Data Usability Memorandum
Munger Landing Sediment Characterization
St. Louis River AOC, Minnesota and Wisconsin
Task Order No. 68HE0518F0693, Contract No. EP-R5-11-09

PREPARED FOR:	U.S. Environmental Protection Agency - Great Lakes National Program Office
PREPARED BY:	CH2M HILL
DATE:	May 30, 2019
PROJECT NUMBER:	EG1693SC

This data usability memorandum presents the quality assessment of the data collected during the sediment characterization of the Munger Landing site within the St. Louis River Area of Concern (AOC) in Minnesota and Wisconsin. The primary objective for the sediment characterization was to obtain the data necessary to fill gaps and identify areas that may require further investigation or remedial action, if either Snively Creek or Stewart Creek may be ongoing contaminant sources to the Munger Landing sediments. CH2M HILL, Inc. (CH2M) performed the investigation for the U.S. Environmental Protection Agency (EPA) Great Lakes National Program Office (GLNPO) in accordance with Task Order No. 68HE0518F0693, Contract No. EP-R5-11-09.

Sediment sampling occurred on October 14 through October 20, 2018. Due to an expedited project schedule, the fieldwork was performed based on the draft Data Quality Objectives quality assurance plan (DQO; CH2M 2018a) and health and safety plan (HASP; CH2M 2018b). Prior to field activities, the draft DQO was conditionally approved by EPA GLNPO on October 11, 2018. Following field activities, the field sampling and quality assurance project plan (FSP-QAPP; CH2M 2019) was submitted to EPA GLNPO. All work was performed in accordance with the following site-specific plans prepared and approved by EPA:

- 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). 2019. *Field Sampling and Quality Assurance Project Plan, Munger Landing Sediment Characterization, St. Louis River AOC, Minnesota and Wisconsin Site Characterization.* May.

Field and analytical results were evaluated using the criteria of precision, accuracy, representativeness, comparability, and completeness. Sample collection methods, processing and analytical methods, general field observations, and the analytical data will be summarized in a site characterization report submitted separately.

Field Data

The following subsections summarize field data collected during the sampling activities. Deviations from the sampling program and potential impacts on the usability of the data and decision making are also discussed.

Survey Data

The survey activities were performed following the procedures outlined in the DQOs and FSP-QAPP (CH2M 2018a and 2019):

- Manual sediment cores and ponar sample locations were surveyed by CH2M using a differential Global Positioning System (GPS) receiver capable of submeter accuracy. Vibracore sediment sample location coordinates were surveyed by the EPA's Research Vessel (R/V) Mudpuppy II using differential GPS receivers capable of submeter accuracy.
- Sampling locations were referenced horizontally using latitude and longitude coordinates in decimal degree format, North American Datum of 1983 coordinate system. The completed GPS data checklists are provided in **Attachment 1**.
- Sediment surface elevations are reported in International Great Lakes Datum 1985 US Survey feet. Sediment surface elevation data are not available in Snively and Stewart Creek, this will not adversely affect the data usability.
- Water elevation data were documented at the time of core or Ponar collection for each location from the National Oceanic and Atmospheric Administration gauge station #9099064 or U.S. Geological Survey gauge station 464646092052900, Superior Bay Duluth Ship Canal at Duluth, Minnesota.
- Water depth 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).

Sediment Sampling

Sediment cores or Ponar grab samples were collected from a total of 40 locations. CH2M used manual coring methods at 8 locations from Snively Creek and Stewart Creek, Cetacean Marine staff aboard the EPA's R/V Mudpuppy II collected vibracore samples from 28 locations, and CH2M accompanied by Wisconsin Department of Natural Resource staff used a petite Ponar sampler to collect samples from four locations along Clough Island.

Pocket penetrometer and Torvane shear-strength measurements were not collected during sediment core processing because significant cohesive material was not recovered in any of the cores. This will not adversely affect the data usability.

Deviations

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

- Vibracore locations SD-27 and SD-28 were offset 130 feet to the northwest and 47 feet southeast of the proposed location, respectively, 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 analysis were inadvertently not collected at a frequency of 10 percent.

Analytical Laboratory Data

Samples were collected and shipped to Pace Analytical laboratories for analysis. Pace Analytical in Green Bay, Wisconsin was used as the primary lab for this project. Pace Analytical methods and corresponding laboratory assignments are presented in **Table 1**.

Table 1. Analytical Method and Laboratory Information

Analyte Class	Matrix	Method Citations	Laboratory Assignment
Mercury	Sediment	SW-846 7471B	Pace Analytical, Green Bay, WI
Methyl Mercury	Sediment	EPA 1630	Pace Analytical, Duluth, MN
PCB Aroclors	Sediment	SW-846 3541/8082	Pace Analytical, Green Bay, WI
TOC	Sediment	Lloyd Kahn	Pace Analytical, Green Bay, WI
Dioxin/Furan Congeners	Sediment	EPA 1613B	Pace Analytical, Minneapolis, MN

Two hundred and forty-two sediment samples and 24 field duplicate samples were collected from 40 locations. Seventy-one sediment samples and 7 field duplicate samples from the upper sediment intervals were submitted to the laboratory for analysis and the remaining 171 samples and 17 field duplicates collected from the lower intervals were placed on hold for pending analysis by the laboratory. Upon review of the laboratory's 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. The number of samples collected from each location and analyses performed are presented in **Table 2**.

QA/QC sediment samples were collected as described in the FSP-QAPP (CH2M 2019) except for TOC, where field duplicate samples were inadvertently not collected at the 10 percent frequency. QA/QC samples included field duplicates, matrix spikes/matrix spike duplicates, and two equipment blank samples. The equipment blank samples were collected by pouring deionized water over decontaminated sampling equipment, including the Ponar sampler (ML-EB-002-10182018) and stainless-steel spoon (ML-EB-001-10182018) used to homogenize the sediment samples.

One solid waste sample was collected and analyzed for waste characterization parameters as well as total PCBs and dioxin/furan congeners. The results of the sample were used to characterize the IDW for disposal. The waste data were not validated and are not included in this memorandum.

In addition to the samples collected in the field, EPA's Quality Assurance Technical Support (QATS) contractor, APTIM Federal Services, LLC (APTIM), submitted three performance evaluation samples (PES) to Pace Analytical laboratory. Each performance evaluation sample was designated for one of the following analyses: PCB Aroclors, dioxin/furan congeners, or mercury.

Upon receipt at the laboratory, the samples were logged and batched into sample delivery groups (SDGs). The SDGs and sample identifications (IDs) of analyzed samples are presented in **Table 3**.

Table 2. Analytical Summary for Sediment Core and QA/QC Samples

	Number of Samples Analyzed					Number of Samples Placed on Hold[a]				
Location Identification	PCB Aroclors	Dioxin/Furan	Mercury	Methyl Mercury	TOC	PCB Aroclors	Dioxin/Furan	Mercury	Methyl Mercury	TOC
ML-SD-01	3	3	2	2	3	5	5	6	-	5

Table 2. Analytical Summary for Sediment Core and QA/QC Samples

	Number of Samples Analyzed					Number of Samples Placed on Hold[a]				
Location Identification	PCB Aroclors	Dioxin/Furan	Mercury	Methyl Mercury	TOC	PCB Aroclors	Dioxin/Furan	Mercury	Methyl Mercury	TOC
ML-SD-02	5	5	5	2	5	-	-	-	-	-
ML-SD-03	2	2	2	2	2	8	8	8	-	8
ML-SD-04	-	2	-	-	2	-	7	-	-	7
ML-SD-05	2	2	-	-	2	5	5	-	-	5
ML-SD-06	-	2	-	-	2	-	5	-	-	5
ML-SD-07	-	2	2	-	2	-	7	7	-	7
ML-SD-08	2	2	2	2	2	5	5	5	-	5
ML-SD-09	-	2	2	-	2	-	3	3	-	3
ML-SD-10	2	2	2	-	2	7	7	7	-	7
ML-SD-11	2	2	2	-	2	4	4	4	-	4
ML-SD-12	2	2	2	2	2	8	8	8	-	8
ML-SD-13	2	2	-	-	2	3	3	-	-	3
ML-SD-14	3	3	-	-	3	6	6	-	-	6
ML-SD-15	2	2	-	-	2	7	7	-	-	7
ML-SD-16	3	2	2	2	3	7	8	8	-	7
ML-SD-17	2	2	-	-	2	1	1	-	-	1
ML-SD-18	2	2	2	2	2	7	7	7	-	7
ML-SD-19	2	2	2	2	2	8	8	8	-	8
ML-SD-20	2	2	-	-	2	8	8	-	-	8
ML-SD-21	2	2	2	2	2	8	8	8	-	8
ML-SD-22	2	2	2	2	2	7	7	7	-	7
ML-SD-23	4	4	-	-	4	6	6	-	-	6
ML-SD-24	4	4	-	-	4	5	5	-	-	5
ML-SD-25	2	2	-	-	2	6	6	-	-	6
ML-SD-26	4	4	-	-	4	6	6	-	-	6
ML-SD-27	4	1	-	-	4	-	3	-	-	-
ML-SD-28	1	1	-	-	1	7	7	-	-	7
ML-SD-29	-	1	-	-	1	-	-	-	-	-
ML-SD-30	-	1	-	-	1	-	-	-	-	-
ML-SD-31	-	1	-	-	1	-	-	-	-	-
ML-SD-32	-	1	-	-	1	-	-	-	-	-
ML-SD-33	1	1	1	-	1	-	-	-	-	-

Table 2. Analytical Summary for Sediment Core and QA/QC Samples

	Number of Samples Analyzed					Number of Samples Placed on Hold[a]				
Location Identification	**PCB Aroclors**	**Dioxin/Furan**	**Mercury**	**Methyl Mercury**	**TOC**	**PCB Aroclors**	**Dioxin/Furan**	**Mercury**	**Methyl Mercury**	**TOC**
ML-SD-34	2	2	2	-	2	-	-	-	-	-
ML-SD-35	1	1	1	-	1	-	-	-	-	-
ML-SD-36	2	2	2	-	2	-	-	-	-	-
ML-SD-37	1	1	1	-	1	-	-	-	-	-
ML-SD-38	2	2	2	-	2	-	-	-	-	-
ML-SD-39	2	2	2	-	2	-	-	-	-	-
ML-SD-40	2	2	2	-	2	-	-	-	-	-
Native Sample Count[b]	**74**	**82**	**44**	**20**	**86**	**134**	**160**	**86**	**0**	**156**
QA/QC Samples										
FD	*9*	*9*	*4*	*2*	*3*	*13*	*15*	*9*	-	-
MS/MSD	*4*	*4*	*2*	*1*	-	*8*	*10*	*6*	-	-
EB	*2*	*2*	*2*	*2*	-	-	-	-	-	-
PES	*1*	*1*	*1*	-	-	-	-	-	-	-

[a] Samples were placed on hold at the laboratory and were not analyzed.
[b] Sample count excludes QA/QC samples.
EB = equipment blank; FD = field duplicate; MS/MSD = matrix spike and matrix spike duplicate; PES = performance evaluation sample

Table 3. Analyzed Sample Identification Summary

Sample ID	Analytical SDG No.[a]	Dioxin SDG No.	Methyl Mercury SDG No.	Sample ID	Analytical SDG No.[a]	Dioxin SDG No.	Methyl Mercury SDG No.
ML-SD-01-0.0/1.0	40177757	40177781	40177782	ML-SD-20-1.0/2.0	40177941	40177939	-
ML-SD-01-0.0/1.0-FD	40177757	40177781	40177782	ML-SD-21-0.0/1.0	40177941	40177939	40177918
ML-SD-01-1.0/2.0	40177757	40177781	40177782	ML-SD-21-1.0/2.0	40177941	40177939	40177918
ML-SD-01-2.0/3.0	40179190	40179190	-	ML-SD-22-0.0/1.0	40178112	40177992	-
ML-SD-02-0.0/1.0	40177757	40177781	40177782	ML-SD-22-1.0/2.0	40178112	40177992	-
ML-SD-02-1.0/2.0	40177757	40177781	40177782	ML-SD-23-0.0/1.0	40179190	40179190	-
ML-SD-02-2.0/3.0	40179190	40179190	-	ML-SD-23-1.0/2.0	40179190	40179190	-
ML-SD-02-3.0/4.0	40179190	40179190	-	ML-SD-23-2.0/3.0	40179190	40179190	-
ML-SD-02-4.0/4.7	40179190	40179190	-	ML-SD-23-2.0/3.0-FD	40178112	40177992	-
ML-SD-03-0.0/1.0	40177823	40177827	40177822	ML-SD-23-3.0/4.0	40179190	40179190	-
ML-SD-03-1.0/2.0	40177823	40177827	40177822	ML-SD-24-0.0/1.0	40178112	40177992	-
ML-SD-04-0.0/1.0	40177823	40177827	-	ML-SD-24-1.0/2.0	40178112	40177992	-
ML-SD-04-1.0/2.0	40177823	40177827	-	ML-SD-24-2.0/3.0	40179190	40179190	-

Table 3. Analyzed Sample Identification Summary

Sample ID	Analytical SDG No.[a]	Dioxin SDG No.	Methyl Mercury SDG No.	Sample ID	Analytical SDG No.[a]	Dioxin SDG No.	Methyl Mercury SDG No.
ML-SD-05-0.0/1.0	40177757	40177781	-	ML-SD-24-2.0/3.0-FD	40179190	40179190	-
ML-SD-05-0.0/1.0-FD	40177757	40177781	-	ML-SD-24-3.0/4.0	40179190	40179190	-
ML-SD-05-1.0/2.0	40177757	40177781	-	ML-SD-25-0.0/1.0	40178112	40177992	-
ML-SD-06-0.0/1.0	40177823	40177827	-	ML-SD-25-1.0/2.0	40178112	40177992	-
ML-SD-06-1.0/2.0	40177823	40177827	-	ML-SD-26-0.0/1.0	40178112	40177992	-
ML-SD-07-0.0/1.0	40177823	40177827	-	ML-SD-26-1.0/2.0	40178112	40177992	-
ML-SD-07-1.0/2.0	40177823	40177827	-	ML-SD-26-1.0/2.0-FD	40178112	40177992	-
ML-SD-08-0.0/1.0	40177823	40177827	40177822	ML-SD-26-2.0/3.0	40179190	40179190	-
ML-SD-08-1.0/2.0	40177823	40177827	40177822	ML-SD-26-3.0/4.0	40179190	40179190	-
ML-SD-09-0.0/1.0	40177823	40177827	-	ML-SD-27-0.0/1.0	40177941	40177939	-
ML-SD-09-1.0/2.0	40177823	40177827	-	ML-SD-27-1.0/2.0	40179190	-	-
ML-SD-10-0.0/1.0	40177823	40177827	-	ML-SD-27-2.0/3.0	40179190	-	-
ML-SD-10-0.0/1.0-FD	40177823	40177827	-	ML-SD-27-3.0/3.7	40179190	-	-
ML-SD-10-1.0/2.0	40177823	40177827	-	ML-SD-28-0.0/1.0	40178112	40177992	-
ML-SD-11-0.0/1.0	40177823	40177827	-	ML-SD-29-0.0/0.25	40177757	40177781	-
ML-SD-11-1.0/2.0	40177823	40177827	-	ML-SD-30-0.0/0.25	40177757	40177781	-
ML-SD-12-0.0/1.0	40177941	40177939	40177918	ML-SD-31-0.0/0.25	40177757	40177781	-
ML-SD-12-1.0/2.0	40177941	40177939	40177918	ML-SD-32-0.0/0.25	40177757	40177781	-
ML-SD-13-0.0/1.0	40177823	40177827	-	ML-SD-33-0.0/1.2	40178112	40177992	-
ML-SD-13-0.0/1.0-FD	40177823	40177827	-	ML-SD-34-0.0/1.0	40178112	40177992	-
ML-SD-13-1.0/2.0	40177823	40177827	-	ML-SD-34-0.0/1.0-FD	40178112	40177992	-
ML-SD-14-0.0/1.0	40177941	40177939	-	ML-SD-34-1.0/1.8	40178112	40177992	-
ML-SD-14-1.0/2.0	40177941	40177939	-	ML-SD-35-0.0/1.3	40178113	40177993	-
ML-SD-14-2.0/3.0	40179190	40179190	-	ML-SD-36-0.0/1.0	40178113	40177993	-
ML-SD-15-0.0/1.0	40178112	40177992	-	ML-SD-36-1.0/1.6	40178113	40177993	-
ML-SD-15-1.0/2.0	40178112	40177992	-	ML-SD-37-0.0/1.2	40178113	40177993	-
ML-SD-16-0.0/1.0	40177941	40177939	40177918	ML-SD-38-0.0/1.0	40178113	40177993	-
ML-SD-16-1.0/2.0	40177941	40177939	40177918	ML-SD-38-1.0/1.7	40178113	40177993	-
ML-SD-16-2.0/3.0	40179190	-	-	ML-SD-39-0.0/1.0	40178113	40177993	-
ML-SD-17-0.0/1.0	40177941	40177939	-	ML-SD-39-1.0/1.9	40178113	40177993	-
ML-SD-17-1.0/2.0	40177941	40177939	-	ML-SD-40-0.0/1.0	40178113	40177993	-
ML-SD-18-0.0/1.0	40177941	40177939	40177918	ML-SD-40-1.0/2.3	40178113	40177993	-
ML-SD-18-1.0/2.0	40177941	40177939	40177918	ML-EB-001-10182018	40177935	40177938	40177936
ML-SD-19-0.0/1.0	40177941	40177939	40177918	ML-EB-002-10182018	40177935	40177938	40177936

Table 3. Analyzed Sample Identification Summary

Sample ID	Analytical SDG No.[a]	Dioxin SDG No.	Methyl Mercury SDG No.	Sample ID	Analytical SDG No.[a]	Dioxin SDG No.	Methyl Mercury SDG No.
ML-SD-19-1.0/2.0	40177941	40177939	40177918	AS1962[b]	4077704	-	-
ML-SD-19-1.0/2.0-FD	40177941	40177939	40177918	DS00317[b]	-	4077708	-
ML-SD-20-0.0/1.0	40177941	40177939	-	MS02615[b]	4077704	-	-

[a] SDG number for laboratory analysis of one or more parameters (PCB Aroclors, mercury and/or TOC)
[b] Performance evaluation sample

Data Review, Verification, and Validation

Staged Electronic Data Deliverables (SEDD) were submitted by the laboratory to EPA's electronic data exchange and evaluation system (EXES) as part of a pilot study. Upon successful upload of the SEDD files, data assessment checks were performed by the EPA Analytical Services Branch, and subsequent validation by EPA's QATS contactor, APTIM.

Data were qualified according to the measurement quality objectives specified in the FSP-QAPP for each parameter. Data qualifiers were applied to sample results when the QC statistics indicated a possible bias to specific compounds or analytes associated with a particular method and sample batch. Multiple qualifiers are routinely applied to specific sample method/matrix/analyte combinations, but the final qualifier will be the most conservative of the applied validation qualifiers. Standard data qualifiers were used as a means of classifying the data regarding their conformance to QC requirements. The applied data qualifiers are defined in **Table 4**.

Table 4. Qualifier Definitions

Qualifier	Definition
U	The analyte was analyzed for but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample result was rejected because of serious deficiencies in the ability to analyze the sample and meet the QC criteria. The presence or absence of the analyte could not be verified.

Independent Validation

APTIM completed Tier 1 validation on 100 percent of the data and Tier 2 on 20 percent of the data for mercury, methyl mercury, TOC, and dioxin/furan congeners. Tier 1 and Tier 2 validation was performed on 100 percent of the PCB data. The results of the APTIM validation review are summarized in the release of validated data reports provided in **Attachment 2**. A summary of qualifiers applied by APTIM provided below:

- Two samples (ML-SD-02-3.0/4.0 and ML-SD-02-4.0/4.7) were rejected by APTIM for hold time exceedances for mercury by method SW-846 7471B; R.
- Hold time exceedance qualifiers were applied to TOC and mercury; J and J-.
- Surrogate recovery qualifiers were applied to PCB Aroclors; UJ.
- Continuing calibration verification qualifiers were applied to PCB Aroclors; UJ.
- For dioxin data the laboratory is reporting non-detects and estimate "J" value sample concentrations based on the Estimated Detection Limit (EDL). The EXES program is reporting the non-detected results to either the Method Detection Limit (MDL) or EDL, whichever is the greater value. As a result, some laboratory-reported "J" value analyte results (between the EDL and Reporting Limit [RL]) are reported as detects by the laboratory as estimated ("J" values); however, the analyte concentration is less than the reported adjusted analyte MDL for the sample in the electronic data deliverable file.
  - Sample results between the EDL and RL qualified as estimate; J.
  - Polychlorinated diphenyl ether (PCDE) interference qualifiers were applied to dioxin and furan congeners; J.
  - Calibration range exceedance qualifiers were applied to dioxin and furan congeners; J.
  - Internal standard recovery qualifiers were applied to dioxin and furan congeners; UJ.
  - Ion ratio outside of criteria qualifiers were applied to dioxin and furan congeners and were reported at the Estimated Maximum Possible Concentration (EMPC); J.
  - Samples less than 10 percent solid qualifiers were applied to dioxin and furan congeners; J.
  - Homologue Totals without their own labeled standards qualified; UJ, J.

CH2M Validation Review and Findings

CH2M reviewed the EPA independent validator's results and their changes to data qualifiers, specifically as it relates to data usability. The evaluation assessed how the data, as qualified by the data validator, would be used for project decision making.

Equipment Blank Samples

The CH2M validator found that the APTIM validator did not include evaluation of equipment blank contamination as it applies to the native field samples. The CH2M validator reviewed the data and found that the equipment blanks were free from contamination; therefore, no qualifiers were applied to the data.

Equipment blank sample ML-EB-001-10182018 is associated with all field-collected sediment core samples. Equipment blank sample ML-EB-002-10182018 is associated with samples collected at four locations (SD-29, SD-30, SD-31 and SD-32).

Conclusions

The goal of the data assessment is to determine if deviations from the FSP-QAPP affect the usability of the field data and the analytical results, and whether the field and laboratory data can be used to support the decision-making process.

The following summary highlights the data evaluation findings:

- Two proposed sampling locations were adjusted in the field due to site conditions (physical obstructions). The adjusted locations will not adversely affect the data usability.
- Field duplicate samples were not collected at a 10 percent frequency for TOC. Three field duplicates were collected for 86 native sediment samples that were analyzed by the laboratory (29 percent frequency). This will not adversely affect the data usability.
- Field duplicate samples were not analyzed at a 10 percent frequency for mercury. Four field duplicates were analyzed for 47 native mercury samples that were analyzed by the laboratory (12 percent frequency). This will not adversely affect the data usability.
- Matrix spike and matrix spike duplicate (MS/MSD) samples were not analyzed at a 20 percent frequency for mercury. Two MS/MSD samples were analyzed for 47 native mercury samples that were analyzed by the laboratory (24 percent frequency). This will not adversely affect the data usability.
- The most accurate, precise, representative, and comparable samples were determined by data validation and reported to be final.
- CH2M validators and chemists determined that the data quality objectives were met, as measured by field and laboratory QC indicators.
- Two samples analyzed for mercury were rejected by the third-party validators for hold time exceedances. The percentage of usable mercury data is 95.75 percent. The completeness objective of 90 percent was met for all method/analyte combinations.

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). 2019. *Field Sampling and Quality Assurance Project Plan, Munger Landing Sediment Characterization, St. Louis River AOC, Minnesota and Wisconsin Site Characterization.* May.

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.

Attachment 1
Locational Data Checklist and Metadata Recording Forms

U.S. EPA Great Lakes National Program Office
Locational Data Checklist and Metadata Recording Form

This document accompanies *GLNPO's Great Lakes Legacy Act Data Reporting Standard* , Version 1.0, March 2010, which provides detailed data reporting guidance for project data including required electronic data deliverables (EDD). In addition to the EDD and project field forms, project participants are required to complete this checklist at the end of each sampling event. Copies of completed forms should be submitted to the GLNPO Project Lead.

Contact Information

Contact Name: Raja Kaliappan
Phone Number: 414-847-0304
Affiliation: CH2M
E-mail Address: Raja.Kaliappan@jacobs.com

Study Information

Project Title: Munger Landing Sediment Characterization
Site Name: Munger Landing Sediment Characterization St. Louis River AOC, Minnesota & Wisconsin Site Characterization
Sampling Start Date: 10/15/2018
Sampling Stop Date: 10/19/2018

Preparation Activities (please confirm each activity in the boxes to the right)

1. Sampling staff are trained in GPS Field Data Collection and have familiarized themselves with the GPS unit used for this project (certified training recommended). ☑
2. Determined window of satellite availability. http://www.trimble.com/planningsoftware_ts.asp ☐
3. Established at least two control points for both vertical and horizontal accuracy. ☐
   For assistance locating control points visit http://www.ngs.noaa.gov/cgi-bin/datasheet.prl or http://www.geocaching.com/mark/. This may not be feasible if the GPS unit is mounted to a vessel. *
4. Located 3 reference points. * ☑

Data Collection Activities (please confirm each activity in the boxes to the right)

1. GPS unit was configured to collect data only when the following requirements were met:
   a. A minimum of four satellites ☑
   b. Position dilution of precision (PDOP)<=6 ☐
   c. Satellite elevation >=15° above the horizon ☐
   d. A minimum signal-to-noise ratio (refer to GPS user manual for recommendation) ☐
2. Collected point data based on the nearest base station's logging interval. ☐
3. Collected point data for a period of at least 1 minute per location. ☐
4. Reported locational data in WGS 84 or NAD 83 (please specify WGS 84). ☑

Please provide an explanation if a box was not checked for any of the responses above and specify deviations (include sample IDs if applicable):

*Collect these points on at least the first day of sampling. Collecting on each sampling day is recommended. Record on page 2.

GPS Unit Specifications

GPS Brand and model number: GeoXH 2008-3000
Model accuracy: Real-Time H-Star Accuracy

Data Processing

Which of the following best describes any data correction that may have been performed:

☐ real-time correction - specify type _____
☑ post processed differential correction - provide base station id and location CORS, Wisconsin Point 6 (WIS6)
☐ no correction
☐ other, please specify _____

Quality Information

Describe any difficulties in collecting locational data: _____

List final post-processed accuracy of the data: 62% 5-15cm accuracy, 17.24% between 15-50cm accuracy, 20.69% between 30-50cm accuracy.

Data Collector:

Confirm required information has been provided.

Signature _____ Date _____

GLNPO Project Lead:

Confirm required information has been provided.

Signature _____ Date _____

U.S. EPA Great Lakes National Program Office
GPS Daily Check

Collect these data on at least the first day of sampling. Collecting on each sampling day is recommended.

Project Title: Munger Landing

Date: 10/15/2018 - 10/19/2018

Horizontal Control Point 1

Benchmark ID: _____ Time: _____

Established Latitude: _____ Measured Latitude: _____

Established Longitude: _____ Measured Longitude: _____

Displacement (include UOM): _____

Horizontal Control Point 2

Benchmark ID: _____ Time: _____

Established Latitude: _____ Measured Latitude: _____

Established Longitude: _____ Measured Longitude: _____

Displacement (include UOM): _____

Vertical Control Point 1

Benchmark ID: _____ Time: _____

Established Elevation: _____ Measured Elevation: _____

Displacement (include UOM): _____

Vertical Control Point 2

Benchmark ID: _____ Time: _____

Established Elevation: _____ Measured Elevation: _____

Displacement (include UOM): _____

Reference Point 1

Time: 09:11

Physical/Locational description: ref101918 0911am

Measured Latitude: 46.705730289 Measured Longitude: -92.20321804

Reference Point 2

Time: 13:48

Physical/Locational description: Reference Point 10/19/18 PM

Measured Latitude: 46.705763804 Measured Longitude: -92.203240007

Reference Point 3

Time: 14:43

Physical/Locational description: ref1

Measured Latitude: 46.705755502 Measured Longitude: -92.203230040

U.S. EPA Great Lakes National Program Office
Locational Data Checklist and Metadata Recording Form

This document accompanies *GLNPO's Great Lakes Legacy Act Data Reporting Standard*, Version 1.0, March 2010, which provides detailed data reporting guidance for project data including required electronic data deliverables (EDD). In addition to the EDD and project field forms, project participants are required to complete this checklist at the end of each sampling event. Copies of completed forms should be submitted to the GLNPO Project Lead.

Contact Information

Contact Name: Joe Bonem
Affiliation: Cetacean Marine
Phone Number: 989 686 9640
E-mail Address: jbonem@cetaceanmarine.com

Study Information

Project Title: Munger Landing Sediment Sampling
Site Name: Munger Landing, Duluth, MN
Sampling Start Date: 10-15-14
Sampling Stop Date: 10-17-14

Preparation Activities (please confirm each activity in the boxes to the right)

1. Sampling staff are trained in GPS Field Data Collection and have familiarized themselves with the GPS unit used for this project (certified training recommended). ☑
2. Determined window of satellite availability. http://www.trimble.com/planningsoftware_ts.asp ☐
3. Established at least two control points for both vertical and horizontal accuracy. For assistance locating control points visit http://www.ngs.noaa.gov/cgi-bin/datasheet.prl or http://www.geocaching.com/mark/. This may not be feasible if the GPS unit is mounted to a vessel. * ☑
4. Located 3 reference points. * ☐

Data Collection Activities (please confirm each activity in the boxes to the right)

1. GPS unit was configured to collect data only when the following requirements were met:
   a. A minimum of four satellites ☑
   b. Position dilution of precision (PDOP)<=6 ☑
   c. Satellite elevation >=15° above the horizon ☐
   d. A minimum signal-to-noise ratio (refer to GPS user manual for recommendation) ☑
2. Collected point data based on the nearest base station's logging interval. ☑
3. Collected point data for a period of at least 1 minute per location. ☑
4. Reported locational data in WGS 84 or NAD 83 (please specify NAD 83). ☑

Please provide an explanation if a box was not checked for any of the responses above and specify deviations (include sample IDs if applicable):

Sometimes satellites below 15° had to be used in order to collect data. only 1 reference point used because sampling area was small

*Collect these points on at least the first day of sampling. Collecting on each sampling day is recommended. Record on page 2.

GPS Unit Specifications

GPS Brand and model number: Trimble PRO XRS
Model accuracy: Sub meter

Data Processing

Which of the following best describes any data correction that may have been performed:

☒ real-time correction - specify type: Beacon
☒ post processed differential correction - provide base station id and location: Cors, Wisconsin point 6 (wis6)
☐ no correction
☐ other, please specify

Quality Information

Describe any difficulties in collecting locational data: Too few satellite at times

List final post-processed accuracy of the data: 97.7% of positions < 1 meter

Data Collector:

Confirm required information has been provided.

Signature: J E Bonem
Date: 11-6-14

GLNPO Project Lead:

Confirm required information has been provided.

Signature
Date

U.S. EPA Great Lakes National Program Office
GPS Daily Check

Collect these data on at least the first day of sampling. Collecting on each sampling day is recommended.

Project Title: Munger Landing Sediment Sampling

Date: 10-14-18

Horizontal Control Point 1

Benchmark ID: Louis (DM2824) Time: 1540

Established Latitude: 46° 43' 41.84370" N Measured Latitude: 46° 43' 41.83654" N

Established Longitude: 92° 11' 04.02633" W Measured Longitude: 92° 11' 04.02126" W

Displacement (include UOM): .62 Ft

Horizontal Control Point 2

Benchmark ID: Olson (AA9913) Time: 1605

Established Latitude: 46° 47' 16.04831" N Measured Latitude: 46° 47' 16.05277" N

Established Longitude: 92° 05' 41.42260" W Measured Longitude: 92° 05' 41.43152" W

Displacement (include UOM): .75 Ft

Vertical Control Point 1

Benchmark ID: Louis (DM2824) Time: 1540

Established Elevation: 168.034 m HAE Measured Elevation: 168.12 m HAE

Displacement (include UOM): .086 m

Vertical Control Point 2

Benchmark ID: Olson (AA9913) Time: 1605

Established Elevation: 166.701 m HAE Measured Elevation: 166.87 m HAE

Displacement (include UOM): .169 m

Reference Point 1

Time: 1525

Physical/Locational description: Cleat on Dock @ Spirit Lake Marina

Measured Latitude: 46° 42.364711' N Measured Longitude: 92° 12.104910' W

Reference Point 2

Time:

Physical/Locational description:

Measured Latitude: Measured Longitude:

Reference Point 3

Time:

Physical/Locational description:

Measured Latitude: Measured Longitude:

U.S. EPA Great Lakes National Program Office
GPS Daily Check

Collect these data on at least the first day of sampling. Collecting on each sampling day is recommended.

Project Title: Munger Landing Sediment Sampling

Date: 10-15-18

Horizontal Control Point 1

Benchmark ID: _____ Time: _____

Established Latitude: _____ Measured Latitude: _____

Established Longitude: _____ Measured Longitude: _____

Displacement (include UOM): _____

Horizontal Control Point 2

Benchmark ID: _____ Time: _____

Established Latitude: _____ Measured Latitude: _____

Established Longitude: _____ Measured Longitude: _____

Displacement (include UOM): _____

Vertical Control Point 1

Benchmark ID: _____ Time: _____

Established Elevation: _____ Measured Elevation: _____

Displacement (include UOM): _____

Vertical Control Point 2

Benchmark ID: _____ Time: _____

Established Elevation: _____ Measured Elevation: _____

Displacement (include UOM): _____

Reference Point 1

Time: 0825

Physical/Locational description: Cleat on Dock @ Spirit Lake Marina

Measured Latitude: 46° 42.364663'N Measured Longitude: 92° 12.104720'W

Reference Point 2

Time: _____

Physical/Locational description: _____

Measured Latitude: _____ Measured Longitude: _____

Reference Point 3

Time: _____

Physical/Locational description: _____

Measured Latitude: _____ Measured Longitude: _____

U.S. EPA Great Lakes National Program Office
GPS Daily Check

Collect these data on at least the first day of sampling. Collecting on each sampling day is recommended.

Project Title: Munger Landing Sediment Sampling

Date: 10-16-18

Horizontal Control Point 1

Benchmark ID: _____ Time: _____

Established Latitude: _____ Measured Latitude: _____

Established Longitude: _____ Measured Longitude: _____

Displacement (include UOM): _____

Horizontal Control Point 2

Benchmark ID: _____ Time: _____

Established Latitude: _____ Measured Latitude: _____

Established Longitude: _____ Measured Longitude: _____

Displacement (include UOM): _____

Vertical Control Point 1

Benchmark ID: _____ Time: _____

Established Elevation: _____ Measured Elevation: _____

Displacement (include UOM): _____

Vertical Control Point 2

Benchmark ID: _____ Time: _____

Established Elevation: _____ Measured Elevation: _____

Displacement (include UOM): _____

Reference Point 1

Time: 0745

Physical/Locational description: Cleat on Dock @ Spirit Lake MARINA

Measured Latitude: 46° 42.365119' N Measured Longitude: 92° 12.105161' W

Reference Point 2

Time: _____

Physical/Locational description: _____

Measured Latitude: _____ Measured Longitude: _____

Reference Point 3

Time: _____

Physical/Locational description: _____

Measured Latitude: _____ Measured Longitude: _____

U.S. EPA Great Lakes National Program Office
GPS Daily Check

Collect these data on at least the first day of sampling. Collecting on each sampling day is recommended.

Project Title: Munger Landing Sediment Sampling

Date: 10-17-18

Horizontal Control Point 1

Benchmark ID: _____ Time: _____

Established Latitude: _____ Measured Latitude: _____

Established Longitude: _____ Measured Longitude: _____

Displacement (include UOM): _____

Horizontal Control Point 2

Benchmark ID: _____ Time: _____

Established Latitude: _____ Measured Latitude: _____

Established Longitude: _____ Measured Longitude: _____

Displacement (include UOM): _____

Vertical Control Point 1

Benchmark ID: _____ Time: _____

Established Elevation: _____ Measured Elevation: _____

Displacement (include UOM): _____

Vertical Control Point 2

Benchmark ID: _____ Time: _____

Established Elevation: _____ Measured Elevation: _____

Displacement (include UOM): _____

Reference Point 1

Time: 0745

Physical/Locational description: Client on Dock @ Split Lake Marina

Measured Latitude: 46° 42.364500' N Measured Longitude: 92° 12.104958' W

Reference Point 2

Time: _____

Physical/Locational description: _____

Measured Latitude: _____ Measured Longitude: _____

Reference Point 3

Time: _____

Physical/Locational description: _____

Measured Latitude: _____ Measured Longitude: _____

Attachment 2
APTIM Validated Data Report

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 24, 2019

SUBJECT: Review of Data for SDG Number: 40177757
Received for Review: 11/30/2018, 12/04/2018, and 12/10/2018

LABORATORY: Pace Analytical Laboratories, Green Bay, Wisconsin

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 2 Validation Review

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177757

Number and Type of Samples: 12 Sediment Samples for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A).

EPA Sample Numbers:

ML-SD-01-0.0/1.0	ML-SD-02-1.0/2.0	ML-SD-29-0.0/0.25
ML-SD-01-0.0/1.0-FD	ML-SD-05-0.0/1.0	ML-SD-30-0.0/0.25
ML-SD-01-1.0/2.0	ML-SD-05-0.0/1.0-FD	ML-SD-31-0.0/0.25
ML-SD-02-0.0/1.0	ML-SD-05-1.0/2.0	ML-SD-32-0.0/0.25

Case Number: 47930 SDG Number: 40177757
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Twelve (12) sediment samples for Case 47930, SDG 40177757 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/15/2018 and shipped to Pace Analytical Laboratory in Green Bay, Wisconsin for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A) analysis.

The organic fraction was validated/verified by the QATS Program in accordance with the National Functional Guidelines for Organic Superfund Methods Data Review, January 2017, and the inorganic fractions by the National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. Tier 2 review was applied to all fractions. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the tables below are summaries of the data qualified in each fraction.

DATA QUALIFICATION SUMMARY TABLES

Aroclor Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Mercury Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Total Organic Carbon Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Case Number: 47930 SDG Number: 40177757
Site Name: Munger Landing Laboratory: Pace Analytical

AROCLOR ANALYSIS

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. GC PERFORMANCE

No problems were found.

3. CALIBRATION - INITIAL AND CONTINUING CALIBRATION

No problems were found.

4. BLANKS

No problems were found.

5. SURROGATE RECOVERY

No problems were found.

6. MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

The MS/MSD solution consisted of Aroclor-1260 only. No problems were found.

7. LABORATORY CONTROL SAMPLE

The LCS solution consisted of Aroclor-1260 only. No problems were found.

8. FIELD BLANK AND FIELD DUPLICATES

Sample ML-SD-01-0.0/1.0-FD is the field duplicate of sample ML-SD-01-0.0/1.0 and ML-SD-05-0.0/1.0-FD is the field duplicate of sample ML-SD-05-0.0/1.0. For one field duplicate pair the RPD between sample results was within the 100% QC limit and for one pair no Aroclors were detected.

9. INTERNAL STANDARDS

Not applicable.

10. COMPOUND IDENTIFICATION

No problems were found.

Case Number: 47930 SDG Number: 40177757
Site Name: Munger Landing Laboratory: Pace Analytical

11. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

No problems were found.

12. SYSTEM PERFORMANCE

No problems were found.

13. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Rebecca Garry DATE: 12/17/2018

Case Number: 47930 SDG Number: 40177757
Site Name: Munger Landing Laboratory: Pace Analytical

MERCURY

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. INITIAL CALIBRATION

No problems were found.

3. INITIAL AND CONTINUING CALIBRATION VERIFICATION

No problems were found.

4. CRI STANDARD

No problems were found.

5. BLANKS – INITIAL AND CONTINUING

No problems were found.

6. PREPARATION BLANK

No problems were found.

7. PRE-DIGESTION/DISTILLATION MATRIX SPIKE

No problems were found.

8. POST DIGESTION SPIKE

A post-digestion spike is not required for mercury analysis.

9. LABORATORY DUPLICATE

A laboratory duplicate was not analyzed.

10. FIELD DUPLICATE COMPARISON

Sample ML-SD-01-0.0/1.0-FD is the field duplicate of sample ML-SD-01-0.0/1.0. The RPD is less than the 100% RPD criteria.

11. ICP INTERFERENCE CHECK SAMPLE

An ICSAB is not required for mercury analysis.

Case Number: 47930 SDG Number: 40177757
Site Name: Munger Landing Laboratory: Pace Analytical

12. LABORATORY CONTROL SAMPLE

No problems were found.

13. SERIAL DILUTION

A serial dilution is not required for mercury analysis.

14. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Lydia Heter DATE 01/07/2019

Case Number: 47930 SDG Number: 40177757
Site Name: Munger Landing Laboratory: Pace Analytical

TOTAL ORGANIC CARBON (TOC)

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. INITIAL CALIBRATION

No problems were found.

3. INITIAL AND CONTINUING CALIBRATION VERIFICATION

An initial calibration was analyzed on 10/31/2017 and the correlation coefficient was 0.99984. Note that the initial calibration is almost one year older than the associated sample analysis; however, SOP S-GB-1-076-REV.02 states up to one year is acceptable. No qualification necessary.

4. BLANKS – INITIAL AND CONTINUING

No problems were found.

5. PREPARATION BLANK

No problems were found.

6. PRE-DIGESTION/DISTILLATION MATRIX SPIKE

No problems were found. The MS/MSD recoveries were within the expanded criteria allowed by the NFG for solid samples.

7. LABORATORY DUPLICATE

A Laboratory Duplicate was not analyzed with this SDG.

8. FIELD DUPLICATE COMPARISON

A Field Duplicate was not analyzed with this SDG although two field duplicate samples were designated for TOC analysis according to the Chain-of-Custody (COC).

9. LABORATORY CONTROL SAMPLE

No problems were found.

10. ADDITIONAL INFORMATION

Sample ML-SD-01-0.0/1.0 (40177757001) was analyzed in quadruplicate as required in the laboratory SOP. The %RSD between the results was less than the 40% criteria specified in the SOP for both samples.

REVIEWED BY: Timothy Vonnahme DATE: 01/11/2019

Case Number: 47930 SDG Number: 40177757
Site Name: Munger Landing Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: April 02, 2019

SUBJECT: Review of Data for SDG Number: 40177781
Received for Review: 01/04/2019 and 03/15/2019

LABORATORY: Pace Analytical Laboratories, Minneapolis, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1+ Validation Review

QATS has reviewed the validated data for the following project:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177781

Number and Type of Samples: 12 Sediment Samples for Dioxins and Furans (EPA 8290/8290A).

EPA Sample Numbers:

ML-SD-01-0.0/1.0	ML-SD-02-1.0/2.0	ML-SD-29-0.0/0.25
ML-SD-01-0.0/1.0-FD	ML-SD-05-0.0/1.0	ML-SD-30-0.0/0.25
ML-SD-01-1.0/2.0	ML-SD-05-0.0/1.0-FD	ML-SD-31-0.0/0.25
ML-SD-02-0.0/1.0	ML-SD-05-1.0/2.0	ML-SD-32-0.0/0.25

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177781
Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Twelve (12) sediment samples for Case 47930, SDG 40177781 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/15/2018 and shipped to Pace Analytical Laboratory in Minneapolis, Minnesota for Dioxins and Furans (EPA 8290/8290A) analysis.

The Dioxin/Furan data were validated/verified by the QATS Program in accordance with the National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. A Tier 1+(*) review was applied to the Dioxin data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Note that the laboratory is reporting non-detects and "J" value (estimated) sample concentrations based on the Estimated Detection Limit (EDL). The EXES program is reporting the non-detected results to either the Method Detection Limit (MDL) or EDL, whichever is the greater value. As a result, some laboratory-reported "J" value analyte results (between the EDL and Reporting Limit (RL)) are reported as detects by the laboratory as estimated ("J" values); however, the analyte concentration is less than the reported adjusted analyte MDL for the sample in the EDD file.

Listed in the table below is the summary of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Dioxin/Furan Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
PCDE Interference	1,2,3,4,7,8-HxCDF	J Detects	ML-SD-01-0.0/1.0 ML-SD-01-0.0/1.0-FD
PCDE Interference	1,2,3,6,7,8-HxCDF	J Detects	ML-SD-30-0.0/0.25 ML-SD-32-0.0/0.25
Result exceeds the calibration range of the instrument	OCDD	J Detect	ML-SD-02-1.0/2.0
Internal Standard recovery outside acceptance limits	1,2,3,4,7,8-HxCDD 1,2,3,4,6,7,8-HpCDF	UJ Non-detects	ML-SD-05-0.0/1.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	1,2,3,7,8,9-HxCDF	J Detect	ML-SD-01-0.0/1.0-FD ML-SD-31-0.0/0.25
Qualified "J" (EMPC) due ion ratios not meeting criteria	1,2,3,7,8,9-HxCDD	J Detect	ML-SD-01-1.0/2.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	2,3,4,7,8-PeCDF	J Detect	ML-SD-02-0.0/1.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	OCDD	J Detect	ML-SD-05-0.0/1.0 ML-SD-05-1.0/2.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	1,2,3,4,6,7,8-HpCDF OCDF	J Detect	ML-SD-05-0.0/1.0-FD
Qualified "J" (EMPC) due ion ratios not meeting criteria	1,2,3,7,8,9-HxCDF 1,2,3,4,7,8,9-HpCDF	J Detect	ML-SD-29-0.0/0.25

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177781
Laboratory: Pace Analytical

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
Qualified "J" (EMPC) due ion ratios not meeting criteria	2,3,4,7,8-PeCDF 1,2,3,7,8-PeCDD 1,2,3,7,8,9-HxCDF 1,2,3,4,7,8-HxCDD	J Detects	ML-SD-30-0.0/0.25
Sample results are between the EDL and the RL	2,3,4,7,8-PeCDF 1,2,3,7,8-PeCDF 1,2,3,7,8-PeCDD 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF	J Estimated	ML-SD-01-0.0/1.0
Sample results are between the EDL and the RL	2,3,4,7,8-PeCDF 1,2,3,7,8-PeCDD 2,3,4,6,7,8-HxCDF	J Detects	ML-SD-01-0.0/1.0-FD
Sample results are between the EDL and the RL	OCDF 1,2,3,6,7,8-HxCDF 1,2,3,6,7,8-HxCDD 1,2,3,4,6,7,8-HpCDD	J Detects	ML-SD-01-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,7,8-PeCDF 1,2,3,7,8-PeCDD 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,7,8-HxCDF 1,2,3,4,7,8-HxCDD 1,2,3,4,7,8,9-HpCDF	J Detects	ML-SD-02-0.0/1.0
Sample results are between the EDL or MDL and the CRQL	1,2,3,7,8-PeCDF 1,2,3,7,8-PeCDD 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF	J Detects	ML-SD-02-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD OCDD	J Detects	ML-SD-05-0.0/1.0-FD
Sample results are between the EDL and the RL	2,3,7,8-TCDF 2,3,7,8-TCDD 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF 1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,7,8,9-HpCDF	J Detects	ML-SD-29-0.0/0.25
Sample results are between the EDL and the RL	2,3,7,8-TCDF 2,3,7,8-TCDD 1,2,3,7,8-PeCDF 1,2,3,4,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,7,8,9-HpCDF	J Detects	ML-SD-30-0.0/0.25
Sample results are between the EDL and the RL	2,3,7,8-TCDD 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF 1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,4,7,8-HxCDD	J Detects	ML-SD-31-0.0/0.25

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177781
Laboratory: Pace Analytical

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
	1,2,3,4,7,8,9-HpCDF		
Sample results are between the EDL and the RL	2,3,7,8-TCDF 2,3,7,8-TCDD 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF 1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,7,8,9-HpCDF	J Detects	ML-SD-32-0.0/0.25
Sample is less than 10 percent solids (9.8%)	2,3,7,8-TCDF 2,3,7,8-TCDD 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF 1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 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-HpCDF 1,2,3,4,7,8,9-HpCDF 1,2,3,4,6,7,8-HpCDD OCDF OCDD Total TCDF Total TCDD Total PeCDF Total PeCDD Total HxCDF Total HxCDD Total HpCDF Total HpCDD	J Detects	ML-SD-29-0.0/0.25
Reported Homologue Totals Qualified per NFG	Total TCDF Total TCDD Total PeCDF Total PeCDD Total HxCDF Total HxCDD Total HpCDF Total HpCDD	J Detects UJ Non-detects	ML-SD-01-0.0/1.0 ML-SD-02-1.0/2.0 ML-SD-29-0.0/0.25 ML-SD-01-0.0/1.0-FD ML-SD-05-0.0/1.0 ML-SD-30-0.0/0.25 ML-SD-01-1.0/2.0 ML-SD-05-0.0/1.0-FD ML-SD-31-0.0/0.25 ML-SD-02-0.0/1.0 ML-SD-05-1.0/2.0 ML-SD-32-0.0/0.25

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177781
Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 24, 2019

SUBJECT: Review of Data for SDG Number: 40177782
Received for Review: 12/13/2018 and 01/03/2019

LABORATORY: Pace Analytical Laboratories, Duluth, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 2 Validation Review

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177782

Number and Type of Samples: 5 Sediment Samples for Methyl Mercury (EPA 1630).

EPA Sample Numbers:

ML-SD-01-0.0/1.0	ML-SD-01-1.0/2.0	ML-SD-02-1.0/2.0
ML-SD-01-0.0/1.0-FD	ML-SD-02-0.0/1.0	

Case Number: 47930 SDG Number: 40177782
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Five (5) sediment samples for Case 47930, SDG 40177782 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/15/2018 and shipped to Pace Analytical Laboratory in Duluth, Minnesota for Methyl Mercury (EPA 1630) analysis.

The Methyl Mercury data were validated/verified by the QATS Program in accordance with the National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. A Tier 2 review was applied the Methyl Mercury data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the table below are summaries of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Methyl Mercury Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Case Number: 47930 SDG Number: 40177782
Site Name: Munger Landing Laboratory: Pace Analytical

METHYL MERCURY

1. HOLDING TIME AND PRESERVATION

The samples for methyl mercury analysis arrived at the laboratory at 8.9℃ which exceeds the required 6.0℃ temperature. Since the temperature at receipt is less than 10℃, and using professional judgment, no qualification was applied.

2. INITIAL CALIBRATION

No problems were found.

3. INITIAL AND CONTINUING CALIBRATION VERIFICATION

No problems were found.

4. CRI STANDARD

No problems were found.

5. BLANKS – INITIAL AND CONTINUING

No problems were found.

6. PREPARATION BLANK

No problems were found.

7. PRE-DIGESTION/DISTILLATION MATRIX SPIKE

No problems were found.

8. POST DIGESTION SPIKE

A post-digestion spike was not analyzed.

9. LABORATORY DUPLICATE

A laboratory duplicate was not analyzed.

10. FIELD DUPLICATE COMPARISON

Sample ML-SD-01-0.0/1.0-FD is the field duplicate of sample ML-SD-01-0.0/1.0. The RPD is less than the 100% RPD criteria.

11. ICP INTERFERENCE CHECK SAMPLE

An ICSAB is not required for methyl mercury analysis.

Case Number: 47930 SDG Number: 40177782
Site Name: Munger Landing Laboratory: Pace Analytical

12. LABORATORY CONTROL SAMPLE

No problems were found.

13. SERIAL DILUTION

A serial dilution is not required for methyl mercury analysis.

14. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Michael Nys DATE 12/17/2018

Case Number: 47930 SDG Number: 40177782
Site Name: Munger Landing Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 24, 2019

SUBJECT: Review of Data for SDG Number: 40177822
Received for Review: 12/13/2018 and 01/03/2019

LABORATORY: Pace Analytical Laboratories, Duluth, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1+ Validation Review

QATS has reviewed the validated data for the following project:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177822

Number and Type of Samples: 4 Sediment Samples for Methyl Mercury (EPA 1630).

EPA Sample Numbers:

ML-SD-03-0.0/1.0	ML-SD-08-0.0/1.0
ML-SD-03-1.0/2.0	ML-SD-08-1.0/2.0

Case Number: 47930 SDG Number: 40177822
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Four (4) sediment samples for Case 47930, SDG 40177822 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/16/2018 and shipped to Pace Analytical Laboratory in Duluth, Minnesota for Methyl Mercury (EPA 1630) analysis.

The Methyl Mercury data were validated/verified by the QATS Program in accordance with the Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. A Tier 1+ review was applied to the Methyl Mercury data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the table below are summaries of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Methyl Mercury Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930 SDG Number: 40177822
Site Name: Munger Landing Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 24, 2019

SUBJECT: Review of Data for SDG Number: 40177823
Received for Review: 12/05/2018, 12/07/2018, 12/19/2018, and 12/20/2018

LABORATORY: Pace Analytical Laboratories, Green Bay, Wisconsin

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1 and Tier 2 Validation Reviews

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177823

Number and Type of Samples: 20 Sediment Samples for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A).

EPA Sample Numbers:

ML-SD-03-0.0/1.0	ML-SD-07-1.0/2.0	ML-SD-10-1.0/2.0
ML-SD-03-1.0/2.0	ML-SD-08-0.0/1.0	ML-SD-11-0.0/1.0
ML-SD-04-0.0/1.0	ML-SD-08-1.0/2.0	ML-SD-11-1.0/2.0
ML-SD-04-1.0/2.0	ML-SD-09-0.0/1.0	ML-SD-13-0.0/1.0
ML-SD-06-0.0/1.0	ML-SD-09-1.0/2.0	ML-SD-13-0.0/1.0-FD
ML-SD-06-1.0/2.0	ML-SD-10-0.0/1.0	ML-SD-13-1.0/2.0
ML-SD-07-0.0/1.0	ML-SD-10-0.0/1.0-FD	

Case Number: 47930 SDG Number: 40177823
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Twenty (20) sediment samples for Case 47930, SDG 40177823 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/16/2018 and shipped to Pace Analytical Laboratory in Green Bay, Wisconsin for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A) analysis.

The organic fraction was validated/verified by the QATS Program in accordance with the National Functional Guidelines for Organic Superfund Methods Data Review, January 2017, and the inorganic fractions by the National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. Tier 2 review was applied to the Aroclor fraction and Tier 1+(*) review was applied to the Mercury and TOC fractions. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the tables below are summaries of the data qualified in each fraction.

DATA QUALIFICATION SUMMARY TABLES

Aroclor Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
Low Surrogate Recovery	Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclor-1262 Aroclor-1268	UJ	1 Sample

Mercury Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Total Organic Carbon Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930 SDG Number: 40177823
Site Name: Munger Landing Laboratory: Pace Analytical

AROCLOR ANALYSIS

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. GC PERFORMANCE

No problems were found.

3. CALIBRATION - INITIAL AND CONTINUING CALIBRATION

No problems were found.

4. BLANKS

No problems were found.

5. SURROGATE RECOVERY

The percent recovery (%R) for surrogate Decachlorobiphenyl (DCBP) of 46%R in one Aroclor sample is less than the laboratory-established QC limits (49-104%) on the quantitation column. Note that the laboratory only reports surrogate recoveries from the quantitation column, which appears to be the RTX-CLP GC column for instrument 40GCS9. No Aroclors were detected in the sample. The non-detected Aroclors in the following sample are qualified "UJ":

ML-SD-03-1.0/2.0 – Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclor-1262, Aroclor-1268

6. MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

The MS/MSD solution consisted of Aroclor-1260 only. No problems were found.

7. LABORATORY CONTROL SAMPLE

The LCS solution consisted of Aroclor-1260 only. No problems were found.

8. FIELD BLANK AND FIELD DUPLICATES

Sample ML-SD-10-0.0/1.0-FD is the field duplicate of sample ML-SD-10-0.0/1.0 and ML-SD-13-0.0/1.0-FD is the field duplicate of sample ML-SD-13-0.0/1.0. No Aroclors were detected in either pair.

9. INTERNAL STANDARDS

Not applicable.

Case Number: 47930 SDG Number: 40177823
Site Name: Munger Landing Laboratory: Pace Analytical

10. COMPOUND IDENTIFICATION

No problems were found.

11. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

No problems were found.

12. SYSTEM PERFORMANCE

No problems were found.

13. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Rebecca Garry DATE: 01/04/2019

Case Number: 47930 SDG Number: 40177823
Site Name: Munger Landing Laboratory: Pace Analytical

NPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: April 02, 2019

SUBJECT: Review of Data for SDG Number: 40177827
Received for Review: 01/10/2019 and 03/15/2019

LABORATORY: Pace Analytical Laboratories, Minneapolis, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1+ Validation Review

QATS has reviewed the validated data for the following project:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177827

Number and Type of Samples: 20 Sediment Samples for Dioxins and Furans (EPA 8290/8290A).

EPA Sample Numbers:

ML-SD-03-0.0/1.0	ML-SD-03-1.0/2.0	ML-SD-04-0.0/1.0
ML-SD-04-1.0/2.0	ML-SD-06-0.0/1.0	ML-SD-06-1.0/2.0
ML-SD-07-0.0/1.0	ML-SD-07-1.0/2.0	ML-SD-08-0.0/1.0
ML-SD-08-1.0/2.0	ML-SD-09-0.0/1.0	ML-SD-09-1.0/2.0
ML-SD-10-0.0/1.0	ML-SD-10-0.0/1.0-FD	ML-SD-10-1.0/2.0
ML-SD-11-0.0/1.0	ML-SD-11-1.0/2.0	ML-SD-13-0.0/1.0
ML-SD-13-0.0/1.0-FD	ML-SD-13-1.0/2.0	

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177827
Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Twenty (20) sediment samples for Case 47930, SDG 40177827 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/16/2018 and shipped to Pace Analytical Laboratory in Minneapolis, Minnesota for Dioxins and Furans (EPA 8290/8290A) analysis.

The Dioxin/Furan data were validated/verified by the QATS Program in accordance with the National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. A Tier 1+(*) review was applied to the Dioxin data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Note that the laboratory is reporting non-detects and "J" value (estimated) sample concentrations based on the Estimated Detection Limit (EDL). The EXES program is reporting the non-detected results to either the Method Detection Limit (MDL) or EDL, whichever is the greater value. As a result, some laboratory-reported "J" value analyte results (between the EDL and Reporting Limit (RL)) are reported as detects by the laboratory as estimated ("J" values); however, the analyte concentration is less than the reported adjusted analyte MDL for the sample in the EDD file.

Listed in the table below is the summary of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Dioxin/Furan Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
Qualified "J" (EMPC) due ion ratios not meeting criteria	OCDF	J Detects	ML-SD-04-0.0/1.0 ML-SD-11-1.0/2.0 ML-SD-13-0.0/1.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF	J Detects	ML-SD-06-0.0/1.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	2,3,7,8-TCDF OCDF	J Detects	ML-SD-06-1.0/2.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	1,2,3,7,8-PeCDF	J Detect	ML-SD-07-0.0/1.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	OCDD	J Detect	ML-SD-08-1.0/2.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	1,2,3,4,6,7,8-HpCDF	J Detect	ML-SD-09-0.0/1.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	2,3,4,7,8-PeCDF 1,2,3,4,7,8-HxCDF 1,2,3,7,8,9-HxCDF	J Detects	ML-SD-11-0.0/1.0
Qualified "J" (EMPC) due ion ratios not meeting criteria	1,2,3,6,7,8-HxCDD OCDF	J Detects	ML-SD-13-0.0/1.0-FD
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD 1,2,3,4,6,7,8-HpCDF	J Detects	ML-SD-03-0.0/1.0 ML-SD-09-1.0/2.0

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177827
Laboratory: Pace Analytical

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
	OCDD		ML-SD-13-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD 1,2,3,4,6,7,8-HpCDF 2,3,7,8-TCDF	J Detects	ML-SD-04-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD OCDF	J Detects	ML-SD-06-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD 1,2,3,4,6,7,8-HpCDF 1,2,3,6,7,8-HxCDF	J Detects	ML-SD-06-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD 1,2,3,4,6,7,8-HpCDF	J Detects	ML-SD-06-1.0/2.0 ML-SD-10-0.0/1.0-FD
Sample results are between the EDL and the RL	1,2,3,4,7,8-HxCDD 1,2,3,7,8,9-HxCDF 1,2,3,7,8-PeCDD 2,3,4,7,8-PeCDF	J Detects	ML-SD-07-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD OCDF	J Detects	ML-SD-07-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,6,7,8-HxCDD 1,2,3,6,7,8-HxCDF	J Detects	ML-SD-08-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDF OCDD	J Detects	ML-SD-10-0.0/1.0 ML-SD-10-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,7,8-PeCDF	J Detects	ML-SD-11-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD	J Detects	ML-SD-11-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD 1,2,3,6,7,8-HxCDF	J Detects	ML-SD-13-0.0/1.0-FD
Reported Homologue Totals Qualified per NFG	Total TCDF Total TCDD Total PeCDF Total PeCDD Total HxCDF Total HxCDD Total HpCDF Total HpCDD	J Detects UJ Non-detects	ML-SD-03-0.0/1.0 ML-SD-03-1.0/2.0 ML-SD-04-0.0/1.0 ML-SD-04-1.0/2.0 ML-SD-06-0.0/1.0 ML-SD-06-1.0/2.0 ML-SD-07-0.0/1.0 ML-SD-07-1.0/2.0 ML-SD-08-0.0/1.0 ML-SD-08-1.0/2.0 ML-SD-09-0.0/1.0 ML-SD-09-1.0/2.0 ML-SD-10-0.0/1.0 ML-SD-10-0.0/1.0-FD ML-SD-10-1.0/2.0 ML-SD-11-0.0/1.0 ML-SD-11-1.0/2.0 ML-SD-13-0.0/1.0 ML-SD-13-0.0/1.0-FD ML-SD-13-1.0/2.0

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177827
Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 24, 2019

SUBJECT: Review of Data for SDG Number: 40177918
Received for Review: 12/13/2018 and 01/03/2019

LABORATORY: Pace Analytical Laboratories, Duluth, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1+ Validation Review

QATS has reviewed the validated data for the following project:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177918

Number and Type of Samples: 13 Sediment Samples for Methyl Mercury (EPA 1630).

EPA Sample Numbers:

ML-SD-12-0.0/1.0	ML-SD-18-1.0/2.0	ML-SD-21-0.0/1.0
ML-SD-12-1.0/2.0	ML-SD-19-0.0/1.0	ML-SD-21-1.0/2.0
ML-SD-16-0.0/1.0	ML-SD-19-1.0/2.0	ML-SD-22-0.0/1.0
ML-SD-16-1.0/2.0	ML-SD-19-1.0/2.0-FD	ML-SD-22-1.0/2.0
ML-SD-18-0.0/1.0		

Case Number: 47930 SDG Number: 40177918
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Thirteen (13) sediment samples for Case 47930, SDG 40177918 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/17/2018 and shipped to Pace Analytical Laboratory in Duluth, Minnesota for Methyl Mercury (EPA 1630) analysis.

The Methyl Mercury data were validated/verified by the QATS Program in accordance with the Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. A Tier 1+(*) review was applied to the Methyl Mercury data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the table below are summaries of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Methyl Mercury Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930 SDG Number: 40177918
Site Name: Munger Landing Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 24, 2019

SUBJECT: Review of Data for SDG Number: 40177935
Received for Review: 12/05/2018 and 12/07/2018

LABORATORY: Pace Analytical Laboratories, Green Bay, Wisconsin

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 2 Validation Review

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177935

Number and Type of Samples: 2 Equipment Blanks for Mercury (SW-846 7471B) and Aroclor (SW-846 8082A)

EPA Sample Numbers: ML-EB-001-10182018 ML-EB-002-10182018

Case Number: 47930 SDG Number: 40177935
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Two (2) equipment blanks for Case 47930, SDG 40177935 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/18/2018 and shipped to Pace Analytical Laboratory in Green Bay, Wisconsin for Mercury (SW-846 7471B) and Aroclor (SW-846 8082A) analysis.

The organic fraction was validated/verified by the QATS Program in accordance with the National Functional Guidelines for Organic Superfund Methods Data Review, January 2017, and the inorganic fraction by the National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. Tier 2 review was applied to both fractions. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the tables below are summaries of the data qualified in each fraction.

DATA QUALIFICATION SUMMARY TABLES

Aroclor Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Mercury Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Case Number: 47930 SDG Number: 40177935
Site Name: Munger Landing Laboratory: Pace Analytical

AROCLOR ANALYSIS

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. GC PERFORMANCE

No problems were found.

3. CALIBRATION - INITIAL AND CONTINUING CALIBRATION

No problems were found.

4. BLANKS

No problems were found.

5. SURROGATE RECOVERY

No problems were found.

6. MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

No MS/MSD were analyzed.

7. LABORATORY CONTROL SAMPLE

The LCS solution consisted of Aroclor-1260 only. No problems were found.

8. FIELD BLANK AND FIELD DUPLICATES

No Aroclors were detected in the two field blanks. Field duplicates were not analyzed.

9. INTERNAL STANDARDS

Not applicable.

10. COMPOUND IDENTIFICATION

No problems were found.

11. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

No problems were found.

12. SYSTEM PERFORMANCE

No problems were found.

Case Number: 47930 SDG Number: 40177935
Site Name: Munger Landing Laboratory: Pace Analytical

13. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Rebecca Garry DATE: 01/04/2019

Case Number: 47930 SDG Number: 40177935
Site Name: Munger Landing Laboratory: Pace Analytical

MERCURY

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. INITIAL CALIBRATION

No problems were found.

3. INITIAL AND CONTINUING CALIBRATION VERIFICATION

No problems were found.

4. CRI STANDARD

No problems were found.

5. BLANKS – INITIAL AND CONTINUING

No problems were found.

6. PREPARATION BLANK

No problems were found.

7. PRE-DIGESTION/DISTILLATION MATRIX SPIKE

No problems were found.

8. POST DIGESTION SPIKE

A post-digestion spike is not required for mercury analysis.

9. LABORATORY DUPLICATE

A laboratory duplicate was not analyzed.

10. FIELD DUPLICATE COMPARISON

A field duplicate was not analyzed with this SDG.

11. ICP INTERFERENCE CHECK SAMPLE

An ICSAB is not required for mercury analysis.

12. LABORATORY CONTROL SAMPLE

No problems were found.

13. SERIAL DILUTION

A serial dilution is not required for mercury analysis.

14. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Lydia Heter DATE 01/08/2019

Case Number: 47930 SDG Number: 40177935
Site Name: Munger Landing Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 24, 2019

SUBJECT: Review of Data for SDG Number: 40177936
Received for Review: 12/13/2018 and 01/03/2019

LABORATORY: Pace Analytical Laboratories, Duluth, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 2 Validation Review

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177936

Number and Type of Samples: 2 Equipment Blanks for Methyl Mercury (EPA 1630).

EPA Sample Numbers: ML-EB-001-10182018 ML-EB-002-10182018

Case Number: 47930 SDG Number: 40177936
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Two (2) equipment blanks for Case 47930, SDG 40177936 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/18/2018 and shipped to Pace Analytical Laboratory in Duluth, Minnesota for Methyl Mercury (EPA 1630) analysis.

The Methyl Mercury data were validated/verified by the QATS Program in accordance with the National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. A Tier 2 review was applied the Methyl Mercury data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the table below are summaries of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Methyl Mercury Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Case Number: 47930 SDG Number: 40177936
Site Name: Munger Landing Laboratory: Pace Analytical

METHYL MERCURY

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. INITIAL CALIBRATION

No problems were found.

3. INITIAL AND CONTINUING CALIBRATION VERIFICATION

No problems were found.

4. CRI STANDARD

No problems were found.

5. BLANKS – INITIAL AND CONTINUING

No problems were found.

6. PREPARATION BLANK

No problems were found.

7. PRE-DIGESTION/DISTILLATION MATRIX SPIKE

No problems were found.

8. POST DIGESTION SPIKE

A post-digestion spike was not analyzed.

9. LABORATORY DUPLICATE

A laboratory duplicate was not analyzed.

10. FIELD DUPLICATE COMPARISON

A field duplicate was not analyzed with this SDG.

11. ICP INTERFERENCE CHECK SAMPLE

An ICSAB is not required for methyl mercury analysis.

12. LABORATORY CONTROL SAMPLE

No problems were found.

Case Number: 47930 SDG Number: 40177936
Site Name: Munger Landing Laboratory: Pace Analytical

13. SERIAL DILUTION

A serial dilution is not required for methyl mercury analysis.

14. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Michael Nys DATE 12/20/2018

Case Number: 47930 SDG Number: 40177936
Site Name: Munger Landing Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: April 16, 2019

SUBJECT: Review of Data for SDG Number: 40177938
Received for Review: 02/26/2019 and 03/15/2019

LABORATORY: Pace Analytical Laboratories, Minneapolis, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1+ Validation Review

QATS has reviewed the validated data for the following project:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177938

Number and Type of Samples: 2 Water Samples for Dioxins and Furans (EPA 8290/8290A).

EPA Sample Numbers: ML-EB-002-10182018 ML-EB-001-10182018

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177938
Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Two (2) equipment blank samples for Case 47930, SDG 40177938 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/18/2018 and shipped to Pace Analytical Laboratory in Minneapolis, Minnesota for Dioxins and Furans (EPA 8290/8290A) analysis.

The Dioxin/Furan data were validated/verified by the QATS Program in accordance with the National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. A Tier 1+(*) review was applied to the Dioxin data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the table below is the summary of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Dioxin/Furan Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
Reported Homologue Totals Qualified per NFG	Total TCDF Total TCDD Total PeCDF Total PeCDD Total HxCDF Total HxCDD Total HpCDF Total HpCDD	UJ Non-detects	ML-EB-002-10182018 ML-EB-001-10182018

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177938
Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: April 02, 2019

SUBJECT: Review of Data for SDG Number: 40177939
Received for Review: 01/04/2019 and 03/15/2019

LABORATORY: Pace Analytical Laboratories, Minneapolis, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1+ Validation Review

QATS has reviewed the validated data for the following project:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177939

Number and Type of Samples: 20 Sediment Samples for Dioxins and Furans (EPA 8290/8290A).

EPA Sample Numbers:

ML-SD-12-0.0/1.0	ML-SD-17-1.0/2.0	ML-SD-20-1.0/2.0
ML-SD-12-1.0/2.0	ML-SD-18-0.0/1.0	ML-SD-21-0.0/1.0
ML-SD-14-0.0/1.0	ML-SD-18-1.0/2.0	ML-SD-21-1.0/2.0
ML-SD-14-1.0/2.0	ML-SD-19-0.0/1.0	ML-SD-22-0.0/1.0
ML-SD-16-0.0/1.0	ML-SD-19-1.0/2.0	ML-SD-22-1.0/2.0
ML-SD-16-1.0/2.0	ML-SD-19-1.0/2.0-FD	ML-SD-27-0.0/1.0
ML-SD-17-0.0/1.0	ML-SD-20-0.0/1.0	

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177939
Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Twenty (20) sediment samples for Case 47930, SDG 40177939 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/17/2018 and shipped to Pace Analytical Laboratory in Minneapolis, Minnesota for Dioxins and Furans (EPA 8290/8290A) analysis.

The Dioxin/Furan data were validated/verified by the QATS Program in accordance with the National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. Tier 1+(*) review was applied to the Dioxin data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Note that the laboratory is reporting non-detects and "J" value (estimated) sample concentrations based on the Estimated Detection Limit (EDL). The EXES program is reporting the non-detected results to either the Method Detection Limit (MDL) or EDL, whichever is the greater value. As a result, some laboratory-reported "J" value analyte results (between the EDL and Reporting Limit (RL)) are reported as detects by the laboratory as estimated ("J" values); however, the analyte concentration is less than the reported adjusted analyte MDL for the sample in the EDD file.

Listed in the table below is the summary of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Dioxin/Furan Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
Qualified "J" (EMPC) due to ion ratios not meeting criteria	OCDF	J Detects	ML-SD-12-1.0/2.0
PCDE interferences	1,2,3,4,7,8-HxCDF	J Detects	ML-SD-14-1.0/2.0
Result exceeds the calibration range of the instrument	1,2,3,4,6,7,8-HpCDF Total HpCDF OCDD	J Detects	ML-SD-14.0.0/1.0
Result exceeds the calibration range of the instrument	1,2,3,4,6,7,8-HpCDF Total HpCDF	J Detects	ML-SD-14-1.0/2.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	2,3,4,6,7,8-HxCDF 1,2,3,4,7,8,9-HpCDF	J Detects	ML-SD-16-0.0/1.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,6,7,8-HxCDF OCDF	J Detects	ML-SD-16-1.0/2.0 ML-SD-18-0.0/1.0 ML-SD-20-0.0/1.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,7,8-PeCDF 2,3,4,6,7,8-HxCDF	J Detects	ML-SD-17-0.0/1.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,4,6,7,8-HpCDD	J Detects	ML-SD-19-0.0/1.0 ML-SD-20-1.0/2.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,4,6,7,8-HpCDF	J Detects	ML-SD-19-1.0/2.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	OCDD	J Detects	ML-SD-21-0.0/1.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDD	J Detects	ML-SD-22-0.0/1.0

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177939
Laboratory: Pace Analytical

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,4,6,7,8-HpCDF 1,2,3,4,6,7,8-HpCDD OCDD	J Detects	ML-SD-22-1.0/2.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD	J Detects	ML-SD-27-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDF 1,2,3,4,6,7,8-HpCDD 1,2,3,6,7,8-HxCDF OCDF	J Detects	ML-SD-12-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDF 1,2,3,4,6,7,8-HpCDD OCDD	J Detects	ML-SD-12-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,7,8-PeCDF	J Detects	ML-SD-14-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,7,8-HxCDD 1,2,3,7,8-PeCDF 2,3,7,8-TCDF	J Detects	ML-SD-14-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,7,8,9-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDF 2,3,7,8-TCDF 2,3,4,7,8-PeCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF	J Detects	ML-SD-16-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD 1,2,3,6,7,8-HxCDD 1,2,3,4,7,8-HxCDF 2,3,4,6,7,8-HxCDF	J Detects	ML-SD-16-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,7,8,9-HxCDD 1,2,3,4,7,8-HxCDD 1,2,3,4,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,7,8-PeCDD 2,3,4,7,8-PeCDF 2,3,7,8-TCDD 2,3,7,8-TCDF	J Detects	ML-SD-17-0.0/1.0
Sample results are between the EDL and the RL	2,3,4,7,8-PeCDF	J Detects	ML-SD-18-0.0/1.0
Sample results are between the EDL and the RL	OCDD	J Detects	ML-SD-18-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDF OCDD	J Detects	ML-SD-19-0.0/1.0
Sample results are between the EDL and the RL	OCDD	J Detects	ML-SD-19-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDF 1,2,3,4,6,7,8-HpCDD 1,2,3,6,7,8-HxCDD	J Detects	ML-SD-20-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDF OCDD	J Detects	ML-SD-20-1.0/2.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDF 1,2,3,4,6,7,8-HpCDD	J Detects	ML-SD-21-0.0/1.0
Sample results are between the EDL and the RL	1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF OCDF	J Detects	ML-SD-22-0.0/1.0
Sample results are between the EDL and the RL	OCDF	J Detects	ML-SD-22-1.0/2.0

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177939
Laboratory: Pace Analytical

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,4,7,8-HxCDD OCDF 2,3,7,8-TCDF	J Detects	ML-SD-27-0.0/1.0
Reported Homologue Totals Qualified per NFG	Total TCDF Total TCDD Total PeCDF Total PeCDD Total HxCDF Total HxCDD Total HpCDF Total HpCDD	J Detects UJ Non-detects	ML-SD-12-0.0/1.0 ML-SD-17-1.0/2.0 ML-SD-20-1.0/2.0 ML-SD-12-1.0/2.0 ML-SD-18-0.0/1.0 ML-SD-21-0.0/1.0 ML-SD-14-0.0/1.0 ML-SD-18-1.0/2.0 ML-SD-21-1.0/2.0 ML-SD-14-1.0/2.0 ML-SD-19-0.0/1.0 ML-SD-22-0.0/1.0 ML-SD-16-0.0/1.0 ML-SD-19-1.0/2.0 ML-SD-22-1.0/2.0 ML-SD-16-1.0/2.0 ML-SD-19-1.0/2.0-FD ML-SD-27-0.0/1.0 ML-SD-17-0.0/1.0 ML-SD-20-0.0/1.0

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40177939
Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 24, 2019

SUBJECT: Review of Data for SDG Number: 40177941
Received for Review: 12/05/2018 and 12/07/2018

LABORATORY: Pace Analytical Laboratories, Green Bay, Wisconsin

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1+ and Tier 2 Validation Reviews

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177941

Number and Type of Samples: 20 Sediment Samples for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A).

EPA Sample Numbers:

ML-SD-12-0.0/1.0	ML-SD-17-1.0/2.0	ML-SD-20-1.0/2.0
ML-SD-12-1.0/2.0	ML-SD-18-0.0/1.0	ML-SD-21-0.0/1.0
ML-SD-14-0.0/1.0	ML-SD-18-1.0/2.0	ML-SD-21-1.0/2.0
ML-SD-14-1.0/2.0	ML-SD-19-0.0/1.0	ML-SD-22-0.0/1.0
ML-SD-16-0.0/1.0	ML-SD-19-1.0/2.0	ML-SD-22-1.0/2.0
ML-SD-16-1.0/2.0	ML-SD-19-1.0/2.0-FD	ML-SD-27-0.0/1.0
ML-SD-17-0.0/1.0	ML-SD-20-0.0/1.0	

Case Number: 47930 SDG Number: 40177941
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Twenty (20) sediment samples for Case 47930, SDG 40177941 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/17/2018 and shipped to Pace Analytical Laboratory in Green Bay, Wisconsin for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A) analysis.

The organic fraction was validated/verified by the QATS Program in accordance with the National Functional Guidelines for Organic Superfund Methods Data Review, January 2017, and the inorganic fractions by the National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. Tier 2 review was applied to the Aroclor fraction and Tier 1+(*) review was applied to the Mercury and TOC fractions. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the tables below are summaries of the data qualified in each fraction.

DATA QUALIFICATION SUMMARY TABLES

Aroclor Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Mercury Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Total Organic Carbon Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930 SDG Number: 40177941
Site Name: Munger Landing Laboratory: Pace Analytical

AROCLOR ANALYSIS

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. GC PERFORMANCE

No problems were found.

3. CALIBRATION - INITIAL AND CONTINUING CALIBRATION

No problems were found.

4. BLANKS

No problems were found.

5. SURROGATE RECOVERY

No problems were found.

6. MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

The MS/MSD solution consisted of Aroclor-1260 only. No problems were found.

7. LABORATORY CONTROL SAMPLE

The LCS solution consisted of Aroclor-1260 only. No problems were found.

8. FIELD BLANK AND FIELD DUPLICATES

Sample ML-SD-19-1.0/2.0-FD is the field duplicate of sample ML-SD-19-1.0/2.0. No Aroclors were detected.

9. INTERNAL STANDARDS

Not applicable.

10. COMPOUND IDENTIFICATION

No problems were found.

Case Number: 47930 SDG Number: 40177941
Site Name: Munger Landing Laboratory: Pace Analytical

11. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

For one sample in this SDG, Aroclor-1260 was detected at a concentration of 55.5 µg/kg on one GC column, slightly above the reporting limit (RL) of 49.6 µg/kg. The analyte was not detected on the confirmation column. Note that this laboratory uses one GC column for quantitation, and one for confirmation only. The laboratory reported in the Narrative, "The peak ratio of Aroclor 1260 for sample ML-SD-14-1.0/2.0 was below the signal threshold on the confirmation column. The analyst visually confirmed the presence of the pattern. The PC code was applied to the confirmation column quantitation report to note the occurrence."

Due to the visual confirmation of Aroclor-1260 by the analyst on the confirmation column, the QATS validator concurs with the result and the "J" qualifier applied by the laboratory.

12. SYSTEM PERFORMANCE

No problems were found.

13. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Rebecca Garry DATE: 12/17/2018

Case Number: 47930 SDG Number: 40177941
Site Name: Munger Landing Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: April 02, 2019

SUBJECT: Review of Data for SDG Number: 40177992
Received for Review: 02/26/2019 and 03/15/2019

LABORATORY: Pace Analytical Laboratories, Minneapolis, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 2 Validation Review

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177992

Number and Type of Samples: 16 Sediment Samples for Dioxins and Furans (EPA 8290/8290A).

EPA Sample Numbers:

ML-SD-15-0.0/1.0	ML-SD-15-1.0/2.0	ML-SD-23-0.0/1.0
ML-SD-23-1.0/2.0	ML-SD-24-0.0/1.0	ML-SD-24-1.0/2.0
ML-SD-25-0.0/1.0	ML-SD-25-1.0/2.0	ML-SD-26-0.0/1.0
ML-SD-26-1.0/2.0	ML-SD-26-1.0/2.0-FD	ML-SD-28-0.0/1.0
ML-SD-33-0.0/1.2	ML-SD-34-0.0/1.0	ML-SD-34-0.0/1.0-FD
ML-SD-34-1.0/1.8		

Case Number: 47930
Site Name: Munger Landing
SDG Number: 40177992
Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Sixteen (16) sediment samples for Case 47930, SDG 40177992 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/18/2018 and shipped to Pace Analytical Laboratory in Minneapolis, Minnesota for Dioxins and Furans (EPA 8290/8290A) analysis.

The Dioxin/Furan data were validated/verified by the QATS Program in accordance with the National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. A Tier 2 review was applied to the Dioxin data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Note that the laboratory is reporting non-detects and "J" value (estimated) sample concentrations based on the Estimated Detection Limit (EDL). The EXES program is reporting the non-detected results to either the Method Detection Limit (MDL) or EDL, whichever is the greater value. As a result, some laboratory-reported "J" value analyte results (between the EDL and Reporting Limit (RL)) are reported as detects by the laboratory as estimated ("J" values); however, the analyte concentration is less than the reported adjusted analyte MDL for the sample in the EDD file.

Listed in the table below is a summary of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Dioxin/Furan Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
Qualified "J" (EMPC) due to ion ratios not meeting criteria	2,3,4,7,8-PeCDF	J Detect	1 Sample
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,4,7,8-HxCDD	J Detect	1 Sample
Qualified "J" (EMPC) due to ion ratios not meeting criteria	2,3,4,7,8-PeCDF 1,2,3,7,8-PeCDD 1,2,3,7,8,9-HxCDF 1,2,3,4,7,8-HxCDD 1,2,3,4,7,8,9-HpCDF	J Detects	1 Sample
PCDE Interference	1,2,3,7,8-PeCDF 1,2,3,7,8,9-HxCDF	J Detects	1 Sample
PCDE Interference	1,2,3,7,8-PeCDF	J Detect	1 Sample
PCDE Interference	1,2,3,4,7,8-HxCDF	J Detect	1 Sample
Result exceeds the calibration range of the instrument	1,2,3,4,6,7,8-HpCDF Total HpCDF OCDD	J Detects	3 Samples
Result exceeds the calibration range of the instrument	Total HpCDF OCDD	J Detects	1 Sample
Result exceeds the calibration range of the instrument	1,2,3,4,6,7,8-HpCDF Total HpCDF	J Detects	1 Sample

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
	Total HpCDD OCDD		
Sample results are between the EDL and the RL	Various	J Detects	14 Samples
Reported Homologue Totals Qualified per NFG	Total TCDF Total TCDD Total PeCDF Total PeCDD Total HxCDF Total HxCDD Total HpCDF Total HpCDD	J Detects UJ Non-detects	16 Samples

CHLORINATED DIBENZO-P-DIOXIN (CDD) AND CHLORINATED DIBENZOFURAN (CDF)

1. DATA COMPLETENESS

Data package was complete.

2. HOLDING TIME AND PRESERVATION

No problems were found.

3. INSTRUMENT PERFORMANCE

No problems were found.

4. CALIBRATION - INITIAL AND CONTINUING CALIBRATION

No problems were found.

5. ANALYTICAL SEQUENCE

No problems were found.

6. BLANKS – METHOD, RINSATE, FIELD

No target compounds were detected in the method blank.

7. LABELED COMPOUND RECOVERY

No problems were found.

8. INTERNAL STANDARD AREA RESPONSE

No problems were found.

9. ISOMER SPECIFICITY AND TEF

No problems were found.

10. SECOND COLUMN CONFIRMATION

No problems were found.

11. LABORATORY CONTROL SAMPLE

No problems were found.

12. MATRIX SPIKE AND MATRIX SPIKE DUPLICATE, IF APPLICABLE

No problems were found.

13. FIELD DUPLICATES, IF APPLICABLE

Samples ML-SD-26-1.0/2.0-FD and ML-SD-34-0.0/1.0-FD are the field duplicates of samples ML-SD-26-1.0/2.0 and ML-SD-34-0.0/1.0, respectively. All RPDs were within criteria.

14. ADDITIONAL INFORMATION

Ion Abundance Ratios:
Seven (7) target compounds in three samples listed ratios exceeding criteria, and were reported as Estimated Maximum Possible Concentration (EMPC) by the laboratory. Therefore, the following target compound (EMPCs) results in the following samples were qualified "J" by the QATS validator:

ML-SD-15-0.0/1.0: 2,3,4,7,8-PeCDF
ML-SD-23-0.0/1.0: 1,2,3,4,7,8-HxCDD
ML-SD-25-1.0/2.0: 2,3,4,7,8-PeCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8,9-HxCDF, 1,2,3,4,7,8-HxCDD, 1,2,3,4,7,8,9-HpCDF

PCDE Interference:
Four (4) target compounds in three samples are qualified "J" due to PCDE interference:

ML-SD-25-0.0/1.0: 1,2,3,4,7,8-HxCDF
ML-SD-24-1.0/2.0: 1,2,3,7,8-PeCDF
ML-SD-23-1.0/2.0: 1,2,3,7,8-PeCDF, 1,2,3,7,8,9-HxCDF

Calibration Range Exceeded:
Fifteen (15) target compounds in five samples exceeded the calibration range of the instrument and were qualified "J" by the QATS validator:

ML-SD-26-1.0/2.0:	1,2,3,4,6,7,8-HpCDF, Total HpCDF, OCDD
ML-SD-26-1.0/2.0-FD:	1,2,3,4,6,7,8-HpCDF, Total HpCDF, OCDD
ML-SD-23-1.0/2.0:	1,2,3,4,6,7,8-HpCDF, Total HpCDF, OCDD
ML-SD-26-0.0/1.0:	Total HpCDF, OCDD
ML-SD-24-1.0/2.0:	1,2,3,4,6,7,8-HpCDF, Total HpCDF, Total HpCDD, OCDD

Homologue Totals:
Per National Functional Guidelines, Homologue Total detected results were qualified as estimated "J" and non-detected results as estimated "UJ" in the following samples:

ML-SD-15-0.0/1.0	ML-SD-15-1.0/2.0	ML-SD-23-0.0/1.0
ML-SD-23-1.0/2.0	ML-SD-24-0.0/1.0	ML-SD-24-1.0/2.0
ML-SD-25-0.0/1.0	ML-SD-25-1.0/2.0	ML-SD-26-0.0/1.0
ML-SD-26-1.0/2.0	ML-SD-26-1.0/2.0-FD	ML-SD-28-0.0/1.0
ML-SD-33-0.0/1.2	ML-SD-34-0.0/1.0	ML-SD-34-0.0/1.0-FD
ML-SD-34-1.0/1.8		

Estimated Detects:
The following sample results are between the EDL and CRQL and are qualified "J":

ML-SD-15-0.0/1.0: 1,2,3,4,7,8,9-HpCDF; 1,2,3,4,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,4,7,8-HxCDF; 1,2,3,7,8,9-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,7,8-PeCDD; 1,2,3,7,8-PeCDF; 2,3,7,8-TCDD; 2,3,7,8-TCDF

ML-SD-15-1.0/2.0: 1,2,3,4,6,7,8-HpCDD; 1,2,3,6,7,8-HxCDF; OCDF

ML-SD-23-0.0/1.0: 1,2,3,4,7,8,9-HpCDF; 1,2,3,6,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,4,7,8-HxCDF; 1,2,3,6,7,8-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,7,8-PeCDD; 2,3,4,7,8-PeCDF; 2,3,7,8-TCDD

ML-SD-24-0.0/1.0: 1,2,3,4,7,8,9-HpCDF; 1,2,3,4,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,4,7,8-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,7,8-PeCDD; 1,2,3,7,8-PeCDF; 2,3,4,7,8-PeCDF; 2,3,7,8-TCDD

ML-SD-25-0.0/1.0: 1,2,3,7,8,9-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,7,8-PeCDF; 2,3,4,7,8-PeCDF

ML-SD-25-1.0/2.0: 1,2,3,6,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,4,7,8-HxCDF; 1,2,3,6,7,8-HxCDF; 2,3,4,6,7,8-HxCDF

ML-SD-26-0.0/1.0: 1,2,3,7,8,9-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,7,8-PeCDD; 1,2,3,7,8-PeCDF

ML-SD-26-1.0/2.0: 1,2,3,7,8-PeCDF

ML-SD-26-1.0/2.0-FD: 1,2,3,7,8-PeCDF

ML-SD-28-0.0/1.0: 1,2,3,4,6,7,8-HpCDD; 1,2,3,4,6,7,8-HpCDF; OCDF

ML-SD-33-0.0/1.2: OCDD

ML-SD-34-0.0/1.0: OCDD

ML-SD-34-0.0/1.0-FD: OCDD

ML-SD-34-1.0/1.8: OCDD

REVIEWED BY: Timothy Vonnahme DATE: 03/08/2019

Case Number: 47930
Site Name: Munger Landing
SDG Number: 40177992
Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: April 02, 2019

SUBJECT: Review of Data for SDG Number: 40177993
Received for Review: 01/04/2019 and 03/15/2019

LABORATORY: Pace Analytical Laboratories, Minneapolis, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 2 Validation Review

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40177993

Number and Type of Samples: 10 Sediment Samples for Dioxins and Furans (EPA 8290/8290A).

EPA Sample Numbers:

ML-SD-35-0.0/1.3	ML-SD-38-0.0/1.0	ML-SD-39-1.0/1.9
ML-SD-36-0.0/1.0	ML-SD-38-1.0/1.7	ML-SD-40-0.0/1.0
ML-SD-36-1.0/1.6	ML-SD-39-0.0/1.0	ML-SD-40-1.0/2.3
ML-SD-37-0.0/1.2		

Case Number: 47930
Site Name: Munger Landing
SDG Number: 40177993
Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Ten (10) sediment samples for Case 47930, SDG 40177993 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/19/2018 and shipped to Pace Analytical Laboratory in Minneapolis, Minnesota for Dioxins and Furans (EPA 8290/8290A) analysis.

The Dioxin/Furan data were validated/verified by the QATS Program in accordance with the National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. A Tier 2 review was applied to the Dioxin data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Note that the laboratory is reporting non-detects and "J" value (estimated) sample concentrations based on the Estimated Detection Limit (EDL). The EXES program is reporting the non-detected results to either the Method Detection Limit (MDL) or EDL, whichever is the greater value. As a result, some laboratory-reported "J" value analyte results (between the EDL and Reporting Limit (RL)) are reported as detects by the laboratory as estimated ("J" values); however, the analyte concentration is less than the reported adjusted analyte MDL for the sample in the EDD file.

Listed in the table below is a summary of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Dioxin/Furan Fraction

Criteria Exceeded	Compounds	Validation Qualifier	Samples Impacted
Qualified "J" (EMPC) due to ion ratios not meeting criteria	2,3,4,7,8-PeCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF	J Detects	2 Samples
Qualified "J" (EMPC) due to ion ratios not meeting criteria	2,3,4,6,7,8-HxCDF	J Detects	1 Sample
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,4,7,8,9-HpCDF	J Detects	1 Sample
Qualified "J" (EMPC) due to ion ratios not meeting criteria	OCDD	J Detects	1 Sample
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,4,7,8,9-HpCDF 1,2,3,6,7,8-HxCDF	J Detects	1 Sample
Sample results are between the EDL and the RL	Various	J Detects	10 Samples
Reported Homologue Totals Qualified per NFG	Total TCDF Total TCDD Total PeCDF Total PeCDD Total HxCDF Total HxCDD Total HpCDF Total HpCDD	J Detects UJ Non-detects	10 Samples

CHLORINATED DIBENZO-P-DIOXIN (CDD) AND CHLORINATED DIBENZOFURAN (CDF)

1. DATA COMPLETENESS

Data package was complete.

2. HOLDING TIME AND PRESERVATION

No problems were found.

3. INSTRUMENT PERFORMANCE

No problems were found.

4. CALIBRATION - INITIAL AND CONTINUING CALIBRATION

No problems were found.

5. ANALYTICAL SEQUENCE

No problems were found.

6. BLANKS – METHOD, RINSATE, FIELD

No target compounds were detected in method blank DFBLKRB above the EDL.

7. LABELED COMPOUND RECOVERY

No problems were found.

8. INTERNAL STANDARD AREA RESPONSE

No problems were found.

9. ISOMER SPECIFICITY AND TEF

No problems were found.

10. SECOND COLUMN CONFIRMATION

No problems were found.

11. LABORATORY CONTROL SAMPLE

No problems were found.

12. MATRIX SPIKE AND MATRIX SPIKE DUPLICATE, IF APPLICABLE

Not applicable for this SDG data set.

13. FIELD DUPLICATES, IF APPLICABLE

Not applicable for this SDG data set.

14. ADDITIONAL INFORMATION

Ion Abundance Ratios:
Eleven (11) target compounds in six samples listed ratios exceeding criteria, and were reported as Estimated Maximum Possible Concentration (EMPC) by the laboratory. Therefore, the following target compound (EMPCs) results in the following samples were qualified "J" by the QATS validator:

ML-SD-38-0.0/1.0: 2,3,4,7,8-PeCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF
ML-SD-38-1.0/1.7: 2,3,4,6,7,8-HxCDF
ML-SD-39-1.0/1.9: 2,3,4,7,8-PeCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF
ML-SD-36-0.0/1.0: OCDD
ML-SD-40-0.0/1.0: 1,2,3,4,7,8,9-HpCDF
ML-SD-40-1.0/2.3: 1,2,3,6,7,8-HxCDF, 1,2,3,4,7,8,9-HpCDF

Homologue Totals:
Per National Functional Guidelines, Homologue Total detected results were qualified as estimated "J" and non-detected results as estimated "UJ" in the following samples:

ML-SD-35-0.0/1.3	ML-SD-38-0.0/1.0	ML-SD-39-1.0/1.9
ML-SD-36-0.0/1.0	ML-SD-38-1.0/1.7	ML-SD-40-0.0/1.0
ML-SD-36-1.0/1.6	ML-SD-39-0.0/1.0	ML-SD-40-1.0/2.3
ML-SD-37-0.0/1.2		

Estimated Detects:
The following sample results are between the EDL and CRQL and are qualified "J":

ML-SD-35-0.0/1.3: 1,2,3,4,6,7,8-HpCDD; 1,2,3,4,6,7,8-HpCDF; OCDF

ML-SD-36-0.0/1.0: 1,2,3,4,6,7,8-HpCDD; 1,2,3,4,6,7,8-HpCDF

ML-SD-36-1.0/1.6: OCDD

ML-SD-37-0.0/1.2: OCDD

ML-SD-38-0.0/1.0: 1,2,3,4,6,7,8-HpCDD; 1,2,3,4,7,8-HxCDF; OCDF

ML-SD-38-1.0/1.7: 1,2,3,4,7,8,9-HpCDF; 1,2,3,4,7,8-HxCDF; 1,2,3,6,7,8-HxCDF; 2,3,4,7,8-PeCDF

ML-SD-39-0.0/1.0: 1,2,3,4,6,7,8-HpCDF; 1,2,3,4,7,8-HxCDF; OCDF; 2,3,4,7,8-PeCDF

ML-SD-39-1.0/1.9: 1,2,3,4,7,8-HxCDF; 1,2,3,6,7,8-HxCDD; 1,2,3,4,6,7,8-HpCDD; OCDF

ML-SD-40-0.0/1.0: 1,2,3,4,6,7,8-HpCDD; 1,2,3,4,6,7,8-HpCDF; 1,2,3,4,7,8-HxCDF; OCDF; 2,3,4,7,8-PeCDF

ML-SD-40-1.0/2.3: 1,2,3,4,6,7,8-HpCDD; 1,2,3,4,6,7,8-HpCDF; 1,2,3,4,7,8-HxCDF; 2,3,4,6,7,8-HxCDF; 2,3,4,7,8-PeCDF

REVIEWED BY: Timothy Vonnahme DATE: 01-08-2019

Case Number: 47930
Site Name: Munger Landing
SDG Number: 40177993
Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 24, 2019

SUBJECT: Review of Data for SDG Number: 40178112
Received for Review: 12/05/2018 and 12/07/2018

LABORATORY: Pace Analytical Laboratories, Green Bay, Wisconsin

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1+ and Tier 2 Validation Reviews

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40178112

Number and Type of Samples: 16 Sediment Samples for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A).

EPA Sample Numbers:

ML-SD-15-0.0/1.0	ML-SD-25-0.0/1.0	ML-SD-28-0.0/1.0
ML-SD-15-1.0/2.0	ML-SD-25-1.0/2.0	ML-SD-33-0.0/1.2
ML-SD-23-0.0/1.0	ML-SD-26-0.0/1.0	ML-SD-34-0.0/1.0
ML-SD-23-1.0/2.0	ML-SD-26-1.0/2.0	ML-SD-34-0.0/1.0-FD
ML-SD-24-0.0/1.0	ML-SD-26-1.0/2.0-FD	ML-SD-34-1.0/1.8
ML-SD-24-1.0/2.0		

Case Number: 47930 SDG Number: 40178112
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Sixteen (16) sediment samples for Case 47930, SDG 40178112 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/18/2018 and shipped to Pace Analytical Laboratory in Green Bay, Wisconsin for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A) analysis.

The organic fraction was validated/verified by the QATS Program in accordance with the National Functional Guidelines for Organic Superfund Methods Data Review, January 2017, and the inorganic fractions by the National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. Tier 2 review was applied to the Aroclor fraction and Tier 1+(*) review was applied to the Mercury and TOC fractions. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the tables below are summaries of the data qualified in each fraction.

DATA QUALIFICATION SUMMARY TABLES

Mercury Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Aroclor Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Total Organic Carbon Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930 SDG Number: 40178112
Site Name: Munger Landing Laboratory: Pace Analytical

AROCLOR ANALYSIS

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. GC PERFORMANCE

No problems were found.

3. CALIBRATION - INITIAL AND CONTINUING CALIBRATION

No problems were found.

4. BLANKS

No problems were found.

5. SURROGATE RECOVERY

No problems were found.

6. MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

The MS/MSD solution consisted of Aroclor-1260 only. No problems were found.

7. LABORATORY CONTROL SAMPLE

The LCS solution consisted of Aroclor-1260 only. No problems were found.

8. FIELD BLANK AND FIELD DUPLICATES

Sample ML-SD-26-1.0/2.0 -FD is the field duplicate of sample ML-SD-26-1.0/2.0 and ML-SD-34-0.0/1.0-FD is the field duplicate of sample ML-SD-34-0.0/1.0. No Aroclors were detected in either pair.

9. INTERNAL STANDARDS

Not applicable.

10. COMPOUND IDENTIFICATION

No problems were found.

11. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

No problems were found.

Case Number: 47930 SDG Number: 40178112
Site Name: Munger Landing Laboratory: Pace Analytical

12. SYSTEM PERFORMANCE

No problems were found.

13. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Rebecca Garry DATE: 12/17/2018

Case Number: 47930 SDG Number: 40178112
Site Name: Munger Landing Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 24, 2019

SUBJECT: Review of Data for SDG Number: 40178113
Received for Review: 12/05/2018 and 12/07/2018

LABORATORY: Pace Analytical Laboratories, Green Bay, Wisconsin

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 2 Validation Review

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40178113

Number and Type of Samples: 10 Sediment Samples for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A).

EPA Sample Numbers:

ML-SD-35-0.0/1.3	ML-SD-38-0.0/1.0	ML-SD-39-1.0/1.9
ML-SD-36-0.0/1.0	ML-SD-38-1.0/1.7	ML-SD-40-0.0/1.0
ML-SD-36-1.0/1.6	ML-SD-39-0.0/1.0	ML-SD-40-1.0/2.3
ML-SD-37-0.0/1.2		

Case Number: 47930 SDG Number: 40178113
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Ten (10) sediment samples for Case 47930, SDG 40178113 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/19/2018 and shipped to Pace Analytical Laboratory in Green Bay, Wisconsin for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A) analysis.

The organic fraction was validated/verified by the QATS Program in accordance with the National Functional Guidelines for Organic Superfund Methods Data Review, January 2017, and the inorganic fractions by the National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. Tier 2 review was applied to all fractions. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the tables below are summaries of the data qualified in each fraction.

DATA QUALIFICATION SUMMARY TABLES

Aroclor Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Mercury Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Total Organic Carbon Fraction

Criteria Exceeded	Analytes	Validation Qualifier	Samples Impacted
No Criteria Exceeded			

Case Number: 47930 SDG Number: 40178113
Site Name: Munger Landing Laboratory: Pace Analytical

AROCLOR ANALYSIS

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. GC PERFORMANCE

No problems were found.

3. CALIBRATION - INITIAL AND CONTINUING CALIBRATION

No problems were found.

4. BLANKS

No problems were found.

5. SURROGATE RECOVERY

No problems were found.

6. MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

The parent sample for the MS/MSD analyses are in a separate SDG. The MS/MSD solution consisted of Aroclor-1260 only.

7. LABORATORY CONTROL SAMPLE

The LCS solution consisted of Aroclor-1260 only. No problems were found.

8. FIELD BLANK AND FIELD DUPLICATES

No field blanks or field duplicates were analyzed in this SDG,

9. INTERNAL STANDARDS

Not applicable.

10. COMPOUND IDENTIFICATION

No problems were found.

11. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

No problems were found.

12. SYSTEM PERFORMANCE

No problems were found.

Case Number: 47930 SDG Number: 40178113
Site Name: Munger Landing Laboratory: Pace Analytical

13. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Rebecca Garry DATE: 12/17/2018

Case Number: 47930 SDG Number: 40178113
Site Name: Munger Landing Laboratory: Pace Analytical

MERCURY

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. INITIAL CALIBRATION

No problems were found.

3. INITIAL AND CONTINUING CALIBRATION VERIFICATION

No problems were found.

4. CRI STANDARD

No problems were found.

5. BLANKS – INITIAL AND CONTINUING

No problems were found.

6. PREPARATION BLANK

No problems were found.

7. PRE-DIGESTION/DISTILLATION MATRIX SPIKE

No problems were found.

8. POST DIGESTION SPIKE

A post-digestion spike is not required for mercury analysis.

9. LABORATORY DUPLICATE

A laboratory duplicate was not analyzed.

10. FIELD DUPLICATE COMPARISON

A field duplicate sample was not analyzed with this SDG.

11. ICP INTERFERENCE CHECK SAMPLE

An ICSAB is not required for mercury analysis.

12. LABORATORY CONTROL SAMPLE

No problems were found.

13. SERIAL DILUTION

A serial dilution is not required for mercury analysis.

14. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Lydia Heter DATE 01/09/2019

Case Number: 47930 SDG Number: 40178113
Site Name: Munger Landing Laboratory: Pace Analytical

TOTAL ORGANIC CARBON (TOC)

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. INITIAL CALIBRATION

No problems were found.

3. INITIAL AND CONTINUING CALIBRATION VERIFICATION

The initial calibration is almost one year older than sample analysis; however, SOP S-GB-1-076-REV.02 states up to one year is acceptable. All of the SDG samples were associated with this calibration.

4. BLANKS – INITIAL AND CONTINUING

No problems were found.

5. PREPARATION BLANK

No problems were found.

6. PRE-DIGESTION/DISTILLATION MATRIX SPIKE

No problems were found.

7. LABORATORY DUPLICATE

A Laboratory Duplicate was not analyzed with this SDG.

8. FIELD DUPLICATE COMPARISON

A Field Duplicate was not analyzed with this SDG.

9. LABORATORY CONTROL SAMPLE

No problems were found.

10. ADDITIONAL INFORMATION

Sample ML-SD-39-1.0/1.9 was analyzed in quadruplicate as required in the laboratory SOP. The %RSD between the results was less than the 40% criteria specified in the SOP for both samples.

REVIEWED BY: Michael Nys DATE: 01/09/2019

Case Number: 47930 SDG Number: 40178113
Site Name: Munger Landing Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: January 30, 2019

SUBJECT: Review of Data for SDG Number: 40178190
Received for Review: 01/04/2019, 01/08/2019, and 01/25/2019

LABORATORY: Pace Analytical Laboratories, Green Bay, Wisconsin

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1+ and Tier 2 Validation Reviews

QATS has reviewed the data for the following SDG:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40178190

Number and Type of Samples: 17 Sediment Samples for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A).

EPA Sample Numbers:

ML-SD-01-2.0/3.0	ML-SD-23-2.0/3.0	ML-SD-26-2.0/3.0
ML-SD-02-2.0/3.0	ML-SD-23-2.0/3.0-FD	ML-SD-26-3.0/4.0
ML-SD-02-3.0/4.0	ML-SD-23-3.0/4.0	ML-SD-27-1.0/2.0
ML-SD-02-4.0/4.7	ML-SD-24-2.0/3.0	ML-SD-27-2.0/3.0
ML-SD-14-2.0/3.0	ML-SD-24-2.0/3.0-FD	ML-SD-27-3.0/3.7
ML-SD-16-2.0/3.0	ML-SD-24-3.0/4.0	

Case Number: 47930 SDG Number: 40178190
Site Name: Munger Landing Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Seventeen (17) sediment samples for Case 47930, SDG 40178190 were collected by CH2M/Jacobs from the Munger Landing site locations between 10/15-18/2018 and shipped to Pace Analytical Laboratory in Green Bay, Wisconsin for Mercury (SW-846 7471B); Aroclor (SW-846 8082A); and Total Organic Carbon (TOC) (SW-846 9060A) analysis.

The organic fraction was validated/verified by the QATS Program in accordance with the National Functional Guidelines for Organic Superfund Methods Data Review, January 2017, and the inorganic fractions by the National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. Tier 2 review was applied to the Aroclor fraction and Tier 1+(*) review was applied to the Mercury and TOC fractions. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Listed in the tables below are summaries of the data qualified in each fraction.

DATA QUALIFICATION SUMMARY TABLES

Mercury Fraction

Criteria Exceeded	Compounds	Validation Qualifier	Samples Impacted
Technical holding time exceeded	Mercury	J- Detect	ML-SD-02-2.0/3.0
Technical holding time exceeded	Mercury	R Non-detects	ML-SD-02-3.0/4.0 ML-SD-02-4.0/4.7

Aroclor Fraction

Criteria Exceeded	Compounds	Validation Qualifier	Samples Impacted
No required opening 1016/1260 CCV analysis	Aroclor-1016, Aroclor-1221 Aroclor-1232, Aroclor-1248 Aroclor-1254, Aroclor-1260 Aroclor-1262, Aroclor-1268	UJ Non-detects	1 Sample
Low surrogate recovery	All	UJ Non-detects	1 Sample

Total Organic Carbon Fraction

Criteria Exceeded	Compounds	Validation Qualifier	Samples Impacted
Holding time criteria exceeded	TOC	J Detects	ML-SD-01-2.0/3.0, ML-SD-02-2.0/3.0 ML-SD-02-3.0/4.0, ML-SD-02-4.0/4.7 ML-SD-14-2.0/3.0, ML-SD-27-1.0/2.0 ML-SD-16-2.0/3.0, ML-SD-23-2.0/3.0 ML-SD-23-2.0/3.0-FD, ML-SD-23-3.0/4.0 ML-SD-24-2.0/3.0, ML-SD-24-2.0/3.0-FD ML-SD-24-3.0/4.0, ML-SD-26-2.0/3.0 ML-SD-26-3.0/4.0, ML-SD-27-2.0/3.0 ML-SD-27-3.0/3.7

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930 SDG Number: 40178190
Site Name: Munger Landing Laboratory: Pace Analytical

AROCLOR ANALYSIS

1. HOLDING TIME AND PRESERVATION

No problems were found.

2. GC PERFORMANCE

No problems were found.

3. CALIBRATION - BOTH INITIAL AND CONTINUING CALIBRATION

One sample in this SDG was not bracketed by the method-required Aroclor-1016/1260 continuing calibration verification (CCV) analysis. For one sample (ML-SD-02-3.0/4.0), and one Method Blank, LCS, and MS/MSD analysis, an Aroclor-1242 opening CCV was analyzed and submitted in lieu of an Aroclor-1016/1260 CCV. Method SW-846 8082A states, "Verify calibration each 12-hour shift by injecting calibration verification standards prior to conducting any sample analyses. A calibration standard must also be injected at intervals of not less than once every twenty samples (after every 10 samples is recommended to minimize the number of samples requiring re-injection when QC limits are exceeded) and at the end of the analysis sequence. For Aroclor analyses, the calibration verification standard should be a mixture of Aroclor 1016 and Aroclor 1260. The calibration verification process does not require analysis of the other Aroclor standards used for pattern recognition, but the analyst may wish to include a standard for one of these Aroclors after the 1016/1260 mixture used for calibration verification throughout the analytical sequence." Note that Aroclor-1242 was not detected in the sample or QC analyses. Also note that the Aroclor-1242 CCV passed percent difference (%D) criteria. No Aroclors were detected in the sample. The non-detected Aroclors, with the exception of Aroclor-1242 are qualified "UJ".

ML-SD-02-3.0/4.0 – Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclor-1262, Aroclor-1268

4. BLANKS

No problems were found.

5. SURROGATE RECOVERY

One Aroclor sample had a surrogate percent recovery that was less than the laboratory-established surrogate recovery criteria of 49%-104%. Decachlorobiphenyl failed with a recovery of 48%. No Aroclors were detected in the sample. The non-detected results in the following sample were qualified "UJ".

ML-SD-23-3.0/4.0 – Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclor-1262, and Aroclor-1268.

6. MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

The MS/MSD solution consisted of Aroclor-1260 only. No problems were found.

Case Number: 47930 SDG Number: 40178190
Site Name: Munger Landing Laboratory: Pace Analytical

7. LABORATORY CONTROL SAMPLE

The LCS solution consisted of Aroclor-1260 only. No problems were found.

8. FIELD BLANK AND FIELD DUPLICATES

Sample ML-SD-23-2.0/3.0-FD is the field duplicate of sample ML-SD-23-2.0/3.0 and ML-SD-24-2.0/3.0-FD is the field duplicate of sample ML-SD-24-2.0/3.0. No Aroclors were detected in either pair.

9. INTERNAL STANDARDS

Not applicable.

10. COMPOUND IDENTIFICATION

No problems were found.

11. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

No problems were found.

12. SYSTEM PERFORMANCE

No problems were found.

13. ADDITIONAL INFORMATION

No problems were found.

REVIEWED BY: Rebecca Garry DATE: 01/28/2019

Case Number: 47930 SDG Number: 40178190
Site Name: Munger Landing Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.

APTIM Federal Services, LLC
QATS Program
2700 Chandler Avenue
Las Vegas, Nevada 89120

RELEASE OF VALIDATED DATA

DATE: April 02, 2019

SUBJECT: Review of Data for SDG Number: 40179190
Received for Review: 02/26/2019 and 03/15/2019

LABORATORY: Pace Analytical Laboratories, Minneapolis, Minnesota

FROM: APTIM Federal Services, LLC
Quality Assurance Technical Support (QATS) Program, Las Vegas, NV

TO: Mark Loomis, Great Lakes National Program Office (GLNPO)

LEVEL OF REVIEW: Tier 1+ Validation Review

QATS has reviewed the validated data for the following project:

SITE Name: Munger Landing Sediment Characterization, St. Louis River, Minnesota and Wisconsin

Case Number: 47930

SDG Number: 40179190

Number and Type of Samples: 13 Sediment Samples for Dioxins and Furans (EPA 8290/8290A).

EPA Sample Numbers:

ML-SD-01-2.0/3.0	ML-SD-02-2.0/3.0	ML-SD-02-3.0/4.0
ML-SD-02-4.0/4.7	ML-SD-14-2.0/3.0	ML-SD-26-2.0/3.0
ML-SD-26-3.0/4.0	ML-SD-23-2.0/3.0	ML-SD-23-2.0/3.0-FD
ML-SD-23-3.0/4.0	ML-SD-24-2.0/3.0	ML-SD-24-2.0/3.0-FD
ML-SD-24-3.0/4.0		

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40179190
Laboratory: Pace Analytical

VALIDATION SUMMARY

This report summarizes the data validation results of samples from the Munger Landing Site, St. Louis River Area of Concern in Minnesota and Wisconsin, in support of EPA's Great Lakes National Program Office (GLNPO). This evaluation was performed by APTIM's Quality Assurance Technical Support Program (QATS) under Task Order 1025.

Thirteen (13) sediment samples for Case 47930, SDG 40179190 were collected by CH2M/Jacobs from the Munger Landing site locations on 10/15/2018, 10/17/2018, and 10/18/2018 and shipped to Pace Analytical Laboratory in Minneapolis, Minnesota for Dioxins and Furans (EPA 8290/8290A) analysis.

The Dioxin/Furan data were validated/verified by the QATS Program in accordance with the National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016, and in accordance with the Munger Landing Field Sampling and Quality Assurance Project Plan, Revision 0, November 2018. A Tier 1+(*) review was applied to the Dioxin data. Automated primary validation of these data were performed prior to the QATS review via GLNPO's EXES program.

Note that the laboratory is reporting non-detects and "J" value (estimated) sample concentrations based on the Estimated Detection Limit (EDL). The EXES program is reporting the non-detected results to either the Method Detection Limit (MDL) or EDL, whichever is the greater value. As a result, some laboratory-reported "J" value analyte results (between the EDL and Reporting Limit (RL)) are reported as detects by the laboratory as estimated ("J" values); however, the analyte concentration is less than the reported adjusted analyte MDL for the sample in the EDD file.

Listed in the table below is the summary of the data qualified.

DATA QUALIFICATION SUMMARY TABLES

Dioxin/Furan Fraction

Criteria Exceeded	Compounds	Validation Qualifier	Samples Impacted
Qualified "J" (EMPC) due to ion ratios not meeting criteria	2,3,4,7,8-PeCDF	J Detect	ML-SD-01-2.0/3.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,7,8,9-HxCDD	J Detect	ML-SD-02-2.0/3.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	2,3,4,7,8-PeCDF 1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD	J Detects	ML-SD-02-3.0/4.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,4,6,7,8-HpCDD	J Detects	ML-SD-02-4.0/4.7 ML-SD-26-2.0/3.0 ML-SD-23-3.0/4.0 ML-SD-24-3.0/4.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,6,7,8-HxCDF 1,2,3,6,7,8-HxCDD	J Detects	ML-SD-14-2.0/3.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,6,7,8-HxCDD	J Detect	ML-SD-26-3.0/4.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	OCDD	J Detect	ML-SD-23-2.0/3.0 ML-SD-23-2.0/3.0-FD

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40179190
Laboratory: Pace Analytical

Criteria Exceeded	Compounds	Validation Qualifier	Samples Impacted
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDF	J Detects	ML-SD-24-2.0/3.0
Qualified "J" (EMPC) due to ion ratios not meeting criteria	1,2,3,4,7,8-HxCDD	J Detect	ML-SD_24-2.0/3.0-FD
RPD between original sample and field duplicate result >100%	Total HxCDF 1,2,3,4,6,7,8-HpCDF OCDF	J Detects	ML-SD-24-2.0/3.0 ML-SD-24-2.0/3.0-FD
MSD %R exceeded criteria	1,2,3,7,8,9-HxCDD	J Detect	ML-SD-02-3.0/4.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD OCDF	J Detects	ML-SD-01-2.0/3.0
Sample results are between the EDL and the RL	1,2,3,6,7,8-HxCDD 1,2,3,6,7,8-HxCDF 1,2,3,7,8-PeCDD 2,3,4,7,8-PeCDF	J Detects	ML-SD-02-2.0/3.0
Sample results are between the EDL and the RL	1,2,3,6,7,8-HxCDF	J Detects	ML-SD-02-3.0/4.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDF	J Detects	ML-SD-02-4.0/4.7
Sample results are between the EDL and the RL	1,2,3,7,8,9-HxCDD 1,2,3,7,8-PeCDD	J Detects	ML-SD-14-2.0/3.0
Sample results are between the EDL and the RL	OCDF	J Detects	ML-SD-23-3.0/4.0
Sample results are between the EDL and the RL	1,2,3,4,7,8,9-HpCDF 1,2,3,7,8,9-HxCDD 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF	J Detects	ML-SD-24-2.0/3.0
Sample results are between the EDL and the RL	1,2,3,7,8,9-HxCDD 1,2,3,7,8,9-HxCDF 2,3,4,6,7,8-HxCDF 2,3,4,7,8-PeCDF	J Detects	ML-SD-24-2.0/3.0-FD
Sample results are between the EDL and the RL	OCDF	J Detects	ML-SD-24-3.0/4.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDF	J Detects	ML-SD-26-2.0/3.0
Sample results are between the EDL and the RL	1,2,3,4,6,7,8-HpCDD 1,2,3,7,8,9-HxCDD OCDF	J Detects	ML-SD-26-3.0/4.0
Reported Homologue Totals Qualified per NFG	Total TCDF Total TCDD Total PeCDF Total PeCDD Total HxCDF Total HxCDD Total HpCDF Total HpCDD	J Detects UJ Non-detects	ML-SD-01-2.0/3.0 ML-SD-02-2.0/3.0 ML-SD-02-3.0/4.0 ML-SD-02-4.0/4.7 ML-SD-14-2.0/3.0 ML-SD-26-2.0/3.0 ML-SD-26-3.0/4.0 ML-SD-23-2.0/3.0 ML-SD-23-2.0/3.0-FD ML-SD-23-3.0/4.0 ML-SD-24-2.0/3.0 ML-SD-24-2.0/3.0-FD ML-SD-24-3.0/4.0

(*) QATS performs a Tier 1+, where all calibration and QC are evaluated as required in a Tier 2 review; however, validation results are provided in a Tier 1 Validation Report.

Case Number: 47930
Site Name: Munger Landing

SDG Number: 40179190
Laboratory: Pace Analytical

GLNPO DATA QUALIFIER SHEET

Data Qualifier	Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased high.
J-	The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte, but may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.
R	The data are unusable. The compound may or may not be present.