25 U	0.52 U	1.5 J
ML-SD-10-1.0/2.0	16 Oct 2018	41.3	21,300	0.055 U	-	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	0.0102	0.0109	0.37 U	0.18 U	0.42 U	0.27 U	0.55 U	0.54 U
ML-SD-10-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-4.0/5.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-6.0/7.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-7.0/8.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-8.0/8.6	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-11-0.0/1.0	16 Oct 2018	47.2	36,200	0.53	-	80.3 J	47.3 U	47.3 U	47.3 U	47.3 U	47.3 U	47.3 U	80.3 J	47.3 U	47.3 U	58.4	70.3	4.1	10	7.7	66	37	660
ML-SD-11-1.0/2.0	16 Oct 2018	26.3	10,300	0.044 U	-	33.9 U	33.9 U	33.9 U	33.9 U	33.9 U	33.9 U	33.9 U	33.9 U	33.9 U	33.9 U	0.0677	0.0890	0.32 U	0.16 U	0.37 U	0.23 U	0.49 U	2 J
ML-SD-11-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-11-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-11-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-11-4.0/5.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-11-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-0.0/1.0	17 Oct 2018	38	19,800	0.059 J	1.34 U	190	40.3 U	40.3 U	40.3 U	40.3 U	40.3 U	40.3 U	190	40.3 U	40.3 U	0.100	0.136	0.66 U	1.1 U	0.41 U	0.43 U	0.41 U	3.4 J
ML-SD-12-1.0/2.0	17 Oct 2018	30.7	14,100	0.048 U	1.37 U	36.1 U	36.1 U	36.1 U	36.1 U	36.1 U	36.1 U	36.1 U	36.1 U	36.1 U	36.1 U	0.0148	0.0249	0.23 U	0.87 U	0.23 U	0.2 U	0.23 U	0.94 J
ML-SD-12-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-9.0/10.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Preliminary Unvalidated Analytical Results

Munger Landing Sediment Site Characterization, Milwaukee Estuary AOC, Milwaukee, Wisconsin

ANALYTIC METHOD:		D2937	Lloyd Kahn	SW7471	E1630	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082			E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		Moisture	Total Organic Carbon	Mercury	Methyl Mercury	PCB, Total[1]	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Fish TEQ[2,3]	Mammal TEQ[2,4]	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD
REPORT RESULT UNIT:		%	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:				0.64		60										3							
SAMPLE ID	SAMPLE DATE																						
ML-SD-13-0.0/1.0	16 Oct 2018	25.5	15,500	-	-	33.6 U	33.6 U	33.6 U	33.6 U	33.6 U	33.6 U	33.6 U	33.6 U	33.6 U	33.6 U	0.0156	0.0256	0.32 U	0.16 U	0.37 U	0.24 U	0.49 U	0.96 J
ML-SD-13-0.0/1.0-FD	16 Oct 2018	28.5	16,500	-	-	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	0.195	0.310	0.33 U	0.17 U	0.38 U	0.35 UJ	0.51 U	5.7
ML-SD-13-1.0/2.0	16 Oct 2018	25.2	12,600	-	-	33.4 U	33.4 U	33.4 U	33.4 U	33.4 U	33.4 U	33.4 U	33.4 U	33.4 U	33.4 U	ND	ND	0.32 U	0.16 U	0.37 U	0.23 U	0.49 U	0.47 U
ML-SD-13-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-13-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-13-4.0/4.9	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-0.0/1.0	17 Oct 2018	60.9	47,800	-	-	1450	128 U	128 U	128 U	128 U	128 U	128 U	1450	128 U	128 U	146	177	14	34	36	180	93	2100
ML-SD-14-1.0/2.0	17 Oct 2018	49.6	37,300	-	-	55.5 J	49.6 U	49.6 U	49.6 U	49.6 U	49.6 U	49.6 U	55.5 J	49.6 U	49.6 U	77.5	87.1	2.4	11	9.2	75	39	500
ML-SD-14-2.0/3.0	17 Oct 2018	33.5	17,000	-	-	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U	0.767	1.12	0.31 U	0.29 J	0.35 U	1 IJ	1.5 J	12
ML-SD-14-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-8.0/9.4	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-0.0/1.0	18 Oct 2018	40.4	32,500	-	-	114	41.9 U	41.9 U	41.9 U	41.9 U	41.9 U	41.9 U	114	41.9 U	41.9 U	7.91	9.45	0.68 J	1.2 J	1.6 J	8.3	5.3 J	110
ML-SD-15-1.0/2.0	18 Oct 2018	38	45,700	-	-	40.3 U	40.3 U	40.3 U	40.3 U	40.3 U	40.3 U	40.3 U	40.3 U	40.3 U	40.3 U	0.120	0.157	0.42 U	0.41 U	0.6 U	0.58 U	0.6 U	3.4 J
ML-SD-15-2.0/3.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-3.0/4.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-4.0/5.0-FD	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-7.0/8.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-8.0/9.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-0.0/1.0	17 Oct 2018	57.5	50,700	0.077 U	2.02 U	58.9 U	58.9 U	58.9 U	58.9 U	58.9 U	58.9 U	58.9 U	58.9 U	58.9 U	58.9 U	2.07	2.57	0.38 U	0.9 U	0.45 U	2.2 J	1.4 J	26
ML-SD-16-1.0/2.0	17 Oct 2018	67.5	89,300	0.1 U	2.89 U	76.9 U	76.9 U	76.9 U	76.9 U	76.9 U	76.9 U	76.9 U	76.9 U	76.9 U	76.9 U	0.463	0.691	0.88 U	1.2 U	0.69 U	1.2 J	0.61 U	11
ML-SD-16-2.0/3.0	17 Oct 2018	49.8	34,100	-	-	49.8 U	49.8 U	49.8 U	49.8 U	49.8 U	49.8 U	49.8 U	49.8 U	49.8 U	49.8 U	-	-	-	-	-	-	-	-
ML-SD-16-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-9.0/10.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-17-0.0/1.0	17 Oct 2018	42.3	28,500	-	-	1000	86.7 U	86.7 U	86.7 U	86.7 U	86.7 U	86.7 U	1000	86.7 U	86.7 U	11.2	13.0	0.75 J	1.7 J	1.8 J	11	6.1 J	130
ML-SD-17-1.0/2.0	17 Oct 2018	26.8	11,800	-	-	34.1 U	34.1 U	34.1 U	34.1 U	34.1 U	34.1 U	34.1 U	34.1 U	34.1 U	34.1 U	ND	ND	0.37 U	0.34 U	0.32 U	0.34 U	0.28 U	0.53 U
ML-SD-17-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-0.0/1.0	17 Oct 2018	42.7	25,000	0.095 J	1.39 U	113	43.6 U	43.6 U	43.6 U	43.6 U	43.6 U	43.6 U	113	43.6 U	43.6 U	0.371	0.426	0.59 U	0.51 U	0.65 U	0.6 U	0.58 U	10
ML-SD-18-1.0/2.0	17 Oct 2018	34.3	23,500	0.049 U	1.21 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	0.00022	0.00066	0.49 U	0.48 U	0.41 U	0.41 U	0.38 U	0.77 U
ML-SD-18-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-8.0/9.2	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-0.0/1.0	17 Oct 2018	38.5	27,200	0.05 U	1.58 U	40.7 U	40.7 U	40.7 U	40.7 U	40.7 U	40.7 U	40.7 U	40.7 U	40.7 U	40.7 U	0.0163	0.0235	0.32 U	0.34 U	0.25 U	0.28 U	0.24 U	0.68 IJ
ML-SD-19-1.0/2.0	17 Oct 2018	34.3	25,100	0.052 U	1.17 U	38 U	38 U	38 U	38 U	38 U	38 U	38 U	38 U	38 U	38 U	0.0126	0.0137	1.3 U	1.1 U	0.6 U	0.57 U	0.59 U	1.1 U
ML-SD-19-1.0/2.0-FD	17 Oct 2018	35.7	-	0.052 U	1.23 U	38.9 U	38.9 U	38.9 U	38.9 U	38.9 U	38.9 U	38.9 U	38.9 U	38.9 U	38.9 U	ND	ND	0.32 U	0.26 U	0.25 U	0.21 U	0.2 U	0.38 U
ML-SD-19-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Preliminary Unvalidated Analytical Results

Munger Landing Sediment Site Characterization, Milwaukee Estuary AOC, Milwaukee, Wisconsin

ANALYTIC METHOD:		D2937	Lloyd Kahn	SW7471	E1630	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082			E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		Moisture	Total Organic Carbon	Mercury	Methyl Mercury	PCB, Total[1]	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Fish TEQ[2,3]	Mammal TEQ[2,4]	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD
REPORT RESULT UNIT:		%	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:				0.64		60										3							
SAMPLE ID	SAMPLE DATE																						
ML-SD-19-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-5.0/6.0-FD	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-9.0/10.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-0.0/1.0	17 Oct 2018	46.5	40,900	-	-	50.8 J	46.7 U	46.7 U	46.7 U	46.7 U	46.7 U	46.7 U	50.8 J	46.7 U	46.7 U	0.145	0.269	0.35 U	0.32 U	0.34 U	0.75 J	0.32 U	5.5 J
ML-SD-20-1.0/2.0	17 Oct 2018	40.9	35,300	-	-	42.3 U	42.3 U	42.3 U	42.3 U	42.3 U	42.3 U	42.3 U	42.3 U	42.3 U	42.3 U	0.00984	0.0165	0.43 U	0.31 U	0.32 U	0.27 U	0.33 U	0.63 IJ
ML-SD-20-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-5.0/6.0-FD	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-9.0/10.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-0.0/1.0	17 Oct 2018	36.7	24,400	0.052 U	1.72 U	39.5 U	39.5 U	39.5 U	39.5 U	39.5 U	39.5 U	39.5 U	39.5 U	39.5 U	39.5 U	0.00764	0.0157	0.32 U	0.28 U	0.28 U	0.24 U	0.26 U	0.83 J
ML-SD-21-1.0/2.0	17 Oct 2018	37.1	30,500	0.05 U	1.62 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	ND	ND	0.27 U	0.33 U	0.22 U	0.23 U	0.22 U	0.51 U
ML-SD-21-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-9.0/10.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-0.0/1.0	17 Oct 2018	39.9	24,900	0.094 J	1.6 U	74.3 J	41.6 U	41.6 U	41.6 U	41.6 U	41.6 U	41.6 U	74.3 J	41.6 U	41.6 U	0.347	0.507	0.23 U	0.23 U	0.21 U	0.51 IJ	0.38 U	9.9
ML-SD-22-1.0/2.0	17 Oct 2018	27.4	12,100	0.043 U	1.01 U	34.4 U	34.4 U	34.4 U	34.4 U	34.4 U	34.4 U	34.4 U	34.4 U	34.4 U	34.4 U	0.0139	0.0195	0.32 U	0.25 U	0.26 U	0.24 U	0.29 U	0.54 IJ
ML-SD-22-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-0.0/1.0	18 Oct 2018	60.2	47,100	-	-	400	62.8 U	62.8 U	62.8 U	62.8 U	62.8 U	62.8 U	400	62.8 U	62.8 U	35.2	49.0	8.6 D	4.5 JD	7.5 IJD	48 D	24 JD	1000 D
ML-SD-23-1.0/2.0	18 Oct 2018	57	52,800	-	-	171	58.1 U	58.1 U	58.1 U	58.1 U	58.1 U	58.1 U	171	58.1 U	58.1 U	249	305	13	63	43	320	180	2900
ML-SD-23-2.0/3.0	18 Oct 2018	32.8	16,800	-	-	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U	0.00034	0.00102	0.31 U	0.16 U	0.36 U	0.23 U	0.47 U	0.46 U
ML-SD-23-2.0/3.0-FD	18 Oct 2018	37.2	21,900	-	-	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	0.00013	0.00039	0.31 U	0.15 U	0.35 U	0.22 U	0.47 U	0.45 U
ML-SD-23-3.0/4.0	18 Oct 2018	35.6	17,900	-	-	38.8 U	38.8 U	38.8 U	38.8 U	38.8 U	38.8 U	38.8 U	38.8 U	38.8 U	38.8 U	0.186	0.214	0.31 U	0.16 U	0.35 U	0.22 U	0.47 U	2.4 IJ
ML-SD-23-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-4.0/5.0-FD	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-7.0/8.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-8.0/9.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-9.0/9.8	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Preliminary Unvalidated Analytical Results

Munger Landing Sediment Site Characterization, Milwaukee Estuary AOC, Milwaukee, Wisconsin

ANALYTIC METHOD:		D2937	Lloyd Kahn	SW7471	E1630	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082			E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		Moisture	Total Organic Carbon	Mercury	Methyl Mercury	PCB, Total[1]	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Fish TEQ[2,3]	Mammal TEQ[2,4]	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD
REPORT RESULT UNIT:		%	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:				0.64		60										3							
SAMPLE ID	SAMPLE DATE																						
ML-SD-24-0.0/1.0	18 Oct 2018	62.8	45,700	-	-	163	67.3 U	67.3 U	67.3 U	67.3 U	67.3 U	67.3 U	163	67.3 U	67.3 U	20.1	25.9	2.6	3.2 J	5.6 J	24	12	470
ML-SD-24-1.0/2.0	18 Oct 2018	59.2	59,900	-	-	1730	123 U	123 U	123 U	123 U	123 U	123 U	1730	123 U	123 U	176	212	13	45	40	200	76	2900
ML-SD-24-2.0/3.0	18 Oct 2018	50.3	32,500	-	-	50.3 U	50.3 U	50.3 U	50.3 U	50.3 U	50.3 U	50.3 U	50.3 U	50.3 U	50.3 U	10.2	11.5	0.36 U	1 IJ	0.41 U	7.7	4.7 J	69
ML-SD-24-2.0/3.0-FD	18 Oct 2018	48.2	30,400	-	-	48.3 U	48.3 U	48.3 U	48.3 U	48.3 U	48.3 U	48.3 U	48.3 U	48.3 U	48.3 U	24.1	25.0	0.32 U	0.16 U	0.56 IJ	5.8	2.8 J	50
ML-SD-24-3.0/4.0	18 Oct 2018	28.2	9,060	-	-	34.8 U	34.8 U	34.8 U	34.8 U	34.8 U	34.8 U	34.8 U	34.8 U	34.8 U	34.8 U	0.0549	0.0752	0.31 U	0.16 U	0.35 U	0.22 U	0.47 U	1.8 IJ
ML-SD-24-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-24-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-24-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-24-7.0/8.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-24-8.0/9.4	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-0.0/1.0	18 Oct 2018	56.2	46,900	-	-	205	57.1 U	57.1 U	57.1 U	57.1 U	57.1 U	57.1 U	205	57.1 U	57.1 U	72.8	88.3	5.2	13	13	82	48	990
ML-SD-25-1.0/2.0	18 Oct 2018	35	16,700	-	-	38.5 U	38.5 U	38.5 U	38.5 U	38.5 U	38.5 U	38.5 U	38.5 U	38.5 U	38.5 U	1.54	1.85	0.34 U	0.37 IJ	0.26 IJ	1.9 J	1.1 J	17
ML-SD-25-2.0/3.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-3.0/4.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-7.0/7.8	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-0.0/1.0	18 Oct 2018	56.8	51,200	-	-	958	116 U	116 U	116 U	116 U	116 U	116 U	958	116 U	116 U	61.6	90.3	5.1	11	27	91	51	2500
ML-SD-26-1.0/2.0	18 Oct 2018	50.6	39,200	-	-	50.6 U	50.6 U	50.6 U	50.6 U	50.6 U	50.6 U	50.6 U	50.6 U	50.6 U	50.6 U	116	137	6.6	25	17	130	68	1100
ML-SD-26-1.0/2.0-FD	18 Oct 2018	52.4	-	-	-	52.5 U	52.5 U	52.5 U	52.5 U	52.5 U	52.5 U	52.5 U	52.5 U	52.5 U	52.5 U	85.2	100	4.2	11	11	89	44	860
ML-SD-26-2.0/3.0	18 Oct 2018	25.8	13,800	-	-	33.7 U	33.7 U	33.7 U	33.7 U	33.7 U	33.7 U	33.7 U	33.7 U	33.7 U	33.7 U	0.0262	0.0375	0.31 U	0.16 U	0.36 U	0.23 U	0.47 U	0.99 IJ
ML-SD-26-3.0/4.0	18 Oct 2018	32.7	10,700	-	-	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U	0.102	0.221	0.31 U	0.15 U	0.35 U	0.43 IJ	0.46 J	3.6 J
ML-SD-26-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-7.0/8.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-8.0/9.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-9.0/10.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-9.0/10.0-	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-27-0.0/1.0	17 Oct 2018	83	287,000	-	-	147 U	147 U	147 U	147 U	147 U	147 U	147 U	147 U	147 U	147 U	1.70	2.23	1.5 U	0.96 U	0.81 J	2.8 IJ	1.3 IJ	38
ML-SD-27-1.0/2.0	17 Oct 2018	71.4	134,000	-	-	230	87.5 U	87.5 U	87.5 U	87.5 U	87.5 U	87.5 U	230	87.5 U	87.5 U	-	-	-	-	-	-	-	-
ML-SD-27-2.0/3.0	17 Oct 2018	74.4	184,000	-	-	195 U	195 U	195 U	195 U	195 U	195 U	195 U	195 U	195 U	195 U	-	-	-	-	-	-	-	-
ML-SD-27-3.0/3.7	17 Oct 2018	70.2	115,000	-	-	168 U	168 U	168 U	168 U	168 U	168 U	168 U	168 U	168 U	168 U	-	-	-	-	-	-	-	-
ML-SD-28-0.0/1.0	18 Oct 2018	23.8	5,920	-	-	32.8 U	32.8 U	32.8 U	32.8 U	32.8 U	32.8 U	32.8 U	32.8 U	32.8 U	32.8 U	0.0431	0.0909	0.89 U	0.54 U	0.86 U	0.73 U	0.79 U	4.5 J
ML-SD-28-1.0/2.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-2.0/3.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-3.0/4.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-3.0/4.0-FD	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-7.0/8.4	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-29-0.0/0.25	15 Oct 2018	90.2	226,000	-	-	-	-	-	-	-	-	-	-	-	-	42.8	49.1	3.3 J	11 J	6.4 J	42	17 J	460
ML-SD-30-0.0/0.25	15 Oct 2018	88.3	223,000	-	-	-	-	-	-	-	-	-	-	-	-	18.2	21.8	1.6 J	3.4 IJ	2.8 IJ	18	15 J	230
ML-SD-31-0.0/0.25	15 Oct 2018	75.2	102,000	-	-	-	-	-	-	-	-	-	-	-	-	27.0	31.6	2.1	4 J	4.4 J	26	12	360
ML-SD-32-0.0/0.25	15 Oct 2018	87.4	187,000	-	-	-	-	-	-	-	-	-	-	-	-	36.0	43.2	3.1	5.7 J	6.9 J	36	25	560

Table 2. Preliminary Unvalidated Analytical Results

Munger Landing Sediment Site Characterization, Milwaukee Estuary AOC, Milwaukee, Wisconsin

ANALYTIC METHOD:		D2937	Lloyd Kahn	SW7471	E1630	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082	SW8082			E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		Moisture	Total Organic Carbon	Mercury	Methyl Mercury	PCB, Total[1]	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Fish TEQ[2,3]	Mammal TEQ[2,4]	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD
REPORT RESULT UNIT:		%	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:				0.64		60										3							
SAMPLE ID	SAMPLE DATE																						
ML-SD-33-0.0/1.2	18 Oct 2018	16.1	11,300	0.041 U	-	29.8 U	29.8 U	29.8 U	29.8 U	29.8 U	29.8 U	29.8 U	29.8 U	29.8 U	29.8 U	0.00046	0.00138	0.44 U	0.43 U	0.38 U	0.53 U	0.63 U	0.94 U
ML-SD-34-0.0/1.0	18 Oct 2018	8.5	6,220	0.034 U	-	27.3 U	27.3 U	27.3 U	27.3 U	27.3 U	27.3 U	27.3 U	27.3 U	27.3 U	27.3 U	0.00038	0.00114	0.43 U	0.38 U	0.7 U	0.52 U	0.71 U	0.84 U
ML-SD-34-0.0/1.0-FD	18 Oct 2018	23.1	-	0.043 U	-	32.5 U	32.5 U	32.5 U	32.5 U	32.5 U	32.5 U	32.5 U	32.5 U	32.5 U	32.5 U	0.00020	0.00060	0.28 U	0.33 U	0.57 U	0.47 U	0.52 U	0.76 U
ML-SD-34-1.0/1.8	18 Oct 2018	28.8	10,700	0.049 U	-	35.1 U	35.1 U	35.1 U	35.1 U	35.1 U	35.1 U	35.1 U	35.1 U	35.1 U	35.1 U	0.00009	0.00027	0.25 U	0.26 U	0.19 U	0.21 U	0.22 U	0.37 U
ML-SD-35-0.0/1.3	19 Oct 2018	25	10,200	0.048 J	-	33.3 U	33.3 U	33.3 U	33.3 U	33.3 U	33.3 U	33.3 U	33.3 U	33.3 U	33.3 U	0.0120	0.0348	0.6 U	0.35 U	0.56 U	0.5 U	0.45 U	2.2 J
ML-SD-36-0.0/1.0	19 Oct 2018	33.7	18,700	0.046 U	-	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	0.0173	0.0503	0.56 U	0.36 U	0.63 U	0.63 U	0.49 U	3.2 J
ML-SD-36-1.0/1.6	19 Oct 2018	24.4	18,400	0.042 U	-	33.1 U	33.1 U	33.1 U	33.1 U	33.1 U	33.1 U	33.1 U	33.1 U	33.1 U	33.1 U	0.00025	0.00075	0.39 U	0.44 U	0.26 U	0.32 U	0.41 U	0.51 U
ML-SD-37-0.0/1.2	19 Oct 2018	22.1	8,920	0.044 U	-	32.1 U	32.1 U	32.1 U	32.1 U	32.1 U	32.1 U	32.1 U	32.1 U	32.1 U	32.1 U	0.00073	0.00219	0.37 U	0.45 U	0.45 U	0.45 U	0.39 U	0.65 U
ML-SD-38-0.0/1.0	19 Oct 2018	11.5	2,860	0.035 U	-	447	28.3 U	28.3 U	28.3 U	28.3 U	28.3 U	28.3 U	447	28.3 U	28.3 U	0.240	0.224	0.36 U	0.26 U	0.38 U	0.38 U	0.33 U	3 J
ML-SD-38-1.0/1.7	19 Oct 2018	18.1	7,670	0.041 U	-	554	61.1 U	61.1 U	61.1 U	61.1 U	61.1 U	61.1 U	554	61.1 U	61.1 U	0.962	0.816	0.4 U	0.34 U	0.48 U	0.41 U	0.43 U	6.3
ML-SD-39-0.0/1.0	19 Oct 2018	13.9	6,720	0.04 U	-	505	29 U	29 U	29 U	29 U	29 U	29 U	505	29 U	29 U	0.380	0.373	0.42 U	0.35 U	0.63 U	0.75 U	0.67 U	7.2
ML-SD-39-1.0/1.9	19 Oct 2018	25.8	18,400	0.054 J	-	186	33.7 U	33.7 U	33.7 U	33.7 U	33.7 U	33.7 U	186	33.7 U	33.7 U	0.439	0.417	0.61 U	0.37 U	0.52 U	0.59 J	0.38 U	5.2
ML-SD-40-0.0/1.0	19 Oct 2018	17.7	7,720	0.04 U	-	303	30.4 U	30.4 U	30.4 U	30.4 U	30.4 U	30.4 U	303	30.4 U	30.4 U	0.359	0.311	0.38 U	0.31 U	0.38 U	0.36 U	0.44 U	5 J
ML-SD-40-1.0/2.3	19 Oct 2018	19	8,400	0.042 U	-	408	30.8 U	30.8 U	30.8 U	30.8 U	30.8 U	30.8 U	408	30.8 U	30.8 U	1.04	0.850	0.35 U	0.32 U	0.36 U	0.62 U	0.32 U	2.6 J

Notes:

The data contained in the summary table is preliminary data. It is not validated, and the data and screening level comparison are subject to change pending completion of data validation.

Non-detect result values (indicated by a "U" qualifier) are reported as the level of detection (LOD) for mercury, methyl mercury, and PCBs; and as the estimated detection limit (EDL) for dioxins and furans.

Yellow highlighting indicate the result value exceeded the screening value.

[1]Total PCB and dioxin and furan homologue result values are presented as reported by the laboratory.

[2]Toxicity equivalence (TEQ) calculated by summing the individual TEQs for 17 congeners, nondetects were not included in the sum. "ND" indicates all 17 individual TEQs were reported as non-detect.

[3]Van den Berg, M; Birnbaum, L; Bosveld, ATC; Brunstrom, B; Cook, P; Feeley, M; Giesy, JP; Hanberg, A; Hasegawa, R; Kennedy, SW; Kubiak, T; Larsen, JC; van Leeuwen, FX; Liem, AK; Nolt, C; Peterson, RE; Poellinger, L; Safe, S; Schrenk, D; Tillitt, D; Tysklind, M; Younes, M; Waern, F; Zacharewski, T. (1998) Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environ Health Perspect 106(12):775-792.

[4]Van den Berg, M; Birnbaum, LS; Denison, M, DeVito, M, Farland, W, Feeley, M; Fiedler, H; Hakansson, H; Hanberg, A; Haws, L; Rose, M; Safe, S; Schrenk, D; Tohyama, C; Tritscher, A; Tuomisto, J; Tysklind, M; Walker, N; Peterson, RE. (2006) The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. Toxicol Sci 93:223-241

[5]Guidance for the Use and Application of Sediment Quality Targets (SQT) for the Protection of Sediment-Dwelling Organisms in Minnesota (MPCA 2007). Mercury (0.64 mg/kg) - midpoint between Level I and II SQTs; Total PCBs (60 µg/kg) - Level I SQT

[6]Fish TEQ screening value (3 ng/kg TEQ) per WDNR request

% = percent; mg/kg = milligrams per kilogram; ug/kg = micrograms per kilogram; ng/kg = nanogram per kilogram

- = parameter not analyzed

HOLD = sample collected and placed on hold at the laboratory

Table 2. Preliminary Unvalidated Analytical Resul

Munger Landing Sediment Site Characterization, M

ANALYTIC METHOD:		E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Total TCDD[1]	Total PeCDD[1]	Total HxCDD[1]	Total HpCDD[1]	Total TCDF[1]	Total PeCDF[1]	Total HxCDF[1]	Total HpCDF[1]
REPORT RESULT UNIT:		ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:																				
SAMPLE ID	SAMPLE DATE																			
ML-SD-01-0.0/1.0	15 Oct 2018	5600	6.4 V	1.8 J	6.6	16 P	22	3.2 J	6.3	960	12	540	19	34	380	1200	25	67	350	2000
ML-SD-01-0.0/1.0-FD	15 Oct 2018	7100	7.9 V	1.7 U	6	19 P	21	3 IJ	5.5 J	820	18	600	18	46	420	1500	33	79	390	1700
ML-SD-01-1.0/2.0	15 Oct 2018	31	0.18 U	0.35 U	0.61 U	0.66 U	0.54 J	0.25 U	0.19 U	13	0.21 U	3.9 J	0.2 U	0.42 U	1.7 J	7.7	0.18 U	0.86 J	3.5 J	25
ML-SD-01-2.0/3.0	15 Oct 2018	41	0.14 U	0.19 U	0.22 IJ	0.2 U	0.21 U	0.26 U	0.27 U	16	0.44 U	5.7 J	0.31 U	0.16 U	1 J	9.7	0.14 U	0.33 U	2 J	31
ML-SD-01-3.0/4.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-01-4.0/5.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-01-4.0/5.0-FD	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-01-5.0/6.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-01-6.0/7.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-01-7.0/8.1	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-02-0.0/1.0	15 Oct 2018	3900	5.7 V	1.3 J	3.4 IJ	5.3 J	15	1.9 J	2.7 J	460	6.8 J	260	9.3	20	150	760	30	42	190	930
ML-SD-02-1.0/2.0	15 Oct 2018	17000 E	22 V	3.8 J	10	24	32	5.3 J	8.5	1000	27	1100	36	63	710	3200	83	140	300	1100
ML-SD-02-2.0/3.0	15 Oct 2018	240	0.14 U	0.19 U	0.88 J	0.2 U	2.4 J	0.26 U	0.27 U	160	0.44 U	54	0.31 U	1.5 J	21	50	0.14 U	6.2	48	280
ML-SD-02-3.0/4.0	15 Oct 2018	75	0.14 U	0.19 U	0.23 IJ	0.41 IJ	0.85 J	0.26 U	0.38 IJ	32	0.44 U	12	0.31 U	0.16 U	7.4	17	0.14 U	1.6 J	12	61
ML-SD-02-4.0/4.7	15 Oct 2018	14	0.14 U	0.19 U	0.14 U	0.2 U	0.21 U	0.26 U	0.27 U	1.3 J	0.44 U	1.1 U	0.31 U	0.15 U	1 U	0.45 U	0.14 U	0.33 U	0.93 U	1.3 J
ML-SD-03-0.0/1.0	16 Oct 2018	2 J	0.15 U	0.2 U	0.15 U	0.21 U	0.22 U	0.27 U	0.28 U	0.63 J	0.46 U	1.2 U	0.27 J	0.16 U	1.1 U	0.57 J	0.15 U	0.42 J	0.98 U	1.5 J
ML-SD-03-1.0/2.0	16 Oct 2018	0.89 U	0.17 U	0.23 U	0.18 U	0.24 U	0.25 U	0.32 U	0.33 U	0.41 U	0.54 U	1.4 U	0.38 U	0.19 U	1.3 U	0.56 U	0.17 U	0.41 U	1.1 U	0.95 U
ML-SD-03-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-2.0/3.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-6.0/7.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-7.0/8.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-7.0/8.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-8.0/9.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-03-9.0/9.7	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-0.0/1.0	16 Oct 2018	12	0.24 J	0.21 U	0.16 U	0.22 U	0.23 U	0.29 U	0.3 U	3.1 J	0.49 U	0.3 UJ	4	2.7 J	2.7 J	3.4 J	0.42 J	0.58 J	1.2 J	5.2 J
ML-SD-04-1.0/2.0	16 Oct 2018	0.75 U	0.14 U	0.19 U	0.15 U	0.2 U	0.21 U	0.27 U	0.28 U	0.34 U	0.45 U	1.2 U	1.4	0.16 U	1.8 J	0.47 U	0.14 U	0.34 U	0.96 U	0.8 U
ML-SD-04-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-6.0/7.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-7.0/8.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-04-8.0/8.7	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-0.0/1.0	15 Oct 2018	1.5 IJ	0.22 U	0.43 U	0.83 U	0.61 U	0.35 U	0.34 U	0.26 U	0.55 U	0.33 U	0.75 U	0.31 U	0.51 U	0.47 U	0.67 U	0.22 U	0.63 U	0.39 U	0.44 U
ML-SD-05-0.0/1.0-FD	15 Oct 2018	4.7 BJ	0.1 U	0.19 U	0.29 U	0.15 U	0.12 U	0.092 U	0.096 U	1.1 IJ	0.19 U	0.43 IJ	0.39 J	0.46 J	0.86 J	0.7 J	0.1 U	0.24 U	0.27 J	1.3 J
ML-SD-05-1.0/2.0	15 Oct 2018	0.45 IJ	0.12 U	0.2 U	0.27 U	0.14 U	0.078 U	0.089 U	0.087 U	0.19 U	0.16 U	0.23 U	0.11 U	0.25 U	0.12 U	0.25 U	0.12 U	0.24 U	0.099 U	0.18 U
ML-SD-05-2.0/3.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-3.0/4.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-4.0/5.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-4.0/5.0-FD	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-5.0/6.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-05-6.0/7.0	15 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-06-0.0/1.0	16 Oct 2018	54	0.17 UJ	0.21 U	0.16 U	0.19 UJ	0.15 UJ	0.29 U	0.31 U	16	0.5 U	3.7 J	2.5	3.7 J	6.4	16	0.48 J	2.2 J	7.5	29
ML-SD-06-1.0/2.0	16 Oct 2018	20	0.13 UJ	0.23 U	0.18 U	0.24 U	0.21 J	0.32 U	0.34 U	3.5 J	0.54 U	0.51 UJ	3.9	2.7 J	2.4 J	4.5 J	0.87 J	0.67 J	2.4 J	6.1 J
ML-SD-06-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-06-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-06-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-06-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-06-6.0/7.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Preliminary Unvalidated Analytical Resul

Munger Landing Sediment Site Characterization, M

ANALYTIC METHOD:		E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Total TCDD[1]	Total PeCDD[1]	Total HxCDD[1]	Total HpCDD[1]	Total TCDF[1]	Total PeCDF[1]	Total HxCDF[1]	Total HpCDF[1]
REPORT RESULT UNIT:		ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:																				
SAMPLE ID	SAMPLE DATE																			
ML-SD-07-0.0/1.0	16 Oct 2018	1600	1.1 V	0.25 UJ	4 J	8.8	21	2.8 J	5.1	950	4.8	220	21	43	230	510	15	86	520	1700
ML-SD-07-1.0/2.0	16 Oct 2018	23	0.16 U	0.22 U	0.17 U	0.23 U	0.24 U	0.3 U	0.31 U	8.7	0.5 U	2.9 J	0.36 U	0.18 U	2.9 J	2.8 J	0.16 U	1 J	4.1 J	16
ML-SD-07-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-3.0/4.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-6.0/7.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-7.0/8.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-07-8.0/8.9	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-0.0/1.0	16 Oct 2018	140	0.15 U	0.21 U	0.16 U	0.22 U	3.5 J	0.29 U	0.3 U	50	0.48 U	15	0.34 U	0.17 U	13	38	0.15 U	7.2	40	95
ML-SD-08-1.0/2.0	16 Oct 2018	3.6 UJ	0.16 U	0.22 U	0.17 U	0.23 U	0.24 U	0.3 U	0.31 U	0.38 U	0.51 U	1.3 U	0.36 U	0.18 U	1.2 U	0.52 U	0.16 U	0.38 U	1.1 U	0.89 U
ML-SD-08-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-5.0/6.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-08-6.0/7.2	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-09-0.0/1.0	16 Oct 2018	13	0.15 U	0.2 U	0.16 U	0.21 U	0.22 U	0.28 U	0.29 U	1.4 UJ	0.47 U	1.2 U	0.33 U	0.17 U	1.1 U	0.49 U	0.15 U	0.36 U	1 U	3.8 J
ML-SD-09-1.0/2.0	16 Oct 2018	7.1 J	0.15 U	0.2 U	0.15 U	0.21 U	0.22 U	0.28 U	0.29 U	2.4 J	0.47 U	1.2 U	0.33 U	0.16 U	1.1 U	3.4 J	0.15 U	0.35 U	0.99 U	2.4 J
ML-SD-09-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-09-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-09-3.0/4.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-09-4.0/5.2	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-0.0/1.0	16 Oct 2018	7.3 J	0.17 U	0.22 U	0.17 U	0.23 U	0.25 U	0.31 U	0.32 U	3.6 J	0.52 U	1.3 U	4.5	0.18 U	2.8 J	0.54 U	0.17 U	0.4 U	1.1 U	3.6 J
ML-SD-10-0.0/1.0-FD	16 Oct 2018	12	0.15 U	0.21 U	0.16 U	0.22 U	0.23 U	0.29 U	0.3 U	2.5 J	0.49 U	1.3 U	4.7	2.5 J	4.3 J	3.8 J	0.15 U	0.37 U	1.4 J	2.5 J
ML-SD-10-1.0/2.0	16 Oct 2018	3.2 J	0.16 U	0.22 U	0.17 U	0.23 U	0.25 U	0.31 U	0.32 U	0.99 J	0.52 U	1.3 U	2.1	0.18 U	1.2 U	1.1 J	0.16 U	0.39 U	1.1 U	2.1 J
ML-SD-10-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-4.0/5.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-6.0/7.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-7.0/8.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-10-8.0/8.6	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-11-0.0/1.0	16 Oct 2018	5500	3.7	3 J	0.17 U	0.24 U	54	0.71 UJ	12	2400	19	780	36	130	590	1600	27	300	530	2500
ML-SD-11-1.0/2.0	16 Oct 2018	15	0.15 U	0.2 U	0.15 U	0.21 U	0.22 U	0.27 U	0.28 U	6.4	0.46 U	1.2 UJ	1	1.4 J	1.1 J	4.8 J	0.37 J	0.22 J	3.2 J	12
ML-SD-11-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-11-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-11-4.0/5.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-11-4.0/5.0-FD	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-11-5.0/6.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-0.0/1.0	17 Oct 2018	25	0.52 U	0.82 U	0.61 U	0.39 U	0.46 J	0.33 U	0.33 U	4.8 J	0.26 U	3.1 J	0.66 U	1.1 U	0.63 J	7.8	0.52 U	1.4 J	0.46 J	8.8
ML-SD-12-1.0/2.0	17 Oct 2018	7.8 J	0.22 U	0.43 U	0.5 U	0.23 U	0.19 U	0.19 U	0.13 U	1.3 J	0.32 U	0.51 IJ	1.7	1.2 J	1.7 J	2.2 J	0.22 U	0.46 U	0.38 J	2.4 J
ML-SD-12-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-12-9.0/10.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Preliminary Unvalidated Analytical Resul

Munger Landing Sediment Site Characterization, M

ANALYTIC METHOD:		E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Total TCDD[1]	Total PeCDD[1]	Total HxCDD[1]	Total HpCDD[1]	Total TCDF[1]	Total PeCDF[1]	Total HxCDF[1]	Total HpCDF[1]
REPORT RESULT UNIT:		ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:																				
SAMPLE ID	SAMPLE DATE																			
ML-SD-13-0.0/1.0	16 Oct 2018	6.1 J	0.15 U	0.2 U	0.15 U	0.21 U	0.22 U	0.27 U	0.28 U	1.4 J	0.46 U	0.53 UJ	0.32 U	0.16 U	1.1 U	0.96 J	0.15 U	0.32 J	0.65 J	2.9 J
ML-SD-13-0.0/1.0-FD	16 Oct 2018	52	0.15 U	0.2 U	0.16 U	0.21 U	0.58 J	0.28 U	0.29 U	12	0.48 U	1.2 UJ	1.5	1.7 J	5.3 J	15	1.2	2.3 J	9.6	23
ML-SD-13-1.0/2.0	16 Oct 2018	0.75 U	0.14 U	0.2 U	0.15 U	0.2 U	0.21 U	0.27 U	0.28 U	0.35 U	0.45 U	1.2 U	0.32 U	0.16 U	1.1 U	0.47 U	0.14 U	0.34 U	0.97 U	0.8 U
ML-SD-13-2.0/3.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-13-3.0/4.0	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-13-4.0/4.9	16 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-0.0/1.0	17 Oct 2018	15000 E	19 V	5.2 J	14	63	110	17	18	4400 E	55	2300	120	290	1900	4700	130	410	1300	8500 E
ML-SD-14-1.0/2.0	17 Oct 2018	3300	1.3 J	4.2 J	12	35 P	98	13	13	3500 E	20	1300	37	120	710	1200	34	260	1000	5900 E
ML-SD-14-2.0/3.0	17 Oct 2018	84	0.14 U	0.19 U	0.14 U	0.2 U	1.1 IJ	0.26 U	0.27 U	32	0.44 U	16	0.31 U	0.77 J	1.5 J	23	0.14 U	0.33 U	9.6	57
ML-SD-14-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-14-8.0/9.4	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-0.0/1.0	18 Oct 2018	1000	0.81 J	0.82 J	1.4 IJ	3.8 J	8.4	0.65 J	2.7 J	250	3.2 J	110	7.6	19	89	260	14	27	150	470
ML-SD-15-1.0/2.0	18 Oct 2018	26	0.34 U	0.45 U	0.25 U	0.4 U	0.46 J	0.4 U	0.26 U	6.8	0.64 U	3.1 J	5.8	3.2 J	5 J	8	0.34 U	0.85 J	4.8 J	13
ML-SD-15-2.0/3.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-3.0/4.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-4.0/5.0-FD	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-7.0/8.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-15-8.0/9.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-0.0/1.0	17 Oct 2018	260	0.47 J	0.59 U	0.67 J	1.3 J	3.8 J	0.63 J	0.45 IJ	99	0.76 IJ	38	5.5	5.5 J	24	64	3.5	11	54	170
ML-SD-16-1.0/2.0	17 Oct 2018	99	0.88 U	0.54 U	0.35 U	0.6 J	0.69 IJ	0.62 U	0.5 J	25	1.2 U	7.6 IJ	6.7	6 J	14	27	0.88 U	2.3 J	10 J	47
ML-SD-16-2.0/3.0	17 Oct 2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-16-9.0/10.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-17-0.0/1.0	17 Oct 2018	1500	1.2 J	0.95 IJ	2.4 J	6.8	11	1.4 J	3.3 IJ	370	7.9	190	6.2	23	120	330	23	53	240	710
ML-SD-17-1.0/2.0	17 Oct 2018	1 U	0.25 U	0.26 U	0.21 U	0.25 U	0.23 U	0.33 U	0.22 U	0.23 U	0.43 U	0.69 U	0.37 U	0.34 U	0.4 J	0.53 U	0.25 U	0.23 U	0.26 U	0.33 U
ML-SD-17-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-0.0/1.0	17 Oct 2018	90	0.51 U	0.52 U	0.27 J	0.64 U	0.66 IJ	0.59 U	0.61 U	15	0.89 U	6.2 IJ	0.59 U	0.51 U	3.8 J	24	0.58 J	0.82 J	12	30
ML-SD-18-1.0/2.0	17 Oct 2018	2.2 J	0.33 U	0.47 U	0.32 U	0.31 U	0.26 U	0.41 U	0.24 U	0.47 U	0.85 U	1.3 U	0.49 U	0.48 U	0.4 U	0.77 U	0.33 U	0.39 U	0.31 U	0.66 U
ML-SD-18-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-18-8.0/9.2	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-0.0/1.0	17 Oct 2018	5.7 J	0.25 U	0.29 U	0.23 U	0.22 U	0.16 U	0.28 U	0.21 U	1.5 J	0.55 U	0.78 U	0.32 U	0.34 U	0.83 J	0.47 U	0.25 U	0.26 U	1.1 J	3.1 J
ML-SD-19-1.0/2.0	17 Oct 2018	5.6 J	0.91 U	0.69 U	0.42 U	0.41 U	0.45 U	0.68 U	0.45 U	1.2 IJ	1.1 U	2.7 U	1.3 U	1.1 U	1 J	1.1 U	0.91 U	0.55 U	0.5 U	1 U
ML-SD-19-1.0/2.0-FD	17 Oct 2018	0.78 U	0.28 U	0.2 U	0.21 U	0.13 U	0.12 U	0.17 U	0.11 U	0.24 U	0.31 U	0.74 U	0.32 U	0.26 U	0.24 J	0.38 U	0.28 U	0.21 U	0.13 U	0.28 U
ML-SD-19-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Preliminary Unvalidated Analytical Resul

Munger Landing Sediment Site Characterization, M

ANALYTIC METHOD:		E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Total TCDD[1]	Total PeCDD[1]	Total HxCDD[1]	Total HpCDD[1]	Total TCDF[1]	Total PeCDF[1]	Total HxCDF[1]	Total HpCDF[1]
REPORT RESULT UNIT:		ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:																				
SAMPLE ID	SAMPLE DATE																			
ML-SD-19-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-5.0/6.0-FD	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-19-9.0/10.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-0.0/1.0	17 Oct 2018	35	0.39 U	0.28 U	0.2 U	0.34 U	0.45 IJ	0.31 U	0.32 U	8.3	0.53 U	2.6 IJ	0.35 U	0.6 J	4.6 J	5.5 J	0.39 U	2.1 J	6.4 J	16
ML-SD-20-1.0/2.0	17 Oct 2018	5.1 J	0.27 U	0.3 U	0.16 U	0.18 U	0.16 U	0.25 U	0.15 U	0.87 J	0.52 U	0.96 U	2.3	3.7 J	2.7 J	1.1 J	0.27 U	0.23 U	0.18 U	0.87 J
ML-SD-20-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-5.0/6.0-FD	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-20-9.0/10.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-0.0/1.0	17 Oct 2018	3.1 IJ	0.24 U	0.26 U	0.21 U	0.2 U	0.18 U	0.22 U	0.17 U	0.65 J	0.45 U	0.81 U	0.32 U	0.66 J	0.26 U	1.8 J	0.24 U	0.24 U	0.54 J	1.5 J
ML-SD-21-1.0/2.0	17 Oct 2018	0.95 U	0.31 U	0.22 U	0.16 U	0.19 U	0.16 U	0.34 U	0.19 U	0.35 U	0.56 U	0.67 U	0.27 U	0.33 U	0.22 U	0.51 U	0.31 U	0.19 U	0.22 U	0.45 U
ML-SD-21-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-21-9.0/10.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-0.0/1.0	17 Oct 2018	120	0.23 U	0.23 U	0.16 U	0.26 IJ	0.93 J	0.19 U	0.4 J	16	0.43 U	6.8 J	0.85 J	1.4 J	6.1	28	0.23 U	3 J	10	30
ML-SD-22-1.0/2.0	17 Oct 2018	3 IJ	0.25 U	0.22 U	0.14 U	0.25 U	0.21 U	0.26 U	0.21 U	1.3 IJ	0.43 U	0.73 J	0.32 U	0.25 U	0.27 U	0.83 J	0.25 U	0.18 U	0.72 J	0.38 U
ML-SD-22-2.0/3.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-3.0/4.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-4.0/5.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-5.0/6.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-6.0/7.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-7.0/8.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-22-8.0/9.0	17 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-0.0/1.0	18 Oct 2018	12000 D	14 DV	2.2 D	9.5 JD	14 JD	20 JD	3.2 D	6.6 JD	520 D	24 JD	630 D	13 D	48 D	460 D	2500 D	95 D	150 D	230 D	1400 D
ML-SD-23-1.0/2.0	18 Oct 2018	24000 E	10 V	33 P	17	88	150	28 P	29	10000 E	57	4200	140	460	3100	7000	75	450	5700	19000 E
ML-SD-23-2.0/3.0	18 Oct 2018	3.4 IJ	0.14 U	0.19 U	0.14 U	0.2 U	0.21 U	0.26 U	0.27 U	0.34 U	0.44 U	1.1 U	0.31 U	0.16 U	1 U	0.46 U	0.14 U	0.33 U	0.94 U	0.78 U
ML-SD-23-2.0/3.0-FD	18 Oct 2018	1.3 IJ	0.14 U	0.19 U	0.14 U	0.2 U	0.21 U	0.26 U	0.27 U	0.33 U	0.44 U	1.1 U	0.31 U	0.15 U	1 U	0.45 U	0.14 U	0.33 U	0.93 U	0.77 U
ML-SD-23-3.0/4.0	18 Oct 2018	23	0.14 U	0.19 U	0.14 U	0.2 U	0.21 U	0.26 U	0.27 U	18	0.44 U	9 J	0.31 U	0.16 U	1 U	3.2 BJ	0.14 U	0.33 U	2.1 J	29
ML-SD-23-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-4.0/5.0-FD	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-7.0/8.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-8.0/9.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-23-9.0/9.8	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Preliminary Unvalidated Analytical Resul

Munger Landing Sediment Site Characterization, M

ANALYTIC METHOD:		E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Total TCDD[1]	Total PeCDD[1]	Total HxCDD[1]	Total HpCDD[1]	Total TCDF[1]	Total PeCDF[1]	Total HxCDF[1]	Total HpCDF[1]
REPORT RESULT UNIT:		ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:																				
SAMPLE ID	SAMPLE DATE																			
ML-SD-24-0.0/1.0	18 Oct 2018	5300	6 V	2 J	4.3 J	8.6	14	1.3 U	3.4 J	490	8.3 J	270	13	56	370	1200	63	73	160	500
ML-SD-24-1.0/2.0	18 Oct 2018	29000 E	13 V	53 P	20	46	110	18	15	5600 E	51	2600	78	260	2200	6500 E	89	350	2400	11000 E
ML-SD-24-2.0/3.0	18 Oct 2018	580	0.16 U	0.6 J	2.7 J	6.6 I	12	0.3 U	0.32 U	560	4.4 J	220	4.3	4.4 J	66	150	6.8	26	90	1000
ML-SD-24-2.0/3.0-FD	18 Oct 2018	470	0.15 U	0.2 U	1.5 J	25	16	2.8 J	3.1 J	1800	14	690	2.5	0.16 U	45	110	3.9	16	300	2800
ML-SD-24-3.0/4.0	18 Oct 2018	17	0.14 U	0.19 U	0.14 U	0.2 U	0.21 U	0.26 U	0.27 U	5.1	0.44 U	3.8 J	0.31 U	0.16 U	1 U	2.3 BJ	0.14 U	0.33 U	0.94 U	10
ML-SD-24-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-24-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-24-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-24-7.0/8.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-24-8.0/9.4	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-0.0/1.0	18 Oct 2018	8900	7.2 V	4.2 J	11	32 P	65	7.6 J	10	2700	25	1300	63	140	790	2400	65	220	1400	5100
ML-SD-25-1.0/2.0	18 Oct 2018	150	0.36 U	0.19 U	0.22 IJ	0.78 J	1.5 J	0.18 IJ	0.6 J	56	0.34 IJ	23	2.1	2.7 J	17	41	0.36 U	3.9 J	32	100
ML-SD-25-2.0/3.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-3.0/4.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-25-7.0/7.8	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-0.0/1.0	18 Oct 2018	27000 E	22 V	4.5 J	12	25	39	6.6 J	7.1 J	1000	25	720	22	210	2000	8800 E	140	110	680	1100
ML-SD-26-1.0/2.0	18 Oct 2018	9800 E	6.9 V	6.1 J	15	47	100	12	16	4600 E	28	1800	43	190	1000	2500	75	260	1000	8400 E
ML-SD-26-1.0/2.0-FD	18 Oct 2018	9200 E	5.4 C	4.9 J	14	41	92	10	12	3800 E	25	1500	53	130	800	2000	63	220	870	6200 E
ML-SD-26-2.0/3.0	18 Oct 2018	12	0.14 U	0.19 U	0.14 U	0.2 U	0.21 U	0.26 U	0.27 U	2.4 J	0.44 U	1.1 U	0.31 U	0.16 U	0.48 J	1.3 BJ	0.14 U	0.33 U	0.94 U	5.7
ML-SD-26-3.0/4.0	18 Oct 2018	29	0.14 U	0.19 U	0.14 U	0.2 U	0.21 U	0.26 U	0.27 U	8.6	0.44 U	4.2 J	0.31 U	0.66 J	1.9 J	3.6 BJ	0.14 U	0.49 J	2.3 J	8.6
ML-SD-26-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-7.0/8.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-8.0/9.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-9.0/10.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-26-9.0/10.0-	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-27-0.0/1.0	17 Oct 2018	330	1.4 J	1.8 U	0.9 U	0.99 J	2.8 J	0.68 U	1.5 J	58	2 U	29	1.5 U	0.96 U	16	83	11	20	27	110
ML-SD-27-1.0/2.0	17 Oct 2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-27-2.0/3.0	17 Oct 2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-27-3.0/3.7	17 Oct 2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-0.0/1.0	18 Oct 2018	33	0.51 U	0.51 U	0.38 U	0.82 U	0.63 U	0.69 U	0.57 U	3.5 J	1.5 U	3.2 J	0.89 U	0.54 U	1.8 J	22	0.51 U	0.44 U	2.3 J	7.5
ML-SD-28-1.0/2.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-2.0/3.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-3.0/4.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-3.0/4.0-FD	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-4.0/5.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-5.0/6.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-6.0/7.0	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-28-7.0/8.4	18 Oct 2018 HOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML-SD-29-0.0/0.25	15 Oct 2018	3500	6.5 V	6 J	8 J	17 J	52	3.4 IJ	9.2 J	1100	8.8 IJ	350	17	60	290	830	47	110	420	2000
ML-SD-30-0.0/0.25	15 Oct 2018	1900	3.7 V	2.3 J	4.4 IJ	8.1 J	22 P	1.5 IJ	3.5 J	500	4.8 J	190	14	8.8 J	130	400	21	44	140	890
ML-SD-31-0.0/0.25	15 Oct 2018	3100	4.4 V	3.5 J	5.5 J	10	43	2.7 IJ	6.6 J	820	7 J	270	24	38	230	740	42	110	430	1500
ML-SD-32-0.0/0.25	15 Oct 2018	5000	5.3 V	4.9 J	8.6 J	12 J	56 P	4.1 J	8.9 J	900	9.4 J	360	24	33	240	910	35	110	290	1600

Table 2. Preliminary Unvalidated Analytical Resul

Munger Landing Sediment Site Characterization, M

ANALYTIC METHOD:		E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613	E1613
CHEMICAL NAME:		OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Total TCDD[1]	Total PeCDD[1]	Total HxCDD[1]	Total HpCDD[1]	Total TCDF[1]	Total PeCDF[1]	Total HxCDF[1]	Total HpCDF[1]
REPORT RESULT UNIT:		ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SCREENING VALUE[5,6]:																			
SAMPLE ID	SAMPLE DATE																		
ML-SD-33-0.0/1.2	18 Oct 2018	4.6 J	0.25 U	0.4 U	0.3 U	0.32 U	0.36 U	0.55 U	0.38 U	0.46 U	0.62 U	0.85 U	0.55 J	0.83 J	0.51 U	1.1 J	0.4 J	0.35 U	0.4 U	0.54 U
ML-SD-34-0.0/1.0	18 Oct 2018	3.8 J	0.26 U	0.3 U	0.31 U	0.62 U	0.59 U	0.95 U	0.6 U	0.85 U	0.76 U	1.5 U	0.43 U	0.38 U	0.64 U	0.84 U	0.26 U	0.31 U	0.69 U	0.8 U
ML-SD-34-0.0/1.0-FD	18 Oct 2018	2 J	0.19 U	0.22 U	0.24 U	0.46 U	0.41 U	0.49 U	0.5 U	0.58 U	1 U	1.1 U	0.28 U	0.33 U	0.52 U	0.76 U	0.19 U	0.23 U	0.47 U	0.8 U
ML-SD-34-1.0/1.8	18 Oct 2018	0.9 J	0.17 U	0.21 U	0.17 U	0.14 U	0.13 U	0.16 U	0.1 U	0.28 U	0.41 U	0.61 U	0.25 U	0.26 U	0.21 U	0.37 U	0.17 U	0.19 U	0.13 U	0.35 U
ML-SD-35-0.0/1.3	19 Oct 2018	13	0.65 U	0.44 U	0.35 U	0.32 U	0.41 U	0.43 U	0.44 U	0.83 J	0.68 U	2 J	0.6 U	0.35 U	0.68 J	5 J	0.65 U	2.2 J	0.91 J	1.9 J
ML-SD-36-0.0/1.0	19 Oct 2018	21 I	0.31 U	0.46 U	0.33 U	0.49 U	0.37 U	0.74 U	0.51 U	1.2 J	0.65 U	2 U	0.56 U	0.36 U	0.78 J	9.1	0.48 J	0.4 U	0.96 J	2.6 J
ML-SD-36-1.0/1.6	19 Oct 2018	2.5 J	0.34 U	0.33 U	0.19 U	0.34 U	0.32 U	0.36 U	0.31 U	0.36 U	0.48 U	0.98 U	0.39 U	0.44 U	0.78 J	0.51 U	0.49 J	0.26 U	0.33 U	0.42 U
ML-SD-37-0.0/1.2	19 Oct 2018	7.3 J	0.49 U	0.37 U	0.25 U	0.41 U	0.44 U	0.42 U	0.31 U	0.46 U	0.55 U	1.1 U	0.37 U	0.45 U	0.43 U	1.1 J	0.49 U	0.31 U	0.39 U	0.6 J
ML-SD-38-0.0/1.0	19 Oct 2018	29	0.3 U	0.21 U	0.25 IJ	0.8 J	0.26 U	0.32 U	0.27 U	1.7 IJ	1.1 IJ	6.6 J	0.36 U	0.26 U	0.36 U	6.8	0.3 U	2.3 J	3.1 J	2.9 J
ML-SD-38-1.0/1.7	19 Oct 2018	77	0.25 U	0.26 U	1.1 J	2 J	0.49 J	0.41 U	0.66 IJ	6.7	1.5 J	11	0.4 U	0.64 J	4.2 J	15	8.8	19	12	13
ML-SD-39-0.0/1.0	19 Oct 2018	81	0.3 U	0.32 U	0.45 J	1.1 J	0.46 U	0.55 U	0.47 U	2.9 J	1.1 U	8 J	0.42 U	0.47 J	2.1 J	20	1.3	5.7	5.6	7.5
ML-SD-39-1.0/1.9	19 Oct 2018	52	0.57 U	0.53 U	0.67 IJ	0.58 J	0.42 U	0.34 U	0.5 U	2.3 IJ	0.65 IJ	4.8 J	0.92 J	0.92 J	4.1 J	13	3.7	8.8	4.8 J	3.1 J
ML-SD-40-0.0/1.0	19 Oct 2018	37	0.27 U	0.29 U	0.51 J	0.67 J	0.41 U	0.41 U	0.35 U	1.9 J	0.88 IJ	6.8 J	0.55 J	0.31 U	0.78 J	11	3.2	4.5 J	3.8 J	5.3
ML-SD-40-1.0/2.3	19 Oct 2018	22	0.35 U	0.36 U	1.1 J	2.8 J	0.75 IJ	0.39 U	0.58 J	4.4 J	2.6 IJ	16	0.39 J	0.32 U	0.43 U	5.5	6.6	15	9.7	11

Notes:

The data contained in the summary table is preliminary data. It is not validated, and the data and screening level comparison are subject to change pending completion of data validation.

Non-detect result values (indicated by a "U" qualifier) are reported as the level of detection (LOD) for mercury, methyl mercury, and PCBs; and as the estimated detection limit (EDL) for dioxins and furans.

Yellow highlighting indicate the result value exceeded the screening value.

[1]Total PCB and dioxin and furan homologue result values are presented as reported by the laboratory.

[2]Toxicity equivalence (TEQ) calculated by summing the individual TEQs for 17 congeners, nondetects were not included in the sum. "ND" indicates all 17 individual TEQs were reported as non-detect.

[3]Van den Berg, M; Birnbaum, L; Bosveld, ATC; Brunstrom, B; Cook, P; Feeley, M; Giesy, JP; Hanberg, A; Hasegawa, R; Kennedy, SW; Kubiak, T; Larsen, JC; van Leeuwen, FX; Liem, AK; Nolt, C; Peterson, RE; Poellinger, L; Safe, S; Schrenk, D; Tillitt, D; Tysklind, M; Younes, M; Waern, F; Zacharewski, T. (1998) Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environ Health Perspect 106(12):775-792.

[4]Van den Berg, M; Birnbaum, LS; Denison, M, DeVito, M, Farland, W, Feeley, M; Fiedler, H; Hakansson, H; Hanberg, A; Haws, L; Rose, M; Safe, S; Schrenk, D; Tohyama, C; Tritscher, A; Tuomisto, J; Tysklind, M; Walker, N; Peterson, RE. (2006) The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. Toxicol Sci 93:223-241

[5]Guidance for the Use and Application of Sediment Quality Targets (SQT) for the Protection of Sediment-Dwelling Organisms in Minnesota (MPCA 2007). Mercury (0.64 mg/kg) - midpoint between Level I and II SQTs; Total PCBs (60 µg/kg) - Level I SQT

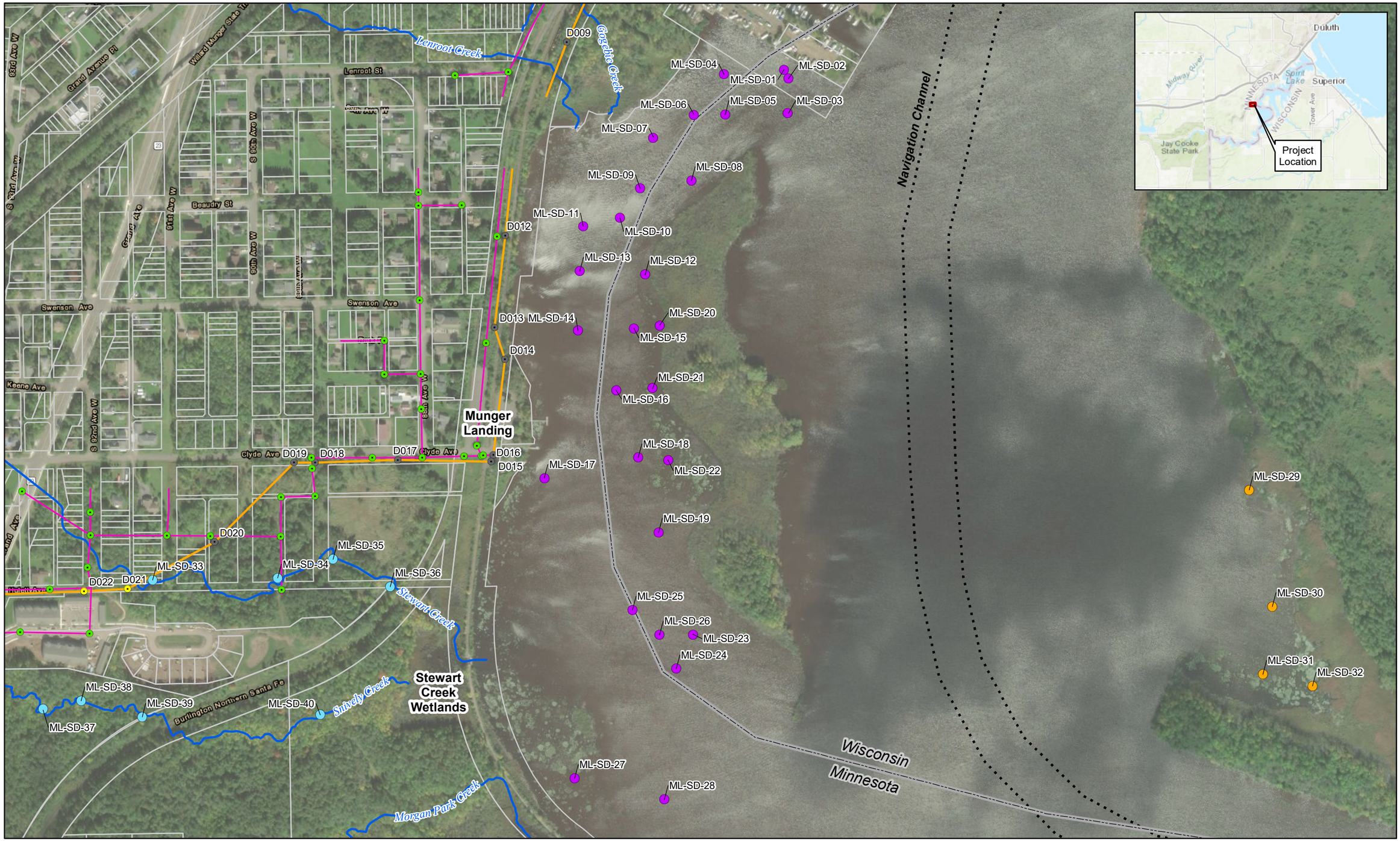
[6]Fish TEQ screening value (3 ng/kg TEQ) per WDNR request

% = percent; mg/kg = milligrams per kilogram; ug/kg = micrograms per kilogram; ng/kg = nanogram per kilogram

- = parameter not analyzed

HOLD = sample collected and placed on hold at the laboratory

Figure



Legend

As-Collected Sample Locations
- Manual Core Location
- Ponar Grab
- Vibracore Location

- City Manhole
- City Sewer

WLSSD Manholes
- Drop
- Standard

WLSSD Collection System
- Gravity

- Creek
- State Boundary
- Navigation Channel
- Parcel Boundary

Note:
WLSSD = Western Lake Superior Sanitary District

N

0 400 800
Feet

Figure 1
2018 As-Collected Sample Locations
Munger Landing
St. Louis County, Minnesota

ch2m

R:\ENBG\00_PROJ\E\EPA\MUNGERLANDING\MAPFILES\FIGURE_1_2018_AS-COLLECTED_SAMPLE_LOCATIONS.MXD AESPEJO 11/5/2018

Attachment 1
Sediment Core Logs

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-01 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 585.1 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 18.0 ft | START : 10/15/18 08:57 | END : 10/15/18 09:10 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0							
585.1	0.0		-		0.0 - 1.5 - SILTY CLAY - moist, soft, dark grayish brown (10YR 4/2), nonplastic, no odor/staining	0.0	ML-SD-01-0.0/1.0 (1620) ML-SD-01-0.0/1.0- FD (1621)
			-		1.5 - 6.1 - SANDY SILT - moist, soft to medium soft, dark grayish brown (10YR 4/2), trace organics, no odor/staining	0.0	ML-SD-01-1.0/2.0 (1625) (MS/MSD)
			-			0.0	ML-SD-01-2.0/3.0 (1630)
			-			0.0	ML-SD-01-3.0/4.0 (1635)
			-			0.0	ML-SD-01-4.0/5.0 (1640) ML-SD-01-4.0/5.0 (1640)
5 580.1		8.1	VC-1				
			-			0.0	ML-SD-01-5.0/6.0 (1645) (MS/MSD)
			-		6.1 - 8.1 - CLAYEY SILT - moist, medium soft, brown (10YR 5/3), some sand, no odor/staining Small shell at 6.5'	0.0	ML-SD-01-6.0/7.0 (1650)
			-			0.0	ML-SD-01-7.0/8.1 (1655)
					End of Recovery at 8.1' bss		
10 575.1	10.0				End of Penetration at 10.0' bss (No Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-02 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.0 ft | REFUSAL ELEVATION : 579.1 ft | SEDIMENT ELEVATION : 584.3 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 18.7 ft | START : 10/15/18 09:30 | END : 10/15/18 09:45 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 (584.3)	0.0				0.0 - 2.0 SILTY CLAY - soft, moist, dark grayish brown (10YR 4/2), nonplastic, no odor/staining		
							ML-SD-02-0.0/1.0 (1400)
			-		Black organic silt layer at 1.2' and 1.5'	0.0	
							ML-SD-02-1.0/2.0 (1405)
			-		2.0 - 3.5 - SANDY SILT - moist, soft, dark grayish brown (10YR 4/2), trace organics, no odor/staining	0.0	
		4.7	VC-1				ML-SD-02-2.0/3.0 (1410)
			-			0.0	
					3.5 - 4.7 - SAND WITH SILT - moist, loose, dark grayish brown (10YR 4/2), trace shells and organics, fine to medium grained, nonplastic, no odor/staining		ML-SD-02-3.0/4.0 (1415)
			-			0.0	
							ML-SD-02-4.0/5.0 (1420)
5 (579.3)	5.3				End of Recovery at 4.7' bss		
					End of Penetration at 5.3' bss (Refusal)		

Abbreviations:
VC - Vibracore
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-03 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 599.6 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 3.5 ft | START : 10/15/18 10:10 | END : 10/15/18 10:25 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 599.6	0.0		-		0.0 - 1.5 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2), no odor/staining	0.0	ML-SD-03-0.0/1.0 (1125)
					Wood chips from 0.8 - 1.5'		
			-		1.5 - 2.0 - CLAYEY SILT - moist, soft, very dark grayish brown (10YR 3/2), some organics, no odor/staining	0.0	ML-SD-03-1.0/2.0 (1130)
			-		2.0 - 9.7 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2), fine grained sand, no odor/staining	0.0	ML-SD-03-2.0/3.0 (1135) ML-SD-03-2.0/3.0-FD (1136)
			-			0.0	ML-SD-03-3.0/4.0 (1140)
			-		Embedded layers of organic silt from 4.3 - 4.8'	0.0	ML-SD-03-4.0/5.0 (1145)
5 / 594.6		9.7	VC-1				ML-SD-03-5.0/6.0 (1150)
			-			0.0	ML-SD-03-6.0/7.0 (1155)
			-			0.0	ML-SD-03-7.0/8.0 (1200) ML-SD-03-7.0/8.0-FD (1201)
			-			0.0	ML-SD-03-8.0/9.0 (1205) (MS/MSD)
			-			0.0	ML-SD-03-9.0/9.7 (1210)
10 / 589.6	10.0				End of Recovery at 9.7' bss End of Penetration at 10.0' bss (No Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-04 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 597.1 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 6.0 ft | START : 10/15/18 10:35 | END : 10/15/18 10:50 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 597.1	0.0		-		0.0 - 5.5 - CLAYEY SILT - moist, medium soft, very dark grayish brown (10YR 3/2), no odor/staining	0.0	ML-SD-04-0.0/1.0 (1430)
			-			0.0	ML-SD-04-1.0/2.0 (1435)
			-			0.0	ML-SD-04-2.0/3.0 (1440)
			-			0.0	ML-SD-04-3.0/4.0 (1445)
			-			0.0	ML-SD-04-4.0/5.0 (1450)
5 / 592.1		8.7	VC-1				ML-SD-04-5.0/6.0 (1455)
					5.5 - 6.7 - POORLY GRADED SAND - moist, loose, very dark grayish brown (10YR 3/2), medium grained, trace silt, no odor/staining		
			-			0.0	ML-SD-04-6.0/7.0 (1500)
					6.7 - 8.7 SANDY SILT - moist, stiff, very dark grayish brown (10YR 3/2), trace clay, medium grained, no odor/staining		
			-			0.0	ML-SD-04-7.0/8.0 (1505)
			-			0.0	ML-SD-04-8.0/8.7 (1510)
					End of Recovery at 8.7' bss		
			-				
10 / 587.1	10.0				End of Penetration at 10.0' bss (No Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-05 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 598.0 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 5.1 ft | START : 10/15/18 11:20 | END : 10/15/18 11:45 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 598.0	0.0		-		0.0 - 2.4 - CLAYEY SILT - moist, soft, dark gray (10YR 4/1), trace fine grained sand, nonplastic, no odor/staining	0.0	ML-SD-05-0.0/1.0 (1500) ML-SD-05-0.0/1.0-FD (1501)
			-			0.0	ML-SD-05-1.0/2.0 (1505) (MS/MSD)
			-		2.4 - 7.0 - SAND - moist, loose, dark gray (10YR 4/1), nonplastic, trace gravel, no odor/staining	0.0	ML-SD-05-2.0/3.0 (1510)
			-			0.0	ML-SD-05-3.0/4.0 (1515)
			-		Silt seams at 4.2', 4.8', and 5.9'	0.0	ML-SD-05-4.0/5.0 (1520) ML-SD-05-4.0/5.0-FD (1521)
5 / 593.0		7.0	VC-1			0.0	ML-SD-05-5.0/6.0 (1525) (MS/MSD)
			-			0.0	ML-SD-05-6.0/7.0 (1530)
			-		End of Recovery at 7.0' bss		
			-				
			-				
			-				
10 / 588.0	10.0				End of Penetration at 10.0' bss (No Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-06 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 602.9 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 594.8 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 8.1 ft | START : 10/15/18 13:55 | END : 10/15/18 14:05 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 594.8	0.0		-		0.0 - 2.1 - SILT - wet, very soft, very dark grayish brown (10YR 3/2), black organic silt seams and organics throughout, no odor/staining	0.0	ML-SD-06-0.0/1.0 (1625)
			-			0.0	ML-SD-06-1.0/2.0 (1630)
			-		2.1 - 5.9 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2), medium grained sand lenses throughout, no odor/staining	0.0	ML-SD-06-2.0/3.0 (1635)
			-			0.0	ML-SD-06-3.0/4.0 (1640)
			-			0.0	ML-SD-06-4.0/5.0 (1645)
5 / 589.8		7.0	VC-1				
			-			0.0	ML-SD-06-5.0/6.0 (1650)
			-		5.9 - 7.0 - POORLY GRADED SAND - moist, loose, very dark grayish brown (10YR 3/2), trace silt, no odor/staining Silt seam from 6.4 - 6.5'	0.0	ML-SD-06-6.0/7.0 (1655)
			-		End of Recovery at 7.0' bss		
			-				
			-				
10 / 584.8	10.0				End of Penetration at 10.0' bss (No Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-07 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 602.9 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 593.7 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 9.2 ft | START : 10/15/18 14:30 | END : 10/15/18 14:35 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 593.7	0.0		-		0.0 - 1.5 - CLAYEY SILT - moist, soft, very dark grayish brown (10YR 3/2), dark organic silt seams from 0.0 - 0.8', no odor, slight sheen	0.0	ML-SD-07-0.0/1.0 (1030)
			-		1.5 - 2.6 - SANDY SILT - moist, soft, dark grayish brown (10YR 4/2), no odor/staining	0.0	ML-SD-07-1.0/2.0 (1035)
			-		2.6 - 7.0 - SAND - moist, loose, brown (10YR 4/3), some silt, fine to medium grained	0.0	ML-SD-07-2.0/3.0 (1040)
			-			0.0	ML-SD-07-3.0/4.0 (1045) ML-SD-07-3.0/4.0-FD (1046)
			-			0.0	ML-SD-07-4.0/5.0 (1050)
5 / 588.7		8.7	VC-1				
			-			0.0	ML-SD-07-5.0/6.0 (1055) (MS/MSD)
			-			0.0	ML-SD-07-6.0/7.0 (1100)
			-		7.0 - 8.9 - SANDY SILT - wet, soft, dark grayish brown (10YR 4/2), no odor/staining	0.0	ML-SD-07-7.0/8.0 (1105)
			-			0.0	ML-SD-07-8.0/8.9 (1110)
			-		End of Recovery at 8.9' bss		
10 / 583.7	10.0				End of Penetration at 10.0' bss (No Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-08 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 602.9 ft | REFUSAL ELEVATION : 592.8 ft | SEDIMENT ELEVATION : 600.0 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 2.9 ft | START : 10/15/18 15:02 | END : 10/15/18 15:05 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 600.0	0.0						
			-		0.0 - 1.7 - POORLY GRADED SAND WITH SILT - moist, soft, very dark grayish brown (10YR 3/2), medium grained, no odor/staining	0.0	ML-SD-08-0.0/1.0 (0950)
			-			0.0	ML-SD-08-1.0/2.0 (0955)
					1.7 - 6.2 - SILT WITH SAND - moist, medium soft, dark grayish brown (10YR 4/2), trace clay, no odor/staining		
			-		Organic peat and shell layer from 2.5 - 3.0' bss	0.0	ML-SD-08-2.0/3.0 (1000)
		7.2	- VC-1			0.0	ML-SD-08-3.0/4.0 (1005)
			-			0.0	ML-SD-08-4.0/5.0 (1010)
5 / 595.0					Peat and shells at 4.8' bss		
			-			0.0	ML-SD-08-5.0/6.0 (1015) ML-SD-08-5.0/6.0-FD (1016)
					6.2 - 7.2 - SAND WITH SILT - moist, soft, very dark grayish brown (10YR 3/2), no odor/staining		
			-			0.0	ML-SD-08-6.0/7.0 (1020)
	7.2				End of Recovery and Penetration at 7.0' bss (Refusal)		
							Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable
10 / 590.0							

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-09 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.0 ft | REFUSAL ELEVATION : 587.5 ft | SEDIMENT ELEVATION : 595.0 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 8.0 ft | START : 10/15/18 15:34 | END : 10/15/18 15:45 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 595.0	0.0		-		0.0 - 2.3 - POORLY GRADED SAND - moist, loose, dark brown (10YR 3/3), little silt, no odor/staining	0.0	ML-SD-09-0.0/1.0 (1400)
			-			0.0	ML-SD-09-1.0/2.0 (1405)
			-		2.3 - 4.0 - CLAYEY SILT - moist, soft, very dark grayish brown (10YR 3/2), no odor/staining	0.0	ML-SD-09-2.0/3.0 (1410)
		5.2	- VC-1			0.0	ML-SD-09-3.0/4.0 (1415) ML-SD-09-3.0/4.0-FD (1416)
			-		4.0 - 5.2 - SANDY SILT - moist, loose, dark brown (10YR 3/3), no odor/staining	0.0	ML-SD-09-4.0/5.2 (1420) (MS/MSD)
5 / 590.0			-		End of Recovery at 5.2' bss		
	7.5				End of Penetration at 7.5' bss (Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable
10 / 585.0							

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-10 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.0 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 595.4 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 7.6 ft | START : 10/15/18 16:20 | END : 10/15/18 16:25 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 595.4	0.0		-		0.0 - 1.8 - SILT - moist, soft, very dark grayish brown (10YR 3/2), some clay, no odor/staining	0.0	ML-SD-10-0.0/1.0 (1545) ML-SD-10-0.0/1.0-FD (1546)
			-			0.0	ML-SD-10-1.0/2.0 (1550)
			-		1.8 - 5.8 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2), trace organics, no odor/staining	0.0	ML-SD-10-2.0/3.0 (1555)
			-			0.0	ML-SD-10-3.0/4.0 (1600)
			-			0.0	ML-SD-10-4.0/5.0 (1605) ML-SD-10-4.0/5.0-FD (1606)
5 / 590.4		8.6	VC-1				
			-			0.0	ML-SD-10-5.0/6.0 (1610) (MS/MSD)
			-		5.8 - 7.2 - SILTY SAND - moist, loose, brown (10YR 4/3), no odor/staining	0.0	ML-SD-10-6.0/7.0 (1615)
			-		7.2 - 8.6 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2), no odor/staining	0.0	ML-SD-03-7.0/8.0 (1620)
			-			0.0	ML-SD-03-8.0/8.6 (1625)
			-		End of Recovery at 8.6' bss		
10 / 585.4	10.0				End of Penetration at 10.0' bss (No Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-11 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft | REFUSAL ELEVATION : 592.5 ft | SEDIMENT ELEVATION : 598.5 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 4.6 ft | START : 10/15/18 17:00 | END : 10/15/18 17:05 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS DYE TEST RESULTS
0 / 598.5	0.0		-		0.0 - 0.8 - CLAYEY SILT - moist, soft, very dark gray (10YR 3/1), thin organic black silt seams throughout, no odor/staining	0.0	ML-SD-11-0.0/1.0 (1510)
			-		0.8 - 4.7 - SILT - moist, medium soft, very dark grayish brown (10YR 3/2), trace clay, no odor/staining	0.0	ML-SD-11-1.0/2.0 (1515)
			-			0.0	ML-SD-11-2.0/3.0 (1520)
		6.0	VC-1				
			-			0.0	ML-SD-11-3.0/4.0 (1525)
			-			0.0	ML-SD-11-4.0/5.0 (1530) ML-SD-11-4.0/5.0-FD (1531)
5 / 593.5			-		4.7 - 6.0 - SILT with ORGANICS - moist, soft to medium soft, very dark gray (10YR 3/1), no odor/staining	0.0	ML-SD-11-5.0/6.0 (1535) (MS/MSD)
6.0					End or Recovery and Penetration at 6.0' bss (Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable
10							

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-12 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization — LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore — DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft — REFUSAL ELEVATION : N/A — SEDIMENT ELEVATION : 600.6 ft — NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 2.5 ft — START : 10/16/18 08:28 — END : 10/16/18 08:30 — LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 600.6	0.0		-		0.0 - 0.5 - SILT - wet, soft, very dark grayish brown (10YR 3/2), some fine grained sand trace organics	0.0	ML-SD-12-0.0/1.0 (1440)
			-		0.5 - 1.7 - SANDY SILT - wet, soft, very dark grayish brown (10YR 3/2), trace organics	0.0	ML-SD-12-1.0/2.0 (1445)
			-		1.7 - 1.9 - CLAYEY SILT - very dark grayish brown (10YR 3/2), trace organics	0.0	ML-SD-12-2.0/3.0 (1450)
			-		1.9 - 10.0 - SANDY SILT Wood debris at 2.7', 3.1' and 3.6'	0.0	ML-SD-12-3.0/4.0 (1455)
			-			0.0	ML-SD-12-4.0/5.0 (15:00)
5 / 595.6		10.0	VC-1			0.0	ML-SD-12-5.0/6.0 (1505)
			-		Organic black silt seam at 5.7'	0.0	ML-SD-12-6.0/7.0 (1510)
			-		Clayey silt lense from 7.0 - 7.2'	0.0	ML-SD-12-7.0/8.0 (1515)
			-			0.0	ML-SD-12-8.0-9.0 (1520)
			-			0.0	ML-SD-12-9.0/10.0 (1525)
10 / 590.6	10.0				End of Recovery and Penetration at 10.0' bss (No Refusal)		

Abbreviations:
VC - Vibracore
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-13 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.2 ft | REFUSAL ELEVATION : 593.7 ft | SEDIMENT ELEVATION : 598.7 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 4.5 ft | START : 10/15/18 17:32 | END : 10/15/18 17:35 | LOGGER : R. Kaliappan

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0							
598.7	0.0		-		0.0 - 4.9 SILT WITH SAND - moist, medium soft, increasing soft with depth, very dark grayish brown (10YR 3/2),	0.0	ML-SD-13-0.0/1.0 (0920) ML-SD-13-0.0/1.0-FD (0921)
			-			0.0	ML-SD-13-1.0/2.0 (0925) (MS/MSD)
		4.9	VC-1 -			0.0	ML-SD-13-2.0/3.0 (0930)
			-			0.0	ML-SD-13-3.0/4.0 (0935)
			-			0.0	ML-SD-13-4.0/5.0 (0940)
5	5.0						
593.7					End of Recovery at 4.9' bss End of Penetration at 5.0' bss (Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-14 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.2 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 594.8 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 8.4 ft | START : 10/16/18 11:01 | END : 10/16/18 11:02 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 594.8	0.0		-		0.0 - 2.4 - ORGANIC SILT - wet, soft, very dark gray (10YR 3/1), trace organics and fine sand	0.0	ML-SD-14-0.0/1.0 (1540)
			-		Color change at 1.4' to very dark grayish brown (10YR 3/2)	0.0	ML-SD-14-1.0/2.0 (1545)
			-		2.4 - 6.3 - SANDY SILT -moist, soft, very dark grayish brown (10YR 3/2)	0.0	ML-SD-14-2.0/3.0 (1550)
			-		Organic layer (wood chips) from 2.9 - 3.1'	0.0	ML-SD-14-3.0/4.0 (1555)
			-		Medium sand lenses from 2.4 - 2.5', 4.4 - 4.5', 5.7 - 5.9'	0.0	ML-SD-14-4.0/5.0 (1600)
5 / 589.8		9.4	VC-1				
			-			0.0	ML-SD-14-5.0/6.0 (1605)
			-		6.3 - 8.0 - POORLY GRADED SAND WITH SILT - wet, loose, very dark grayish brown (10YR 3/2), trace organics	0.0	ML-SD-14-6.0/7.0 (1610)
			-			0.0	ML-SD-14-7.0/8.0 (1615)
			-		8.0 - 9.4 - SANDY SILT WITH CLAY - wet, loose, very dark grayish brown (10YR 3/2)	0.0	ML-SD-14-8.0-9.4 (1620)
					Medium sand lense at 9.4'		
10	10.0				End of Recovery at 9.4' bss		
584.8					End of Penetration at 10.0' bss (No Refusal)		

Abbreviations:
VC - Vibracore
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-15 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization — LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore — DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.0 ft — REFUSAL ELEVATION : 589.8 ft — SEDIMENT ELEVATION : 599.0 ft — NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 4.0 ft — START : 10/16/18 12:00 — END : 10/16/18 12:01 — LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 599.0	0.0		-		0.0 - 3.0 - CLAYEY SILT - moist, medium soft, very dark grayish brown (10YR 3/2), trace sand and organics	0.0	ML-SD-15-0.0/1.0 (0800)
			-			0.0	ML-SD-15-1.0/2.0 (0805)
			-			0.0	ML-SD-15-2.0/3.0 (0810)
			-		3.0 - 5.7 - SILT - moist, medium soft, very dark grayish brown (10YR 3/2), trace sand and clay Organic black silt seam at 3.0', 3.9', 4.1', and 4.9'	0.0	ML-SD-15-3.0/4.0 (0815)
		9.0	- VC-1			0.0	ML-SD-15-4.0/5.0 (0820) ML-SD-15-4.0/5.0-FD (0820)
5 / 594.0			-			0.0	ML-SD-15-5.0/6.0 (0825)
					5.7 - 6.2 - CLAYEY SILT -moist, medium soft, very dark grayish brown (10YR 3/2), trace sand and organics		
			-		6.2 - 9.0 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2)	0.0	ML-SD-15-6.0/7.0 (0830)
			-			0.0	ML-SD-15-7.0/8.0 (0835)
			-		Organic black silt seam at 8.6'	0.0	ML-SD-15-8.0-9.4 (0840)
	9.3				End of Recovery at 9.0' bss End of Penetration at 9.3' bss (Refusal)		
10 / 589.0							Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-16 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 602.9 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 597.7 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 5.2 ft | START : 10/16/18 15:32 | END : 10/16/18 15:34 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 597.7	0.0		-		0.0 - 6.5 - SILT WITH FINE SAND AND ORGANICS - moist, soft, very dark grayish brown (10YR 3/2)	0.0	ML-SD-16-0.0/1.0 (0940)
			-			0.0	ML-SD-16-1.0/2.0 (0945)
			-			0.0	ML-SD-16-2.0/3.0 (0950)
			-			0.0	ML-SD-16-3.0/4.0 (0955)
			-			0.0	ML-SD-16-4.0/5.0 (1000)
5 / 592.7		10.0	VC-1				ML-SD-16-5.0/6.0 (1005)
			-		6.5 - 10.0 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2)	0.0	ML-SD-16-6.0/7.0 (1010)
			-		Organic silt seam at 7.2'	0.0	ML-SD-16-7.0/8.0 (1015)
			-		Clayey silt seam at 8.4' and 9.3'	0.0	ML-SD-16-8.0-9.0 (1020)
			-			0.0	ML-SD-16-9.0-10.0 (1025)
10 / 587.7	10.0				End of Recovery and Penetration at 10.0' bss (No Refusal)		

Abbreviations:
VC - Vibracore
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-17 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft | REFUSAL ELEVATION : 595.6 ft | SEDIMENT ELEVATION : 598.6 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 4.5 ft | START : 10/16/18 10:23 | END : 10/16/18 10:25 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 598.6	0.0				0.0 - 0.5 - CLAYEY SILT - wet, soft, very dark grayish brown (10YR 3/2), plastic trash from 0.2 - 0.4'		
			-		0.5 - 3.0 - SILT - medium soft, moist, very dark grayish brown (10YR 3/2), some sand, trace organics	0.0	ML-SD-17-0.0/1.0 (0800)
		3.0	VC-1 -			0.0	ML-SD-17-1.0/2.0 (0805)
			-			0.0	ML-SD-17-2.0/3.0 (0810)
	3.0				End of Recovery and Penetration at 3.0' bss (Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable
5 / 593.6							

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-18 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 602.9 ft | REFUSAL ELEVATION : 590.3 ft | SEDIMENT ELEVATION : 599.5 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 3.4 ft | START : 10/16/18 16:06 | END : 10/16/18 16:08 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 (599.5)	0.0		-		0.0 - 1.7 - SANDY SILT WITH ORGANICS - moist, soft, very dark grayish brown (10YR 3/2)	1.1	ML-SD-18-0.0/1.0 (0845)
			-			1.0	ML-SD-18-1.0/2.0 (0850)
			-		1.7 - 6.8 - CLAYEY SILT - moist, soft, very dark grayish brown, some fine sand	0.0	ML-SD-18-2.0/3.0 (0855)
			-		Organic wood seams at 3.0', 3.8', and 5.0'	0.0	ML-SD-18-3.0/4.0 (0900)
5 (594.5)		9.2	- VC-1			0.0	ML-SD-18-4.0/5.0 (0905)
			-			0.0	ML-SD-18-5.0/6.0 (0910)
			-			0.0	ML-SD-18-6.0/7.0 (0915)
			-		6.8 - 9.2 - SILT - moist, loose, very dark grayish brown (10YR 3/2), medium sand seams and trace organics throughout	0.0	ML-SD-18-7.0/8.0 (0920)
			-			0.0	ML-SD-18-8.0-9.2 (0925)
					Wood seam at 8.9'		
	9.5				End of Recovery at 9.2' bss		Abbreviations:
10 (589.5)					End of Penetration at 9.5' bss (Refusal)		VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-19 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization — LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore — DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 602.9 ft — REFUSAL ELEVATION : N/A — SEDIMENT ELEVATION : 599.6 ft — NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 3.3 ft — START : 10/16/18 16:37 — END : 10/16/18 16:39 — LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 599.6	0.0		-		0.0 - 0.8 - SILT - moist, soft, very dark grayish brown (10YR 3/2), some organics	0.9	ML-SD-19-0.0/1.0 (1130)
			-		0.8 - 4.2 - SILT WITH MEDIUM SAND - moist, soft, very dark grayish brown (10YR 3/2), trace clay	0.5	ML-SD-19-1.0/2.0 (1135) ML-SD-19-1.0/2.0-FD (1136)
			-			0.0	ML-SD-19-2.0/3.0 (1140)
			-			0.0	ML-SD-19-3.0/4.0 (1145)
			-		4.2 - 5.2 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2), trace organics	0.0	ML-SD-19-4.0/5.0 (1150)
5 / 594.6		10.0	VC-1		5.2 - 8.1 - SILT WITH SAND - moist, soft, very dark grayish brown (10YR 3/2), trace clay and organics	0.0	ML-SD-19-5.0/6.0 (1155)
			-			0.0	ML-SD-19-6.0/7.0 (1200)
			-			0.0	ML-SD-19-7.0/8.0 (1205)
			-		8.1 - 10.0 - SAND WITH SILT - moist, loose, very drak grayish brown (10YR 3/2)	0.0	ML-SD-19-8.0-9.0 (1210)
			-		Silt clay seam at 9.2'	0.0	ML-SD-19-9.0-10.0 (1215)
10 / 589.6	10.0				End of Recovery and Penetration at 10.0' bss (No Refusal)		

Abbreviations:
VC - Vibracore
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-20 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.2 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 600.8 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 2.4 ft | START : 10/16/18 08:56 | END : 10/16/18 08:57 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 600.8	0.0		-		0.0 - 1.5 - CLAYEY SILT WITH ORGANICS - moist, soft, very dark grayish brown (10YR 3/2)	0.0	ML-SD-20-0.0/1.0 (1630)
			-		1.5 - 6.5 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2), some clay	0.0	ML-SD-20-1.0/2.0 (1635)
			-			0.0	ML-SD-20-2.0/3.0 (1640)
			-			0.0	ML-SD-20-3.0/4.0 (1645)
			-			0.0	ML-SD-20-4.0/5.0 (1650)
5 / 595.8		10.0	VC-1				
			-			0.0	ML-SD-20-5.0/6.0 (1655) ML-SD-20-5.0/6.0-FD (1656)
			-		6.5 - 10.0 - CLAYEY SILT - moist, soft, very dark grayish brown (10YR 3/2)	0.0	ML-SD-20-6.0/7.0 (1700)
			-			0.0	ML-SD-20-7.0/8.0 (1705) (MS/MSD)
			-		Alternating bands of black organic silt and clayey silt from 8.6 - 9.0' and 9.5 - 9.6'	0.0	ML-SD-20-8.0-9.0 (1710)
10 / 590.8	10.0				End of Recovery and Penetration at 10.0' bss (No Refusal)		ML-SD-20-9.0-10.0 (1715)

Abbreviations:
VC - Vibracore
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-21 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 600.1 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 3.0 ft | START : 10/16/18 09:36 | END : 10/16/18 09:37 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 600.1	0.0		-		0.0 - 2.5 - CLAYEY SILT - moist, soft, very dark grayish brown (10YR 3/2), low plasticity, trace organics	0.0	ML-SD-21-0.0/1.0 (1350)
			-			0.0	ML-SD-21-1.0/2.0 (1355)
			-		2.5 - 10.0 - SANDY SILT - wet, soft, very dark grayish brown (10YR 3/2), trace organics throughout, some clay	0.0	ML-SD-21-2.0/3.0 (1400)
			-			0.0	ML-SD-21-3.0/4.0 (1405)
			-			0.0	ML-SD-21-4.0/5.0 (1410)
5 / 595.1		10.0	VC-1				
			-			0.0	ML-SD-21-5.0/6.0 (1415)
			-			0.0	ML-SD-21-6.0/7.0 (1420)
			-			0.0	ML-SD-21-7.0/8.0 (1425)
			-			0.0	ML-SD-21-8.0-9.0 (1430)
			-			0.0	ML-SD-21-9.0-10.0 (1435)
10 / 590.1	10.0				End of Recovery and Penetration at 10.0' bss (No Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-22 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization — LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore — DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.0 ft — REFUSAL ELEVATION : 590.4 ft — SEDIMENT ELEVATION : 599.4 ft — NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 3.6 ft — START : 10/16/18 17:06 — END : 10/16/17 17:08 — LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS DYE TEST RESULTS
0 / 599.4	0.0		-		0.0 - 0.8 - SILT - moist, soft, very dark grayish brown (10YR 3/2), trace sand and organics	0.0	ML-SD-22-0.0/1.0 (1050)
			-		0.8 - 5.9 - SANDY SILT WITH ORGANICS - moist, soft, very dark grayish brown (10YR 3/2)	0.0	ML-SD-22-1.0/2.0 (1055)
			-		Organic silt seam at 1.9 and 5.3'	0.0	ML-SD-22-2.0/3.0 (1100)
			-			0.0	ML-SD-22-3.0/4.0 (1105)
		9.0	VC-1 -			0.0	ML-SD-22-4.0/5.0 (1110)
5 / 594.4			-			0.0	ML-SD-22-5.0/6.0 (1115)
			-		5.9 - 6.7 - POORLY GRADED SAND WITH SILT - most, loose, very dark grayish brown (10YR 3/2), medium grained, some organics	0.0	ML-SD-22-6.0/7.0 (1120)
			-		6.7 - 9.0 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2), trace organics	0.0	ML-SD-22-7.0/8.0 (1125)
			-			0.0	ML-SD-22-8.0-9.0 (1130)
9.0					End of Recovery and Penetration at 9.0' bss (Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable
10 / 589.4							

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-23 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 596.9 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 6.2 ft | START : 10/17/18 09:13 | END : 10/17/18 09:15 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 596.9	0.0		-		0.0 - 2.3 - SILT - moist, very soft, black (10YR 2/1), trace organics, slight odor, no staining	0.0	ML-SD-23-0.0/1.0 (1200)
			-			0.0	ML-SD-23-1.0/2.0 (1205)
			-		2.3 - 6.8 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2), little clay	0.0	ML-SD-23-2.0/3.0 (1210) ML-SD-23-2.0/3.0-FD (1211)
			-		Organic seam at 3.2 - 3.3', 3.7', 4.1', and 4.5'	0.0	ML-SD-23-3.0/4.0 (1215)
			-			0.0	ML-SD-23-4.0/5.0 (1220) ML-SD-23-4.0/5.0-FD (1221)
5 / 591.9		9.8	VC-1				
			-			0.0	ML-SD-23-5.0/6.0 (1225)
			-			0.0	ML-SD-23-6.0/7.0 (1230)
			-		6.8 - 7.6 - SILTY SAND - moist, loose, very dark grayish brown (10YR 3/2), little organics	0.0	ML-SD-23-7.0/8.0 (1235)
			-		7.6 - 9.8 - SANDY SILT - moist, soft, very dark grayish brown (10YR 3/2), trace clay, some organics	0.0	ML-SD-23-8.0-9.0 (1240)
			-			0.0	ML-SD-23-9.0-10.0 (1245)
10 / 586.9	10.0				End of Recovery at 9.8' bss End of Penetration at 10.0' bss (No Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-24 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.2 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 594.6 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 8.6 ft | START : 10/17/18 09:47 | END : 10/17/18 09:49 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 594.6	0.0		-		0.0 - 4.5 - SILT - wet, soft to medium soft with depth, black (10YR 2/1), trace fine grained sand and organics	0.0	ML-SD-24-0.0/1.0 (1000)
			-		Organic black silt seam from 1.6 - 1.7'	0.0	ML-SD-24-1.0/2.0 (1005)
			-		Color change to very dark grayish brown (10YR 3/2) from 2.5 - 4.5'	0.0	ML-SD-24-2.0/3.0 (1010) ML-SD-24-2.0/3.0-FD (1015)
			-			0.0	ML-SD-24-3.0/4.0 (1015)
			-			0.0	ML-SD-24-4.0/5.0 (1020)
5 / 589.6		9.4	VC-1		4.5 - 9.4 - SANDY SILT - moist, medium soft, very dark grayish brown (10YR 3/2), no odor/staining		
			-		Poorly graded medium sand lense from 5.3 - 5.8'	0.0	ML-SD-24-5.0/6.0 (1025)
			-			0.0	ML-SD-24-6.0/7.0 (1030)
			-			0.0	ML-SD-24-7.0/8.0 (1035)
			-			0.0	ML-SD-24-8.0-9.4 (1040)
					End of Recovery at 9.4' bss		
10 / 584.6	10.0				End of Penetration at 10.0' bss		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-25 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 602.9 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 595.4 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 7.5 ft | START : 10/17/18 08:08 | END : 10/17/18 08:10 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS DYE TEST RESULTS
0 / 595.4	0.0		-		0.0 - 1.5 - SILT WITH ORGANICS - wet, soft, very dark grayish brown (10YR 3/2), black organic silt seam from 0.0 - 0.3'	0.0	ML-SD-25-0.0/1.0 (0930)
			-		1.5 - 5.1 - SANDY SILT WITH CLAY - moist, soft, very dark grayish brown (10YR 3/2), increasing medium sand with depth	0.0	ML-SD-25-1.0/2.0 (0935)
			-			0.0	ML-SD-25-2.0/3.0 (0940)
			-			0.0	ML-SD-25-3.0/4.0 (0945)
			-			0.0	ML-SD-25-4.0/5.0 (0950)
5 / 590.4		7.8	VC-1				
			-		5.1 - 6.1 - SAND WITH SILT - moist, loose, very dark grayish brown (10YR 3/2), poorly sorted	0.0	ML-SD-25-5.0/6.0 (0955)
			-		6.1 - 7.0 - SILT WITH LITTLE SAND - moist, medium, very dark grayish brown (10YR 3/2)	0.0	ML-SD-25-6.0/7.0 (1000)
			-		7.0 - 7.8 - SAND WITH SILT - moist, loose, very dark grayish brown (10YR 3/2), poorly sorted, medium grained	0.0	ML-SD-25-7.0/7.8 (1005)
					End of Recovery at 7.8' bss		
10 / 585.4	10.0				End of Penetration at 10.0' bss (No Refusal)		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-26 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.0 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 595.0 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 8.0 ft | START : 10/17/18 08:43 | END : 10/17/18 08:45 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 595.0	0.0		-		0.0 - 2.3 - CLAYEY SILT - wet, soft, very dark grayish brown (10YR 3/2), trace organics, no odor/staining	0.0	ML-SD-26-0.0/1.0 (1400)
			-			0.0	ML-SD-26-1.0/2.0 (1405) ML-SD-26-1.0/2.0-FD (1406)
			-		2.3 - 10.0 - SANDY SILT - moist, medium soft, very dark grayish brown (10YR 3/2), trace organics, no odor/staining	0.0	ML-SD-26-2.0/3.0 (1410)
			-			0.0	ML-SD-26-3.0/4.0 (1415)
			-			0.0	ML-SD-26-4.0/5.0 (1420)
5 / 590.0		10.0	VC-1				
			-			0.0	ML-SD-26-5.0/6.0 (1425)
			-			0.0	ML-SD-26-6.0/7.0 (1430)
			-			0.0	ML-SD-26-7.0/8.0 (1435) (MS/MSD)
			-			0.0	ML-SD-26-8.0-9.0 (1440)
			-			0.0	ML-SD-26-9.0-10.0 (1445) ML-SD-26-9.0-10.0-FD (1446)
10 / 585.0	10.0				End of Recovery and Penetration at 10.0' bss		Abbreviations: VC - Vibracore bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-27 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.2 ft | REFUSAL ELEVATION : 594.7 ft | SEDIMENT ELEVATION : 599.9 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 3.3 ft | START : 10/17/18 11:18 | END : 10/17/18 11:20 | LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 599.9	0.0				0.0 - 3.7 - SILT WITH ORGANICS (ROOTS) - moist, soft, very dark brown (10YR 2/2), trace clay		
			-			0.0	ML-SD-27-0.0/1.0 (1705)
			-			0.0	ML-SD-27-1.0/2.0 (1710)
		3.7	- VC-1			0.0	ML-SD-27-2.0/3.0 (1715)
			-			0.0	ML-SD-27-3.0/3.7 (1720)
					End of Recovery at 3.7' bss		
5 / 594.9	5.3				End of Penetration at 5.3' bss (Refusal)		

Abbreviations:
VC - Vibracore
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-28 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization — LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Vibracore — DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft — REFUSAL ELEVATION : 589.6 ft — SEDIMENT ELEVATION : 598.8 ft — NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 4.3 ft — START : 10/17/18 11:52 — END : 10/17/18 11:53 — LOGGER : USEPA

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0 / 598.8	0.0						
			-		0.0 - 4.6 - POORLY GRADED SAND - wet, loose, very dark grayish brown (10YR 3/2), little silt	0.0	ML-SD-28-0.0/1.0 (0845)
			-			0.0	ML-SD-28-1.0/2.0 (0850)
			-			0.0	ML-SD-28-2.0/3.0 (0855)
			-			0.0	ML-SD-28-3.0/4.0 (0900) ML-SD-28-3.0/4.0-FD (0901)
			-			0.0	ML-SD-28-4.0/5.0 (0905)
5 / 593.8		8.4	VC-1		4.6 - 5.3 - SILTY SAND - wet, soft, very dark grayish brown (10YR 3/2), trace clay		
			-		5.3 - 8.4 - POORY GRADED SAND - wet, loose, very dark grayish brown (10YR 3/2), little silt	0.0	ML-SD-28-5.0/6.0 (0910)
			-			0.0	ML-SD-28-6.0/7.0 (0915)
			-			0.0	ML-SD-28-7.0/8.4 (0920)
					End of Recovery at 8.4' bss		
	9.3				End of Penetration at 9.3' bss (Refusal)		
10 / 588.8							Abbreviations: PN - Ponar bss - Below Sediment Surface N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-29 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Ponar | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.2 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 602.2 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 1.0 ft | START : 10/15/18 10:15 | END : 10/15/18 10:25 | LOGGER : S. Bigda

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0							
602.2	0.0 0.3	0.3	PN-1		0.0 - 0.25 - ORGANIC SILT - wet, soft, very dark grayish brown (10YR 3/2), organics throughout, no odor	0.0	ML-SD-29-0.0/0.25 (1140)
					End of Recovery and Penetration at 0.25' bss		

Abbreviations:
PN - Ponar
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-30 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Ponar | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 599.0 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 4.1 ft | START : 10/15/18 10:35 | END : 10/15/18 10:45 | LOGGER : S. Bigda

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS DYE TEST RESULTS
0							
599.0	0.0 0.3	0.3	PN-1		0.0 - 0.25 -ORGANIC SILT - wet, soft, very dark grayish brown (10YR 3/2), nonplastic	0.0	ML-SD-30-0.0/0.25 (1115)
					End of Recovery and Penetration at 0.25' bss		

Abbreviations:
PN - Ponar
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-31 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Ponar | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.0 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 599.0 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 4.0 ft | START : 10/15/18 10:45 | END : 10/15/18 10:50 | LOGGER : S. Bigda

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0							
599.0	0.0 0.3	0.3	PN-1		0.0 - 0.25 - ORGANIC SILT - wet, soft, very dark grayish brown (10YR 3/2), trace shells, nonplastic	0.0	ML-SD-31-0.0/0.25 (1210)
					End of Recovery and Penetration at 0.25' bss		

Abbreviations:
PN - Ponar
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-32 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : R/V Mudpuppy, Ponar | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : 603.1 ft | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : 599.9 ft | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 3.2 ft | START : 10/15/18 10:50 | END : 10/15/18 10:55 | LOGGER : S. Bigda

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0							
599.9	0.0	0.3	PN-1		0.0 - 0.25 - ORGANIC SILT - wet, soft, very dark grayish brown (10YR 3/2), nonplastic, no odor	0	ML-SD-32-0.0/0.25 (1220)
	0.3				End of Recovery and Penetration at 0.25' bss		

Abbreviations:
PN - Ponar
bss - Below Sediment Surface
N/A - Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-33 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : Manual Core | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : N/A | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : N/A | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 0.2 ft | START : 10/18/18 12:00 | END : 10/18/18 12:40 | LOGGER : K. Ma

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS DYE TEST RESULTS
0	0.0				0.0 - 0.3 - SAND - moist, loose, dark reddish brown (5YR 3/3), little silt, trace gravel		
			-		0.3 - 0.6 - SMALL GRAVEL - moist, loose, dark reddish brown (5Y 3/3, some silt	0.0	
		1.2	PC-1		0.6 - 1.2 - SANDY SILT - moist, medium soft, dark reddish brown (5Y 3/4), trace organics		ML-SD-33-0.0/1.2 (1700)
					End of Recovery at 1.2' bss		
	1.9				End of Penetration at 1.9' bss (Refusal)		
5							Abbreviations: PC - Push Core bss - Below Sediment Surface N/A Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-34 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : Manual Core | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : N/A | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : N/A | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 0.2 ft | START : 10/18/18 11:00 | END : 10/18/18 12:00 | LOGGER : K. Ma

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0	0.0						
			-		0.0 - 0.7 - POORLY SAND WITH GRAVEL - moist, loose, very dark grayish brown (10YR 3/2), trace silt, trace glass debris	0.0	ML-SD-34-0.0/1.0 (1625) ML-SD-34-0.0/1.0-FD (1626)
		1.8	PC-1		0.7 - 1.8 CLAYEY SILT - moist, soft, dark brown (7.5YR 3/3), little medium grained sand, trace organics, layers of dark reddish brown (2.5YR 3/3) sandy silt throughout		
			-			0.0	ML-SD-34-1.0/1.8 (1630) (MS/MSD)
					End of Recovery at 1.8' bss		
	2.2				End of Penetration at 2.2' bss (Refusal)		
5							Abbreviations: PC - Push Core bss - Below Sediment Surface N/A Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-35 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : Manual Core | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : N/A | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : N/A | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 0.5 ft | START : 10/18/18 15:00 | END : 10/18/18 15:30 | LOGGER : K. Ma

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS DYE TEST RESULTS
0	0.0				0.0 - 0.2 - POORLY GRADED SAND - moist, loose, yellowish red (5YR 4/6), medium to coarse grained		
					0.2 - 0.4 - SILTY SAND - moist, loose, yelowish red (5YR 4/6), trace coarse sand		
			-		0.4 - 1.3 - CLAYEY SILT - moist, medium soft, yellowish red (5YR 4/6), little sand, trace organics, possible copper oxidation at 0.8' and 1.1'	0.0	ML-SD-35-0.0/1.3 (0840)
		1.3	PC-1				
					End of Recovery at 1.3' bss		
	2.0				End of Penetration at 2.0' bss (Refusal)		
5							

Abbreviations:
PC - Push Core
bss - Below Sediment Surface
N/A Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-36 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : Manual Core | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : N/A | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : N/A | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 2.1 ft | START : 10/18/18 14:30 | END : 10/18/18 15:05 | LOGGER : K. Ma

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0	0.0						
		1.6	-		0.0 - 1.6 - SANDY SILT - moist, soft to medium soft with depth, reddish brown (5YR 4/4), trace organics, no odor/staining	0.0	ML-SD-36-0.0/1.0 (0855)
			PC-1				
			-			0.0	ML-SD-36-1.0/2.0 (0900)
	1.9				End of Recovery at 1.6' bss End of Penetration at 1.9' bss (Refusal)		Abbreviations: PC - Push Core bss - Below Sediment Surface N/A Not Applicable
5							

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-37 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : Manual Core | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : N/A | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : N/A | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 0.5 ft | START : 10/19/18 10:20 | END : 10/19/18 11:00 | LOGGER : K. Ma

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS DYE TEST RESULTS
0	0.0				0.0 - 0.5 - SILTY SAND WITH GRAVEL - wet, loose, yellowish red (5YR 4/6), trace organics, small to large gravel		
		1.2	- PC-1		0.5 - 1.2 - CLAYEY SILT - wet, soft, yellowish red (5YR 4/6), trace organics Large gravel from 0.7 - 0.8' Wood chunk from 1.1 - 1.2'	0.0	ML-SD-37-0.0/1.2 (1210)
	1.4				End of Recovery at 1.2' bss End of Penetration at 1.4' bss (Refusal)		
5							Abbreviations: PC - Push Core bss - Below Sediment Surface N/A Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-38 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : Manual Core | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : N/A | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : N/A | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 0.3 ft | START : 10/19/18 09:50 | END : 10/19/18 10:15 | LOGGER : K. Ma

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION (SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE)	PID (ppm)	COMMENTS (DYE TEST RESULTS)
0	0.0						
			-		0.0 - 0.9 - SAND WITH SILT - wet, loose, yellowish red (5Y 4/6), trace small gravel	0.0	ML-SD-38-0.0/1.0 (1200)
		1.7	PC-1		0.9 - 1.7 - SANDY SILT - moist, soft, yellowish red (5Y 4/6), trace clay, medium sand, and organics		ML-SD-38-1.0/1.7 (1205)
			-		organic black seam at 1.4'	0.0	
			-		slight odor and staining at 1.7'	0.4	
					End of Recovery at 1.7' bss		
	2.5				End of Penetration at 2.5' bss (Refusal)		
5							

Abbreviations:
PC - Push Core
bss - Below Sediment Surface
N/A Not Applicable

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-39 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : Manual Core | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : N/A | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : N/A | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 0.2 ft | START : 10/19/18 11:30 | END : 10/19/18 12:20 | LOGGER : K. Ma

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS DYE TEST RESULTS
0	0.0						
			-		0.0 - 0.6 - POORTLY GRADED SAND - moist, loose, yellowish red (5YR 4/6), little silt, trace small to large gravel	0.0	ML-SD-39-0.0/1.0 (1215)
					0.6 - 1.0 SANDY SILT - moist, soft, yellowish red (5YR 4/6), little medium grained sand, trace organics, black organic seam at 1.0'		
		1.9	PC-1		1.0 - 1.9 - CLAYEY SILT - moist, soft, yellowish red (5YR 4/6), trace fine grained sand, black organic seam at 1.2'	0.0	ML-SD-39-1.0/1.9 (1220)
			-				
					End of Recovery at 1.9' bss		
	2.4				End of Penetration at 2.4' bss (Refusal)		Abbreviations: PC - Push Core bss - Below Sediment Surface N/A Not Applicable
5							

PROJECT NUMBER:	CORE NUMBER:
EG1693SC	ML-SD-40 SHEET 1 OF 1

SEDIMENT CORE LOG

PROJECT : Munger Landing Sediment Characterization | LOCATION : Duluth, MN

DRILLING EQUIPMENT AND METHOD : Manual Core | DRILLING CONTRACTOR : Jacobs/USEPA

WATER ELEVATION : N/A | REFUSAL ELEVATION : N/A | SEDIMENT ELEVATION : N/A | NATIVE CLAY ELEVATION : N/A

WATER DEPTH : 0.3 ft | START : 10/18/18 15:30 | END : 10/18/18 16:10 | LOGGER : K. Ma

DEPTH BELOW TOP OF SEDIMENT (ft)	PENETRATION (ft)	RECOVERY (ft)	CORE TYPE	SYMBOLIC LOG	SEDIMENT DESCRIPTION: SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & SOIL STRUCTURE	PID (ppm)	COMMENTS: DYE TEST RESULTS
0	0.0						
			-		0.0 - 2.3 - SILTY SAND - wet, medium soft, yellowish brown (10YR 5/6), trace small gravel, trace organics, medium sand lense from 0.0 - 0.4' and 1.0 - 1.4'	0.0	ML-SD-40-0.0/1.0 (0820)
		2.3	- PC-1			0.0	ML-SD-40-1.0/2.3 (0825)
					End of Recovery at 2.3' bss		
	3.5				End of Penetration at 3.5' bss (Refusal)		
5							

Abbreviations:
PC - Push Core
bss - Below Sediment Surface
N/A Not Applicable

Attachment 2
Sediment Sampling and Processing Photograph Logs

Sediment Processing Photolog

ML-SD-01 from 0.0-8.1 ft bss photo 1.JPG

ML-SD-01 from 0.0-8.1 ft bss photo 3.JPG

ML-SD-01 from 0.0-8.1 ft bss photo 2.JPG

ML-SD-01 from 0.0-8.1 ft bss photo 4.JPG

ML-SD-01 from 0.0-8.1 ft bss photo 5.JPG

ML-SD-02 from 0.0-4.7 ft bss photo 2.JPG

ML-SD-02 from 0.0-4.7 ft bss photo 1.JPG

ML-SD-02 from 0.0-4.7 ft bss photo 3.JPG

ML-SD-03 from 0.0-9.7 ft bss photo 1.JPG

ML-SD-03 from 0.0-9.7 ft bss photo 3.JPG

ML-SD-03 from 0.0-9.7 ft bss photo 2.JPG

ML-SD-03 from 0.0-9.7 ft bss photo 4.JPG

ML-SD-03 from 0.0-9.7 ft bss photo 5.JPG

ML-SD-04 from 0.0-8.7 ft bss photo 1.JPG

ML-SD-03 from 0.0-9.7 ft bss photo 6.JPG

ML-SD-04 from 0.0-8.7 ft bss photo 2.JPG

ML-SD-04 from 0.0-8.7 ft bss photo 3.JPG

ML-SD-04 from 0.0-8.7 ft bss photo 5.JPG

ML-SD-04 from 0.0-8.7 ft bss photo 4.JPG

ML-SD-04 from 0.0-8.7 ft bss photo 6.JPG

ML-SD-05 from 0.0-7.0 ft bss photo 1.JPG

ML-SD-05 from 0.0-7.0 ft bss photo 3.JPG

ML-SD-05 from 0.0-7.0 ft bss photo 2.JPG

ML-SD-05 from 0.0-7.0 ft bss photo 4.JPG

ML-SD-06 from 0.0-7.0 ft bss photo 1.JPG

ML-SD-06 from 0.0-7.0 ft bss photo 3.JPG

ML-SD-06 from 0.0-7.0 ft bss photo 2.JPG

ML-SD-06 from 0.0-7.0 ft bss photo 4.JPG

ML-SD-06 from 0.0-7.0 ft bss photo 5.JPG

ML-SD-07 from 0.0-8.9 ft bss photo 2.JPG

ML-SD-07 from 0.0-8.9 ft bss photo 1.JPG

ML-SD-07 from 0.0-8.9 ft bss photo 3.JPG

ML-SD-07 from 0.0-8.9 ft bss photo 4.JPG

ML-SD-08 from 0.0-7.2 ft bss photo 1.JPG

ML-SD-07 from 0.0-8.9 ft bss photo 5.JPG

ML-SD-08 from 0.0-7.2 ft bss photo 2.JPG

ML-SD-08 from 0.0-7.2 ft bss photo 3.JPG

ML-SD-09 from 0.0-5.2 ft bss photo 1.JPG

ML-SD-08 from 0.0-7.2 ft bss photo 4.JPG

ML-SD-09 from 0.0-5.2 ft bss photo 2.JPG

ML-SD-09 from 0.0-5.2 ft bss photo 3.JPG

ML-SD-10 from 0.0-8.6 ft bss photo 2.JPG

ML-SD-10 from 0.0-8.6 ft bss photo 1.JPG

ML-SD-10 from 0.0-8.6 ft bss photo 3.JPG

ML-SD-10 from 0.0-8.6 ft bss photo 4.JPG

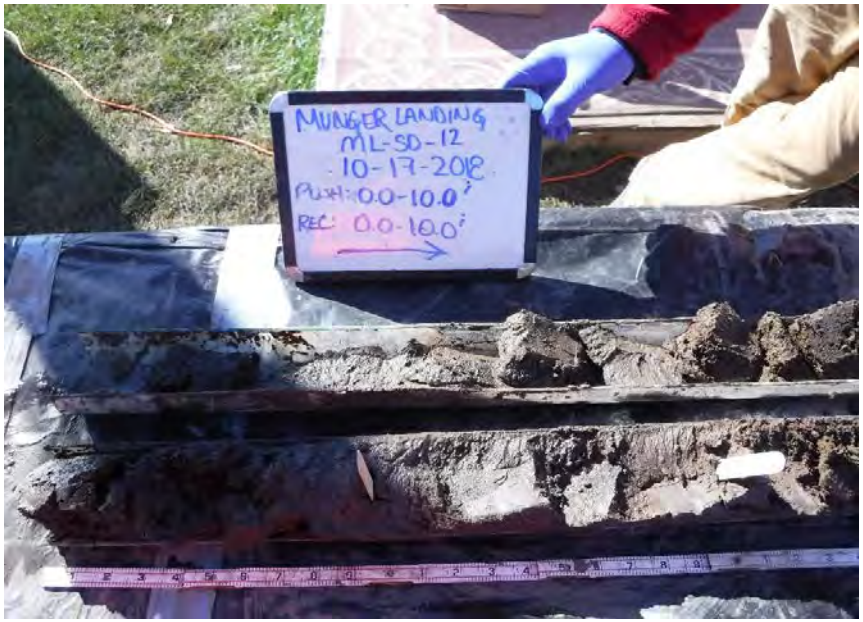
ML-SD-11 from 0.0-6.0 ft bss photo 1.JPG

ML-SD-10 from 0.0-8.6 ft bss photo 5.JPG

ML-SD-11 from 0.0-6.0 ft bss photo 2.JPG

ML-SD-11 from 0.0-6.0 ft bss photo 3.JPG

ML-SD-12 from 0.0-10.0 ft bss photo 2.JPG



ML-SD-12 from 0.0-10.0 ft bss photo 1.JPG

ML-SD-12 from 0.0-10.0 ft bss photo 3.JPG

ML-SD-12 from 0.0-10.0 ft bss photo 4.JPG

ML-SD-13 from 0.0-4.9 ft bss photo 2.JPG

ML-SD-13 from 0.0-4.9 ft bss photo 1.JPG

ML-SD-13 from 0.0-4.9 ft bss photo 3.JPG

ML-SD-14 from 0.0-9.4 ft bss photo 1.JPG

ML-SD-14 from 0.0-9.4 ft bss photo 3.JPG

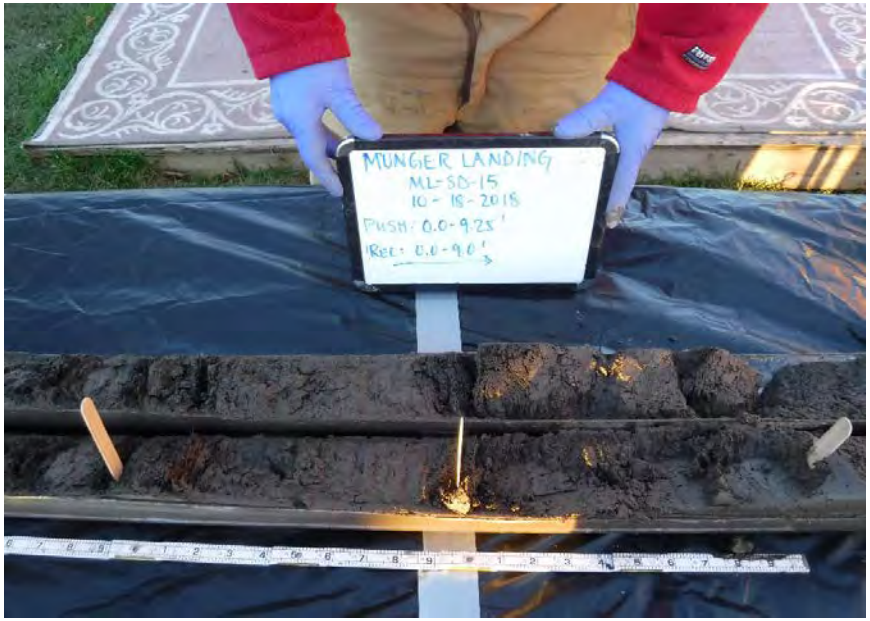
ML-SD-14 from 0.0-9.4 ft bss photo 2.JPG

ML-SD-14 from 0.0-9.4 ft bss photo 4.JPG

ML-SD-14 from 0.0-9.4 ft bss photo 5.JPG

ML-SD-15 from 0.0-9.0 ft bss photo 2.JPG

ML-SD-15 from 0.0-9.0 ft bss photo 1.JPG



ML-SD-15 from 0.0-9.0 ft bss photo 3.JPG

ML-SD-15 from 0.0-9.0 ft bss photo 4.JPG

ML-SD-16 from 0.0-10.0 ft bss photo 1.JPG

ML-SD-15 from 0.0-9.0 ft bss photo 5.JPG

ML-SD-16 from 0.0-10.0 ft bss photo 2.JPG

ML-SD-16 from 0.0-10.0 ft bss photo 3.JPG

ML-SD-16 from 0.0-10.0 ft bss photo 5.JPG

ML-SD-16 from 0.0-10.0 ft bss photo 4.JPG

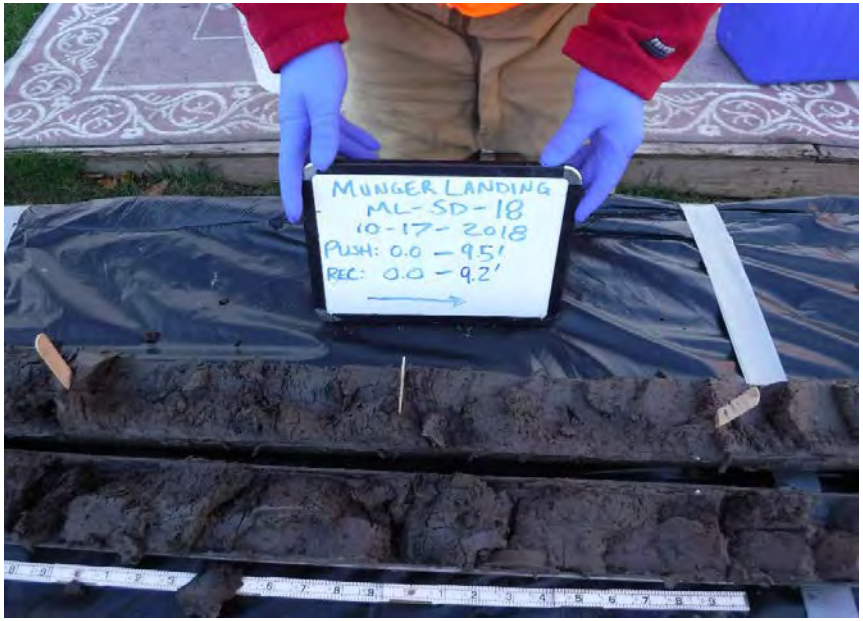
ML-SD-17 from 0.0-3.0 ft bss photo 1.JPG

ML-SD-17 from 0.0-3.0 ft bss photo 2.JPG

ML-SD-18 from 0.0-9.2 ft bss photo 1.JPG

ML-SD-17 from 0.0-3.0 ft bss photo 3.JPG

ML-SD-18 from 0.0-9.2 ft bss photo 2.JPG



ML-SD-18 from 0.0-9.2 ft bss photo 3.JPG

ML-SD-18 from 0.0-9.2 ft bss photo 5.JPG

ML-SD-18 from 0.0-9.2 ft bss photo 4.JPG

ML-SD-19 from 0.0-10.0 ft bss photo 1.JPG

ML-SD-19 from 0.0-10.0 ft bss photo 2.JPG

ML-SD-19 from 0.0-10.0 ft bss photo 4.JPG

ML-SD-19 from 0.0-10.0 ft bss photo 3.JPG

ML-SD-19 from 0.0-10.0 ft bss photo 5.JPG

ML-SD-20 from 0.0-10.0 ft bss photo 1.JPG

ML-SD-20 from 0.0-10.0 ft bss photo 3.JPG

ML-SD-20 from 0.0-10.0 ft bss photo 2.JPG

ML-SD-20 from 0.0-10.0 ft bss photo 4.JPG

ML-SD-20 from 0.0-10.0 ft bss photo 5.JPG

ML-SD-21 from 0.0-10 ft bss photo 2.JPG

ML-SD-21 from 0.0-10 ft bss photo 1.JPG

ML-SD-21 from 0.0-10 ft bss photo 3.JPG

ML-SD-21 from 0.0-10 ft bss photo 4.JPG

ML-SD-22 from 0.0-9.0 ft bss photo 1.JPG

ML-SD-21 from 0.0-10 ft bss photo 5.JPG

ML-SD-22 from 0.0-9.0 ft bss photo 2.JPG

ML-SD-22 from 0.0-9.9.0 ft bss photo 3.JPG

ML-SD-22 from 0.0-9.0 ft bss photo 5.JPG

ML-SD-22 from 0.0-9.0 ft bss photo 4.JPG

ML-SD-23 from 0.0-9.8 ft bss photo 1.JPG

ML-SD-23 from 0.0-9.8 ft bss photo 2.JPG

ML-SD-23 from 0.0-9.8 ft bss photo 4.JPG

ML-SD-23 from 0.0-9.8 ft bss photo 3.JPG

ML-SD-23 from 0.0-9.8 ft bss photo 5.JPG

ML-SD-23 from 0.0-9.8 ft bss photo 6.JPG

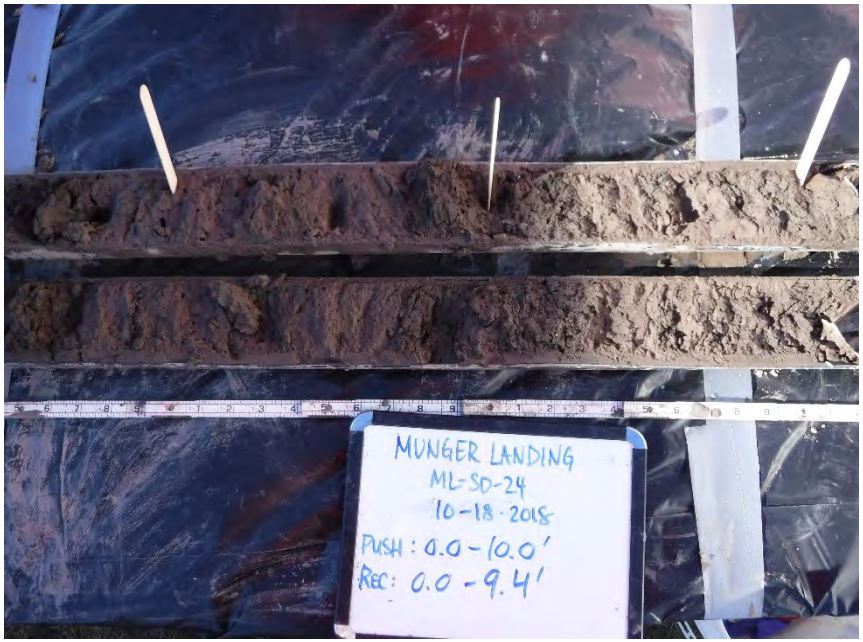
ML-SD-24 from 0.0-9.4 ft bss photo 2.JPG

ML-SD-24 from 0.0-9.4 ft bss photo 1.JPG

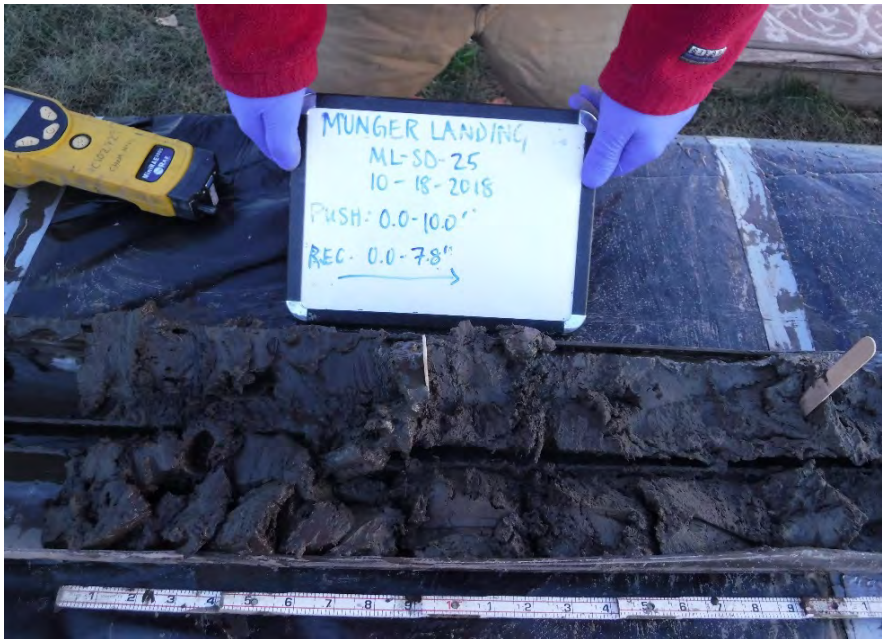
ML-SD-24 from 0.0-9.4 ft bss photo 3.JPG

ML-SD-24 from 0.0-9.4 ft bss photo 4.JPG

ML-SD-24 from 0.0-9.4 ft bss photo 6.JPG



ML-SD-24 from 0.0-9.4 ft bss photo 5.JPG



ML-SD-25 from 0.0-7.8 ft bss photo 1.JPG

ML-SD-25 from 0.0-7.8 ft bss photo 2.JPG

ML-SD-25 from 0.0-7.8 ft bss photo 4.JPG

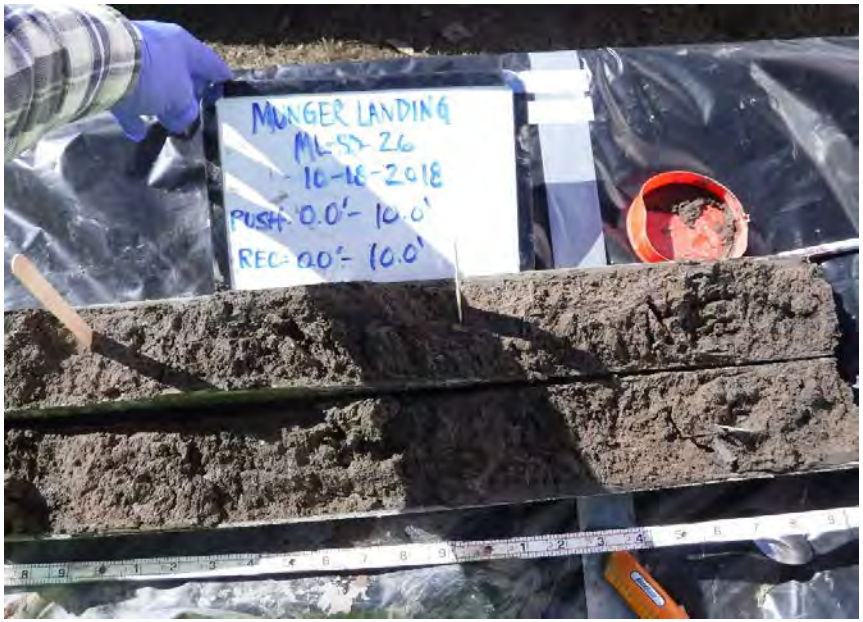
ML-SD-25 from 0.0-7.8 ft bss photo 3.JPG

ML-SD-26 from 0.0-10.0 ft bss photo 1.JPG

ML-SD-26 from 0.0-10.0 ft bss photo 2.JPG

ML-SD-26 from 0.0-10.0 ft bss photo 4.JPG

ML-SD-26 from 0.0-10.0 ft bss photo 3.JPG



ML-SD-26 from 0.0-10.0 ft bss photo 5.JPG

ML-SD-27 from 0.0-3.7 ft bss photo 1.JPG

ML-SD-27 from 0.0-3.7 ft bss photo 3.JPG

ML-SD-27 from 0.0-3.7 ft bss photo 2.JPG

ML-SD-28 from 0.0-8.4 ft bss photo 1.JPG

ML-SD-28 from 0.0-8.4 ft bss photo 2.JPG

ML-SD-28 from 0.0-8.4 ft bss photo 4.JPG

ML-SD-28 from 0.0-8.4 ft bss photo 3.JPG

ML-SD-28 from 0.0-8.4 ft bss photo 5.JPG

ML-SD-28 from 0.0-8.4 ft bss photo 6.JPG

ML-SD-30 from 0.0-0.25 ft bss.JPG

ML-SD-29 from 0.0-0.25 ft bss.JPG

ML-SD-31 from 0.0-0.25 ft bss.JPG

ML-SD-32 from 0.0-0.25 ft bss.JPG

ML-SD-34 from 0.0-1.8 ft bss photo 1.JPG

ML-SD-33 from 0.0-1.2 ft bss photo 1.JPG

ML-SD-34 from 0.0-1.8 ft bss photo 2.JPG

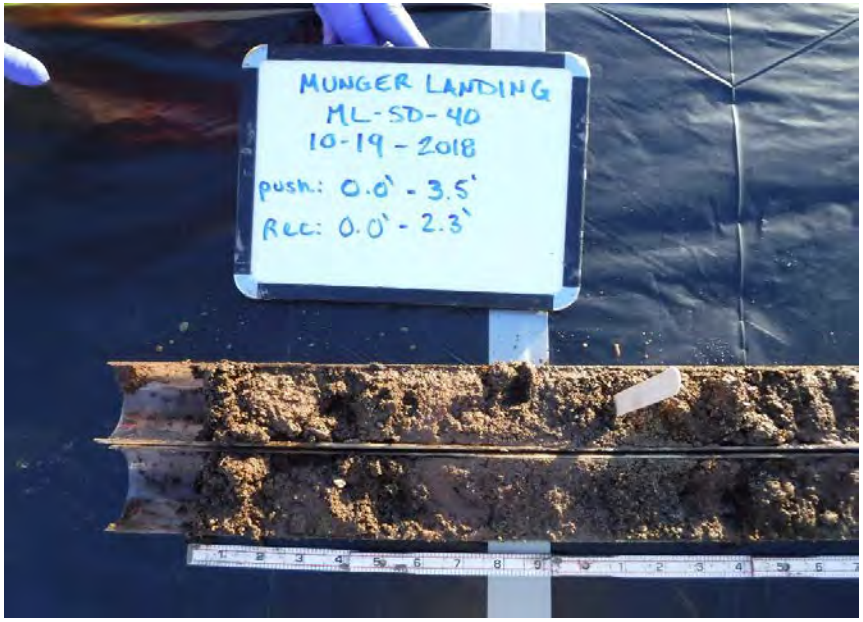
ML-SD-34 from 0.0-1.8 ft bss photo 3.JPG

ML-SD-36-0.0-1.6 ft bss photo 1.JPG

ML-SD-35-0.0-1.3 ft bss photo 1.JPG

ML-SD-37-0.0-1.2 ft bss photo 1.JPG

ML-SD-38-0.0-1.7 ft bss photo 1.JPG



ML-SD-40-0.0-2.3 ft bss photo 1.JPG

ML-SD-39-0.0-1.9 ft bss photo 1.JPG

ML-SD-40-0.0-2.3 ft bss photo 2.JPG

Sediment Sampling Photolog

Filling core with water at ML-SD-38.JPG

Manual coring at ML-SD-38 photo 2.JPG

Manual coring at ML-SD-38 photo 1.JPG

Manual coring at ML-SD-39.JPG

Sediment probing at ML-SD-37.JPG

Vibracore operations photo 1.JPG

Vibracore operations photo 2.JPG

Vibracore operations photo 3.JPG

View from ML-SD-37 photo 1.JPG

View from ML-SD-37 photo 3.JPG

View from ML-SD-37 photo 2.JPG

View from ML-SD-38 photo 1.JPG

View from ML-SD-38 photo 2.JPG

View from ML-SD-39 photo 2.JPG

View from ML-SD-39 photo 1.JPG

Attachment 3
IDW Waste Profile and Manifest

WASTE MATERIAL PROFILE SHEET

Clean Harbors Profile No. CH1752988

A. GENERAL INFORMATION

GENERATOR EPA ID #/REGISTRATION # ***CESQG*** GENERATOR NAME: ***Great Lakes National Program Office***

GENERATOR CODE (Assigned by Clean Harbors) ***GE28627*** CITY ***Chicago*** STATE/PROVINCE ***IL*** ZIP/POSTAL CODE ***60604***

ADDRESS ***77 West Jackson Boulevard*** PHONE: **(404) 414-2505**

CUSTOMER CODE (Assigned by Clean Harbors) ***CH20618*** CUSTOMER NAME: ***CH2M Hill***

ADDRESS ***6600 Peachtree Dunwoody Road Embassy Row - Building 400 Suite 600*** CITY ***Atlanta*** STATE/PROVINCE ***GA*** ZIP/POSTAL CODE ***30328***

B. WASTE DESCRIPTION

WASTE DESCRIPTION: ***Munger Landing Nonhazardous nonTSCA sediment***

PROCESS GENERATING WASTE: **Sampling of river sediment locations for contamination**

IS THIS WASTE CONTAINED IN SMALL PACKAGING CONTAINED WITHIN A LARGER SHIPPING CONTAINER ? **No**

C. PHYSICAL PROPERTIES (at 25C or 77F)

PHYSICAL STATE

- SOLID WITHOUT FREE LIQUID POWDER
- MONOLITHIC SOLID
- [x] LIQUID WITH NO SOLIDS
- LIQUID/SOLID MIXTURE

% FREE LIQUID ***0.00 - 10.00***
% SETTLED SOLID ***90.00 - 100.00***
% TOTAL SUSPENDED SOLID ***0.00 - 0.00***

- SLUDGE
- GAS/AEROSOL

NUMBER OF PHASES/LAYERS

1 [x] 2 3

% BY VOLUME (Approx.)

TOP ***10.00***
MIDDLE ***0.00***
BOTTOM ***90.00***

VISCOSITY (If liquid present)

- 1 - 100 (e.g. Water)
- 101 - 500 (e.g. Motor Oil)
- 501 - 10,000 (e.g. Molasses)
- [x] > 10,000

COLOR

brown/black

ODOR

- [x] NONE
- MILD
- STRONG

Describe:

BOILING POINT °F (°C)

- <= 95 (<=35)
- 95 - 100 (35-38)
- 101 - 129 (38-54)
- [x] >= 130 (>54)

MELTING POINT °F (°C)

- < 140 (<60)
- 140-200 (60-93)
- [x] > 200 (>93)

TOTAL ORGANIC CARBON

- [x] <= 1%
- 1-9%
- >= 10%

FLASH POINT °F (°C)

- < 73 (<23)
- 73 - 100 (23-38)
- 101 -140 (38-60)
- 141 -200 (60-93)
- [x] > 200 (>93)

pH

- <= 2
- [x] 2.1 - 6.9
- 7 (Neutral)
- 7.1 - 12.4
- >= 12.5

SPECIFIC GRAVITY

- < 0.8 (e.g. Gasoline)
- 0.8-1.0 (e.g. Ethanol)
- [x] 1.0 (e.g. Water)
- 1.0-1.2 (e.g. Antifreeze)
- > 1.2 (e.g. Methylene Chloride)

ASH

- < 0.1
- 0.1 - 1.0
- 1.1 - 5.0
- 5.1 - 20.0
- > 20
- [x] Unknown

BTU/LB (MJ/kg)

- [x] < 2,000 (<4.6)
- 2,000-5,000 (4.6-11.6)
- 5,000-10,000 (11.6-23.2)
- > 10,000 (>23.2)

Actual:

D. COMPOSITION (List the complete composition of the waste, include any inert components and/or debris. Ranges for individual components are acceptable. If a trade name is used, please supply an MSDS. Please do not use abbreviations.)

CHEMICAL	MIN	--	MAX	UOM
2-BUTANONE	211.0000000	--	211.0000000	PPB
BARIUM	0.4700000	--	0.4700000	PPM
OCDD	38.0000000	--	38.0000000	PPB
OCDF	4.0000000	--	4.0000000	PPB
PCBS	38.0000000	--	38.0000000	PPB
PPE, LINER, SAMPLING EQUIPMENT	0.0000000	--	5.0000000	%
SEDIMENT	95.0000000	--	100.0000000	%
TOTAL HPCDD	10.0000000	--	10.0000000	PPB
TOTAL HPCDF	19.0000000	--	19.0000000	PPB
TOTAL HXCDD	2.0000000	--	2.0000000	PPB

DOES THIS WASTE CONTAIN ANY HEAVY GAUGE METAL DEBRIS OR OTHER LARGE OBJECTS (EX., METAL PLATE OR PIPING >1/4" THICK OR >12" LONG, METAL REINFORCED HOSE >12" LONG, METAL WIRE >12" LONG, METAL VALVES, PIPE FITTINGS, CONCRETE REINFORCING BAR OR PIECES OF CONCRETE >3")? YES [x] NO

If yes, describe, including dimensions:

DOES THIS WASTE CONTAIN ANY METALS IN POWDERED OR OTHER FINELY DIVIDED FORM? YES [x] NO

DOES THIS WASTE CONTAIN OR HAS IT CONTACTED ANY OF THE FOLLOWING; ANIMAL WASTES, HUMAN BLOOD, BLOOD PRODUCTS, BODY FLUIDS, MICROBIOLOGICAL WASTE, PATHOLOGICAL WASTE, HUMAN OR ANIMAL DERIVED SERUMS OR PROTEINS OR ANY OTHER POTENTIALLY INFECTIOUS MATERIAL? YES [x] NO

I acknowledge that this waste material is neither infectious nor does it contain any organism known to be a threat to human health. This certification is based on my knowledge of the material. Select the answer below that applies:

The waste was never exposed to potentially infectious material. YES NO

Chemical disinfection or some other form of sterilization has been applied to the waste. YES NO

I ACKNOWLEDGE THAT THIS PROFILE MEETS THE CLEAN HARBORS BATTERY PACKAGING REQUIREMENTS. YES NO

I ACKNOWLEDGE THAT MY FRIABLE ASBESTOS WASTE IS DOUBLE BAGGED AND WETTED. YES NO

SPECIFY THE SOURCE CODE ASSOCIATED WITH THE WASTE. ***G49*** SPECIFY THE FORM CODE ASSOCIATED WITH THE WASTE. ***W301***

E. CONSTITUENTS

Are these values based on testing or knowledge? Knowledge ☑ Testing

If constituent concentrations are based on analytical testing, analysis must be provided. Please attach document(s) using the link on the Submit tab.

Please indicate which constituents below apply. Concentrations must be entered when applicable to assist in accurate review and expedited approval of your waste profile. Please note that the total regulated metals and other constituents sections require answers.

RCRA	REGULATED METALS	REGULATORY LEVEL (mg/l)	TCLP mg/l	TOTAL	UOM	NOT APPLICABLE
D004	ARSENIC	5.0				☑
D005	BARIUM	100.0				☑
D006	CADMIUM	1.0				☑
D007	CHROMIUM	5.0				☑
D008	LEAD	5.0				☑
D009	MERCURY	0.2				☑
D010	SELENIUM	1.0				☑
D011	SILVER	5.0				☑

	VOLATILE COMPOUNDS	
D018	BENZENE	0.5
D019	CARBON TETRACHLORIDE	0.5
D021	CHLOROBENZENE	100.0
D022	CHLOROFORM	6.0
D028	1,2-DICHLOROETHANE	0.5
D029	1,1-DICHLOROETHYLENE	0.7
D035	METHYL ETHYL KETONE	200.0
D039	TETRACHLOROETHYLENE	0.7
D040	TRICHLOROETHYLENE	0.5
D043	VINYL CHLORIDE	0.2

	SEMI-VOLATILE COMPOUNDS	
D023	o-CRESOL	200.0
D024	m-CRESOL	200.0
D025	p-CRESOL	200.0
D026	CRESOL (TOTAL)	200.0
D027	1,4-DICHLOROBENZENE	7.5
D030	2,4-DINITROTOLUENE	0.13
D032	HEXACHLOROBENZENE	0.13
D033	HEXACHLOROBUTADIENE	0.5
D034	HEXACHLOROETHANE	3.0
D036	NITROBENZENE	2.0
D037	PENTACHLOROPHENOL	100.0
D038	PYRIDINE	5.0
D041	2,4,5-TRICHLOROPHENOL	400.0
D042	2,4,6-TRICHLOROPHENOL	2.0

	PESTICIDES AND HERBICIDES	
D012	ENDRIN	0.02
D013	LINDANE	0.4
D014	METHOXYCHLOR	10.0
D015	TOXAPHENE	0.5
D016	2,4-D	10.0
D017	2,4,5-TP (SILVEX)	1.0
D020	CHLORDANE	0.03
D031	HEPTACHLOR (AND ITS EPOXIDE)	0.008

OTHER CONSTITUENTS	MAX	UOM	NOT APPLICABLE
BROMINE			☑
CHLORINE			☑
FLUORINE			☑
IODINE			☑
SULFUR			☑
POTASSIUM			☑
SODIUM			☑
AMMONIA			☑
CYANIDE AMENABLE			☑
CYANIDE REACTIVE			☑
CYANIDE TOTAL			☑
SULFIDE REACTIVE			☑

HOCs

☑ NONE
< 1000 PPM
>= 1000 PPM

PCBs

NONE
☑ < 50 PPM
>=50 PPM

IF PCBS ARE PRESENT, IS THE WASTE REGULATED BY TSCA 40 CFR 761?

YES ☑ NO

ADDITIONAL HAZARDS

DOES THIS WASTE HAVE ANY UNDISCLOSED HAZARDS OR PRIOR INCIDENTS ASSOCIATED WITH IT, WHICH COULD AFFECT THE WAY IT SHOULD BE HANDLED?

YES ☑ NO (If yes, explain)

CHOOSE ALL THAT APPLY

DEA REGULATED SUBSTANCES | EXPLOSIVE | FUMING | OSHA REGULATED CARCINOGENS
POLYMERIZABLE | RADIOACTIVE | REACTIVE MATERIAL | ☑ NONE OF THE ABOVE

F. REGULATORY STATUS

YES ☑ NO USEPA HAZARDOUS WASTE?

YES ☑ NO DO ANY STATE WASTE CODES APPLY?

Texas Waste Code

YES ☑ NO DO ANY CANADIAN PROVINCIAL WASTE CODES APPLY?

YES ☑ NO IS THIS WASTE PROHIBITED FROM LAND DISPOSAL WITHOUT FURTHER TREATMENT PER 40 CFR PART 268?

LDR CATEGORY: ***Not subject to LDR***
VARIANCE INFO:

YES ☑ NO IS THIS A UNIVERSAL WASTE?

YES ☑ NO IS THE GENERATOR OF THE WASTE CLASSIFIED AS VERY SMALL QUANTITY GENERATOR (VSQG) OR A STATE EQUIVALENT DESIGNATION?

YES NO IS THIS MATERIAL GOING TO BE MANAGED AS A RCRA EXEMPT COMMERCIAL PRODUCT, WHICH IS FUEL (40 CFR 261.2 (C)(2)(II))?

YES ☑ NO DOES TREATMENT OF THIS WASTE GENERATE A F006 OR F019 SLUDGE?

YES NO IS THIS WASTE STREAM SUBJECT TO THE INORGANIC METAL BEARING WASTE PROHIBITION FOUND AT 40 CFR 268.3(C)?

YES ☑ NO DOES THIS WASTE CONTAIN VOC'S IN CONCENTRATIONS >=500 PPM?

YES NO DOES THE WASTE CONTAIN GREATER THAN 20% OF ORGANIC CONSTITUENTS WITH A VAPOR PRESSURE >= .3KPA (.044 PSIA)?

YES ☑ NO DOES THIS WASTE CONTAIN AN ORGANIC CONSTITUENT WHICH IN ITS PURE FORM HAS A VAPOR PRESSURE > 77 KPA (11.2 PSIA)?

YES ☑ NO IS THIS CERCLA REGULATED (SUPERFUND) WASTE ?

YES ☑ NO IS THE WASTE SUBJECT TO ONE OF THE FOLLOWING NESHAP RULES?

Hazardous Organic NESHAP (HON) rule (subpart G) Pharmaceuticals production (subpart GGG)

YES NO IF THIS IS A US EPA HAZARDOUS WASTE, DOES THIS WASTE STREAM CONTAIN BENZENE?

YES NO Does the waste stream come from a facility with one of the SIC codes listed under benzene NESHAP or is this waste regulated under the benzene NESHAP rules because the original source of the waste is from a chemical manufacturing, coke by-product recovery, or petroleum refinery process?

YES NO Is the generating source of this waste stream a facility with Total Annual Benzene (TAB) >10 Mg/year?

What is the TAB quantity for your facility? Megagram/year (1 Mg = 2,200 lbs)

The basis for this determination is: Knowledge of the Waste Or Test Data Knowledge Testing

Describe the knowledge :

G. DOT/TDG INFORMATION

DOT/TDG PROPER SHIPPING NAME:

NON HAZARDOUS, NON D.O.T. REGULATED

H. TRANSPORTATION REQUIREMENTS

ESTIMATED SHIPMENT FREQUENCY ONE TIME WEEKLY MONTHLY QUARTERLY YEARLY ☑ OTHER ***as needed***

☑ **CONTAINERIZED**

1-25 CONTAINERS/SHIPMENT

STORAGE CAPACITY:
CONTAINER TYPE:

PORTABLE TOTE TANK BOX|CARTON|CASE
CUBIC YARD BOX ☑ DRUM
OTHER:
DRUM SIZE: ***55***

BULK LIQUID

GALLONS/SHIPMENT: ***0 Min -0 Max*** GAL.

BULK SOLID

SHIPMENT UOM: TON YARD

TONS/YARDS/SHIPMENT: ***0 Min - 0 Max***

I. SPECIAL REQUEST

COMMENTS OR REQUESTS:

Pickup address: Spirit Lake Marina & Rv- 121 Spring St, Duluth, MN 55808; Generator is USEPA Great Lakes National Progra

GENERATOR'S CERTIFICATION

I certify that I am authorized to execute this document as an authorized agent. I hereby certify that all information submitted in this and attached documents is correct to the best of my knowledge.I also certify that any samples submitted are representative of the actual waste.If Clean Harbors discovers a discrepancy during the approval process, Generator grants Clean Harbors the authority to amend the profile, as Clean Harbors deems necessary, to reflect the discrepancy.

AUTHORIZED SIGNATURE	NAME (PRINT)	TITLE	DATE
lisa.schwan@jacobs.com			

This waste profile has been submitted using Clean Harbors' electronic signature system.

*40 CFR Sec. 264.12 required notice:

As required by Federal Resource Conservation and Recovery Act regulations found in 40 CFR Part 264.12(b) and all equivalent State hazardous waste regulations, notice is hereby provided that all Clean Harbors facilities that may be used to treat, store, and /or dispose of the hazardous waste described on this waste profile have the appropriate permits and the capacity to manage these wastes.

Please note this profile must be submitted for re-evaluation if there has been a change in the waste generating process or when there have been changes in the chemical composition or physical characteristics of the material.

Addendum

D. COMPOSITION

CHEMICAL	MIN	--	MAX	UOM
TOTAL HXCDF	4.000000	--	4.000000	PPB
TOTAL PECDF	0.000000	--	0.000000	PPB
TOTAL TCDD	1.000000	--	1.000000	PPB
WATER	0.000000	--	10.000000	%

G. DOT/TDG INFORMATION

Site Address : 121 Spring Street
Duluth,MN 55808

SC PPW 7/12/2018

WORK ORDER NO 1806062126

1117114

DOCUMENT NO.

STRAIGHT BILL OF LADING

TRANSPORTER 1 Clean Harbors Environmental Services, Inc. VEHICLE ID # 5577

EPA ID # MAD039822250 TRANS. 1 PHONE (781)792-5000

TRANSPORTER 2 Pioneer Tank Lines VEHICLE ID #

EPA ID # MNB044176113 TRANS. 2 PHONE (612) 490-8200

DESIGNATED FACILITY	SHIPPER
Spring Grove Resource Recovery Inc.	ATTN:Heather Williams Great Lakes National Program Office
FACILITY EPA ID #	SHIPPER EPA ID #
OHD000816629	CESQG
ADDRESS 4879 Spring Grove Avenue	ADDRESS 77 West Jackson Boulevard USEPA Mail Code: G-17J
CITY Cincinnati STATE OH ZIP 45232	CITY Chicago STATE IL ZIP 60604

CONTAINERS NO. & SIZE	TYPE	HM	DESCRIPTION OF MATERIALS	TOTAL QUANTITY	UNIT WT/VOL
6X55	DM		A. NON HAZARDOUS, NON D.O.T. REGULATED	01500	P
			B.		
			C.		
			D.		
			E.		
			F.		
			G.		
			H.		

SPECIAL HANDLING INSTRUCTIONS EMERGENCY PHONE #: (800) 483-3718 GENERATOR: Great Lakes National Program Office

A.CH1752988

SHIPPERS CERTIFICATION: This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

	PRINT	SIGN	DATE
SHIPPER	[illegible] EPA	[signature]	[illegible]
TRANSPORTER 1	Brian Nelson	[signature]	11-20-18
TRANSPORTER 2			
RECEIVED BY			

4

CHI 107

Attachment 4
IDW Analytical Data

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 47930
Pace Project No.: 40178079

Sample: ML-IDW-ST-10192018 **Lab ID: 40178079001** Collected: 10/19/18 09:30 Received: 10/20/18 09:55 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8081 GCS Pesticides, TCLP	Analytical Method: EPA 8081 Preparation Method: EPA 3510								
	Leachate Method/Date: EPA 1311; 10/22/18 14:32								
gamma-BHC (Lindane)	**<0.063**	ug/L	0.21	0.063	1	10/24/18 07:30	10/29/18 13:35	58-89-9	
Chlordane (Technical)	**<2.2**	ug/L	7.3	2.2	1	10/24/18 07:30	10/29/18 13:35	57-74-9	
alpha-Chlordane	**<0.29**	ug/L	0.97	0.29	1	10/24/18 07:30	10/29/18 13:35	5103-71-9	
gamma-Chlordane	**<0.068**	ug/L	0.23	0.068	1	10/24/18 07:30	10/29/18 13:35	5103-74-2	
Endrin	**<0.16**	ug/L	0.52	0.16	1	10/24/18 07:30	10/29/18 13:35	72-20-8	
Heptachlor	**<0.065**	ug/L	0.22	0.065	1	10/24/18 07:30	10/29/18 13:35	76-44-8	
Heptachlor epoxide	**<0.13**	ug/L	0.43	0.13	1	10/24/18 07:30	10/29/18 13:35	1024-57-3	
Methoxychlor	**<0.81**	ug/L	2.7	0.81	1	10/24/18 07:30	10/29/18 13:35	72-43-5	
Toxaphene	**<15.0**	ug/L	30.0	15.0	1	10/24/18 07:30	10/29/18 13:35	8001-35-2	
Surrogates									
Decachlorobiphenyl (S)	65	%	10-108		1	10/24/18 07:30	10/29/18 13:35	2051-24-3	
Tetrachloro-m-xylene (S)	86	%	45-112		1	10/24/18 07:30	10/29/18 13:35	877-09-8	
8082 GCS PCB	Analytical Method: EPA 8082 Preparation Method: EPA 3541								
PCB-1016 (Aroclor 1016)	**<34.0**	ug/kg	67.9	34.0	1	11/05/18 09:24	11/05/18 22:22	12674-11-2	
PCB-1221 (Aroclor 1221)	**<34.0**	ug/kg	67.9	34.0	1	11/05/18 09:24	11/05/18 22:22	11104-28-2	
PCB-1232 (Aroclor 1232)	**<34.0**	ug/kg	67.9	34.0	1	11/05/18 09:24	11/05/18 22:22	11141-16-5	
PCB-1242 (Aroclor 1242)	**<34.0**	ug/kg	67.9	34.0	1	11/05/18 09:24	11/05/18 22:22	53469-21-9	
PCB-1248 (Aroclor 1248)	**<34.0**	ug/kg	67.9	34.0	1	11/05/18 09:24	11/05/18 22:22	12672-29-6	
PCB-1254 (Aroclor 1254)	**<34.0**	ug/kg	67.9	34.0	1	11/05/18 09:24	11/05/18 22:22	11097-69-1	
PCB-1260 (Aroclor 1260)	**37.5J**	ug/kg	67.9	34.0	1	11/05/18 09:24	11/05/18 22:22	11096-82-5	
PCB-1262 (Aroclor 1262)	**<34.0**	ug/kg	67.9	34.0	1	11/05/18 09:24	11/05/18 22:22	37324-23-5	
PCB-1268 (Aroclor 1268)	**<34.0**	ug/kg	67.9	34.0	1	11/05/18 09:24	11/05/18 22:22	11100-14-4	
PCB, Total	**37.5J**	ug/kg	67.9	34.0	1	11/05/18 09:24	11/05/18 22:22	1336-36-3	
Surrogates									
Tetrachloro-m-xylene (S)	76	%	56-98		1	11/05/18 09:24	11/05/18 22:22	877-09-8	
Decachlorobiphenyl (S)	73	%	49-104		1	11/05/18 09:24	11/05/18 22:22	2051-24-3	
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 10/22/18 14:32								
Arsenic	**<0.042**	mg/L	0.12	0.042	1	10/25/18 07:37	10/27/18 13:35	7440-38-2	
Barium	**0.47**	mg/L	0.075	0.025	1	10/25/18 07:37	10/27/18 13:35	7440-39-3	
Cadmium	**<0.0066**	mg/L	0.025	0.0066	1	10/25/18 07:37	10/27/18 13:35	7440-43-9	
Chromium	**<0.013**	mg/L	0.050	0.013	1	10/25/18 07:37	10/27/18 13:35	7440-47-3	
Lead	**<0.030**	mg/L	0.098	0.030	1	10/25/18 07:37	10/27/18 13:35	7439-92-1	
Selenium	**0.081J**	mg/L	0.25	0.061	1	10/25/18 07:37	10/27/18 13:35	7782-49-2	1q
Silver	**<0.017**	mg/L	0.050	0.017	1	10/25/18 07:37	10/27/18 13:35	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
	Leachate Method/Date: EPA 1311; 10/22/18 14:32								
Mercury	**0.12J**	ug/L	0.28	0.084	1	10/24/18 10:05	10/25/18 10:03	7439-97-6	

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 47930
Pace Project No.: 40178079

Sample: ML-IDW-ST-10192018 **Lab ID: 40178079001** Collected: 10/19/18 09:30 Received: 10/20/18 09:55 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV TCLP Sep Funnel	Analytical Method: EPA 8270 Preparation Method: EPA 3510 Leachate Method/Date: EPA 1311; 10/22/18 14:32								
1,4-Dichlorobenzene	**<18.8**	ug/L	62.5	18.8	1	10/25/18 07:45	10/25/18 18:17	106-46-7	
2,4-Dinitrotoluene	**<7.9**	ug/L	26.4	7.9	1	10/25/18 07:45	10/25/18 18:17	121-14-2	
Hexachloro-1,3-butadiene	**<24.6**	ug/L	82.0	24.6	1	10/25/18 07:45	10/25/18 18:17	87-68-3	
Hexachlorobenzene	**<16.9**	ug/L	56.4	16.9	1	10/25/18 07:45	10/25/18 18:17	118-74-1	
Hexachloroethane	**<26.6**	ug/L	88.6	26.6	1	10/25/18 07:45	10/25/18 18:17	67-72-1	
2-Methylphenol(o-Cresol)	**<8.7**	ug/L	28.9	8.7	1	10/25/18 07:45	10/25/18 18:17	95-48-7	
3&4-Methylphenol(m&p Cresol)	**<15.6**	ug/L	52.0	15.6	1	10/25/18 07:45	10/25/18 18:17		
Nitrobenzene	**<14.5**	ug/L	48.3	14.5	1	10/25/18 07:45	10/25/18 18:17	98-95-3	
Pentachlorophenol	**<14.3**	ug/L	47.8	14.3	1	10/25/18 07:45	10/25/18 18:17	87-86-5	
Pyridine	**<17.9**	ug/L	59.6	17.9	1	10/25/18 07:45	10/25/18 18:17	110-86-1	
2,4,5-Trichlorophenol	**<8.4**	ug/L	28.0	8.4	1	10/25/18 07:45	10/25/18 18:17	95-95-4	
2,4,6-Trichlorophenol	**<21.1**	ug/L	70.4	21.1	1	10/25/18 07:45	10/25/18 18:17	88-06-2	
Surrogates									
Nitrobenzene-d5 (S)	65	%	56-120		1	10/25/18 07:45	10/25/18 18:17	4165-60-0	
2-Fluorobiphenyl (S)	76	%	54-122		1	10/25/18 07:45	10/25/18 18:17	321-60-8	
2,4,6-Tribromophenol (S)	94	%	58-134		1	10/25/18 07:45	10/25/18 18:17	118-79-6	
Phenol-d6 (S)	26	%	16-120		1	10/25/18 07:45	10/25/18 18:17	13127-88-3	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 10/22/18 14:32								
Benzene	**<5.0**	ug/L	10.0	5.0	10		10/24/18 10:33	71-43-2	
2-Butanone (MEK)	**211**	ug/L	200	29.8	10		10/24/18 10:33	78-93-3	2q
Carbon tetrachloride	**<5.0**	ug/L	10.0	5.0	10		10/24/18 10:33	56-23-5	
Chlorobenzene	**<5.0**	ug/L	10.0	5.0	10		10/24/18 10:33	108-90-7	
Chloroform	**<25.0**	ug/L	50.0	25.0	10		10/24/18 10:33	67-66-3	
1,2-Dichloroethane	**<1.7**	ug/L	10.0	1.7	10		10/24/18 10:33	107-06-2	
1,1-Dichloroethene	**<4.1**	ug/L	10.0	4.1	10		10/24/18 10:33	75-35-4	
Tetrachloroethene	**<5.0**	ug/L	10.0	5.0	10		10/24/18 10:33	127-18-4	
Trichloroethene	**<3.3**	ug/L	10.0	3.3	10		10/24/18 10:33	79-01-6	
Vinyl chloride	**<1.8**	ug/L	10.0	1.8	10		10/24/18 10:33	75-01-4	
Surrogates									
Toluene-d8 (S)	95	%	70-130		10		10/24/18 10:33	2037-26-5	
4-Bromofluorobenzene (S)	87	%	70-130		10		10/24/18 10:33	460-00-4	
Dibromofluoromethane (S)	91	%	70-130		10		10/24/18 10:33	1868-53-7	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**26.4**	%	0.10	0.10	1		10/22/18 11:40		
1020 Flashpoint,Closed Cup	Analytical Method: EPA 1020B								
Flashpoint	**>200**	deg F	68.0	68.0	1		11/01/18 15:16		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**6.6**	Std. Units	0.10	0.010	1		10/29/18 11:58		3q,H6

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	ML-IDW-ST-10192018		
Lab Sample ID	40178079001		
Filename	F181110B_06		
Injected By	BAL		
Total Amount Extracted	13.7 g	Matrix	Sediment
% Moisture	26.4	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	10/19/2018 09:30
ICAL ID	F181011	Received	11/03/2018 09:00
CCal Filename(s)	F181110B_01	Extracted	11/06/2018 14:25
Method Blank ID	BLANK-65999	Analyzed	11/10/2018 14:18

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.21		2,3,7,8-TCDF-13C	2.00	64
Total TCDF	ND	-----	0.21		2,3,7,8-TCDD-13C	2.00	64
					1,2,3,7,8-PeCDF-13C	2.00	60
2,3,7,8-TCDD	ND	-----	0.36		2,3,4,7,8-PeCDF-13C	2.00	59
Total TCDD	0.75	-----	0.36	J	1,2,3,7,8-PeCDD-13C	2.00	66
					1,2,3,4,7,8-HxCDF-13C	2.00	56
1,2,3,7,8-PeCDF	ND	-----	0.21		1,2,3,6,7,8-HxCDF-13C	2.00	77
2,3,4,7,8-PeCDF	ND	-----	0.14		2,3,4,6,7,8-HxCDF-13C	2.00	70
Total PeCDF	0.41	-----	0.18	J	1,2,3,7,8,9-HxCDF-13C	2.00	72
					1,2,3,4,7,8-HxCDD-13C	2.00	64
1,2,3,7,8-PeCDD	ND	-----	0.30		1,2,3,6,7,8-HxCDD-13C	2.00	74
Total PeCDD	ND	-----	0.30		1,2,3,4,6,7,8-HpCDF-13C	2.00	58
					1,2,3,4,7,8,9-HpCDF-13C	2.00	77
1,2,3,4,7,8-HxCDF	ND	-----	0.20		1,2,3,4,6,7,8-HpCDD-13C	2.00	74
1,2,3,6,7,8-HxCDF	0.57	-----	0.13	J	OCDD-13C	4.00	63
2,3,4,6,7,8-HxCDF	ND	-----	0.13				
1,2,3,7,8,9-HxCDF	ND	-----	0.15		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	3.9	-----	0.15	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.26		2,3,7,8-TCDD-37Cl4	0.20	61
1,2,3,6,7,8-HxCDD	-----	0.37	0.25	IJ			
1,2,3,7,8,9-HxCDD	ND	-----	0.19				
Total HxCDD	1.8	-----	0.23	J			
1,2,3,4,6,7,8-HpCDF	9.4	-----	0.32		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.24		Equivalence: 0.27 ng/Kg		
Total HpCDF	19	-----	0.28		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	4.4	-----	0.28	J			
Total HpCDD	10	-----	0.28				
OCDF	3.6	-----	0.57	J			
OCDD	38	-----	0.57				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.
J = Estimated value
I = Interference present

REPORT OF LABORATORY ANALYSIS

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Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		10/25/2018 10:21:16 AM	WG1186274
Fluid	1		10/25/2018 10:21:16 AM	WG1186274
Initial pH	6.72		10/25/2018 10:21:16 AM	WG1186274
Final pH	5.01		10/25/2018 10:21:16 AM	WG1186274

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
2,4,5-TP (Silvex)	ND		0.00200	1	1	10/30/2018 12:16	WG1187731
2,4-D	ND		0.00200	10	1	10/30/2018 12:16	WG1187731
(S) 2,4-Dichlorophenyl Acetic Acid	*60.8*		*14.0-158*			*10/30/2018 12:16*	WG1187731