

**OBG**

**SITE INVESTIGATION / REMEDIAL ACTION OPTION REPORT**

**C.M. Christiansen Co., Inc. Former Pole Yard  
Military Creek, Phelps, Wisconsin  
WDNR BRRTS Activity #02-64-000068**

October 26, 2018



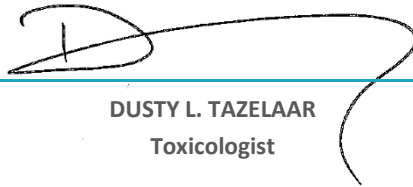
OCTOBER 26, 2018 | PROJECT #2381

# Site Investigation / Remedial Action Option Report

**Military Creek  
Phelps, Wisconsin**

Prepared for:

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## ACRONYMS AND ABBREVIATIONS

CBSQG	Consensus Based Sediment Quality Guidelines
CCME	Canadian Council of Ministers of the Environment
CMC Co., Inc.	CM Christiansen Co., Inc.
CY	cubic yard
DGPS	differential global positioning system
DRO	diesel range organics
dw	dry weight
GIS	geographic information system
1,2,3,4,6,7,8-HpCDD	1,2,3,4,6,7,8-heptachlorodibenzo- <i>p</i> -dioxin
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MEC	midpoint effect concentration
NRT	Natural Resource Technology, Inc.
MS	matrix spike
MSD	matrix spike duplicate
OBG	O'Brien & Gere Engineers, Inc.
OCDD	Octachlorodibenzodioxin
PCC	Pearson's correlation coefficient
PCDD/F	2,3,7,8-substituted polychlorinated dibenzo- <i>p</i> -dioxin and polychlorinated dibenzofuran
PEC	probable effect concentration
RAO	remedial action options
RPD	relative percent difference
SDG	sample delivery group
SI	site investigation
SQG	sediment quality guideline
TCDD	2,3,7,8-tetrachlorodibenzodioxin
TEC	threshold effect concentration
TEF	toxic equivalency factor
TEQ	2,3,7,8-TCDD toxic equivalency
TEQ <sub>SWHO-Fish</sub>	World Health Organization fish-based TEQs
TOC	total organic carbon
ng/kg	nanogram per kilogram
USEPA	United States Environmental Protection Agency
WDNR	Wisconsin Department of Natural Resources
WHO	World Health Organization
wt	weight

## EXECUTIVE SUMMARY

O'Brien & Gere Engineers, Inc. (OBG), formerly Natural Resource Technology, Inc. (NRT), was retained by CM Christiansen Co., Inc. (CMC Co., Inc.) to perform supplemental sediment characterization of Military Creek, summarize findings in a site investigation (SI) report, and describe applicable remedial alternatives in a remedial action options (RAO) report. Military Creek is adjacent to the CM Christiansen Pole Yard (Site) located on County Highway E, Village of Phelps, Vilas County, Wisconsin. The Site is a non-operational pole dipping facility that underwent a soil remedial action in 1999 and limited sediment investigation in 1992 and 2003. To streamline preparation and review, the SI and RAO reports were combined in this document. Content related to the SI and RAO reports were prepared in accordance with NR 716 and 722. This report was prepared to satisfy Item 9 (Military Creek Investigation Report) and Item 10 (Military Creek Remedial Action Options Report) of the Spill Response Agreement, dated April 17, 1998, between CMC Co., Inc. and the Wisconsin Department of Natural Resources (WDNR). The Site is the subject of a property transfer planned to the Town of Phelps for redevelopment of portions for a recreational path.

Sediment sampling performed by WDNR in 2003 indicated the presence of concentrations of 2,3,7,8-substituted polychlorinated dibenzo-*p*-dioxin and polychlorinated dibenzofuran (PCDD/F) congeners in creek sediments. Since then, ongoing communication between CMC Co., Inc. and WDNR has revolved around an approach for additional characterization that resulted in an August 3, 2016 Military Creek Sediment Sampling Plan. Implementation of the Military Creek Sediment Sampling Plan took place from October 17 to October 21, 2016. It included sediment core collection for laboratory analysis, and field measurements of water depth, sediment thickness, and stream flow.

Water depth, sediment thickness, and stream flow measurements indicated that the culvert beneath County Highway E restricts water flow and sediment transport of Military Creek. Sediment cores were collected from 14 locations starting at the mouth of Military Creek at North Twin Lake and extending upstream of the Site. Sediment quality data were screened via an assessment consistent with the WDNR interim guidance, "Consensus-Based Sediment Quality Guidelines (CBSQG), Recommendations for Use & Application" (WDNR, 2003). A modification to the guidelines was also included related to the methods for normalization of congener-specific concentrations of PCDD/Fs to 2,3,7,8-tetrachlorodibenzodioxin (TCDD) equivalent (TEQ) concentrations. Specifically, concentrations of PCDD/Fs were normalized to concentrations of TEQs using World Health Organization (WHO) toxic equivalency factors (TEFs) for fish (WHO, 1998), rather than United States Environmental Protection Agency (USEPA) TEFs (USEPA, 1989). This allowed for appropriate comparisons to CBSQG criteria, which were also based on WHO TEFs for fish.

For the assessment of Military Creek, a relevant screening comparison for the protection of ecological aquatic life from concentrations of PCDD/Fs in sediment was the comparison of concentrations of WHO fish-based TEQs (TEQ<sub>WHO-Fish</sub>) in surface sediments to sediment quality guidelines (SQGs). Concentrations of TEQ<sub>WHO-Fish</sub> in surface sediments were presented in Tables 4 and 6 of this document. Table 4 presented concentrations of TEQ<sub>WHO-Fish</sub> from sediment core samples as they relate to relative WDNR CBSQG-based levels of concern. The comparison in Table 4 was an appropriate screening-level exercise. In addition, an appropriate remedial action decision-making assessment was presented in Table 6. The assessment in Table 6 presented the same data, but compared concentrations of TEQ<sub>WHO-Fish</sub> to the same WDNR CBSQG-based levels of concern, but unadjusted by the conservative safety factor of 10 (Unadjusted SQGs). Table 6 demonstrated that one of the 14 surficial sediment samples (SED-03), located directly adjacent to the Site, had concentrations of TEQ<sub>WHO-Fish</sub> that exceeded a relevant midpoint effect concentration (MEC) and probable effect concentration (PEC). Human risk with present site use scenarios was determined to be minimal due to the submerged nature of the sediment and the limited access and use of Military Creek for recreational purposes.

Three RAOs were evaluated including 1) no action, 2) institutional controls, and 3) targeted sediment removal with cover placement. Option 3 included up to 30 inches of sediment removal through dredging and placement of a 6-inch thick clean cover layer. The no action option was ruled out as not protective for alternate future use scenarios that might increase human contact with sediments. The dredge and cover option was ruled out due to the extremely high total and unit cost for implementation to reduce the de minimis risk that exists at the Site for

invertebrates and fish. The recommended remedial action is the use of institutional controls, which can mitigate potential risks that may result from future use scenarios. Institutional controls are anticipated to include zoning/deed restrictions, access controls as appropriate depending on future use plans, and the installation and maintenance of notification signs. WDNR NR726 Case Closure with residual contamination and geographic information system (GIS) registry would be required. Institutional controls were also anticipated to be protective of human health for the intended recreational path at the Site.

## 1 INTRODUCTION

OBG was retained by CMC Co., Inc. to perform supplemental sediment characterization of Military Creek, summarize findings in an SI report, and describe applicable remedial alternatives in an RAO report. Military Creek is adjacent to the Site located on County Highway E, Village of Phelps, Vilas County, Wisconsin. The Site is a non-operational pole dipping facility that underwent a soil remedial action in 1999 and limited sediment investigation in 1992 and 2003. To streamline preparation and review, the SI and RAO reports were combined in this document. Content related to the SI and RAO reports were prepared in accordance with NR 716 and 722.

The objective of this report was to present supplemental investigation data and to recommend a remedial action based on evaluated options. The recommended response action was intended to manage environmental issues identified at the Site and eliminate or control potential threats to human health, safety, and welfare and the environment to the extent practicable. This was done so in consideration of the intended future use of the Site, which includes a recreational path to be developed by the Town of Phelps following the transfer of the Site property. This report was prepared to satisfy Item 9 (Military Creek Investigation Report) and Item 10 (Military Creek Remedial Action Options Report) of the Spill Response Agreement, dated April 17, 1998, between CMC Co., Inc. and the WDNR.

### 1.1 GENERAL INFORMATION

Site Owner:	CM Christiansen Co., Inc. P.O. Box 100 Phelps, WI 54554 Site Contact: Mr. Eric R. Christiansen (414) 963-9211
Site Location:	Lake Street, County Road E Phelps, WI Vilas County Southeast ¼ and Southwest ¼ Section 35, T42N, R11E
Consultant:	O'Brien & Gere, Inc. 234 West Florida St, 5 <sup>th</sup> Floor Milwaukee, WI 53204 Contact: Mr. Dusty Tazelaar (517) 803-7095

## 2 BACKGROUND INFORMATION

Background information, site history, and contaminant types have been described in previous documents submitted to WDNR. Information from these documents was not restated, but was included by reference. Previously prepared documents included the following:

- WDNR (2004). *Expanded Site Inspection*, CM Christiansen – Pole Yard, Village of Phelps, Vilas County, USEPA ID: WID988639035.
- NRT (2000). *Remedial Action Documentation Report*.
- WDNR (1998). Spill Response Agreement with CM Christiansen Co., Inc.
- NRT (1998). *CM Christiansen Co., Inc., Supplemental Evaluation of Military Creek and Revised Work Plan for Screening Level Assessment, Phelps, WI*.
- Coleman Engineering Company (1997). *Site Investigation Report, CM Christiansen Co., Inc., Pole Treatment Facility*.
- WDNR (1995). *Final Screening Site Inspection Report for CM Christiansen Co., Inc. Pole Dipping Site*.
- WDNR (1993). *Preliminary Assessment*, USEPA ID# WID998639035.

### 2.1 MILITARY CREEK SEDIMENT CHARACTERIZATION

Sampling performed by WDNR in 2003 indicated the presence of PCDD/F congeners in creek sediments. Since then, ongoing communication between CMC Co., Inc. and WDNR has revolved around an approach for additional characterization. A conceptual investigation approach was submitted to WDNR on December 16, 2015. WDNR provided comments and questions on the investigation approach in a subsequent letter on February 11, 2016. WDNR comments were considered and incorporated into the Military Creek Sediment Sampling Plan dated August 3, 2016. WDNR provided a letter on September 7, 2016 encouraging the implementation of the August 3<sup>rd</sup> Military Creek Sediment Sampling Plan.

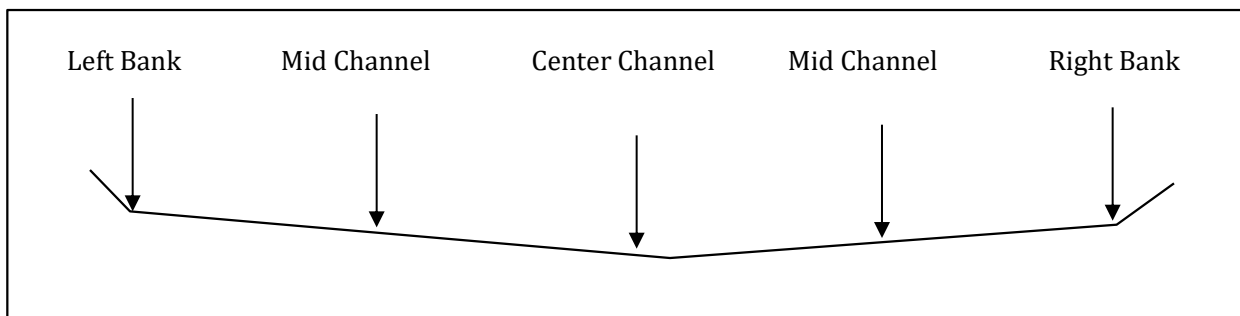
Military Creek sediment sampling took place from October 17 to October 21, 2016. WDNR personnel (Mr. Chris Saari) was on site on October 18, 2016 for observation of sampling activities. Sampling methods and results were described in Sections 3 and 4, respectively.

### 3 METHODS OF INVESTIGATION

In accordance with the August 3, 2016 Military Creek Sediment Sampling Plan, field activities included sediment thickness measurements and sediment core sampling. The condition of Military Creek was photo-documented. Stream flow measurements were obtained to provide additional characterization information. Military Creek is narrow and shallow with heavy vegetation along its shoreline. These conditions restricted the use of a conventional shallow-draft sampling vessel (e.g., jon boat). Instead, the lower portion (i.e., County Highway E to Twin Lake) was accessed and sampled by foot, and the upper portion (i.e., all locations upstream of County Highway E) was accessed and sampled by kayak. All sampling locations were located and documented using a handheld differential global positioning system (DGPS) with sub-meter accuracy.

#### 3.1 SEDIMENT THICKNESS MEASUREMENTS

Sediment thickness measurements were obtained through manual poling with a 1.5-inch diameter aluminum poling rod marked with 0.1-foot increments. Manual poling was performed along cross-channel transects spaced approximately 100 feet apart from the mouth of North Twin Lake upstream to sediment sample location SED-01. Twenty transects were poled with five poling locations per transect as shown in the schematic below: left bank, center channel, right bank, and two intermediate mid channel locations. The depth to sediment (i.e., water depth) was first measured and recorded using a survey rod with a 6-inch circular disc attached to the bottom. Poling was then performed through manual effort until refusal was encountered. The total penetrated depth of the poling rod at each location was recorded. Poling transects were shown on Figure 1 and data were presented in Table 1.



*Example Sediment Thickness Measurement Transect Profile Looking Upstream*

#### 3.2 STREAM FLOW MEASUREMENTS

Stream flow measurements were collected along seven of the twenty poling transects using a HACH FH950 Portable Velocity Meter. Velocity measurements were recorded at 0.6 times the total water depth at each sediment thickness poling location of the selected transects. The selected transects collected flow data upstream of the Site, directly upstream of the culvert crossing beneath County Highway E, directly downstream of the culvert crossing beneath County Highway E, and at the mouth of Military Creek with North Twin Lake. Transects selected for stream flow measurements are shown on Figure 1, and velocity data are reported in Table 2.

#### 3.3 SEDIMENT CORE COLLECTION

Actual sediment sample locations were shown in Figure 1 and were generally at the midpoint of the creek unless there were notable features at the sampling location to suggest zones of sediment deposition, such as the inside of a bend. In those instances, the sampling locations were at the area of suspected sediment deposition. Samples were collected by manual coring methods using clear plastic core tubes (2-5/8 inch inside diameter). Cores were pushed or driven with a slide hammer until either the target depth of 30 inches was reached or refusal was encountered.

Collected cores were capped and transported to shore for processing in accordance with the Military Creek Sediment Sampling Plan. Cores were extruded onto clean plastic sheeting, photographed, and divided into three intervals depending on actual core recovery. If present, the top two intervals (i.e., 0 to 6 inches and 6 to 18 inches) were submitted for laboratory testing of diesel range organics (DRO), PCDD/F congeners, particle size, total organic carbon (TOC), and percent solids/percent moisture. Recovered core material from 18 to 30 inches was archived for possible future analysis. Laboratory data were reported on Table 3. Particle size distribution curves were included in Appendix A.

## 4 RESULTS

### 4.1 SEDIMENT THICKNESS MEASUREMENT

Sediment thickness measurements were tabulated in Table 1 for transects 1 through 20, which were numbered from downstream to upstream as shown in Figure 1. Transects 1 through 9 were located downstream of County Highway E and had a maximum sediment thickness of 1.3 feet and maximum water depth of 2.3 feet. Particle size curves for sediment from these downstream transects were predominantly sand and gravel. Transects 10 through 20 were located upstream of County Highway E and had a maximum sediment thickness of 5.7 feet and maximum water depth of 6 feet. Particle size curves for these upstream transects were predominantly softer deposits of sand with organics.

Water depth and sediment thickness measurements indicate that the culvert beneath County Highway E restricts water flow and sediment transport of Military Creek. This is supported by deeper water depths and thicker deposits of soft sediment upstream of County Highway E compared to shallower water depths and higher proportion of sand and gravel downstream of County Highway E.

### 4.2 STREAM FLOW MEASUREMENTS

Stream flow measurements were tabulated in Table 2 for select transects upstream and downstream of County Highway E as shown on Figure 1. Stream flow was greatest at the most downstream transect and decreased with farther upstream transects. This further supports that the crossing of County Highway E acts as a flow control feature for Military Creek.

### 4.3 SEDIMENT CORE SAMPLING

Sediment cores were collected from 14 locations as shown in Figure 1. Laboratory data were tabulated in Table 3. Sediment chemical concentrations were screened via an assessment consistent with WDNR interim guidance (WDNR, 2003). An additional assessment with a modification to the guidelines for normalization of congener-specific PCDD/Fs concentrations to TEQ concentrations. Per Appendix C of the Interim Guidance, TEFs derived from 1989 USEPA risk guidance were recommended for the normalization of congener-specific PCDD/F concentrations to TEQ concentrations. However, the SQGs in the Interim Guidance were derived based on the protection of aquatic life using TEFs recommended by the WHO in 1998 for exposure to fish (Canadian Council of Ministers of the Environment (CCME), 2002). It is inappropriate to compare concentrations of TEQs in sediments calculated using one set of TEFs to SQGs derived using a different set of TEFs. To facilitate an appropriate comparison of site-specific data to the SQGs, congener-specific concentrations of PCDD/Fs were normalized to TEQs using the WHO 1998 TEFs for fish. Concentrations of TEQs normalized in this manner were referred to as  $TEQ_{S_{WHO-Fish}}$ .

Per Appendix D of the Interim Guidance, dry weight concentrations of  $TEQ_{S_{WHO-Fish}}$  were normalized to 1% TOC for comparison with CBSQGs using sample specific TOC values. The Interim Guidance indicated that, "TOC can have its origin either from organic matter from natural sources such as plant materials deposited on sediments or anthropogenic inputs to aquatic systems." Therefore, paired sample-specific TOC and DRO data were subjected to a Pearson's correlation analysis. The correlation analysis indicated that there was a significant positive correlation ( $p < 0.01$ ). However, the Pearson's correlation coefficient (PCC) ( $PCC = 0.54$ ) suggested that DRO was not the sole source of TOC. This was consistent with sediment composition characteristics noted during sediment thickness measurements (Table 1), which suggested that organic matter flowing downstream was deposited at and upstream of the culvert. Therefore, it was determined that using sample-specific TOC data for normalization was appropriate.

Concentrations of  $TEQ_{S_{WHO-Fish}}$  from sediment core samples as they relate to relative levels of concern were presented in Tables 4 and 5. These levels of concern were based on lower and upper effect levels at which toxicity to benthic-dwelling organisms were predicted to be unlikely, the threshold effect concentration (TEC), and probable, the probable effect concentration (PEC) (WDNR, 2003). A concentration midway between the TEC and PEC, the midpoint effect concentration (MEC), was also included in the assessment. Table 4 presented



surface sediment results and Table 5 presented subsurface sediment results. Data in both tables were categorized relative to the WDNR Interim Guidance SQGs derived from CCME for screening purposes (2002). The surficial sediment results presented the relevant screening assessment because the SQGs were derived for concentrations of PCDD/Fs from ‘surficial sediments (i.e., top 5 cm)’ (CCME, 2002).

Concentrations of TEQ<sub>SWHO-Fish</sub> from sediment core samples as they relate to unadjusted relative levels of concern were presented in Tables 6 and 7. The assessment presented in Tables 6 and 7 was based on the WDNR Interim Guidance SQGs. While the assessment depicted in Tables 4 and 5 was consistent with a screening-level exercise, the levels of concern were derived using a safety factor adjustment. For the purposes of remedial action decision making, that likely yielded an overly conservative assessment. For the modified assessment, relative levels of concern were based on the screening values used to derive the WDNR Interim Guidance SQGs, but unadjusted by the safety factor of 10. The concentrations of TEQ<sub>SWHO-Fish</sub> that make up these unadjusted levels of concern were consistent with screening values presented in NOAAs Screening Quick Reference Tables (SQuiRTs, NOAA 2004) and in a 2010 toxicity assessment for the St. Regis Superfund Site in Minnesota (Integral 2010).

#### 4.3.1 Data review

Analytical data packages underwent review prior to use in data assessment. This was an important step in ensuring that environmental decisions will be “supported by data of the type and quality needed and expected for their intended use” (USEPA, 2002). Review processes were consistent with level 2 data validation and considered the acceptability of the following:

- Sample condition upon receipt
- Hold times and preservation
- Reporting limits
- Laboratory method blank results (< reporting limit)
- Laboratory control sample (LCS)/LCS duplicate (LCSD) (% recovery +/- 20%)
- LCSD relative percent difference (RPD) (+/- 20%)
- Matrix spike (MS)/MS duplicate (MSD) recoveries (% recovery +/-20%)
- MS/MSD RPD (+/-20%)
- Field duplicate (+/- 25%)

#### 4.3.2 Data review results

All PCDD/F, DRO, and TOC data reported were determined to be acceptable for use in this assessment. Some data were qualified with reporting flags, but no data were rejected. For each of three TOC sample delivery groups (SDG), the MS % recovered and the MSD % recovered were outside of the acceptable limits. However, the laboratory method blank was acceptable and the LCS duplicate was acceptable. This suggests that the method was working correctly and the samples were not homogenous with respect to TOC. This is supported by the field duplicate samples that were collected where TOC concentrations differed. Finally, sample times on two sample containers and a sample ID typo on another container were identified in a single SDG, but these typos were documented and corrected in the data files. These discrepancies had no effect on the acceptability of the associated data.

**Table 4. Concentrations of TEQ<sub>WHO-Fish</sub> in Surface Sediments<sup>1</sup> Relative to WDNR CBSQG-based Levels of Concern<sup>2</sup>**

Station/Sample Name	Level 1 Concern Conc. ≤ TEC	Level 2 Concern TEC < Conc. ≤ MEC	Level 3 Concern MEC < Conc. ≤ PEC	Level 4 Concern PEC < Conc.
All Concentrations Reported in ng/kg dry wt. at 1% TOC				
SED-01	0.04	-	-	-
SED-101	0.15	-	-	-
SED-102	0.07	-	-	-
SED-02	-	5.33	-	-
SED-03	-	-	-	220.2
SED-04	-	8.23	-	-
SED-05	-	-	20.19	-
SED-06	-	-	11.80	-
SED-103	-	-	13.59	-
SED-104	-	8.21	-	-
SED-105	-	6.40	-	-
SED-106	-	1.59	-	-
SED-107	-	1.70	-	-
SED-108	-	-	-	25.21

<sup>1</sup> Surface sediment sample depths were 0-0.5 feet, with the exception of SED-104, which was 0-0.4 feet.

<sup>2</sup> TEC = 0.85 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC; MEC = 11.2 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC; PEC = 21.5 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC

**Table 5. Concentrations of TEQ<sub>WHO-Fish</sub> in Subsurface Sediments<sup>1</sup> Relative to WDNR CBSQG-based Levels of Concern<sup>2</sup>**

Station/Sample Name	Level 1 Concern Conc. ≤ TEC	Level 2 Concern TEC < Conc. ≤ MEC	Level 3 Concern MEC < Conc. ≤ PEC	Level 4 Concern PEC < Conc.
All Concentrations Reported in ng/kg dry wt. at 1% TOC				
SED-01	0.03	-	-	-
SED-101	0.11	-	-	-
SED-102	0.04	-	-	-
SED-02	0.63	-	-	-
SED-03	-	-	-	569.5
SED-04	-	-	-	47.37
SED-05	-	9.12	-	-
SED-06	-	-	-	49.40
SED-103	0.09	-	-	-
SED-104	-	-	-	-
SED-105	0.18	-	-	-
SED-105 duplicate	0.28	-	-	-
SED-106	-	2.27	-	-
SED-107	-	4.20	-	-
SED-108	0.68	-	-	-
SED-108 duplicate	0.39	-	-	-

<sup>1</sup> Subsurface sediment sample depths ranged from 0.5-0.7 to 0.5-1.5 feet.

<sup>2</sup> TEC = 0.85 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC; MEC = 11.2 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC; PEC = 21.5 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC



**Table 6. Concentrations of TEQ<sub>WHO-Fish</sub> in Surface Sediments<sup>1</sup> Relative to Unadjusted SQG-based Levels of Concern<sup>2</sup>**

Station/Sample Name	Level 1 Concern Conc. ≤ TEC	Level 2 Concern TEC < Conc. ≤ MEC	Level 3 Concern MEC < Conc. ≤ PEC	Level 4 Concern PEC < Conc.
All Concentrations Reported in ng/kg dry wt. at 1% TOC				
SED-01	0.04	-	-	-
SED-101	0.15	-	-	-
SED-102	0.07	-	-	-
SED-02	5.33	-	-	-
SED-03	-	-	-	220.2
SED-04	8.23	-	-	-
SED-05	-	20.19	-	-
SED-06	-	11.80	-	-
SED-103	-	13.59	-	-
SED-104	8.21	-	-	-
SED-105	6.40	-	-	-
SED-106	1.59	-	-	-
SED-107	1.70	-	-	-
SED-108	-	25.21	-	-

<sup>1</sup> Surface sediment sample depths were 0-0.5 feet, with the exception of that of SED-104, which was 0-0.4 feet.

<sup>2</sup> TEC = 8.5 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC; MEC = 112 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC; PEC = 215 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC

**Table 7. Concentrations of TEQ<sub>WHO-Fish</sub> in Subsurface Sediments<sup>1</sup> Relative to Unadjusted SQG-based Levels of Concern<sup>2</sup>**

Station/Sample Name	Level 1 Concern Conc. ≤ TEC	Level 2 Concern TEC < Conc. ≤ MEC	Level 3 Concern MEC < Conc. ≤ PEC	Level 4 Concern PEC < Conc.
All Concentrations Reported in ng/kg dry wt. at 1% TOC				
SED-01	0.03	-	-	-
SED-101	0.11	-	-	-
SED-102	0.04	-	-	-
SED-02	0.63	-	-	-
SED-03	-	-	-	569.5
SED-04	-	47.37	-	-
SED-05	-	9.12	-	-
SED-06	-	49.40	-	-
SED-103	0.09	-	-	-
SED-104	-	-	-	-
SED-105	0.18	-	-	-
SED-105	0.28	-	-	-
SED-106	2.27	-	-	-
SED-107	4.20	-	-	-
SED-108	0.68	-	-	-
SED-108 duplicate	0.39	-	-	-

<sup>1</sup> Subsurface sediment sample depths ranged from 0.5-0.7 to 0.5-1.5 feet.

<sup>2</sup> TEC = 8.5 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC; MEC = 112 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC; PEC = 215 ng TEQ<sub>WHO-Fish</sub>/kg dw at 1% TOC



## 5 SITE INVESTIGATION CONCLUSIONS

Sediment quality data were screened via an assessment consistent with WDNR interim guidance by comparing concentrations of TEQ<sub>SWHO-Fish</sub> to CBSQG-based levels of concern. The WDNR Interim Guidance suggested that, “the greatest certainty in predicting absence or presence of sediment toxicity occurs at sediment contaminant concentrations that are lower than the TEC or greater than the PEC values, respectively.” Further, the Interim Guidance suggested that, “there is a consistent incremental increase in the incidence of toxicity to sediment-dwelling organisms with increasing chemical concentrations”. This is the basis for the calculation of a MEC. While including a MEC does support a qualitative understanding of risk, there is uncertainty in determining whether potential adverse effects occur within the levels of concern bounded with the MEC. Therefore, the greatest risk for potential adverse effects is expected to occur at locations associated with Level 4 Concern, with decreasing incremental risk potential to Level 1 Concern, at which no risk is expected.

For the assessment of Military Creek, a relevant comparison for the protection of aquatic life from concentrations of PCDD/Fs in sediments is the comparison of concentrations of TEQ<sub>SWHO-Fish</sub> in surficial sediment to SQGs for the protection of aquatic life expressed in the same terms (i.e., normalization of congener-specific concentrations of PCDD/Fs to concentrations of TEQ using the WHO 1998 TEFs for fish). The application of a safety factor of 10 used in the WDNR Interim Guidance SQGs was sufficient for screening purposes, but unwarranted for remedial action decision making. Therefore, the most appropriate assessment levels of concern were those that were unadjusted by the safety factor of 10. These were presented as the unadjusted levels of concern. Also, given that the SQGs were derived from surficial sediments (i.e., top 5 cm), the data summarized in Table 6 are the most relevant to the protection of aquatic life. Table 6 demonstrates that only one of the 14 surficial sediment samples (SED-03), which was located directly adjacent to the site, has a concentration of TEQ<sub>SWHO-Fish</sub> that exceeded a relevant level of concern (PEC).

The WDNR CBSQG document states that, “The CBSQGs should not be used on a stand-alone basis to establish cleanup levels or for sediment management decision making (WDNR 2003).” Therefore, historic site-specific sampling data were reviewed and considered in support of this SI/RAOR. The resources listed below were reviewed.

- Dioxin Results from North Twin Lake (WDNR, 1994a)
- Collection of Minnows in Military Creek & North Twin Lake (Caged Fish Study) (WDNR, 1994b)
- Acute and Chronic Toxicity Test Results for Military Creek Sediments (Wisconsin State Laboratory of Hygiene (WSLH), 1995)

In brief, these resources summarized studies of concentrations of dioxins and furan in feral white sucker and walleye (WDNR, 1994a), followed by caged fathead minnow health and survivability (WDNR, 1994b), and finally sediment toxicity acute and chronic tests in *Daphnia* and *Chironomus* (WSLH, 1995).

The North Twin Lake feral fish study was not indicative of risk to white suckers and walleye. In general, most congener-specific dioxin and furan results were below detection limits (non-detects). For the two congeners that were detected, 1,2,3,4,6,7,8-HpCDD and OCDD, the concentrations were apparently similar to those detected in the laboratory method blank. The author of the report stated that, “The good news is that the contamination of Military Creek does not appear to be contaminating feral fish from North Twin Lake with dioxins or furans (WDNR, 1994a).” Further, in the context of human risk, the author indicated that, “...the current fish advisory tolerance level of dioxin equivalents in fillets is 10 parts per trillion (ppt). The whole fish samples of white sucker and walleye contained 0.0156 ppt and 0.0385 ppt dioxin equivalents, respectively. As you can see, this is well below the advisory level. I suspect if we had analyzed fillets, the levels would have been even lower (WDNR, 1994a).”

The Military Creek and North Twin Lake caged fish study was not indicative of risk to fathead minnows. The author of the report indicated that, “In summary, all the minnows looked healthy and in good condition, with the exception of above-normal mortality in North Twin Lake fish cages. It is not known if this is dissolved oxygen or

contaminant related (WDNR 1994b).” Not surprisingly, dioxins and furans were not included in the list of chemical analytes the fathead minnow tissue samples. This was likely due in part to the results of the feral fish study.

In general sediment toxicity acute and chronic tests in invertebrates were not indicative of risk with one exception. Samples were collected from one reference location and four exposed locations for each of the *Ceriodaphnia dubia* 48-hour acute, *Daphnia magna* 48-hour acute, *Daphnia magna* 10-day chronic, and *Chironomus tentans* 10-day chronic tests. Only sediments from a sampling location adjacent to the Site were conclusively toxic using *Daphnia magna* in the 10-day chronic test (WSLH, 1995).

Overall, the feral fish, caged fish, and sediment toxicity studies were in agreement with the assessment summarized in Table 6.

## 6 REMEDIAL ACTION OPTIONS

The objective of the remedial action options evaluation was to recommend a response action for sediment within Military Creek as required by the WDNR under NR 722. The recommended response action was intended to manage the environmental issues identified in Military Creek and eliminate or control potential threats to human health, safety, and welfare and the environment to the extent practicable. The remedial action options evaluated for Military Creek sediment included: 1) no action; 2) institutional controls; and 3) targeted sediment removal with cover placement.

### 6.1 SITE SPECIFIC OBJECTIVES

The objectives of evaluated remedial actions, specific to Military Creek, were to accomplish the following:

- Prevent human exposure through direct contact with contaminated sediment.
- Reduce potential wildlife exposure through ingestion of contaminated sediment.
- Reduce potential transport of contaminated sediment in Military Creek to North Twin Lake through sediment transport mechanisms.

Assessed remedial actions capable of achieving site objectives included the following:

- Establishment and enforcement of institutional controls to restrict access or activities that could pose a threat to human health or exacerbate a threat to the environment.
- Removal of contaminated surface sediment from Military Creek through physical excavation and off-site disposal of sediment exhibiting impacts that pose an ecological risk.
- Placement of clean cover material over contaminated sediment to reduce potential human/wildlife contact and sediment transport.

### 6.2 IDENTIFICATION OF REMEDIAL ACTION OPTIONS

The remedial action technologies considered for evaluation included those that met the following initial screening criteria:

- Documented effectiveness from pilot-scale or full-scale applications.
- Ability to address identified sediment contamination in a timely manner.
- Appropriateness based on the distribution of contaminants.

Considering these screening criteria, applicable administrative and engineering technologies for use in developing remedial action options were institutional controls (i.e., zoning restrictions, notification signs), removal through excavation (i.e., dredging), and covering with clean material (i.e., sand placement). Concentrations of TEQ<sub>SWHO-Fish</sub> in surface sediment exceeded the PEC by approximately 10-fold and were greatest at sediment core location SED-03. The screening also indicated that there was potential risk at an area in North Twin Lake proximal to the mouth of Military Creek, where concentrations of TEQ<sub>SWHO-Fish</sub> in surface sediment samples exceeded the PEC by 1.2-fold. However, this location was not considered to be a necessary focus of remedial action given the relative uncertainties associated with risk. Therefore, for estimating purposes, an area extending from Transect T-13 upstream of SED-03 to T-12 downstream of SED-03 was used to develop and compare remedial action options. Options considered for further evaluation included the following:

- RAO No. 1 – No action
- RAO No. 2 – Institutional controls
- RAO No. 3 – Targeted sediment removal with cover placement, including removal of up to 30 inches of sediment and replacement with 6 inches of clean cover material

Sediment remedial action options were evaluated based on criteria consistent with NR 722.07 including technical feasibility (i.e., short-term effectiveness, long-term effectiveness, implementability), restoration timeframe, economic feasibility, and additional requirements. A comparison of remedial options was presented in Table 8. Estimated remedial option costs were presented in Table 9; detailed cost estimates were included in Appendix B.

### 6.2.1 RAO No. 1 – No Action

#### Technology Description:

For completeness, the no action option was considered for comparison with other options. Under the no action option, no remedial work would be performed to address contaminated sediment within Military Creek.

#### Regulatory Issues:

This option would satisfy requirements stipulated in the 1998 spill agreement between CMC Co., Inc. and WDNR, which allows for evaluation of non-remedial actions.

#### Technical Feasibility:

This option could be implemented immediately. The short-term effectiveness would be poor since sediment impacts remain in place that present a potential ecological risk. The long-term effectiveness would be satisfactory since natural processes will cover and/or dilute concentrations over time through deposition of clean sediment. The impacted section of Military Creek was small and had little human presence under current site conditions presenting low exposure risk. Under future use conditions (recreational path), the effectiveness of this option would be poor.

Restoration Timeframe: The restoration timeframe was expected to be long. Site investigation data indicated that contaminant concentrations have been persistent over time.

#### Economic Feasibility:

This option is economically feasible and has no cost to implement.

### 6.2.2 RAO No. 2 – Institutional Controls

#### Technology Description:

This option included the implementation of legal requirements designed to protect public health and the environment. These are referred to as institutional controls or continuing obligations, and would be applied to the property even after it is sold. Each subsequent owner would be responsible for maintaining and complying with institutional controls. The following institutional controls were assumed:

- Zoning Restrictions and/or Deed Covenants: Restricts the allowable use for the Site.
- Manage Contaminated Sediment that is Excavated: In the event that sediment needs to be removed, such as for maintenance or replacement (planned or unplanned) of the existing culvert beneath County Highway E, the owner must ensure that proper sampling, management, and disposal will occur. Management and disposal must be in compliance with state and federal laws. By example, if the invert of a replacement culvert was set at a lower elevation, controls would need to be put in place to prevent or reduce the downstream migration of sediment deposits from upstream of the culvert. Such controls may include additional sediment characterization proximal to the culvert.
- Notification of Workers: If any work occurs in contaminated areas, the owner must inform all workers of known contamination and required personal protection equipment.
- Notification of Public: The owner must install and maintain signage describing known contamination, threats to human health, and not to disturb sediment. Signs must be located at locations of public access to Military



Creek, particularly at the interface of the proposed recreational path and the area from transect T13 to transect T12.

Regulatory Issues:

This option would satisfy requirements stipulated in the 1998 spill agreement between CMC Co., Inc. and WDNR. WDNR Case Closure (NR726) with residual contamination and GIS registry listing with continuing obligations was assumed to be required.

Technical Feasibility:

This option could be readily implemented. Completion of the WDNR Case Closure Request was estimated to take approximately 6 months. Following closure approval, signage was estimated to be manufactured and installed within 6 months. The short-term and long-term effectiveness would be administratively satisfactory in providing protectiveness to human health under current and future conditions. The short-term effectiveness to the environment would be poor since sediment impacts remain in place for potential wildlife exposure. The long-term effectiveness to the environment would be satisfactory since natural processes will cover and/or dilute concentrations over time through deposition of clean sediment.

Restoration Timeframe: The restoration timeframe was expected to be long. Site investigation data indicated that contaminant concentrations have been persistent over time.

Economic Feasibility:

The capitol costs to implement this remedial option was estimated at \$38,500. Annual maintenance costs were assumed to maintain and replace site signage. The total unadjusted cost (i.e., no discount factor for present value) including 30 years of annual maintenance was estimated at \$60,500.

### 6.2.3 RAO No. 3 – Targeted Sediment Removal with Cover Placement

Technology Description:

This option included removing up to 30 inches of sediment and placing a 6-inch thick cover of clean cover material (e.g., sand) from transect T13 to transect T12. This option would remove delineated sediment impacts and place a clean cover material to mitigate potential residual contaminants below the removal interval.

The estimated surface area between transect T13 and T12 is approximately 3,300 ft<sup>2</sup>, which equates to approximately 305 cubic yards (CY) of sediment removal. It was assumed that removed sediments would need to be dewatered on a temporary sediment management pad using a stabilizing agent such as Portland cement. Stabilized sediment would be transported off site for disposal at a licensed non-hazardous disposal facility. Following sediment removal, the exposed sediment surface would be sampled to document residual conditions and 6 inches of clean sand would be placed as a clean substrate for recolonization of benthic organisms.

Supporting work for this option would include the following elements:

- Pre-design sediment sampling.
- Final design or remedial action.
- Permitting, bidding, and contracting to perform remedial action.
- Site preparation, including erosion controls, access tracking pad, access road, sediment management pad, and tree clearing to access Military Creek.
- Documentation sampling of post-dredge sediment surface and of cover material thickness.
- Removal/Disposal of temporary facilities following completion of remedial action.
- Site restoration (e.g., seeding disturbed areas)



Regulatory Issues:

This option would satisfy requirements stipulated in the 1998 spill agreement between CMC Co., Inc. and WDNR. Permits would be required authorizing work in a waterbody. Removed sediment would need to be properly characterized for offsite disposal. It was assumed that WDNR Case Closure (NR726) would be required.

Technical Feasibility:

Sediment removal and cover placement are common remedial actions that could be implemented following final design and permitting. The short-term effectiveness would be satisfactory since impacted sediment would be physically removed from Military Creek; however, this option would destroy any existing benthic habitat in the sediment removal area. The long-term effectiveness would be good since natural processes would deposit clean sediment on the placed cover material to re-establish the benthic habitat. Disruption of the placed cover would be expected to be low due to low flow velocities and the lack of human presence. The short-term and long-term effectiveness would be satisfactory in providing protectiveness to human health under current and future conditions.

Restoration Timeframe:

The restoration timeframe was expected to be relatively short (i.e., less than 5 years) for final design and implementation.

Economic Feasibility:

The capitol costs to implement this remedial option was estimated at \$326,000. No annual operation and maintenance costs were assumed.

### 6.3 Evaluation and Recommendation

Based on findings presented in the SI section of this report, Military Creek sediments present a low ecological risk potential. An area of potential ecological risk was identified directly adjacent to the site where concentrations of TEQ<sub>WHO-Fish</sub> in surface sediment exceeded the ecologically-relevant PEC. A review of historical resources that detailed no to low risk in feral and caged fish and sediment toxicity studies in invertebrates supported the assessment detailed in Table 6. In general, the potential for risk to humans was considered minimal given that the contamination was in submerged sediment and that access and recreational use is limited to Military Creek. Further, historic resources indicated that concentrations of dioxin equivalents in fish were well below advisory levels. Recreational use was expected to be limited to small boat use (e.g., canoes and kayaks) and use of a planned recreational path, in and on which users were unlikely to come in contact with the creek sediment.

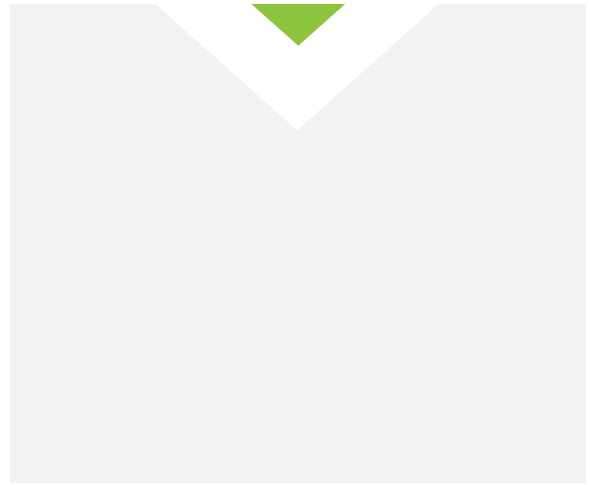
- RAO No. 1 (no action) was included to provide a comparison with other options. The no action option was ruled out due to concern for alternate future use scenarios that might increase human contact with sediments.
- RAO No. 2 (institutional controls) fit well with the existing and anticipated site use for Military Creek. There is minimal existing human use of Military Creek that would present a risk of contacting impacted sediment. Future uses of Military Creek would need to consider existing conditions and include access controls as appropriate, depending on the future use, including the appropriate documentation and implementation of institutional controls. This option could be implemented in a reasonable timeframe and with reasonable cost.
- RAO No. 3 (targeted sediment removal with cover placement) would be technically acceptable as an appropriate remedial option to address contaminated sediment; however, the economic feasibility would not be appropriate for the small quantity of targeted impacted sediment exhibiting potential ecological risk. On a per cubic yard basis of sediment addressed, RAO No. 3 would mitigate potential risk at a unit cost of \$1,069/CY while RAO No. 2 would mitigate potential risk at a unit cost of approximately \$198/CY. Considering the magnitude of the potential risk compared to the economic cost to implement this option, RAO No. 3 was ruled out of consideration.

Based on data presented in the SI section of this report, the screening of data against SQGs, and the feasibility of identified Remedial Action Options, RAO No. 2 (institutional controls) was the recommended remedial option. The no action option was ruled out as not protective for alternate future use scenarios that might increase human contact with sediments. The dredge and cover option was ruled out due to the extremely high total and unit cost for implementation to reduce the de minimis risk that exists at the Site for invertebrates and fish. The recommended remedial action is the use of institutional controls, which can mitigate potential risks that may result from future use scenarios. Institutional controls are anticipated to include zoning/deed restrictions, access controls as appropriate depending on future use plans, and the installation and maintenance of notification signs. WDNR NR726 Case Closure with residual contamination and geographic information system (GIS) registry would be required. Institutional controls were also anticipated to be protective of human health for the intended recreational path at the Site.

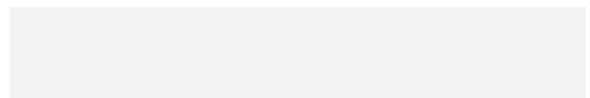
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**TABLES**



**Table 1. Sediment Thickness Measurements**

Military Creek Site investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Transect	Left Bank		Mid-Channel		Center		Mid-Channel		Right Bank		Average Sediment Thickness	Comments
	Water Depth	Sediment Thickness	Water Depth	Sediment Thickness	Water Depth	Sediment Thickness	Water Depth	Sediment Thickness	Water Depth	Sediment Thickness		
1	0.4	0.6	0.4	0.7	0.7	0.6	0.7	0.6	0.5	0.6	0.6	Sandy
2	1.2	0.2	1.5	0.1	1.5	0.2	1.3	0.1	1.2	0.3	0.2	Sand with gravel and rocks
3	1.1	0.5	1.3	0.1	1.2	0.4	1.3	0.3	1.3	0.2	0.3	Sandy gravel
4	1.0	0.3	1.6	0.0	1.6	0.0	1.3	0.0	1.2	0.4	0.1	Sand with gravel and rocks
5	1.6	0.2	2.3	0.3	2.3	0.2	1.1	0.4	0.8	0.5	0.3	Sand and gravel. Some organics
6	1.2	1.0	1.9	1.3	2.0	0.5	2.0	1.0	0.5	0.6	0.9	Soft sediment
7	0.5	1.4	1.9	1.0	1.8	1.3	2.0	0.6	0.6	0.7	1.0	Soft sediment
8	2.1	1.0	2.2	0.9	1.7	0.3	1.8	0.5	1.4	0.7	0.7	Soft sediment
9	1.6	0.9	1.7	0.5	1.6	0.2	1.3	0.1	1.4	0.1	0.4	Sandy gravel
10	1.9	0.8	3.7	1.0	3.2	0.3	2.8	1.1	1.2	0.1	0.7	Soft sediment and sand
11	1.2	2.3	1.7	4.4	3.5	0.1	2.0	2.9	0.6	1.0	2.1	Soft sediment
12	1.0	0.9	2.4	1.6	3.0	1.3	3.1	1.3	2.4	2.4	1.5	Soft sediment
13	3.7	5.7	4.9	4.6	5.1	2.7	5.0	3.2	5.2	2.4	3.7	Soft sediment
14	3.6	4.4	4.5	2.7	4.6	3.8	5.1	3.2	4.7	3.4	3.5	Soft sediment
15	3.8	3.1	5.3	2.0	5.1	2.2	5.4	1.4	5.3	0.9	1.9	Soft sediment
16	6.0	3.8	5.7	4.5	5.5	2.0	3.4	3.1	2.8	1.8	3.0	Soft sediment
17	3.7	3.6	4.0	3.9	5.0	3.0	5.7	1.1	4.2	0.3	2.4	Soft sediment
18	5.0	3.8	5.1	3.9	5.3	2.8	5.0	4.7	4.8	4.1	3.9	Soft sediment
19	4.6	2.8	4.5	3.1	5.8	1.2	5.7	1.8	4.9	3.0	2.4	Soft sediment
20	5.9	1.7	6.0	2.4	6.0	2.2	5.5	4.1	5.1	4.1	2.9	Soft sediment

**Notes:**

1. All measurements are reported in Feet.
2. Transect measurement locations are based on facing upstream.
3. Comments on sediment type are subjective based on sampler feel and visual observation of sediment on poling rod



**Table 2. Stream Flow Measurements**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Transect	Left Bank		Mid-Channel		Center		Mid-Channel		Right Bank		Average Velocity
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
1	0.43	0.74	0.11	0.96	0.86	1.27	0.83	1.52	0.85	1.42	0.90
2	0.57	1.38	0.61	0.81	0.48	0.81	0.31	0.54	0.73	0.83	0.71
3	0.47	0.63	0.31	0.62	0.28	0.91	0.38	0.85	NM	NM	0.56
9	0.24	0.40	0.45	0.58	0.30	0.45	0.25	0.36	0.21	0.27	0.35
10	0.00	0.00	0.06	0.11	0.17	0.44	0.31	0.33	0.08	0.13	0.16
16	0.01	0.09	0.00	0.04	0.01	0.05	0.02	0.05	0.00	0.01	0.03
18	0.01	0.02	0.04	0.06	0.12	0.17	0.02	0.06	0.03	0.06	0.06

**Notes:**

1. All measurements are reported in feet per second (fps). Velocity measurements were collected for approximately 120 seconds per location
2. Transect measurement locations are based on facing upstream.
3. NM = no measurement recorded at the location.



**Table 3. Sediment Analytical Results**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			102016035	102016036	101916027	101916028	101916024	101916025	101916021	101916022	101916018	101916019	101816008	101816009
Station Name:			SED-01		SED-02		SED-03		SED-04		SED-05		SED-06	
Sample Depth (feet):			0-0.5	0.5-1.5	0-0.5	0.5-1.5	0-0.5	0.5-1.5	0-0.5	0.5-1.5	0-0.5	0.5-1.5	0-0.5	0.5-1.5
Sample Date:			10/20/2016	10/20/2016	10/19/2016	10/19/2016	10/19/2016	10/19/2016	10/19/2016	10/19/2016	10/19/2016	10/19/2016	10/18/2016	10/18/2016
GEO	Moisture Content <sup>5</sup>	(%)	90.3	85.5	91.9	87.2	46.3	55.4	91.4	75.4	35.8	16.9	92	77.3
Organic	Carbon, Total Organic	(mg/kg)	268,000	353,000	317,000	216,000	19,300	30,900	245,000	128,000	19,400	649	350,000	95,900
Organic	Carbon, Total Organic	(%)	26.8	35.3	31.7	21.6	1.93	3.09	24.5	12.8	1.94	0.0649	35	9.59
TEQ	TEQ (EPA-89 TEF) <sup>1</sup>	(ng/Kg)	1.02	0.92	307.8	23.64	781.7	3139.4	360.5	1241.9	73.81	0.78	802.0	1011.7
TEQ	TEQ (EPA-89 TEF) @ 1% TOC	(ng/Kg)	0.04	0.03	9.71	1.09	405.0	1016.0	14.71	97.02	38.05	11.96	22.92	105.5
TEQ	TEQ (WHO-98 TEF) <sup>2</sup>	(ng/Kg)	1.11	1.04	168.8	13.55	424.9	1759.7	201.7	606.4	39.18	0.59	413.0	473.7
TEQ	TEQ (WHO-98 TEF) @ 1% TOC	(ng/Kg)	0.04	0.03	5.33	0.63	220.2	569.5	8.23	47.37	20.19	9.12	11.80	49.40
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	3.6 J	1 J	6,500	470	17,000 E	75,000 EDN2	7,800	31,000 DN2	1,600	11	18,000 E	25,000 E
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	< 0.27	< 0.32	47	3.9 J	100	370	48	160	10	< 0.16	110	140
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	< 0.29	< 0.32	260	18 J	740	2,800	340	960	65	0 IJ	690	810
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	< 0.26	< 0.25	100	7.2 J	230	780	110	310	25	0.21 J	220	280
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	< 0.3	< 0.26	11 J	0 IJ	27	89	15 J	42	2.6 J	< 0.08	26 J	33
Dioxin	2,3,7,8-TCDD	(ng/Kg)	< 0.34	< 0.34	< 2.3	< 0.65	2.1	9.3	0.97 J	2.4	0 IJ	< 0.12	2.1 J	2.1 J
Dioxin	OCDD	(ng/Kg)	29 J	6.2 J	72,000 E	5,700	170,000 EDN2	570,000 EDN2	73,000 E	310,000 EDN2	17,000 E	120	190,000 DN2	270,000 EDN2
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	1 J	0.47 J	2,200	150	5700 E	27,000 DN2	2,600	12,000 DN2	580	4.6 J	7,900	11,000 E
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	< 0.32	< 0.24	200	14 J	570	2,500 DN2	210	960 DN2	52	0.38 J	680	920
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	< 0.21	< 0.16	250	17 J	620	2,500	290	890	58	0 IJ	460	300
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	< 0.23	< 0.16	110	9 J	230	1,000	110	360	24	0 IJ	300	400
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	< 0.27	< 0.23	76	5.8 J	250	1,100	110	190	20	< 0.15	200	160
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	< 0.45	< 0.34	29 J	2.2 J	0 P	270	41	76	8	< 0.11	63	67
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	< 0.28	< 0.22	110	8.3 J	280	1,200	130	390	25	0 IJ	300	370
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	< 0.25	< 0.22	67	5.3 J	190	820	93	170	15	0.24 J	130	110
Furan	2,3,7,8-TCDF	(ng/Kg)	1.2 J	1.3 J	7.2 V	1.8 J	15 V	71 V	9.9 V	11 V	1.3 V	< 0.12	9.9 V	5.6 V
Furan	OCDF	(ng/Kg)	2.6 J	0 IJ	8,000	540	18,000 DN2	65,000 DN2	9,600	53,000 DN2	2,300	16	34,000 DN2	49,000 DN2

**Qualifiers / Definitions:**

< = Concentration is less than reported limit  
 U = Concentration was not detected above the reported limit  
 J = Concentration estimated  
 L = Analyte recovery in the laboratory control sample was outside quality control limits. Results may be biased low

D = Result obtained from analysis of diluted sample  
 E = Exceeds calibration range  
 EDL = Estimated Detection Limit  
 N2 = Value obtained from additional analysis  
 V = Result verified by confirmation analysis

ng/Kg = nanograms per kilogram  
 TEQ = Total 2,3,7,8-TCDD Equivalence  
 TEF = Toxic Equivalency Factors to 2,3,7,8-TCDD  
 GEO = Geotechnical Property  
 Results reported on a dry weight basis

**Notes:**

1. TEQs calculated using 1989 USEPA Interim TEF Values  
 2. TEQs calculated using 1998 World Health Organization TEF Values for fish.  
 3. For concentrations reported as non detect, the reported detection limit was used in TEQ calculations.  
 4. For concentrations reported as estimated, the reported estimated value was used in TEQ calculations.  
 5. Sample-specific moisture content of sediment expressed as percent



**Table 3. Sediment Analytical Results**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			102016032	102016033	102016030	102016031	101816012	101816013	101816011	101816015	101816016	101816017	101716001	101716002
Station Name:			SED-101		SED-102		SED-103		SED-104	SED-105			SED-106	
Sample Depth (feet):			0-0.5	0.5-1.5	0-0.5	0.5-1.5	0-0.5	0.5-1.5	0-0.4	0-0.5	0.5-1.4	0.5-1.4	0-0.5	0.5-1.4
Sample Date:			10/20/2016	10/20/2016	10/20/2016	10/20/2016	10/18/2016	10/18/2016	10/18/2016	10/18/2016	10/18/2016	10/18/2016	10/17/2016	10/17/2016
GEO	Moisture Content <sup>5</sup>	(%)	90.6	87.8	92.2	88.2	28	21.6	24.6	8.6	58.7	38.7	14.5	5.2
Organic	Carbon, Total Organic	(mg/kg)	146,000	165,000	279,000	226,000	17,800	38,300	11,100	5,310	76,100	43,500	2,360	1,610
Organic	Carbon, Total Organic	(%)	14.6	16.5	27.9	22.6	1.78	3.83	1.11	0.531	7.61	4.35	0.236	0.161
TEQ	TEQ (EPA-89 TEF) <sup>1</sup>	(ng/Kg)	2.83	2.14	2.27	0.85	45.40	0.43	14.67	5.38	2.31	1.93	0.40	0.40
TEQ	TEQ (EPA-89 TEF) @ 1% TOC	(ng/Kg)	0.19	0.13	0.08	0.04	25.50	0.11	13.22	10.14	0.30	0.44	1.70	2.49
TEQ	TEQ (WHO-98 TEF) <sup>2</sup>	(ng/Kg)	2.17	1.81	1.98	0.94	24.19	0.35	9.12	3.40	1.35	1.20	0.38	0.37
TEQ	TEQ (WHO-98 TEF) @ 1% TOC	(ng/Kg)	0.15	0.11	0.07	0.04	13.59	0.09	8.21	6.40	0.18	0.28	1.59	2.27
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	39	20 J	27	2 J	950	5.8	290	110	45	38	4 J	4.1 J
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0 IJ	< 0.24	0.55 J	< 0.26	5.3 J	< 0.083	2.8 J	1.1 J	0.4 J	0.41 J	< 0.16	< 0.16
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	2.1 J	0.82 J	1.4 J	< 0.29	39	0.18 J	15	5	1.7 J	1.6 J	0.21 J	0 IJ
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.92 J	0.4 J	0.64 J	< 0.26	11	< 0.091	5.8	1.6 J	0.72 J	0.63 J	< 0.17	0.21 J
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	< 0.42	< 0.35	< 0.45	< 0.23	1.5 J	< 0.078	0.73 J	0.32 J	< 0.11	< 0.092	< 0.057	< 0.052
Dioxin	2,3,7,8-TCDD	(ng/Kg)	< 0.41	< 0.6	< 0.36	< 0.28	< 0.16	< 0.083	< 0.11	< 0.091	< 0.2	< 0.12	< 0.095	< 0.1
Dioxin	OCDD	(ng/Kg)	370	230	230	13 J	11,000 E	65	2,500	970	510	360	38	51
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	12 J	7.1 J	10 J	0 IJ	360	2.7 J	100	41	21	15	0 IJ	1.3 J
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0 IJ	0 IJ	1.1 J	< 0.29	35	0.21 J	9.6	3.7 J	1.6 J	1.2 J	< 0.15	< 0.15
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	1.5 J	0.87 J	1.4 J	0.23 J	35	0 IJ	12	3.4 J	1.3 J	1.2 J	0.16 J	0.13 J
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0 IJ	0.52 J	0 IJ	< 0.17	17	0.14 J	5 J	1.6 J	0.56 J	0.46 J	< 0.13	0 IJ
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.71 J	< 0.26	0.47 J	< 0.16	16	< 0.084	5 J	1.4 J	0.36 J	0.44 J	< 0.16	< 0.072
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	< 0.55	< 0.48	< 0.31	< 0.49	5.4 J	< 0.085	1.9 J	0.61 J	< 0.14	0.18 J	0 IJ	< 0.054
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	1.1 J	< 0.26	0.71 J	< 0.22	6.4	0.17 J	6.3	2.2 J	0.78 J	0 IJ	< 0.13	< 0.086
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.73 J	0.65 J	0.62 J	< 0.24	11	< 0.07	4.1 J	1.6 J	0.31 J	0.45 J	0 IJ	0.11 J
Furan	2,3,7,8-TCDF	(ng/Kg)	1.4 J	1.4 J	1.5 J	1.1 J	0.96 J	0.2 J	0.54 J	0.25 J	0.4 J	0.34 J	0.16 J	< 0.12
Furan	OCDF	(ng/Kg)	34 J	27 J	29 J	0 IJ	1,200	9.4 J	310	130	85	57	5.5 J	5.1 J

**Qualifiers / Definitions:**

< = Concentration is less than reported limit  
 U = Concentration was not detected above the reported limit  
 J = Concentration estimated  
 L = Analyte recovery in the laboratory control sample was outside quality control limits. Results may be biased low

D = Result obtained from analysis of diluted sample  
 E = Exceeds calibration range  
 EDL = Estimated Detection Limit  
 N2 = Value obtained from additional analysis  
 V = Result verified by confirmation analysis

ng/Kg = nanograms per kilogram  
 TEQ = Total 2,3,7,8-TCDD Equivalence  
 TEF = Toxic Equivalency Factors to 2,3,7,8-TCDD  
 GEO = Geotechnical Property  
 Results reported on a dry weight basis

**Notes:**

1. TEQs calculated using 1989 USEPA Interim TEF Values  
 2. TEQs calculated using 1998 World Health Organization TEF Values for fish.  
 3. For concentrations reported as non detect, the reported detection limit was used in TEQ calculations.  
 4. For concentrations reported as estimated, the reported estimated value was used in TEQ calculations.  
 5. Sample-specific moisture content of sediment expressed as percent





**Table 3. Sediment Analytical Results**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			101716003	101716004	101716005	101716006	101716007
Station Name:			SED-107		SED-108		
Sample Depth (feet):			0-0.5	0.5-0.7	0-0.5	0.5-1.4	0.5-1.4
Sample Date:			10/17/2016	10/17/2016	10/17/2016	10/17/2016	10/17/2016
GEO	Moisture Content <sup>5</sup>	(%)	17.1	14.8	9	13.1	13.6
Organic	Carbon, Total Organic	(mg/kg)	1,390	1,810	2,960	6,290	16,500
Organic	Carbon, Total Organic	(%)	0.139	0.181	0.296	0.629	1.65
TEQ	TEQ (EPA-89 TEF) <sup>1</sup>	(ng/Kg)	0.24	0.75	29.60	0.40	0.62
TEQ	TEQ (EPA-89 TEF) @ 1% TOC	(ng/Kg)	1.73	4.16	99.99	0.63	0.38
TEQ	TEQ (WHO-98 TEF) <sup>2</sup>	(ng/Kg)	0.24	0.76	7.46	0.43	0.65
TEQ	TEQ (WHO-98 TEF) @ 1% TOC	(ng/Kg)	1.70	4.20	25.21	0.68	0.39
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	1.5 J	6.4	880	1.3 J	2.9 J
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	< 0.059	0.27 J	0.48 J	< 0.12	< 0.11
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	< 0.077	0.55 J	14	< 0.12	0 IJ
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	< 0.06	< 0.2	1.4 J	< 0.12	< 0.11
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	< 0.041	< 0.14	< 0.088	< 0.084	< 0.14
Dioxin	2,3,7,8-TCDD	(ng/Kg)	< 0.085	< 0.26	< 0.095	< 0.18	< 0.24
Dioxin	OCDD	(ng/Kg)	11	30	12,000 E	12	28
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.7 J	1.4 J	360	0 IJ	1.4 J
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	< 0.14	< 0.34	14	< 0.13	< 0.2
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	< 0.1	0 IJ	2.5 J	< 0.093	0 IJ
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	< 0.088	< 0.17	1.4 J	< 0.073	0.15 J
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	< 0.097	< 0.27	0 IJ	< 0.1	< 0.13
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	< 0.05	< 0.14	0.1 J	< 0.079	< 0.16
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	< 0.077	< 0.19	2.4 J	< 0.069	0.12 J
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	< 0.04	0 IJ	0.27 J	0 IJ	0 IJ
Furan	2,3,7,8-TCDF	(ng/Kg)	0.2 J	< 0.33	0.26 J	0.24 J	< 0.19
Furan	OCDF	(ng/Kg)	1.7 J	0 IJ	2,500	0 IJ	5.8 J

[O:ECK 1/26/17 - C:KJB 1/27/17][U:ECK 5/4/18]

**Qualifiers / Definitions:**

< = Concentration is less than reported limit  
 U = Concentration was not detected above the reported limit  
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 L = Analyte recovery in the laboratory control sample was outside quality control limits. Results may be biased low

D = Result obtained from analysis of diluted sample  
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 N2 = Value obtained from additional analysis  
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ng/Kg = nanograms per kilogram  
 TEQ = Total 2,3,7,8-TCDD Equivalence  
 TEF = Toxic Equivalency Factors to 2,3,7,8-TCDD  
 GEO = Geotechnical Property  
 Results reported on a dry weight basis

**Notes:**

1. TEQs calculated using 1989 USEPA Interim TEF Values
2. TEQs calculated using 1998 World Health Organization TEF Values for fish.
3. For concentrations reported as non detect, the reported detection limit was used in TEQ calculations.
4. For concentrations reported as estimated, the reported estimated value was used in TEQ calculations.
5. Sample-specific moisture content of sediment expressed as percent



**Table 8 - Remedial Action Options**

Military Creek Site Investigation / Remedial Action Options  
 C.M.Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Remedial Action Option	Remedial Action Option Description	EFFECTIVENESS			IMPLEMENTABILITY		COST
		Ability / Timeframe to Meet site-specific Objectives	Long-term and Short-term Effects	Proven and Reliability	Technical Feasibility	Administrative / Regulatory Feasibility	Relative Cost
No Action	<ul style="list-style-type: none"> <li>No action taken to reduce, monitor, or control site risks.</li> </ul>	<ul style="list-style-type: none"> <li>Does not reduce potential exposure to or disturbance of contaminated sediment.</li> </ul>	<ul style="list-style-type: none"> <li>No added risk during short term.</li> <li>Does not provide short-term effectiveness to achieve site-specific objectives.</li> <li>Does provide long-term effectiveness to achieve site-specific objectives through natural clean sediment deposition.</li> </ul>	<ul style="list-style-type: none"> <li>Not reliable</li> </ul>	<ul style="list-style-type: none"> <li>Easily implemented.</li> </ul>	<ul style="list-style-type: none"> <li>Satisfies requirements of 1998 Spill Agreement.</li> </ul>	Very Low
Institutional Controls / Continuing Obligations	<ul style="list-style-type: none"> <li>Zoning Restrictions: Restrict land use within a given area through zoning ordinances.</li> </ul>	<ul style="list-style-type: none"> <li>Achieves site-specific objectives over short and long-term.</li> </ul>	<ul style="list-style-type: none"> <li>No added risk during short term.</li> <li>Provides short and long-term effectiveness for protection to humans.</li> <li>Provides long-term effectiveness to wildlife through natural clean sediment deposition.</li> <li>Protects existing habitat and biological community.</li> <li>Effective for limiting human access.</li> <li>Requires management of any removed sediment in accordance with state and federal regulations.</li> </ul>	<ul style="list-style-type: none"> <li>Administratively reliable.</li> <li>Physical controls relies on compliance by public.</li> <li>Physical controls need to be maintained to ensure protection of receptors.</li> </ul>	<ul style="list-style-type: none"> <li>Easily implemented.</li> <li>Requires long-term maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>Administratively implementable.</li> <li>Assumed to require WDNR Case Closure (NR726) with residual contamination and GIS registry listing.</li> <li>Satisfies requirements of 1998 Spill Agreement.</li> </ul>	Low
	<ul style="list-style-type: none"> <li>Deed Covenants: Limit activities that would increase risk, and manage further development with legal instruments of property transfer (e.g., deeds, easements, mortgages, leases, WDNR GIS Registry).</li> </ul>						
	<ul style="list-style-type: none"> <li>Fencing/Signs: Controls that are installed to prevent access and/or warn of the presence of site-related contaminants.</li> </ul>						
30-Inch Sediment Removal with 6-Inch Sand Cover	<ul style="list-style-type: none"> <li>Sediments are removed by means of mechanical dredging/excavating equipment. Dredged sediments are handled and managed on site to condition sediment (e.g., dewater) for off-site disposal. Six inch sand cover placed to mitigate potential residual concentrations.</li> </ul>	<ul style="list-style-type: none"> <li>Achieves site-specific objectives in short-term.</li> </ul>	<ul style="list-style-type: none"> <li>Effective at rapidly reducing risk to ecological receptors.</li> <li>Long-term effectiveness for controlling contaminated sediment transport.</li> <li>Moderate potential short term exposure risk to construction worker and public during material handling, processing, and disposal.</li> <li>Short-term disruption to benthic community and aquatic habitat.</li> <li>Contaminated sediments may resuspend and be transported downstream during implementation.</li> </ul>	<ul style="list-style-type: none"> <li>Proven and reliable strategy for managing contaminated sediments.</li> </ul>	<ul style="list-style-type: none"> <li>Requires engineering for final design of remedial action, including dredge area design, sediment dewatering and handling, and contact water treatment.</li> <li>Requires development of construction plans, specifications, and contract documents to execute the work.</li> <li>Extensive amounts of shoreline vegetation makes access and implementation difficult.</li> <li>Limited to availability of space for staging and handling of dredge material and water treatment system, if needed.</li> <li>Requires identification and use of appropriate disposal facility, including transportation.</li> </ul>	<ul style="list-style-type: none"> <li>Requires regulatory agency permitting.</li> <li>Requires appropriate identification and disposal facility including transportation.</li> <li>Satisfies requirements of 1998 Spill Agreement.</li> </ul>	High



**Table 9 - Remedial Action Options Estimated Costs**

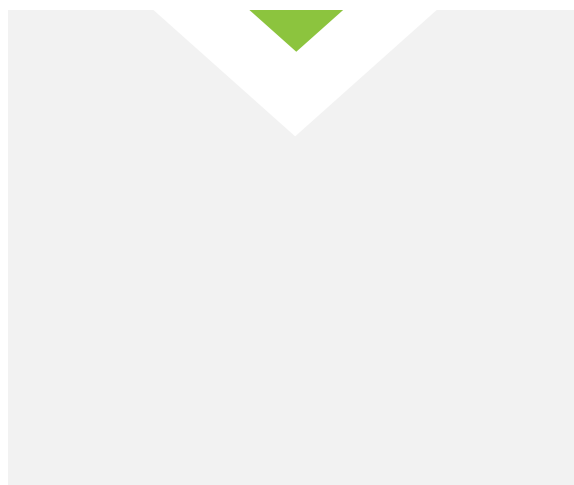
Military Creek Site Investigation / Remedial Action Options  
 C.M.Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Remedial Action Options	Total Capital Cost	Total Present Value of O&M Cost	Total Present Value Cost of Alternative	Total O&M Cost, No Discount Factor	Total Alternative Cost, No Discount Factor
1 – No Action	\$ -	\$ -	\$ -	\$ -	\$ -
2 – Institutional Controls / Continuing Obligations	\$ 38,500	\$ 9,000	\$ 47,500	\$ 22,000	\$ 60,500
3 – 30-Inch Dredge and 6-Inch Sand Cover	\$ 326,000	\$ -	\$ 326,000	\$ -	\$ 326,000

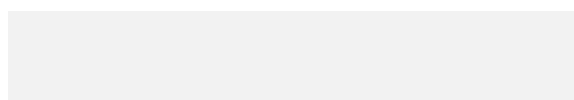
**Notes:**

1. Total Capital Costs include professional services (e.g., design, oversight, project management).
2. Present value costs, if applicable, assume a discount rate of 7% over a 30-year analysis period.
3. Total Operation & Maintenance (O&M) costs are applied over a 30-year analysis period with no discount factor.





**FIGURES**









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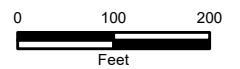


LEGEND

-  SEDIMENT CORE LOCATION - OCTOBER 2016
-  PREVIOUS SEDIMENT SAMPLE LOCATION RESAMPLED - OCTOBER 2016
-  SEDIMENT THICKNESS POLING TRANSECT
-  SEDIMENT THICKNESS POLING TRANSECT WITH STREAM VELOCITY

MILITARY CREEK  
SITE INVESTIGATION

SITE INVESTIGATION /  
REMEDIAL ACTION OPTIONS REPORT  
PHELPS, VILAS COUNTY, WISCONSIN

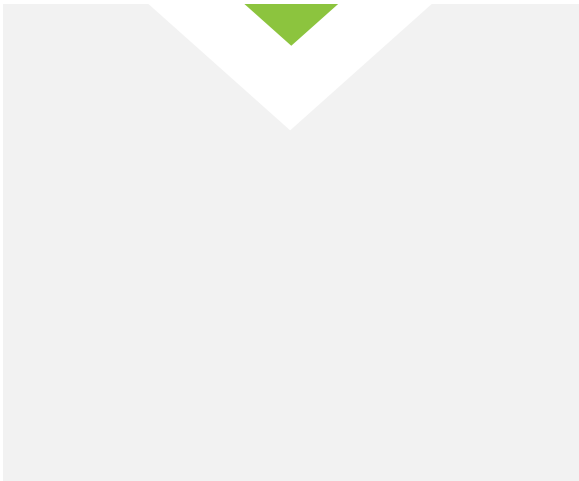


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DATE 5/3/2018

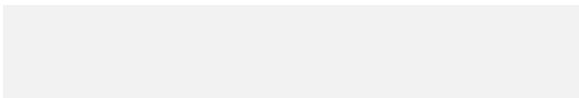


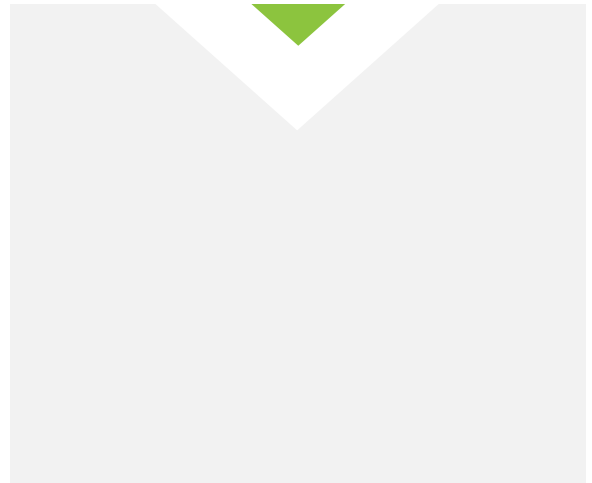
O'BRIEN & GERE ENGINEERS, INC.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

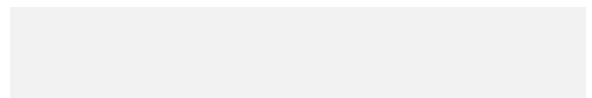


**APPENDIX A**  
**ANALYTICAL LAB REPORTS**





**APPENDIX B**  
**REMEDIAL ACTION**  
**OPTION DETAILED COST**  
**ESTIMATES**



**RAO 1 - No Action****Cost Estimate Summary Worksheet**

**Site:** C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
**Phase:** Remedial Action Options Evaluation ( -30% to +50% )

**Description:** No Action

DESCRIPTION	QTY	UNIT	UNIT COST	ITEM COST	SUBTOTAL	ASSUMPTIONS/REFERENCES
<b>CAPITAL COSTS</b>						
<b>Total Capital Costs</b>					\$	-
<b>OPERATIONS AND MAINTENANCE COSTS</b>						
<b>Total Cost of Annual And Periodic Maintenance, No Discount Factor</b>					\$	-
<b>Present Worth of Annual Costs (30 Year Analysis Period and a 7% Discount Rate)</b>					\$	-
<b>Present Worth of Periodic Costs (30 Year Analysis Period and a 7% Discount Rate)</b>					\$	-
<b>Total Present Worth of Alternative</b>					\$0	

Date: 6/16/17  
Estimated By: AMM  
Reviewed By: LLP





## RAO 2 - Institutional Controls / Continuing Obligations

## Cost Estimate Summary Worksheet

**Site:** C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
**Phase:** Remedial Action Options Evaluation ( -30% to +50% )

**Description:** Implement site controls through zoning restrictions, deed covenants, and site signage. Option includes completing WDNR NR726 Case Closure with residual contamination and GIS registry

DESCRIPTION	QTY	UNIT	UNIT COST	ITEM COST	SUBTOTAL	ASSUMPTIONS/REFERENCES
<b>CAPITAL COSTS</b>						
<i>Sign Installation</i>						
Sign Fabrication	10	Each	\$28	\$280		Assumes 10 notification signs along Military Creek Material and labor for installation
Sign Installation	10	Each	\$50	\$495		
<i>SUBTOTAL</i>					\$ 775	
<i>Professional Services</i>						
WDNR NR726 Case Closure	1	LS	\$30,000	\$30,000		Prepare and submit closure package
<i>SUBTOTAL</i>					\$ 30,000	
<i>Contingency</i>						
Bid Estimating Contingency: 10% of Total Capital Costs				\$3,078		
Scope Estimating Contingency: 15% of Total Capital Costs				\$4,616		
<i>SUBTOTAL</i>					\$ 7,694	
<b>Total Capital Costs</b>					<b>\$ 38,500</b>	
<b>OPERATIONS AND MAINTENANCE COSTS</b>						
<i>Annual Operations and Maintenance - Cost Per Year</i>						
Inspect Signs	1	LS	\$500	\$500		
Replacment Signs	1	Each	\$28	\$28		Assumes 10% of signs need replacement each year
Labor to Install Signs	1	Eah	\$50	\$50		Assumes 10% of signs need replacement each year
Scope Estimating Contingency: 15% of Total Capital Costs				\$87		
<i>SUBTOTAL</i>					\$ 722	
<b>Total Cost of Annual And Periodic Maintenance (30 Year Period and No Discount Factor)</b>					<b>\$ 22,000</b>	
<b>Present Worth of Annual Costs (30 Year Analysis Period and a 7% Discount Rate)</b>					<b>\$ 9,000</b>	
<b>Present Worth of Periodic Costs (30 Year Analysis Period and a 7% Discount Rate)</b>					<b>\$ -</b>	
<b>Total Present Worth of Alternative</b>					<b>\$ 47,500</b>	

Date: 6/16/17

Estimated By: AMM

Reviewed By: LLP



## RAO 3 - 30-Inch Dredge & 6-Inch Sand Cover

## Cost Estimate Summary Worksheet

**Site:** C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
**Phase:** Remedial Action Options Evaluation ( -30% to +50% )

**Description:** Dredge sediment characterized as having probable ecological risk for off-site disposal. Dredge to depth of 30 inches and replace with 6 inches of clean sand cover.

DESCRIPTION	QTY	UNIT	UNIT COST	ITEM COST	SUBTOTAL	ASSUMPTIONS/REFERENCES
<b>CAPITAL COSTS</b>						
<i>Site Preparation</i>						
Mob./Demob.	1	LS	\$5,630	\$5,630		Assumed at 3% of Construction Costs
Silt Fence Installation	350	LF	\$2.06	\$721		Assumes 350 ft of silt fence around sediment management pad and along cleared access to Military Creek.
Stabilized Construction Entrance	100	SY	\$16	\$1,586		Assumes a 50 SY stabled construction entrance from County Highway E
Sediment Management Pad	1	LS	\$21,676	\$21,676		Assumes 12" compacted 3/4" aggregate base course under laid by an impermeable 40-mil PVC geomembrane liner
Clearing and Grubbing of Trees/Vegetation	0.02	Acre	\$11,575	\$232		Assumes clearing of trees/vegetation and grubbing of stumps for access to Military Creek.
Access Road	533	SY	\$12.7	\$6,747		Assumes 200 ft long, 20 ft wide, 8" deep gravel access road from County Highway E to sediment management area and 40 ft long from sediment management area to Military Creek
<b>SUBTOTAL</b>					<b>\$ 36,591</b>	
<i>Sediment Removal</i>						
Dredging and transfer to sediment management pad.	305	CY	\$70	\$21,400		Assumes 30 inch sediment removal over approximately 3,300 sf. Unit rate based on similar project in central Wisconsin.
Dewatering and Stabilization	305	CY	\$60	\$18,300		Assumes sediment stabilization with cement or similar water binding product. Unit rate based on similar project in central Wisconsin.
Transportation to Landfill	503	Tons	\$16	\$8,200		Assumes disposal at non-hazardous landfill. Unit rate based on average of three similar projects across Wisconsin.
Landfill Disposal	503	Tons	\$38	\$19,100		Assumes disposal at non-hazardous landfill. Unit rate based on average of three similar projects across Wisconsin.
Sand (Material and Delivery)	61	CY	\$30	\$1,800		Unit rate based on similar project in central Wisconsin.
Residual Sand Cover Placement	61	CY	\$90	\$5,500		Unit rate based on similar project in central Wisconsin.
<b>SUBTOTAL</b>					<b>\$ 74,300</b>	
<i>Sediment Sampling</i>						
Sediment Disposal Characterization	2	EA	\$900	\$1,800		Assumes pre-disposal waste characterization samples.
Pre-Dredge Analysis	10	EA	\$650	\$6,500		Assumes sampling in target area for final design.
Post-Dredge Analysis	10	EA	\$650	\$6,500		Assumes sampling to characterize post-dredge surface.
Pre-dredge Sample Collection	1	LS	\$9,000	\$9,000		Labor to collect pre-dredge surface concentrations.
Post-Dredge Sample Collection	1	LS	\$9,000	\$9,000		Labor to collect post-dredge surface concentrations.
Sand Cover Thickness	1	LS	\$9,000	\$9,000		Labor to collect sand cover thickness data.
	1	Tons	\$0	\$0		
<b>SUBTOTAL</b>					<b>\$ 41,800</b>	

Date: 6/16/17

Estimated By: AMM

Reviewed By: LLP



**RAO 3 - 30-Inch Dredge & 6-Inch Sand Cover** *continued...* **Cost Estimate Summary Worksheet**

DESCRIPTION	QTY	UNIT	UNIT COST	ITEM COST	SUBTOTAL	ASSUMPTIONS/REFERENCES
<b>Site Restoration</b>						
Removal/Disposal of Temporary Facilities	731	Ton	\$52	\$38,000		Assumes disposal of sediment management pad and access roads. Unit rate is sum of transportation and disposal from "Sediment Removal"
Seeding	1,200	SY	\$2	\$2,600		Assumes hydroseed of disturbed areas from sediment management pad and access to Military Creek.
<b>SUBTOTAL</b>					<b>\$ 40,600</b>	
<b>Professional Services</b>						
Remedial Engineering Design	1	LS	\$15,463	\$15,500		Assumed at 8% based on USEPA Guide to Developing Feasibility Study Cost Estimates
Construction Oversight	1	LS	\$11,597	\$11,600		Assumed to be 6% of Remedial Contractor construction costs based on USEPA Guide to Developing Feasibility Study Cost Estimates
Project Management during Construction	1	LS	\$9,665	\$9,700		Assumed to be 5% of Remedial Contractor construction costs based on USEPA Guide to Developing Feasibility Study Cost Estimates
WDNR NR726 Case Closure	1	LS	\$30,000	\$30,000		Assumes preparation and submittal of closure package
<b>SUBTOTAL</b>					<b>\$ 66,800</b>	
<b>Contingency</b>						
Bid Estimating Contingency: 10% of Total Capital Costs				\$26,009		
Scope Estimating Contingency: 15% of Total Capital Costs				\$39,014		
<b>SUBTOTAL</b>					<b>\$ 65,023</b>	
<b>Total Capital Costs</b>					<b>\$ 326,000</b>	

**OPERATIONS AND MAINTENANCE COSTS**

**Annual Operations and Maintenance - Cost Per Year**

**SUBTOTAL** \$ - - Assumes no O&M costs

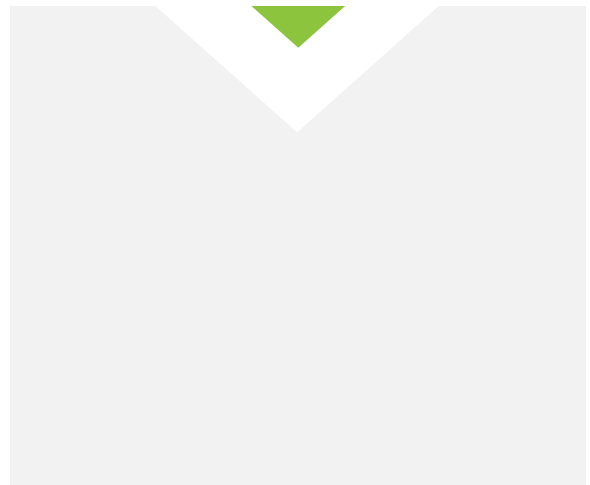
**Periodic (Every 5 Years) Operations and Maintenance - Cost Per Event**

**SUBTOTAL** \$ - - Assumes no O&M costs

<b>Total Cost of Annual And Periodic Maintenance, No Discount Factor</b>	<b>\$ -</b>
<b>Present Worth of Annual Costs (30 Year Analysis Period and a 7% Discount Rate)</b>	<b>\$ -</b>
<b>Present Worth of Periodic Costs (30 Year Analysis Period and a 7% Discount Rate)</b>	<b>\$ -</b>
<b>Total Present Worth of Alternative</b>	<b>\$ 326,000</b>

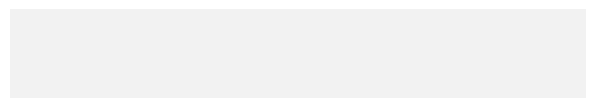
Date: 6/16/17  
 Estimated By: AMM  
 Reviewed By: LLP





## APPENDIX C

### Sediment Core Photos and Logs





Core Number: SED-01  
Date of Photo: 10/20/16



Core Number: SED-02  
Date of Photo: 10/19/16



Core Number: SED-03  
Date of Photo: 10/19/16



Core Number: SED-04  
Date of Photo: 10/19/16





Core Number: SED-05  
Date of Photo: 10/19/16



Core Number: SED-06  
Date of Photo: 10/18/16



Core Number: SED-101  
Date of Photo: 10/20/16



Core Number: SED-102  
Date of Photo: 10/20/16





Core Number: SED-103  
Date of Photo: 10/18/16



Core Number: SED-104  
Date of Photo: 10/18/16



Core Number: SED-105  
Date of Photo: 10/18/16



Core Number: SED-106  
Date of Photo: 10/17/16



Core Number: SED-107  
Date of Photo: 10/17/16



Core Number: SED-108  
Date of Photo: 10/17/16





Description: SED-106 Facing Upstream  
Date of Photo: 10/17/16



Description: Transect T2 Facing Upstream  
Date of Photo: 10/18/16



**Description: Transect T5 Facing Upstream**  
**Date of Photo: 10/18/16**



**Description: Transect T10 at Culvert under County Road E**  
**Date of Photo: 10/19/16**



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**Description: Transect T12 Facing Upstream**  
**Date of Photo: 10/19/16**



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**Description: Transect T18 Facing Upstream**  
**Date of Photo: 10/20/16**



# Sample Collection and Processing Log

**Staff Gauge Reading**  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

**General Information**

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: \_\_\_\_\_  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: \_\_\_\_\_  
 Weather: partly cloudy 40s  
 River Section/DMU: \_\_\_\_\_

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-01	1125		5.7	2.5	1.2	48				
Sample Intervals (in)	Sample Description						Date Processed	Sample Intervals (in)		COC Sample ID Number
0-1.2	Brown silt, some organics, including wood pieces, very wet (0-0.3), then wet						10/20/16 ↓	TOP	BOTTOM	102016035 102016036
								0	0.5	
								0.5	1.5	

**Additional Comments:**

Stream Velocity:				
DTS:	1-H	2-H	Total	
Poling Depth:	2.0			
Core collected with push core on third attempt (first two attempts had low recoveries)				

Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.  
 (2) Sample coordinates will be recorded after being post processed, when applicable.  
 n/a: Not Applicable  
 COC: Chain of Custody

Sampling/Processing Personnel Signature: Andrea Salus



# Sample Collection and Processing Log

Staff Gauge Reading  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

**General Information**

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: \_\_\_\_\_  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: NAD83  
 Weather: Sunny (mostly), 50s  
 River Section/DMU: \_\_\_\_\_

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-02	1209		4.4	2.5	1.7	68				
Sample Intervals (ft)	Sample Description						Date Processed	Sample Intervals (in.)		COC Sample ID Number
0-1.7	DK brown silt, trace organics, very wet (0-0.5), then wet (0.5-1.7)						10/19/16	TOP	BOTTOM	
							↓	0	0.5	101916027
								0.5	1.5	101916028
								1.5	1.7	101916029

Arce

Additional Comments:

Stream Velocity:					
DTS:					
Poling Depth:	1-H	2-H	Total		
	4.0	0.2	4.2		

Two attempts made with push core. Second attempt kept.

Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.  
 (2) Sample coordinates will be recorded after being post processed, when applicable.  
 n/a: Not Applicable  
 COC: Chain of Custody

Sampling/Processing Personnel Signature: Andrea Salus







# Sample Collection and Processing Log

Staff Gauge Reading  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

**General Information**

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: 10/19/16  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: \_\_\_\_\_  
 Weather: mostly Sunny, 50s  
 River Section/DMU: \_\_\_\_\_

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-04	0937		1.3	3.8	2.2	58%				
Sample Intervals (in)	Sample Description						Date Processed	Sample Intervals (in)		COC Sample ID Number
								TOP	BOTTOM	
0 - 2.2	DK brown silt, some organics (leaves, roots, wood, very wet, decreases to just wet after top 6").						10/19/16 ↓	0.5	0.5	101916021
								0.5	1.5	101916022
								1.5	2.2	101916023

**Additional Comments:**

Stream Velocity:				
DTS:	1-H	2-H	Total	
Poling Depth:	5.9	0	5.9	
Three attempts made with push core, b/c material was very soft and had trouble staying in the tube. Third attempt kept.				

Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.  
 (2) Sample coordinates will be recorded after being post processed, when applicable.  
 n/a: Not Applicable  
 COC: Chain of Custody

Sampling/Processing Personnel Signature: Andrea Salus





# Sample Collection and Processing Log

Staff Gauge Reading  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

**General Information**

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: 10/19/16  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: \_\_\_\_\_  
 Weather: partly sunny, 40s  
 River Section/DMU: \_\_\_\_\_

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-05	0912		4.1	2.5	2.0	80		#		
Sample Intervals (in)	Sample Description						Date Processed	Sample Intervals (in)		COC Sample ID Number
								TOP	BOTTOM	
1-0.2	Dk brown SH, trace organic matter, wet						10/19/16	0	0.5	1019116018
0.2-2.0	fine to coarse sand, poorly graded, brown, trace gravel, moist						↓	0.5	1.5	1019116019
<del>2.0-4.5</del>								1.5	2.0	1019116020 Arch

Additional Comments:

Stream Velocity:				
DTS:	H	2-H	Tot	
Poling Depth:	1.0	0	1.0	
Two attempts made with push core. Sample kept on 2 <sup>nd</sup> attempt				

Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.  
 (2) Sample coordinates will be recorded after being post processed, when applicable.  
 n/a: Not Applicable  
 COC: Chain of Custody

Sampling/Processing Personnel Signature: Andrea Salus







# Sample Collection and Processing Log

Staff Gauge Reading  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

**General Information**

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: 10/20/16  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: \_\_\_\_\_  
 Weather: partly cloudy, 40s  
 River Section/DMU: \_\_\_\_\_

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-101	1012		5.2	2.5	1.6	64		ft		
Sample Intervals (in)	Sample Description						Date Processed	Sample Intervals (in)		COC Sample ID Number
								TOP	BOTTOM	
0-1.6	Brown silt, trace wood fibers throughout, very wet (0-0.5), pink wet						10/20/16	0	0.5	102016032
							↓	0.5	1.5	102016033
								1.5	1.6	102016034

Additional Comments:

Stream Velocity:					
DTS:	1-H				
Poling Depth:	9.5				
Sample collected with push core on first attempt.					

Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.  
 (2) Sample coordinates will be recorded after being post processed, when applicable.  
 n/a: Not Applicable  
 COC: Chain of Custody

Sampling/Processing Personnel Signature: Andrea Salus



# Sample Collection and Processing Log

Staff Gauge Reading  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

**General Information**

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: 10/20/16  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: \_\_\_\_\_  
 Weather: mostly cloudy, low 40s  
 River Section/DMU: \_\_\_\_\_

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-102	0936		5.7	2.5	1.5	80				
Sample Intervals (ft)	Sample Description						Date Processed	Sample Intervals (ft)		COC Sample ID Number
								TOP	BOTTOM	
0-1.1	Brown silt, some organic matter (sticks, wood), very wet (0-0.5) then wet						10/20/16	0	0.5	102016030
1.1-1.5	Brown predt, very fibrous, trace silt, wet							0.5	1.5	102016031

Additional Comments:

Stream Velocity:			
DTS:	1-H	2-H	TOTAL
Poling Depth:	2.5	2.0	4.5
Sample collected with push core on first attempt.			

Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.  
 (2) Sample coordinates will be recorded after being post processed, when applicable.  
 n/a: Not Applicable  
 COC: Chain of Custody

Sampling/Processing Personnel Signature: Andrea Salus





# Sample Collection and Processing Log

Staff Gauge Reading  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

**General Information**

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: \_\_\_\_\_  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: \_\_\_\_\_  
 Weather: \_\_\_\_\_  
 River Section/DMU: \_\_\_\_\_

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-103	1245		2.0	2.0	1.6	80				
Sample Intervals (in)	Sample Description						Date Processed	Sample Intervals (in)		COC Sample ID Number
								TOP	BOTTOM	
0-0.2	Brown, silt, trace fine sand, some organic material → wood, wet						10/18/16	0	0.5	101816012
0.2-1.6	Brown, poorly-graded, fine to coarse sand, trace gravel, trace organics (wood), moist to wet							0.5	1.5	101816013
								1.5	1.6	101816014 - Arch

Additional Comments:

Stream Velocity:					
DTS:					
Poling Depth:					
Used piston core collected sample on 2nd attempt. Used hammer to achieve refusal @ 2.0					

Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.

(2) Sample coordinates will be recorded after being post processed, when applicable.

n/a: Not Applicable

COC: Chain of Custody

Sampling/Processing Personnel Signature: \_\_\_\_\_

Andrea Salus



# Sample Collection and Processing Log

Staff Gauge Reading  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

**General Information**

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: \_\_\_\_\_  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: \_\_\_\_\_  
 Weather: Sunny, 60s  
 River Section/DMU: \_\_\_\_\_

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-104	1133		2.6	1.4	0.4	29				
Sample Intervals (in)	Sample Description						Date Processed	Sample Intervals (in)		COC Sample ID Number
0-0.4	Brown, fine to medium grained, poorly graded sand, some organic matter (wood chips, leaves), trace silt in top 0.1 and sand becomes coarse in last 0.1 (0.3-0.4)						10/18/10	TOP	BOTTOM	101816011

Additional Comments:

Stream Velocity:					
DTS:					
Poling Depth:					
Made three attempts w/ piston core, sample material lost on first two attempts. Used piston core on all three attempts.					

material hammer

Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.

(2) Sample coordinates will be recorded after being post processed, when applicable.

n/a: Not Applicable

COC: Chain of Custody

Sampling/Processing Personnel Signature:

Andrea Salus





# Sample Collection and Processing Log

Staff Gauge Reading  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

**General Information**

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: \_\_\_\_\_  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: \_\_\_\_\_  
 Weather: Sunny, 60s  
 River Section/DMU: \_\_\_\_\_

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-105	1017		1.2	1.5	1.4	93				
Sample Intervals (in)	Sample Description						Date Processed	Sample Intervals (in)		COC Sample ID Number
0-0.5	Brown, fine to coarse sand, some gravel, moist						10/18/16	TOP	BOTTOM	101816 015
0.5-1.4	Brown, fine to coarse sand, organic matter, including wood; some silt, moist						↓	0.5	1.4	101816 016
								0.5	1.4 Dup	101816 017

Additional Comments:

Stream Velocity:					
DTS:					
Poling Depth:					

First attempt with piston core, the hammer was used to drive core to 30" (2.5') and drove piston core to 1.5'.  
 Could not get core out (very granular material). Made a second attempt.

Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.  
 (2) Sample coordinates will be recorded after being post processed, when applicable.  
 n/a: Not Applicable  
 COC: Chain of Custody

Sampling/Processing Personnel Signature: Andrea Salus

# Sample Collection and Processing Log

Staff Gauge Reading  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

**General Information**

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: 10/17/16  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: \_\_\_\_\_  
 Weather: cloudy, 60s  
 River Section/DMU: \_\_\_\_\_

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-106	1344		0.8	1.8	1.4	78				
Sample Intervals (in)	Sample Description						Date Processed	Sample Intervals (in)		COC Sample ID Number
								TOP	BOTTOM	
0-1.4	Brown, poorly-graded medium to coarse sand, trace gravel, moist						10/17/16	0	0.5	101716001
								0.5	1.4	101716002

Additional Comments:

Stream Velocity:					
DTS:					
Poling Depth:	0.2	0.2	1.4		
	1-H	2-H	tot	sand/ok	

Made two attempts w/ push core. No recovery, difficult push. Made a third attempt w/ piston core. Used hammer to get refusal @ 1.8'

Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.  
 (2) Sample coordinates will be recorded after being post processed, when applicable.  
 n/a: Not Applicable  
 COC: Chain of Custody

Sampling/Processing Personnel Signature: Andrea Salus







# Sample Collection and Processing Log

Staff Gauge Reading  
Time \_\_\_\_\_ Reading \_\_\_\_\_ ft

## General Information

Project Name/Site: Military Creek  
 Project #: 2381  
 Task #: 2  
 Date: 10/17/10  
 Samplers: Steve Wiskes, Andrea Salus

Sampling Equipment: Push Core  
 Coordinate System: \_\_\_\_\_  
 Datum: \_\_\_\_\_  
 Weather: cloudy, 100s  
 River Section/DMU: MC

Sample Location	Time (military)	Water Elevation <sup>(1)</sup>	Water Depth (ft)	Penetration (ft)	Sediment Recovered (ft)	% Recovery	Sample Location (Northing) <sup>(2)</sup>	Sample Location (Easting) <sup>(2)</sup>	Sample Notes	
SED-108	1432	XANT	1.8	2.3	1.4	61				
Sample Intervals (in)	Sample Description						Date Processed	Sample Intervals (in)		COC Sample ID Number
								TOP	BOTTOM	
0- <del>0.7</del> 0.7	Brown, poorly-graded, fine to coarse sand, trace silt, trace gravel, trace organics, moist, <del>becomes wet</del> 0.7-1.4;							0	0.5	101711005
0.7-1.4	SAA, wet, slight petroleum-like odor							0.5	1.4	101711006
								Dup		101711007
								(0.5, 1.4)		

Additional Comments:

Stream Velocity:				
DTS:				
Poling Depth:	0.7	0.7	sand/wk	
	1-H	2-H		

Moved location approx 16' W of original due to thick layer of bricks along the shoreline (see photos). Used hammer + piston core to reach refusal at 2.3. Sheen seen on water surface after pulling up + the core

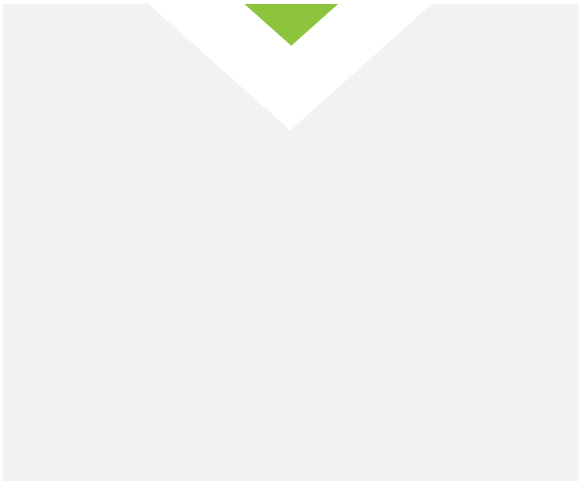
Notes: (1) Water Elevation = Staff Gauge Elevation - Staff Gauge Reading, Calculated at end of day, based on a minimum of 2 staff gauge readings.  
 (2) Sample coordinates will be recorded after being post processed, when applicable.

n/a: Not Applicable  
 COC: Chain of Custody

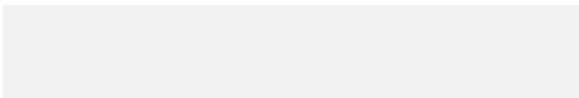
Sampling/Processing Personnel Signature: \_\_\_\_\_

Andrea Salus





**APPENDIX D**  
**SEDIMENT TEQ**  
**CALCULATIONS**



**Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			102016035				102016036		
Station Name:			SED-01						
Station / Sample Name:			SED-01	ng TEQ/kg	% contribution	SED-01	ng TEQ/kg	% contribution	
Sample Depth (feet):			0-0.5			0.5-1.5			
Sample Date:			10/20/2016	10/20/2016					
GEO	Percent Moisture	(%)		90.3			85.5		
Organic	Carbon, Total Organic	(mg/kg)		268,000			353,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	3.6	0.0036	0.33	1	0.001	0.10
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.27	0.135	12.20	0.32	0.16	15.33
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	0.29	0.0029	0.26	0.32	0.0032	0.31
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	0.26	0.0026	0.23	0.25	0.0025	0.24
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.3	0.3	27.10	0.26	0.26	24.92
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.34	0.34	30.71	0.34	0.34	32.58
Dioxin	OCDD	(ng/Kg)	0.0001	29	0.0029	0.26	6.2	0.00062	0.06
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	1	0.01	0.90	0.47	0.0047	0.45
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	0.32	0.0032	0.29	0.24	0.0024	0.23
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	0.21	0.021	1.90	0.16	0.016	1.53
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.23	0.023	2.08	0.16	0.016	1.53
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.27	0.027	2.44	0.23	0.023	2.20
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.45	0.0225	2.03	0.34	0.017	1.63
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.28	0.028	2.53	0.22	0.022	2.11
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.25	0.125	11.29	0.22	0.11	10.54
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	1.2	0.06	5.42	1.3	0.065	6.23
Furan	OCDF	(ng/Kg)	0.0001	2.6	0.00026	0.02	0.66	0.00007	0.01
<b>SUM OF TEQ</b>				<b>1.11</b>			<b>1.04</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
  2. ng/Kg = nanograms per kilogram
  3. mg/Kg = milligram per kilogram
  4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.



**Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101916027			101916028		
Station Name:				SED-02					
Station / Sample Name:				SED-02	ng TEQ/kg	% contribution	SED-02	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.5		
Sample Date:				10/19/2016	10/19/2016				
GEO	Percent Moisture	(%)		91.9			87.2		
Organic	Carbon, Total Organic	(mg/kg)		317,000			216,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	6,500	6.5	3.85	470	0.47	3.47
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	47	23.5	13.92	3.9	1.95	14.40
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	260	2.6	1.54	18	0.18	1.33
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	100	1	0.59	7.2	0.072	0.53
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	11	11	6.52	1.1	1.1	8.12
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	2.3	2.3	1.36	0.65	0.65	4.80
Dioxin	OCDD	(ng/Kg)	0.0001	72,000	7.2	4.27	5,700	0.57	4.21
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	2,200	22	13.03	150	1.5	11.07
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	200	2	1.18	14	0.14	1.03
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	250	25	14.81	17	1.7	12.55
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	110	11	6.52	9	0.9	6.64
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	76	7.6	4.50	5.8	0.58	4.28
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	29	1.45	0.86	2.2	0.11	0.81
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	110	11	6.52	8.3	0.83	6.13
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	67	33.5	19.84	5.3	2.65	19.56
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	7.2	0.36	0.21	1.8	0.09	0.66
Furan	OCDF	(ng/Kg)	0.0001	8,000	0.8	0.47	540	0.054	0.40
<b>SUM OF TEQ</b>				<b>168.81</b>			<b>13.55</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
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Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101916024			101916025		
Station Name:				SED-03					
Station / Sample Name:				SED-03	ng TEQ/kg	% contribution	SED-03	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.5		
Sample Date:				10/19/2016	10/19/2016				
GEO	Percent Moisture	(%)		46.3			55.4		
Organic	Carbon, Total Organic	(mg/kg)		19,300			30,900		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	17,000	17	4.00	75,000	75	4.26
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	100	50	11.77	370	185	10.51
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	740	7.4	1.74	2,800	28	1.59
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	230	2.3	0.54	780	7.8	0.44
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	27	27	6.35	89	89	5.06
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	2.1	2.1	0.49	9.3	9.3	0.53
Dioxin	OCDD	(ng/Kg)	0.0001	170,000	17	4.00	570,000	57	3.24
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	5,700	57	13.41	27,000	270	15.34
Furan	1,2,3,4,7,8,9-HxCDF	(ng/Kg)	0.01	570	5.7	1.34	2,500	25	1.42
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	620	62	14.59	2,500	250	14.21
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	230	23	5.41	1,000	100	5.68
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	250	25	5.88	1,100	110	6.25
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	77	3.85	0.91	270	13.5	0.77
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	280	28	6.59	1,200	120	6.82
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	190	95	22.36	820	410	23.30
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	15	0.75	0.18	71	3.55	0.20
Furan	OCDF	(ng/Kg)	0.0001	18,000	1.8	0.42	65,000	6.5	0.37
<b>SUM OF TEQ</b>				<b>424.90</b>			<b>1759.65</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
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Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101916021			101916022		
Station Name:				SED-04					
Station / Sample Name:				SED-04	ng TEQ/kg	% contribution	SED-04	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.5		
Sample Date:				10/19/2016	10/19/2016				
GEO	Percent Moisture	(%)		91.4			75.4		
Organic	Carbon, Total Organic	(mg/kg)		245,000			128,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	7,800	7.8	3.87	31,000	31	5.11
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	48	24	11.90	160	80	13.19
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	340	3.4	1.69	960	9.6	1.58
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	110	1.1	0.55	310	3.1	0.51
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	15	15	7.44	42	42	6.93
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.97	0.97	0.48	2.4	2.4	0.40
Dioxin	OCDD	(ng/Kg)	0.0001	73,000	7.3	3.62	310,000	31	5.11
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	2,600	26	12.89	12,000	120	19.79
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	210	2.1	1.04	960	9.6	1.58
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	290	29	14.38	890	89	14.68
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	110	11	5.45	360	36	5.94
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	110	11	5.45	190	19	3.13
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	41	2.05	1.02	76	3.8	0.63
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	130	13	6.45	390	39	6.43
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	93	46.5	23.06	170	85	14.02
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	9.9	0.495	0.25	11	0.55	0.09
Furan	OCDF	(ng/Kg)	0.0001	9,600	0.96	0.48	53,000	5.3	0.87
<b>SUM OF TEQ</b>				<b>201.68</b>			<b>606.35</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
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Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101916018			101916019		
Station Name:				SED-05					
Station / Sample Name:				SED-05	ng TEQ/kg	% contribution	SED-05	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.5		
Sample Date:				10/19/2016	10/19/2016				
GEO	Percent Moisture	(%)		35.8			16.9		
Organic	Carbon, Total Organic	(mg/kg)		19,400			649		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	1,600	1.6	4.08	11	0.011	1.86
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	10	5	12.76	0.16	0.08	13.52
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	65	0.65	1.66	0.47	0.0047	0.79
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	25	0.25	0.64	0.21	0.0021	0.35
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	2.6	2.6	6.64	0.08	0.08	13.52
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.16	0.16	0.41	0.12	0.12	20.28
Dioxin	OCDD	(ng/Kg)	0.0001	17,000	1.7	4.34	120	0.012	2.03
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	580	5.8	14.81	4.6	0.046	7.77
Furan	1,2,3,4,7,8,9-HxCDF	(ng/Kg)	0.01	52	0.52	1.33	0.38	0.0038	0.64
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	58	5.8	14.81	0.4	0.04	6.76
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	24	2.4	6.13	0.23	0.023	3.89
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	20	2	5.11	0.15	0.015	2.54
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	8	0.4	1.02	0.11	0.0055	0.93
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	25	2.5	6.38	0.21	0.021	3.55
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	15	7.5	19.14	0.24	0.12	20.28
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	1.3	0.065	0.17	0.12	0.006	1.01
Furan	OCDF	(ng/Kg)	0.0001	2,300	0.23	0.59	16	0.0016	0.27
<b>SUM OF TEQ</b>				<b>39.18</b>			<b>0.59</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
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 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101816008			101816009		
Station Name:				SED-06					
Station / Sample Name:				SED-06	ng TEQ/kg	% contribution	SED-06	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.5		
Sample Date:				10/18/2016	10/18/2016				
GEO	Percent Moisture	(%)		92			77.3		
Organic	Carbon, Total Organic	(mg/kg)		350,000			95,900		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	18,000	18	4.36	25,000	25	5.28
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	110	55	13.32	140	70	14.78
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	690	6.9	1.67	810	8.1	1.71
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	220	2.2	0.53	280	2.8	0.59
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	26	26	6.29	33	33	6.97
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	2.1	2.1	0.51	2.1	2.1	0.44
Dioxin	OCDD	(ng/Kg)	0.0001	190,000	19	4.60	270,000	27	5.70
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	7,900	79	19.13	11,000	110	23.22
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	680	6.8	1.65	920	9.2	1.94
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	460	46	11.14	300	30	6.33
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	300	30	7.26	400	40	8.44
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	200	20	4.84	160	16	3.38
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	63	3.15	0.76	67	3.35	0.71
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	300	30	7.26	370	37	7.81
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	130	65	15.74	110	55	11.61
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	9.9	0.495	0.12	5.6	0.28	0.06
Furan	OCDF	(ng/Kg)	0.0001	34,000	3.4	0.82	49,000	4.9	1.03
<b>SUM OF TEQ</b>				<b>413.05</b>			<b>473.73</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
  2. ng/Kg = nanograms per kilogram
  3. mg/Kg = milligram per kilogram
  4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.



**Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	102016032			102016033		
Station Name:				SED-101					
Station / Sample Name:				SED-101	ng TEQ/kg	% contribution	SED-101	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.5		
Sample Date:				10/20/2016	10/20/2016				
GEO	Percent Moisture	(%)		90.6			87.8		
Organic	Carbon, Total Organic	(mg/kg)		146,000			165,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	39	0.039	1.80	20	0.02	1.10
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.46	0.23	10.60	0.24	0.12	6.61
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	2.1	0.021	0.97	0.82	0.0082	0.45
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	0.92	0.0092	0.42	0.4	0.004	0.22
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.42	0.42	19.36	0.35	0.35	19.28
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.41	0.41	18.90	0.6	0.6	33.06
Dioxin	OCDD	(ng/Kg)	0.0001	370	0.037	1.71	230	0.023	1.27
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	12	0.12	5.53	7.1	0.071	3.91
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	1.3	0.013	0.60	0.6	0.006	0.33
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	1.5	0.15	6.92	0.87	0.087	4.79
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.73	0.073	3.37	0.52	0.052	2.87
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.71	0.071	3.27	0.26	0.026	1.43
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.55	0.0275	1.27	0.48	0.024	1.32
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	1.1	0.11	5.07	0.26	0.026	1.43
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.73	0.365	16.83	0.65	0.325	17.91
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	1.4	0.07	3.23	1.4	0.07	3.86
Furan	OCDF	(ng/Kg)	0.0001	34	0.0034	0.16	27	0.0027	0.15
<b>SUM OF TEQ</b>				<b>2.17</b>		<b>1.81</b>			

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
  2. ng/Kg = nanograms per kilogram
  3. mg/Kg = milligram per kilogram
  4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.





**Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	102016030			102016031		
Station Name:				SED-102					
Station / Sample Name:				SED-102	ng TEQ/kg	% contribution	SED-102	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.5		
Sample Date:				10/20/2016	10/20/2016				
GEO	Percent Moisture	(%)		92.2			88.2		
Organic	Carbon, Total Organic	(mg/kg)		279,000			226,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	27	0.027	1.36	2	0.002	0.21
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.55	0.275	13.89	0.26	0.13	13.88
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	1.4	0.014	0.71	0.29	0.0029	0.31
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	0.64	0.0064	0.32	0.26	0.0026	0.28
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.45	0.45	22.73	0.23	0.23	24.56
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.36	0.36	18.18	0.28	0.28	29.90
Dioxin	OCDD	(ng/Kg)	0.0001	230	0.023	1.16	13	0.0013	0.14
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	10	0.1	5.05	0.7	0.007	0.75
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	1.1	0.011	0.56	0.29	0.0029	0.31
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	1.4	0.14	7.07	0.23	0.023	2.46
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.52	0.052	2.63	0.17	0.017	1.82
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.47	0.047	2.37	0.16	0.016	1.71
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.31	0.0155	0.78	0.49	0.0245	2.62
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.71	0.071	3.59	0.22	0.022	2.35
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.62	0.31	15.66	0.24	0.12	12.82
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	1.5	0.075	3.79	1.1	0.055	5.87
Furan	OCDF	(ng/Kg)	0.0001	29	0.0029	0.15	1.7	0.00017	0.02
<b>SUM OF TEQ</b>				<b>1.98</b>			<b>0.94</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
  2. ng/Kg = nanograms per kilogram
  3. mg/Kg = milligram per kilogram
  4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.



**Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101816012			101816013		
Station Name:				SED-103					
Station / Sample Name:				SED-103	ng TEQ/kg	% contribution	SED-103	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.5		
Sample Date:				10/18/2016	10/18/2016				
GEO	Percent Moisture	(%)		28			21.6		
Organic	Carbon, Total Organic	(mg/kg)		17,800			38,300		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	950	0.95	3.93	5.8	0.0058	1.66
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	5.3	2.65	10.96	0.083	0.0415	11.85
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	39	0.39	1.61	0.18	0.0018	0.51
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	11	0.11	0.45	0.091	0.00091	0.26
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	1.5	1.5	6.20	0.078	0.078	22.27
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.16	0.16	0.66	0.083	0.083	23.70
Dioxin	OCDD	(ng/Kg)	0.0001	11,000	1.1	4.55	65	0.0065	1.86
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	360	3.6	14.88	2.7	0.027	7.71
Furan	1,2,3,4,7,8,9-HxCDF	(ng/Kg)	0.01	35	0.35	1.45	0.21	0.0021	0.60
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	35	3.5	14.47	0.14	0.014	4.00
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	17	1.7	7.03	0.14	0.014	4.00
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	16	1.6	6.61	0.084	0.0084	2.40
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	5.4	0.27	1.12	0.085	0.00425	1.21
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	6.4	0.64	2.65	0.17	0.017	4.85
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	11	5.5	22.74	0.07	0.035	9.99
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.96	0.048	0.20	0.2	0.01	2.86
Furan	OCDF	(ng/Kg)	0.0001	1,200	0.12	0.50	9.4	0.00094	0.27
<b>SUM OF TEQ</b>				<b>24.19</b>			<b>0.35</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
  2. ng/Kg = nanograms per kilogram
  3. mg/Kg = milligram per kilogram
  4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.



**Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101816011		
Station Name:				SED-104		
Station / Sample Name:				SED-104	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.4		
Sample Date:				10/18/2016		
GEO	Percent Moisture	(%)		24.6		
Organic	Carbon, Total Organic	(mg/kg)		11,100		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	290	0.29	3.18
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	2.8	1.4	15.36
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	15	0.15	1.65
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	5.8	0.058	0.64
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.73	0.73	8.01
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.11	0.11	1.21
Dioxin	OCDD	(ng/Kg)	0.0001	2,500	0.25	2.74
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	100	1	10.97
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	9.6	0.096	1.05
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	12	1.2	13.16
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	5	0.5	5.48
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	5	0.5	5.48
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	1.9	0.095	1.04
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	6.3	0.63	6.91
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	4.1	2.05	22.49
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.54	0.027	0.30
Furan	OCDF	(ng/Kg)	0.0001	310	0.031	0.34
<b>SUM OF TEQ</b>				<b>9.12</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
  2. ng/Kg = nanograms per kilogram
  3. mg/Kg = milligram per kilogram
  4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.



**Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101816015			101816016			101816017		
Station Name:				SED-105								
Station / Sample Name:				SED-105	ng TEQ/kg	% contribution	SED-105	ng TEQ/kg	% contribution	SED-105 Duplicate	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.4			0.5-1.4		
Sample Date:				10/18/2016	10/18/2016	10/18/2016						
GEO	Percent Moisture	(%)		8.6			58.7			38.7		
Organic	Carbon, Total Organic	(mg/kg)		5,310			76,100			43,500		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	110	0.11	3.24	45	0.045	3.34	38	0.038	3.16
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	1.1	0.55	16.19	0.4	0.2	14.85	0.41	0.205	17.05
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	5	0.05	1.47	1.7	0.017	1.26	1.6	0.016	1.33
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	1.6	0.016	0.47	0.72	0.0072	0.53	0.63	0.0063	0.52
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.32	0.32	9.42	0.11	0.11	8.17	0.092	0.092	7.65
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.091	0.091	2.68	0.2	0.2	14.85	0.12	0.12	9.98
Dioxin	OCDD	(ng/Kg)	0.0001	970	0.097	2.86	510	0.051	3.79	360	0.036	3.00
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	41	0.41	12.07	21	0.21	15.59	15	0.15	12.48
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	3.7	0.037	1.09	1.6	0.016	1.19	1.2	0.012	1.00
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	3.4	0.34	10.01	1.3	0.13	9.65	1.2	0.12	9.98
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	1.6	0.16	4.71	0.56	0.056	4.16	0.46	0.046	3.83
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	1.4	0.14	4.12	0.36	0.036	2.67	0.44	0.044	3.66
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.61	0.0305	0.90	0.14	0.007	0.52	0.18	0.009	0.75
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	2.2	0.22	6.48	0.78	0.078	5.79	0.6	0.06	4.99
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	1.6	0.8	23.55	0.31	0.155	11.51	0.45	0.225	18.72
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.25	0.0125	0.37	0.4	0.02	1.49	0.34	0.017	1.41
Furan	OCDF	(ng/Kg)	0.0001	130	0.013	0.38	85	0.0085	0.63	57	0.0057	0.47
<b>SUM OF TEQ</b>				<b>3.40</b>			<b>1.35</b>			<b>1.20</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
  2. ng/Kg = nanograms per kilogram
  3. mg/Kg = milligram per kilogram
  4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.



**Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101716001			101716002		
Station Name:				SED-106					
Station / Sample Name:				SED-106	ng TEQ/kg	% contribution	SED-106	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.4		
Sample Date:				10/17/2016	10/17/2016				
GEO	Percent Moisture	(%)		14.5			5.2		
Organic	Carbon, Total Organic	(mg/kg)		2,360			1,610		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	4	0.004	1.06	4.1	0.0041	1.12
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.16	0.08	21.29	0.16	0.08	21.91
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	0.21	0.0021	0.56	0.14	0.0014	0.38
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	0.17	0.0017	0.45	0.21	0.0021	0.58
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.057	0.057	15.17	0.052	0.052	14.24
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.095	0.095	25.29	0.1	0.1	27.38
Dioxin	OCDD	(ng/Kg)	0.0001	38	0.0038	1.01	51	0.0051	1.40
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	1.4	0.014	3.73	1.3	0.013	3.56
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	0.15	0.0015	0.40	0.15	0.0015	0.41
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	0.16	0.016	4.26	0.13	0.013	3.56
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.13	0.013	3.46	0.13	0.013	3.56
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.16	0.016	4.26	0.072	0.0072	1.97
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.071	0.00355	0.94	0.054	0.0027	0.74
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.13	0.013	3.46	0.086	0.0086	2.35
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.093	0.0465	12.38	0.11	0.055	15.06
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.16	0.008	2.13	0.12	0.006	1.64
Furan	OCDF	(ng/Kg)	0.0001	5.5	0.00055	0.15	5.1	0.00051	0.14
<b>SUM OF TEQ</b>				<b>0.38</b>		<b>0.37</b>			

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
  2. ng/Kg = nanograms per kilogram
  3. mg/Kg = milligram per kilogram
  4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.





**Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101716003			101716004		
Station Name:				SED-107					
Station / Sample Name:				SED-107	ng TEQ/kg	% contribution	SED-107	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-0.7		
Sample Date:				10/17/2016	10/17/2016				
GEO	Percent Moisture	(%)		17.1			14.8		
Organic	Carbon, Total Organic	(mg/kg)		1,390			1,810		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	1.5	0.0015	0.63	6.4	0.0064	0.84
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.059	0.0295	12.46	0.27	0.135	17.74
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	0.077	0.00077	0.33	0.55	0.0055	0.72
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	0.06	0.0006	0.25	0.2	0.002	0.26
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.041	0.041	17.32	0.14	0.14	18.40
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.085	0.085	35.90	0.26	0.26	34.16
Dioxin	OCDD	(ng/Kg)	0.0001	11	0.0011	0.46	30	0.003	0.39
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	0.7	0.007	2.96	1.4	0.014	1.84
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	0.14	0.0014	0.59	0.34	0.0034	0.45
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	0.1	0.01	4.22	0.2	0.02	2.63
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.088	0.0088	3.72	0.17	0.017	2.23
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.097	0.0097	4.10	0.27	0.027	3.55
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.05	0.0025	1.06	0.14	0.007	0.92
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.077	0.0077	3.25	0.19	0.019	2.50
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.04	0.02	8.45	0.17	0.085	11.17
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.2	0.01	4.22	0.33	0.0165	2.17
Furan	OCDF	(ng/Kg)	0.0001	1.7	0.00017	0.07	2.4	0.00024	0.03
<b>SUM OF TEQ</b>				<b>0.24</b>		<b>0.76</b>			

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
  2. ng/Kg = nanograms per kilogram
  3. mg/Kg = milligram per kilogram
  4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.



**Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs**

Military Creek Site Investigation / Remedial Action Options  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRTS Activity #02-64-000068

Field Sample ID:			Toxic Equivalency Factors WHO 1998 (Fish)	101716005			101716006			101716007		
Station Name:				SED-108								
Station / Sample Name:				SED-108	ng TEQ/kg	% contribution	SED-108	ng TEQ/kg	% contribution	SED-108 Duplicate	ng TEQ/kg	% contribution
Sample Depth (feet):				0-0.5			0.5-1.4			0.5-1.4		
Sample Date:				10/17/2016	10/17/2016	10/17/2016						
GEO	Percent Moisture	(%)		9			13.1			13.6		
Organic	Carbon, Total Organic	(mg/kg)		2,960			6,290			16,500		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	880	0.88	11.79	1.3	0.0013	0.30	2.9	0.0029	0.45
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.48	0.24	3.22	0.12	0.06	13.93	0.11	0.055	8.52
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	14	0.14	1.88	0.12	0.0012	0.28	0.16	0.0016	0.25
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	1.4	0.014	0.19	0.12	0.0012	0.28	0.11	0.0011	0.17
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.088	0.088	1.18	0.084	0.084	19.50	0.14	0.14	21.69
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.095	0.095	1.27	0.18	0.18	41.78	0.24	0.24	37.18
Dioxin	OCDD	(ng/Kg)	0.0001	12,000	1.2	16.08	12	0.0012	0.28	28	0.0028	0.43
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	360	3.6	48.24	0.6	0.006	1.39	1.4	0.014	2.17
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	14	0.14	1.88	0.13	0.0013	0.30	0.2	0.002	0.31
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	2.5	0.25	3.35	0.093	0.0093	2.16	0.18	0.018	2.79
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	1.4	0.14	1.88	0.073	0.0073	1.69	0.15	0.015	2.32
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.33	0.033	0.44	0.1	0.01	2.32	0.13	0.013	2.01
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.1	0.005	0.07	0.079	0.00395	0.92	0.16	0.008	1.24
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	2.4	0.24	3.22	0.069	0.0069	1.60	0.12	0.012	1.86
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.27	0.135	1.81	0.09	0.045	10.44	0.22	0.11	17.04
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.26	0.013	0.17	0.24	0.012	2.79	0.19	0.0095	1.47
Furan	OCDF	(ng/Kg)	0.0001	2,500	0.25	3.35	1.9	0.00019	0.04	5.8	0.00058	0.09
<b>SUM OF TEQ</b>				<b>7.46</b>			<b>0.43</b>			<b>0.65</b>		

- Notes
1. TEQ = Total 2,3,7,8-TCDD Equivalence
  2. ng/Kg = nanograms per kilogram
  3. mg/Kg = milligram per kilogram
  4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.



Sample Control Log  
 Military Creek Site Investigation  
 C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin  
 WDNR BRRS Activity #02-64-000068

Unique Sample ID	Sample Media	Date	Sample Location	Sample Interval (ft)	Sample Time	Notes
101716001	Sediment	10/17/2016	SED-106	0-0.5	13:44	--
101716002	Sediment	10/17/2016	SED-106	0.5-1.4	13:44	--
101716003	Sediment	10/17/2016	SED-107	0-0.5	13:19	--
101716004	Sediment	10/17/2016	SED-107	0.5-0.7	13:19	--
101716005	Sediment	10/17/2016	SED-108	0-0.5	14:32	--
101716006	Sediment	10/17/2016	SED-108	0.5-1.4	14:32	--
101716007	Sediment	10/17/2016	SED-108	0.5-1.4	14:33	Duplicate
101816008	Sediment	10/18/2016	SED-06	0-0.5	13:42	--
101816009	Sediment	10/18/2016	SED-06	0.5-1.5	13:42	--
101816010	Sediment	10/18/2016	SED-06	1.5-1.8	13:42	Archived
101816011	Sediment	10/18/2016	SED-104	0-0.4	11:33	--
101816012	Sediment	10/18/2016	SED-103	0-0.5	12:45	--
101816013	Sediment	10/18/2016	SED-103	0.5-1.5	12:45	--
101816014	Sediment	10/18/2016	SED-103	1.5-1.6	12:45	Archived
101816015	Sediment	10/18/2016	SED-105	0-0.5	10:17	--
101816016	Sediment	10/18/2016	SED-105	0.5-1.4	10:17	--
101816017	Sediment	10/18/2016	SED-105	0.5-1.4	10:18	Duplicate
101916018	Sediment	10/19/2016	SED-05	0-0.5	9:12	--
101916019	Sediment	10/19/2016	SED-05	0.5-1.5	9:12	--
101916020	Sediment	10/19/2016	SED-05	1.5-2.0	9:12	Archived
101916021	Sediment	10/19/2016	SED-04	0-0.5	9:37	--
101916022	Sediment	10/19/2016	SED-04	0.5-1.5	9:37	--
101916023	Sediment	10/19/2016	SED-04	1.5-2.2	9:37	Archived
101916024	Sediment	10/19/2016	SED-03	0-0.5	10:35	--
101916025	Sediment	10/19/2016	SED-03	0.5-1.5	10:35	--
101916026	Sediment	10/19/2016	SED-03	1.5-1.6	10:35	Archived
101916027	Sediment	10/19/2016	SED-02	0-0.5	12:09	--
101916028	Sediment	10/19/2016	SED-02	0.5-1.5	12:09	--
101916029	Sediment	10/19/2016	SED-02	1.5-1.7	12:09	Archived
102016030	Sediment	10/20/2016	SED-102	0-0.5	9:36	--
102016031	Sediment	10/20/2016	SED-102	0.5-1.5	9:36	--
102016032	Sediment	10/20/2016	SED-101	0-0.5	10:12	--
102016033	Sediment	10/20/2016	SED-101	0.5-1.5	10:12	MS/MSD
102016034	Sediment	10/20/2016	SED-101	1.5-1.6	10:12	Archived
102016035	Sediment	10/20/2016	SED-01	0-0.5	11:25	--
102016036	Sediment	10/20/2016	SED-01	0.5-1.5	11:25	--

November 07, 2016

Andrea Salus  
NATURAL RESOURCE TECHNOLOGY  
234 W. Florida Street  
5th Floor  
Milwaukee, WI 53204

RE: Project: 2381/2 MILITARY CREEK  
Pace Project No.: 40140496

Dear Andrea Salus:

Enclosed are the analytical results for sample(s) received by the laboratory on October 20, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

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

Sincerely,



Brian Basten  
brian.basten@pacelabs.com  
Project Manager

Enclosures

cc: Data Delivery Team, Natural Resources Technologies



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

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### Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky UST Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 12064

North Dakota Certification #: R-150

Virginia VELAP ID: 460263

South Carolina Certification #: 83006001

Texas Certification #: T104704529-14-1

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

USDA Soil Permit #: P330-16-00157

Federal Fish & Wildlife Permit #: LE51774A-0

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40140496001	101716001	Solid	10/17/16 13:44	10/20/16 09:50
40140496002	101716002	Solid	10/17/16 13:44	10/20/16 09:50
40140496003	101716003	Solid	10/17/16 13:19	10/20/16 09:50
40140496004	101716004	Solid	10/17/16 13:19	10/20/16 09:50
40140496005	101716005	Solid	10/17/16 14:32	10/20/16 09:50
40140496006	101716006	Solid	10/17/16 14:32	10/20/16 09:50
40140496007	101716007	Solid	10/17/16 14:33	10/20/16 09:50
40140496008	101816008	Solid	10/18/16 13:42	10/20/16 09:50
40140496009	101816009	Solid	10/18/16 13:42	10/20/16 09:50
40140496010	101816011	Solid	10/18/16 11:33	10/20/16 09:50
40140496011	101816012	Solid	10/18/16 12:45	10/20/16 09:50
40140496012	101816013	Solid	10/18/16 12:45	10/20/16 09:50
40140496013	101816015	Solid	10/18/16 10:17	10/20/16 09:50
40140496014	101816016	Solid	10/18/16 10:17	10/20/16 09:50
40140496015	101816017	Solid	10/18/16 10:18	10/20/16 09:50

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40140496001	101716001	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496002	101716002	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496003	101716003	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496004	101716004	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496005	101716005	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496006	101716006	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496007	101716007	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496008	101816008	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	2	PASI-G
40140496009	101816009	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496010	101816011	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496011	101816012	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496012	101816013	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140496013	101816015	WI MOD DRO	CAH	1	PASI-G

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### SAMPLE ANALYTE COUNT

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40140496014	101816016	ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
		WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
40140496015	101816017	Lloyd Kahn	TJJ	1	PASI-G
		WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

**Sample: 101716001**      **Lab ID: 40140496001**      Collected: 10/17/16 13:44      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>3.3</b>	mg/kg	2.1	0.84	1	10/25/16 09:37	10/26/16 12:18		
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>14.5</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>2360</b>	mg/kg	393	133	1		10/24/16 07:02	7440-44-0	M0,R1

**Sample: 101716002**      **Lab ID: 40140496002**      Collected: 10/17/16 13:44      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>4.3</b>	mg/kg	1.6	0.63	1	10/25/16 09:37	10/26/16 12:27		
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>5.2</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>1610</b>	mg/kg	298	101	1		10/24/16 07:18	7440-44-0	

**Sample: 101716003**      **Lab ID: 40140496003**      Collected: 10/17/16 13:19      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>2.7</b>	mg/kg	1.8	0.71	1	10/25/16 09:37	10/26/16 12:36		DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>17.1</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>1390</b>	mg/kg	268	90.9	1		10/24/16 07:24	7440-44-0	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 2381/2 MILITARY CREEK  
Pace Project No.: 40140496

**Sample: 101716004**      **Lab ID: 40140496004**      Collected: 10/17/16 13:19      Received: 10/20/16 09:50      Matrix: Solid  
*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>2.2</b>	mg/kg	1.9	0.75	1	10/25/16 09:37	10/26/16 12:45		
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>14.8</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>1810</b>	mg/kg	292	98.9	1		10/24/16 07:41	7440-44-0	

**Sample: 101716005**      **Lab ID: 40140496005**      Collected: 10/17/16 14:32      Received: 10/20/16 09:50      Matrix: Solid  
*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>5.0</b>	mg/kg	1.7	0.69	1	10/25/16 09:37	10/26/16 12:53		DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>9.0</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>2960</b>	mg/kg	225	76.1	1		10/24/16 07:47	7440-44-0	

**Sample: 101716006**      **Lab ID: 40140496006**      Collected: 10/17/16 14:32      Received: 10/20/16 09:50      Matrix: Solid  
*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>11.6</b>	mg/kg	1.7	0.68	1	10/25/16 09:37	10/26/16 13:02		DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>13.1</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>6290</b>	mg/kg	452	153	1		10/24/16 07:53	7440-44-0	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

**Sample: 101716007**      **Lab ID: 40140496007**      Collected: 10/17/16 14:33      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>16.9</b>	mg/kg	1.7	0.70	1	10/25/16 09:37	10/26/16 13:11		DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>13.6</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>16500</b>	mg/kg	475	161	1		10/24/16 07:58	7440-44-0	

**Sample: 101816008**      **Lab ID: 40140496008**      Collected: 10/18/16 13:42      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>111</b>	mg/kg	18.6	7.5	1	10/26/16 15:57	10/27/16 11:10		DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>92.0</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>350000</b>	mg/kg	13800	4660	1		10/27/16 05:26	7440-44-0	
<b>Surrogates</b>									
RSD%	<b>19.3</b>	%			1		10/27/16 05:26		

**Sample: 101816009**      **Lab ID: 40140496009**      Collected: 10/18/16 13:42      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>5.4J</b>	mg/kg	8.8	3.6	1	10/26/16 15:57	10/27/16 11:19		D5
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>77.3</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>95900</b>	mg/kg	3050	1030	1		10/27/16 05:50	7440-44-0	P6

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

**Sample: 101816011**      **Lab ID: 40140496010**      Collected: 10/18/16 11:33      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>15.4</b>	mg/kg	2.7	1.1	1	10/26/16 15:57	10/27/16 11:28		D5,DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>24.6</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>11100</b>	mg/kg	916	310	1		10/27/16 06:07	7440-44-0	

**Sample: 101816012**      **Lab ID: 40140496011**      Collected: 10/18/16 12:45      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>2.7J</b>	mg/kg	2.8	1.1	1	10/26/16 15:57	10/27/16 11:37		D5
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>28.0</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>17800</b>	mg/kg	847	287	1		10/27/16 06:13	7440-44-0	

**Sample: 101816013**      **Lab ID: 40140496012**      Collected: 10/18/16 12:45      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>4.5</b>	mg/kg	2.6	1.0	1	10/26/16 15:57	10/27/16 11:46		D5
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>21.6</b>	%	0.10	0.10	1		10/28/16 13:31		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>38300</b>	mg/kg	989	335	1		10/27/16 06:20	7440-44-0	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 2381/2 MILITARY CREEK  
Pace Project No.: 40140496

**Sample: 101816015**      **Lab ID: 40140496013**      Collected: 10/18/16 10:17      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>9.3</b>	mg/kg	2.2	0.88	1	10/26/16 15:57	10/27/16 11:55		D5,DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>8.6</b>	%	0.10	0.10	1		10/28/16 13:32		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>5310</b>	mg/kg	580	196	1		10/27/16 06:25	7440-44-0	

**Sample: 101816016**      **Lab ID: 40140496014**      Collected: 10/18/16 10:17      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>21.8</b>	mg/kg	3.6	1.4	1	10/27/16 09:45	11/02/16 12:57		DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>58.7</b>	%	0.10	0.10	1		10/28/16 13:32		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>76100</b>	mg/kg	9730	3300	1		10/27/16 09:34	7440-44-0	

**Sample: 101816017**      **Lab ID: 40140496015**      Collected: 10/18/16 10:18      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>18.1</b>	mg/kg	2.6	1.1	1	10/27/16 09:45	11/02/16 13:06		DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>38.7</b>	%	0.10	0.10	1		10/28/16 13:32		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>43500</b>	mg/kg	2770	937	1		10/27/16 09:41	7440-44-0	

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

QC Batch: 239502 Analysis Method: WI MOD DRO

QC Batch Method: WI MOD DRO Analysis Description: WIDRO GCS

Associated Lab Samples: 40140496014, 40140496015

METHOD BLANK: 1418769 Matrix: Solid

Associated Lab Samples: 40140496014, 40140496015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Range Organics	mg/kg	<0.80	2.0	11/02/16 12:48	

LABORATORY CONTROL SAMPLE & LCSD: 1418770 1418771

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Diesel Range Organics	mg/kg	40	31.2	34.4	78	86	70-120	10	20	

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### QUALITY CONTROL DATA

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

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QC Batch:	239666	Analysis Method:	ASTM D2974-87
QC Batch Method:	ASTM D2974-87	Analysis Description:	Dry Weight/Percent Moisture
Associated Lab Samples:	40140496001, 40140496002, 40140496003, 40140496004, 40140496005, 40140496006, 40140496007, 40140496008, 40140496009, 40140496010, 40140496011, 40140496012, 40140496013, 40140496014, 40140496015		

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SAMPLE DUPLICATE: 1419913

Parameter	Units	40140520002 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	9.6	9.3	4	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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### QUALITY CONTROL DATA

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

QC Batch: 238840 Analysis Method: Lloyd Kahn  
 QC Batch Method: Lloyd Kahn Analysis Description: Lloyd Kahn TOC  
 Associated Lab Samples: 40140496001, 40140496002, 40140496003, 40140496004, 40140496005, 40140496006, 40140496007

METHOD BLANK: 1415005 Matrix: Solid  
 Associated Lab Samples: 40140496001, 40140496002, 40140496003, 40140496004, 40140496005, 40140496006, 40140496007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/kg	<33.9	100	10/24/16 06:14	

LABORATORY CONTROL SAMPLE: 1415006

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/kg	2000	1980	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1415007 1415008

Parameter	Units	1415007		1415008		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40140496001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
Total Organic Carbon	mg/kg	2360	2000	1990	6430	4050	203	85	80-120	45	20 M0,R1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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### QUALITY CONTROL DATA

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

QC Batch: 239305 Analysis Method: Lloyd Kahn  
 QC Batch Method: Lloyd Kahn Analysis Description: Lloyd Kahn TOC  
 Associated Lab Samples: 40140496008, 40140496009, 40140496010, 40140496011, 40140496012, 40140496013, 40140496014, 40140496015

METHOD BLANK: 1417707 Matrix: Solid  
 Associated Lab Samples: 40140496008, 40140496009, 40140496010, 40140496011, 40140496012, 40140496013, 40140496014, 40140496015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/kg	<33.9	100	10/27/16 05:15	

LABORATORY CONTROL SAMPLE: 1417708

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/kg	2000	1980	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1417709 1417710

Parameter	Units	40140496009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/kg	95900	14900	14900	105000	105000	63	59	80-120	1	20	P6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1417711 1417712

Parameter	Units	40140495001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/kg	19400	6180	6100	20200	24400	13	83	80-120	19	20	M0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-G Pace Analytical Services - Green Bay

### ANALYTE QUALIFIERS

D5 The sample was re-weighed into a new container because the sample weight in the original container exceeded the method specifications.

DC Chromatographic pattern inconsistent with typical Diesel Fuel.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

R1 RPD value was outside control limits.

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140496

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40140496001	101716001	WI MOD DRO	239173	WI MOD DRO	239267
40140496002	101716002	WI MOD DRO	239173	WI MOD DRO	239267
40140496003	101716003	WI MOD DRO	239173	WI MOD DRO	239267
40140496004	101716004	WI MOD DRO	239173	WI MOD DRO	239267
40140496005	101716005	WI MOD DRO	239173	WI MOD DRO	239267
40140496006	101716006	WI MOD DRO	239173	WI MOD DRO	239267
40140496007	101716007	WI MOD DRO	239173	WI MOD DRO	239267
40140496008	101816008	WI MOD DRO	239431	WI MOD DRO	239448
40140496009	101816009	WI MOD DRO	239431	WI MOD DRO	239448
40140496010	101816011	WI MOD DRO	239431	WI MOD DRO	239448
40140496011	101816012	WI MOD DRO	239431	WI MOD DRO	239448
40140496012	101816013	WI MOD DRO	239431	WI MOD DRO	239448
40140496013	101816015	WI MOD DRO	239431	WI MOD DRO	239448
40140496014	101816016	WI MOD DRO	239502	WI MOD DRO	239569
40140496015	101816017	WI MOD DRO	239502	WI MOD DRO	239569
40140496001	101716001	ASTM D2974-87	239666		
40140496002	101716002	ASTM D2974-87	239666		
40140496003	101716003	ASTM D2974-87	239666		
40140496004	101716004	ASTM D2974-87	239666		
40140496005	101716005	ASTM D2974-87	239666		
40140496006	101716006	ASTM D2974-87	239666		
40140496007	101716007	ASTM D2974-87	239666		
40140496008	101816008	ASTM D2974-87	239666		
40140496009	101816009	ASTM D2974-87	239666		
40140496010	101816011	ASTM D2974-87	239666		
40140496011	101816012	ASTM D2974-87	239666		
40140496012	101816013	ASTM D2974-87	239666		
40140496013	101816015	ASTM D2974-87	239666		
40140496014	101816016	ASTM D2974-87	239666		
40140496015	101816017	ASTM D2974-87	239666		
40140496001	101716001	Lloyd Kahn	238840		
40140496002	101716002	Lloyd Kahn	238840		
40140496003	101716003	Lloyd Kahn	238840		
40140496004	101716004	Lloyd Kahn	238840		
40140496005	101716005	Lloyd Kahn	238840		
40140496006	101716006	Lloyd Kahn	238840		
40140496007	101716007	Lloyd Kahn	238840		
40140496008	101816008	Lloyd Kahn	239305		
40140496009	101816009	Lloyd Kahn	239305		
40140496010	101816011	Lloyd Kahn	239305		
40140496011	101816012	Lloyd Kahn	239305		
40140496012	101816013	Lloyd Kahn	239305		
40140496013	101816015	Lloyd Kahn	239305		
40140496014	101816016	Lloyd Kahn	239305		
40140496015	101816017	Lloyd Kahn	239305		

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coc sea0s: 930621, 930622

Fedex tracking #: 806293223845

40140490



NATURAL RESOURCE TECHNOLOGY, INC.  
234 W. FLORIDA STREET, 5th FLOOR  
MILWAUKEE, WI 53204  
TEL: 414.837.3607

MV

CHAIN OF CUSTODY # 101716-1  
DATE: 10/17/16  
PAGE: 1 of 1

LABORATORY SAMPLES SUBMITTED TO: <b>Pace Analytical Services, Inc.</b>			CLIENT PROJECT NAME <b>Military Creek</b>		PROJECT NUMBER/TASK NUMBER: <b>2381 / 2</b>	
ADDRESS: <b>1241 Bellevue Street - Suite 9</b>			PROJECT CONTACT: <b>Andrew Millspaugh, amillspaugh@naturalrt.com</b>		QUOTE NO.: <b>00025715</b>	
CITY: <b>Green Bay, WI 54302</b>			SAMPLER(S): (SIGNATURE) <i>Stephanie, Andrea Salvo</i>			
TEL: <b>(920) 469-2436</b>	FAX:	E-MAIL: <b>Brian.Basten@pacelabs.com</b>				

TURNAROUND TIME <input checked="" type="radio"/> STANDARD <input type="radio"/> 24 HR <input type="radio"/> 48 HR <input type="radio"/> 72 HR			REQUESTED ANALYSIS			
Data Package: Level 2			Method Number and Analytes			
Preservatives: A = none, B = HCL, C = H <sub>2</sub> SO <sub>4</sub> , D = HNO <sub>3</sub> , E = methanol, F = Sodium Bisulfate, G = zinc acetate, H = other			Preservation Code (pick letter) Filtered (Y or N)			

SPECIAL REQUIREMENTS  
Send all SAFs & Reports to ..... Andrew Millspaugh, amillspaugh@naturalrt.com  
and ..... Data data@naturalrt.com  
Please refer to the full List of Analytes for this Sediment project provided by Steve Wiskes.

LAB USE ONLY	ROW	SAMPLE ID	QC SAMPLE	FIELD COMMENTS	SAMPLE		MATRIX	SAMPLE TYPE	SAMPLE INTERVAL (ft)		#CORR	2,3,7,8-TCDD (EPA 1631B)	Hydrometer/Grain Size (ASTM D422, D2216 and D2487)	% Moisture/Dry Weight (D2216)	TOC (Lloyd Kahn)	WI DRO (WI Mod DRO)			
					DATE	TIME			TOP	BOTTOM									
001	1	101716001			10/17/16	1344	SED	Grab			5	X	X	X	X	X	1-80zaf	2-40zaf	1-40zaf
002	2	101716002			10/17/16	1344	SED	Grab			5	X	X	X	X	X			
003	3	101716003			10/17/16	1319	SED	Grab			5	X	X	X	X	X			
004	4	101716004			10/17/16	1319	SED	Grab			5	X	X	X	X	X			
005	5	101716005			10/17/16	1432	SED	Grab			5	X	X	X	X	X			
006	6	101716006			10/17/16	1432	SED	Grab			5	X	X	X	X	X			
007	7	101716007			10/17/16	1433	SED	Grab			5	X	X	X	X	X			
008	8	101816008			10/18/16	1342	SED	Grab											
009	9	101816009				1342	SED	Grab											
010	10	101816011				1133	SED	Grab											
011	11	101816012				1245	SED	Grab											
012	12	101816013				1245	SED	Grab											
013	13	101816015				1017	SED	Grab											
014	14	101816016				1017	SED	Grab											
015	15	101816017				1018	SED	Grab				X	X	X	X	X			

Relinquished by: (Signature) <i>Steve Wiskes</i>	Received by: (Signature) <i>Brian Basten</i>	Date: <u>10/20/16</u>	Time: <u>0950</u>
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

# Sample Condition Upon Receipt

Pace Analytical Services, Inc.  
1241 Bellevue Street, Suite 9  
Green Bay, WI 54302

**Pace Analytical**  
NRT

Project #: **WO# : 40140496**

Client Name: \_\_\_\_\_



Courier:  Fed Ex  UPS  Client  Pace Other: \_\_\_\_\_

Tracking #: 8062 9322 3845 8102 5525 2590

Custody Seal on Cooler/Box Present:  yes  no Seals intact:  yes  no

Custody Seal on Samples Present:  yes  no Seals intact:  yes  no

Packing Material:  Bubble Wrap  Bubble Bags  None  Other \_\_\_\_\_

Thermometer Used NA Type of Ice:  Wet  Blue  Dry  None  Samples on ice, cooling process has begun

Cooler Temperature Uncorr: ROT (Corr: \_\_\_\_\_) Biological Tissue is Frozen:  yes  no

Temp Blank Present:  yes  no

Person examining contents:
Date: <u>10/20/16</u>
Initials: <u>BJ</u>

Temp should be above freezing to 6°C for all sample except Biota.  
Frozen Biota Samples should be received ≤ 0°C.

**Comments:**

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler <u>(Name)</u> & Signature on COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time: _____
<b>Short Hold Time Analysis (&lt;72hr):</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
<b>Rush Turn Around Time Requested:</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>S</u>		<u>004 1-4020A time 1329</u> <u>005 1-4020A 1-4020A ID "10617005"</u> <u>008 1-4020A time 1329</u> <u>1-4020A</u> <u>PH 1020/16</u>
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Initial when completed _____ Lab Std #ID of preservative _____ Date/Time: _____
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____		

**Client Notification/ Resolution:** \_\_\_\_\_ If checked, see attached form for additional comments

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

Project Manager Review: [Signature]

Date: 10-20-16



# CQM, INC.

Engineering – Surveying – Material Testing

## TRANSMITTAL

TO: Brian Basten  
Pace Analytical  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

FROM: Bob Rouse  
CQM, INC.  
 \_\_\_\_\_  
 2679 Continental Drive  
 \_\_\_\_\_  
 Green Bay, WI 54311  
 \_\_\_\_\_  
 PHONE: (920) 465-3911  
 \_\_\_\_\_  
 DATE: November 7, 2016  
 \_\_\_\_\_

RE: Lab Test Result Reports  
 \_\_\_\_\_

PROJECT: No - 40140496  
Military Creek

WE ARE SENDING YOU:

- |  |   |                             |
|--|---|-----------------------------|
| <input checked="" type="checkbox"/> ATTACHED | <input type="checkbox"/> UNDER SEPARATE COVER VIA | <input type="checkbox"/> CD |
| <input type="checkbox"/> DRAWINGS            | <input type="checkbox"/> SPECIFICATIONS           | <input type="checkbox"/>    |
| <input type="checkbox"/> DOCUMENTS           | <input type="checkbox"/> COPY OF LETTER           | <input type="checkbox"/>    |

QUANTITY	DESCRIPTION
1	<u>Lab Test Result Reports</u>
1	<u>Chain of Custody Record</u>
	<u>Invoice to be sent later</u>

IF MATERIAL RECEIVED IS NOT AS LISTED, PLEASE NOTIFY US AT ONCE.

REMARKS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

COPY TO: \_\_\_\_\_

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101716001
Sample No:	40140496-001
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 5/4
Date Sampled:	10/17/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	184.2

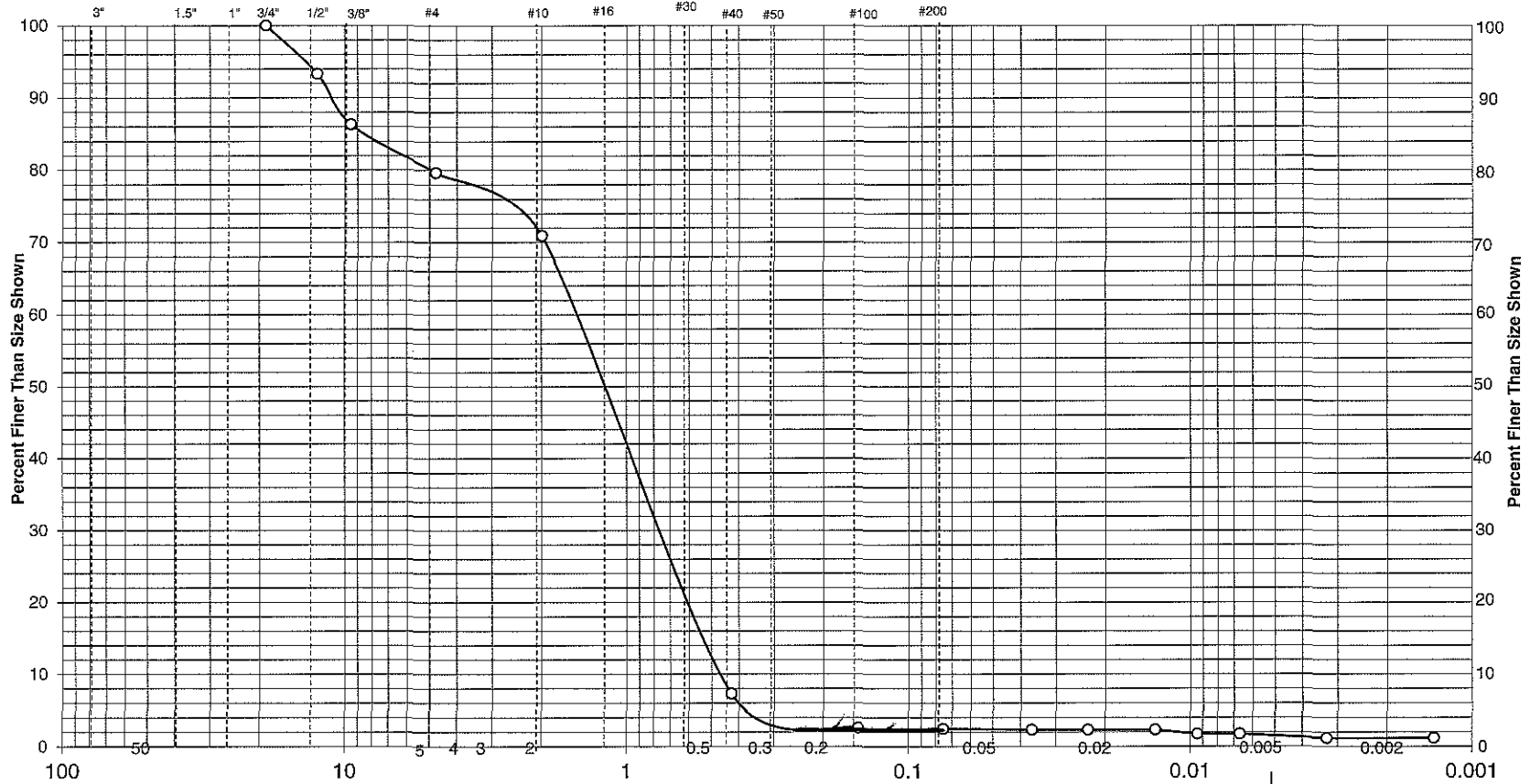
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"	0.0	0.0	100.0		
1/2"	12.3	6.7	93.3		
3/8"	12.9	7.0	86.3		
#4	12.3	6.7	79.6		
#10	16.0	8.7	70.9		
#40	117.3	63.7	7.3		
#100	8.7	4.7	2.6		
#200	0.2	0.1	2.4		

REVIEWED BY:	<i>Robert A. Rouse</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	20.4%	8.7%	63.7%	4.8%	0.9%	1.5%	

Soil Classification: SAND W/GRAVEL, medium grained, yellowish brown (SP)

Location Sampled: 101716001

Elevation or Depth:

Date Sampled: 10/17/16

Sample Number: 40140496-001

Sampled Moisture Content (%): 16.8

Report No.: 496-1

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LI=

PL=

PI=

Client: **Face Analytical**

Munsell Color Code: 10YR 5/4

Project: **No. 40140496**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/3/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. Rouse*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101716002
Sample No:	40140496-002
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 5/4
Date Sampled:	10/17/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	203.7

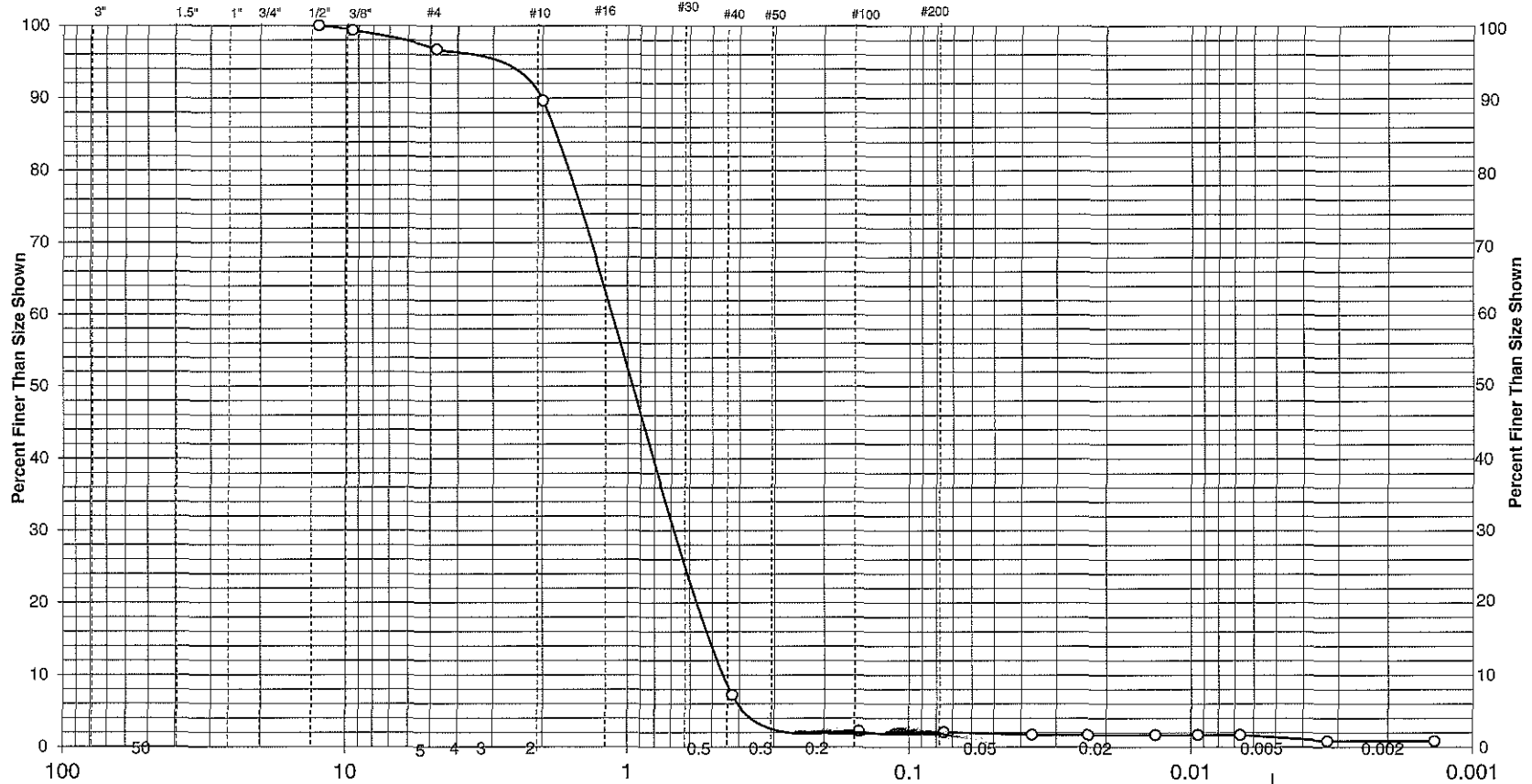
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	1.3	0.6	99.4		
#4	5.4	2.7	96.7		
#10	14.4	7.1	89.6		
#40	167.9	82.4	7.2		
#100	10.2	5.0	2.2		
#200	0.3	0.1	2.1		

REVIEWED BY:	<i>Robert A. Power</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	3.3%	7.1%	82.4%	5.1%	0.6%	1.5%	

Soil Classification: SAND, medium grained, a little gravel, yellowish brown (SP)

Location Sampled: 101716002

Elevation or Depth:

Date Sampled: 10/17/16

Sample Number: 40140496-002

Sampled Moisture Content (%): 8.7

Report No.: 496-2

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 5/4

Project: **No. 40140496**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/3/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. Roese*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101716003
Sample No:	40140496-003
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 5/4
Date Sampled:	10/17/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	111.1

Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"	0.0	0.0	100.0		
3/4"	20.3	18.3	81.7		
1/2"	12.0	10.8	70.9		
3/8"	6.7	6.0	64.9		
#4	5.4	4.9	60.0		
#10	2.1	1.9	58.1		
#40	48.8	43.9	14.2		
#100	13.3	12.0	2.2		
#200	0.4	0.4	1.8		

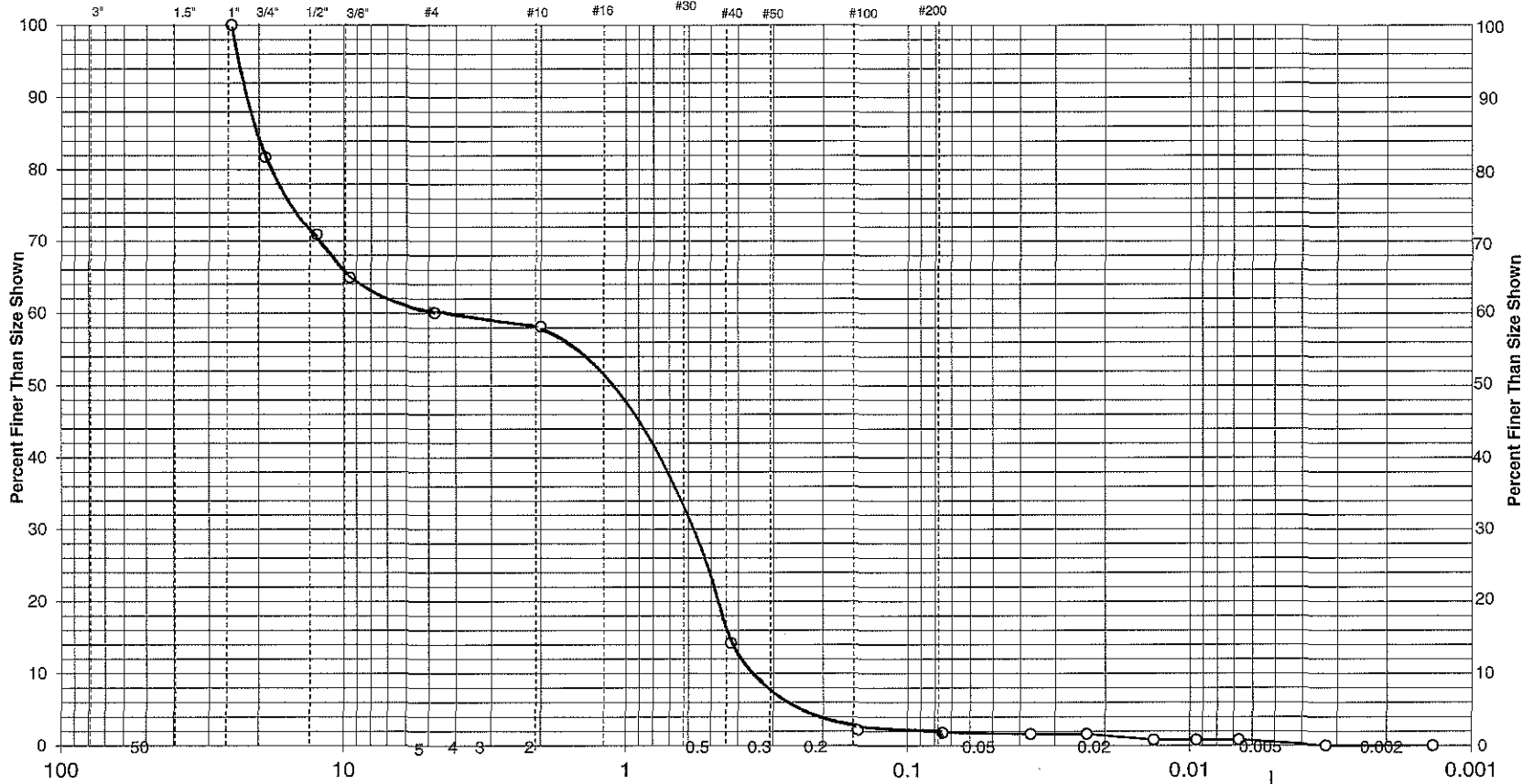
REVIEWED BY:	<i>Robert A. Brown</i>
DATE REVIEWED:	11/3/16

Remarks:



# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
18.3%	21.7%	1.9%	43.9%	12.4%	1.3%	0.5%	

Soil Classification: SAND W/GRAVEL, medium to fine grained, yellowish brown (SP)

Location Sampled: 101716003

Elevation or Depth:

Date Sampled: 10/17/16

Sample Number: 40140496-003

Sampled Moisture Content (%): 14.0

Report No.: 496-3

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: Pace Analytical

Munsell Color Code: 10YR 5/4

Project: No. 40140496

Page: 2

Date Received: 10/24/16

Prepared by: Bob J. Peeters

Date: 11/3/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. Rouse*

Date: 11/3/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101716004
Sample No:	40140496-004
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 3/2
Date Sampled:	10/17/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	30.8

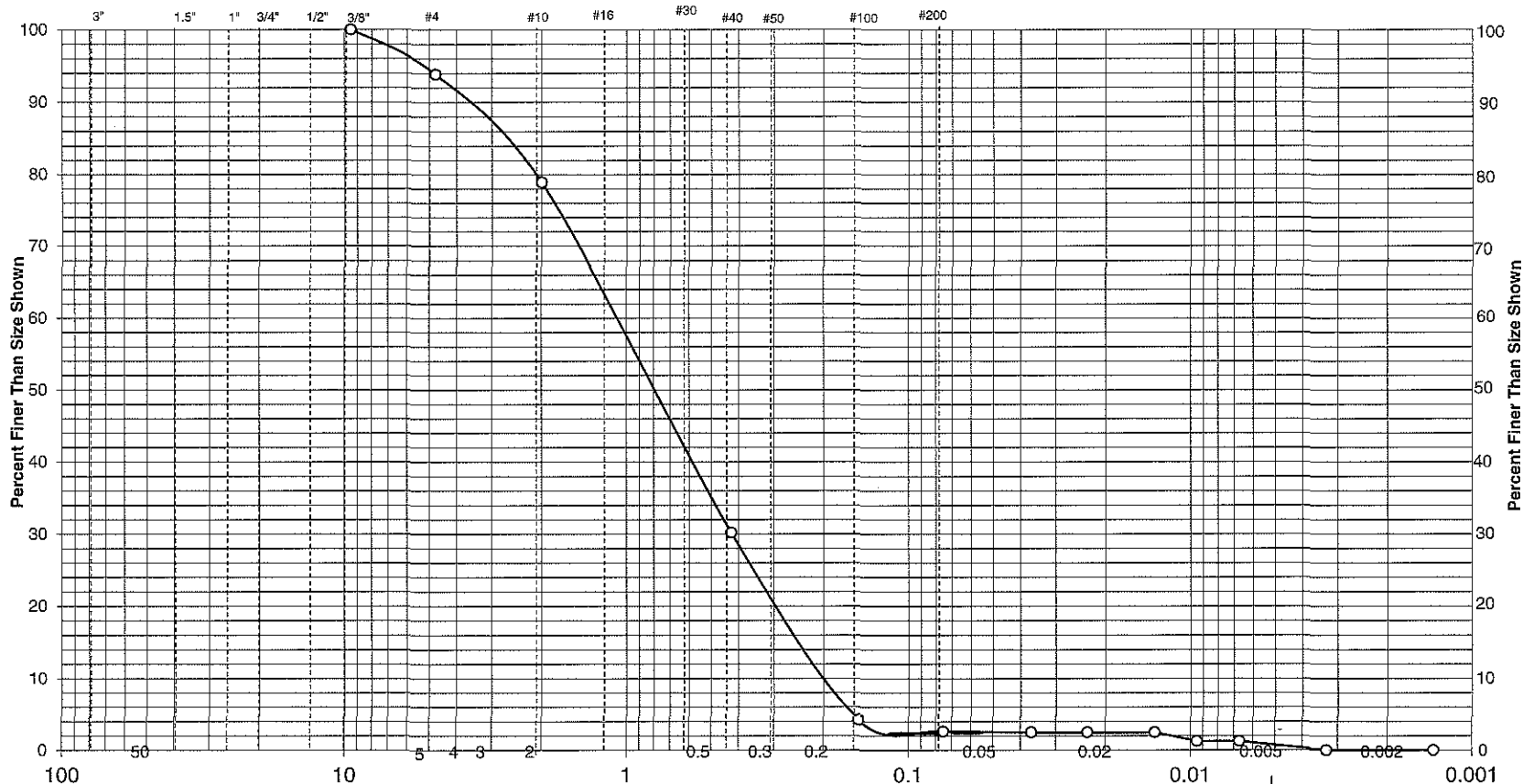
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	1.9	6.2	93.8		
#10	4.6	14.9	78.9		
#40	15.0	48.7	30.2		
#100	8.0	26.0	4.2		
#200	0.5	1.6	2.6		

REVIEWED BY:	<i>Robert R. Rouse</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	6.2%	14.9%	48.7%	27.6%	2.1%	0.5%	

Soil Classification: SAND, medium to fine to coarse grained, a little gravel, very dark grayish brown (SP)

Location Sampled: 101716004

Elevation or Depth:

Date Sampled: 10/17/16

Sample Number: 40140496-004

Sampled Moisture Content (%): 17.5

Report No.: 496-4

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:	LL=	PL=	PI=	
Munsell Color Code: 10YR 3/2				
Date Received: 10/24/16				
Coefficients: Cc=		Cu=		

Client:	Pace Analytical		
Project:	No. 40140496	Page:	2
Prepared by:	Bob J. Peeters	Date:	11/3/16
Checked by:	<i>Robert R. Rouse</i>	Date:	11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101716005
Sample No:	40140496-005
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 5/4
Date Sampled:	10/17/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016	
Test Performed By:	FRH	
24 Hrs. Turn Around:	NO	
Washed Gradation:	YES	
Dry Weight of Soil (gms):	172.8	

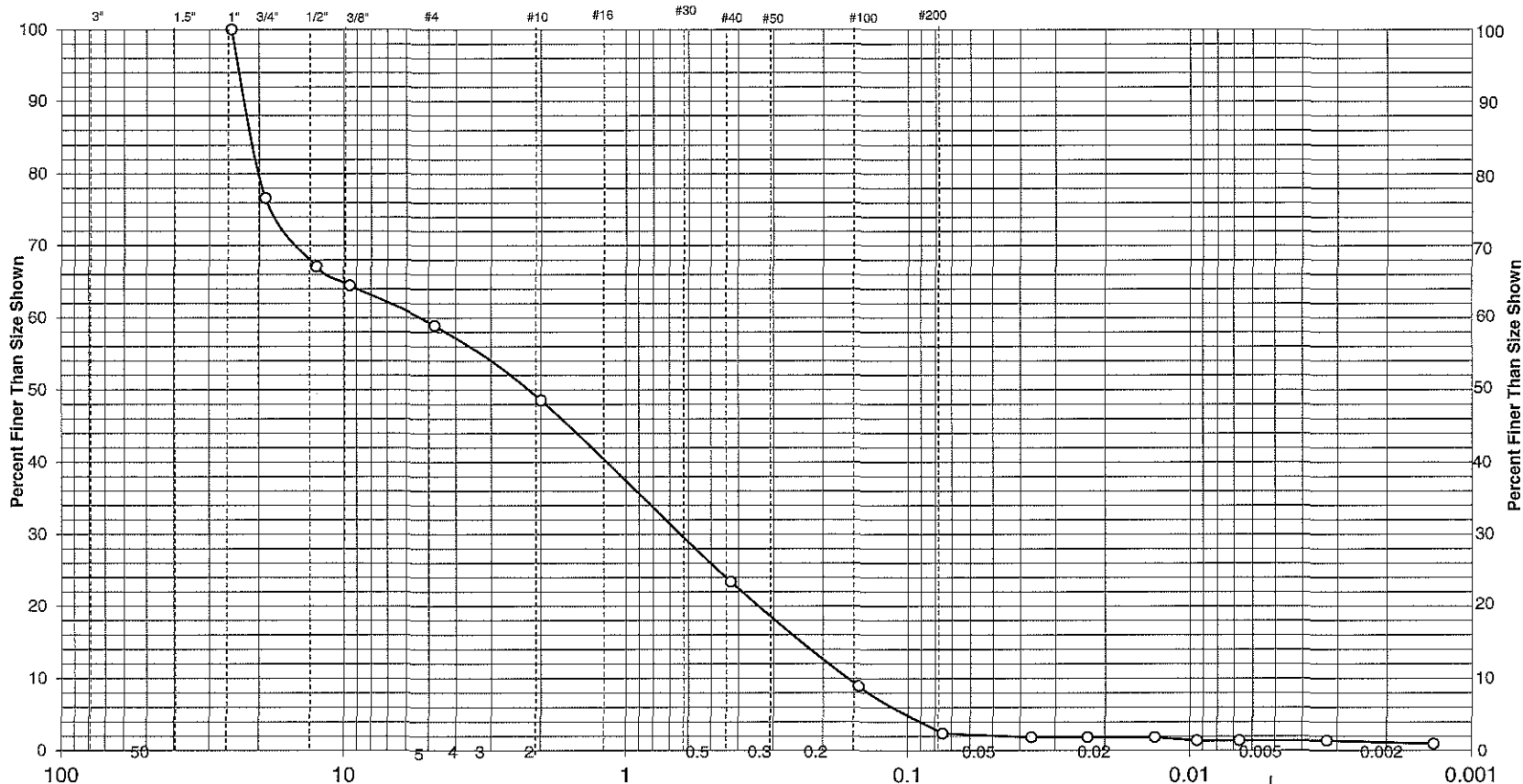
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"	0.0	0.0	100.0		
3/4"	40.4	23.4	76.6		
1/2"	16.5	9.5	67.1		
3/8"	4.5	2.6	64.5		
#4	9.7	5.6	58.9		
#10	17.8	10.3	48.6		
#40	43.5	25.2	23.4		
#100	25.0	14.5	8.9		
#200	11.3	6.5	2.4		

REVIEWED BY:	<i>Robert L. House</i>
DATE REVIEWED:	<i>11/7/16</i>

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand						
Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
23.4%	17.7%	10.3%	25.2%	21.0%	0.9%		1.5%	

Soil Classification: SAND W/GRAVEL, medium to fine to coarse grained, yellowish brown (SP)

Location Sampled: 101716005

Elevation or Depth:

Date Sampled: 10/17/16

Sample Number: 40140496-005

Sampled Moisture Content (%): 7.6

Report No.: 496-5

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: Pace Analytical

Munsell Color Code: 10YR 5/4

Project: No. 40140496

Page: 2

Date Received: 10/24/16

Prepared by: Bob J. Peeters

Date: 11/3/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. Rouse*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101716006
Sample No:	40140496-006
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 5/6
Date Sampled:	10/17/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	100.2

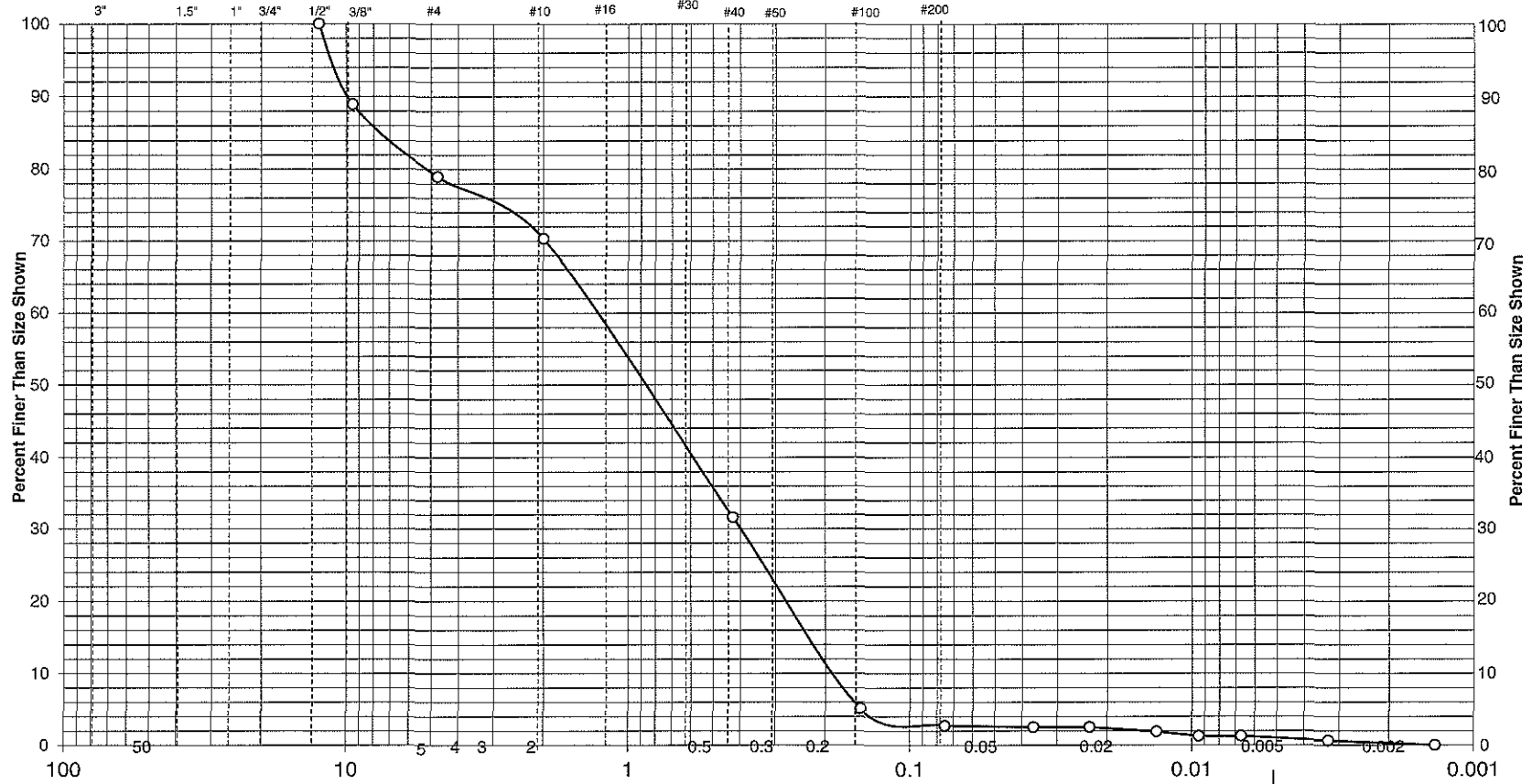
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	11.1	11.1	88.9		
#4	10.0	10.0	78.9		
#10	8.6	8.6	70.3		
#40	38.8	38.7	31.6		
#100	26.6	26.5	5.1		
#200	2.4	2.4	2.7		

REVIEWED BY:	<i>Robert A. Rowe</i>
DATE REVIEWED:	<i>11/7/16</i>

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	21.1%	8.6%	38.7%	28.9%	1.7%	1.0%	

Soil Classification: SAND W/GRAVEL, medium to fine grained, yellowish brown (SP)

Location Sampled: 101716006

Elevation or Depth:

Date Sampled: 10/17/16

Sample Number: 40140496-006

Sampled Moisture Content (%): 19.9

Report No.: 496-6

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 5/6

Project: **No. 40140496**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/3/16

Coefficients: Cc=

Cu=

Checked by: *Robert R. Rouse*

Date: 11/7/16



# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101716007
Sample No:	40140496-007
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 4/2
Date Sampled:	10/17/16

**LABORATORY DATA:**

Date Tested:	October 27-31.2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	175.4

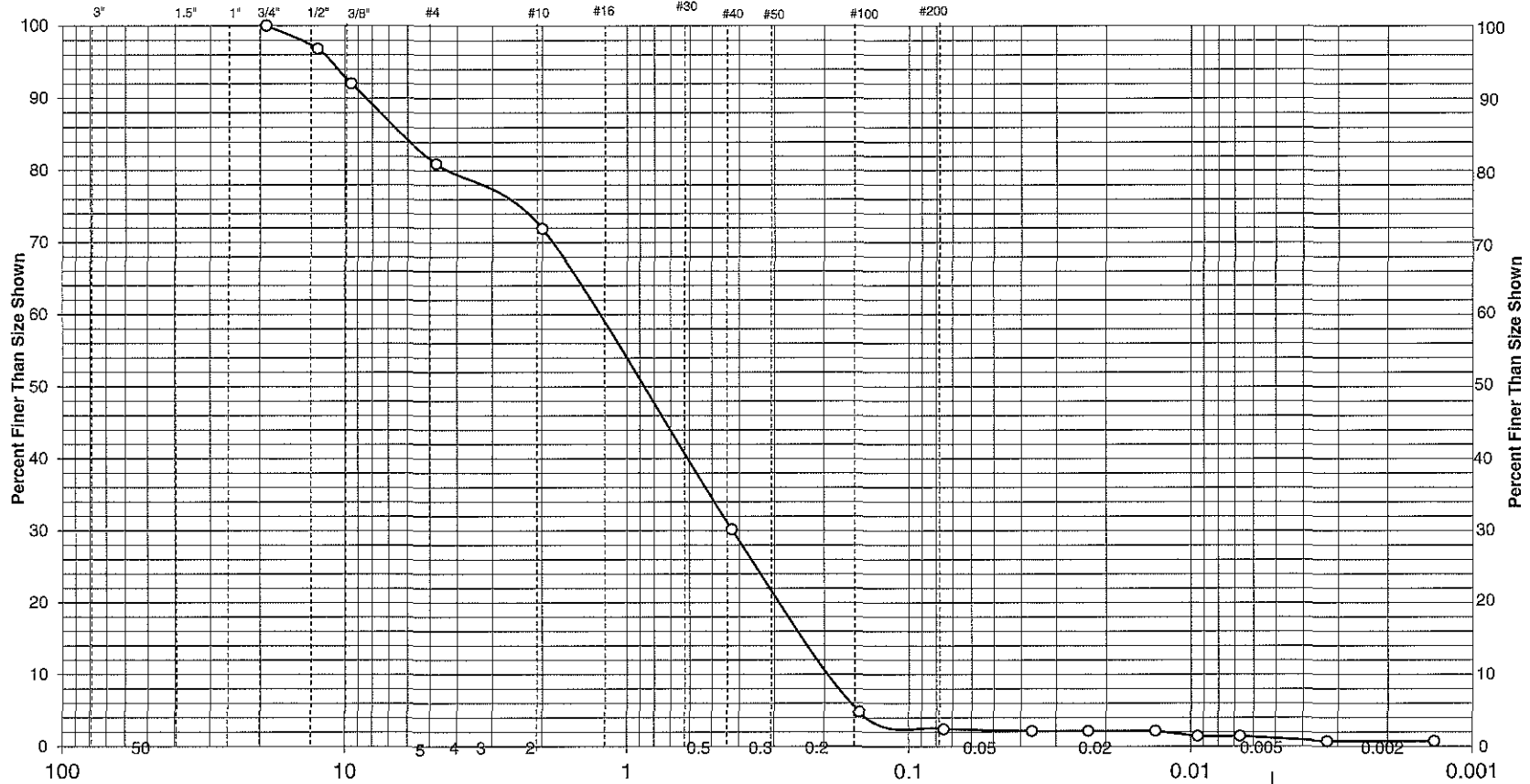
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"	0.0	0.0	100.0		
1/2"	5.6	3.2	96.8		
3/8"	8.4	4.8	92.0		
#4	19.5	11.1	80.9		
#10	15.8	9.0	71.9		
#40	73.2	41.7	30.2		
#100	44.5	25.4	4.8		
#200	4.2	2.4	2.4		

REVIEWED BY:	<i>Robert R. Brown</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	19.1%	9.0%	41.7%	27.8%	1.4%	1.0%	

Soil Classification: SAND W/GRAVEL, medium to fine grained, dark grayish brown (SP)

Location Sampled: 101716007

Elevation or Depth:

Date Sampled: 10/17/16

Sample Number: 40140496-007

Sampled Moisture Content (%): 19.4

Report No.: 496-7

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 4/2

Project: **No. 40140496**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/3/16

Coefficients: Cc=    Cu=

Checked by: *Robert R. Pouse*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101816008
Sample No:	40140496-008
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/18/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016	
Test Performed By:	FRH	
24 Hrs. Turn Around:	NO	
Washed Gradation:	YES	
Dry Weight of Soil (gms):	8.0	

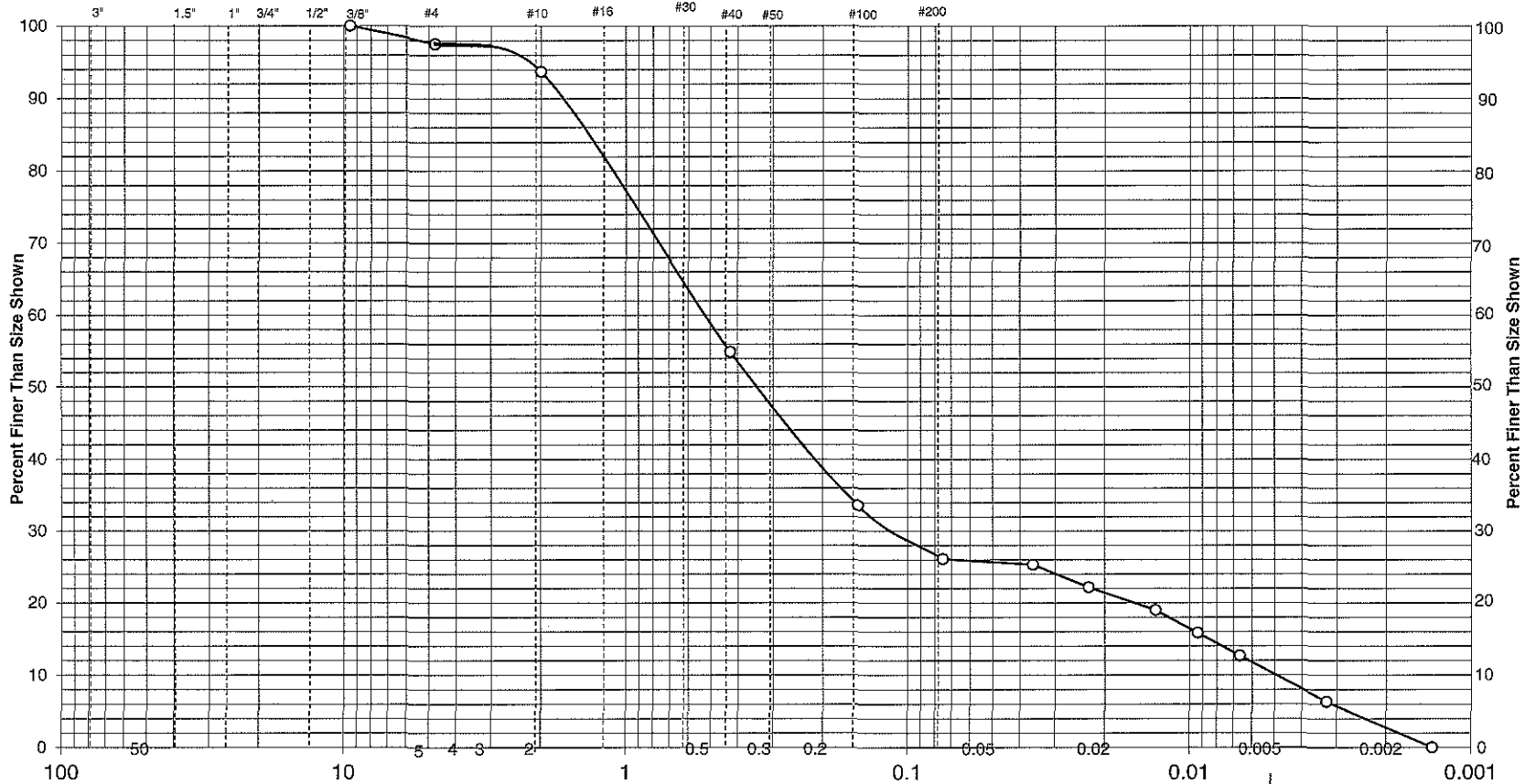
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	0.2	2.5	97.5		
#10	0.3	3.8	93.7		
#40	3.1	38.8	54.9		
#100	1.7	21.3	33.6		
#200	0.6	7.5	26.1		

REVIEWED BY:	<i>Robert A. House</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	2.5%	3.8%	38.8%	28.8%	16.1%	10.0%	

Soil Classification: SILTY SAND W/ORGANIC FINES, medium to fine grained, black (SM)

Location Sampled: 101816008

Elevation or Depth:

Date Sampled: 10/18/16

Sample Number: 40140496-008

Sampled Moisture Content (%): 591.3

Report No.: 496-8

Sample Source: Military Creek

**CQM, INC.**

Page 37 of 51

Atterberg Limits:      LL=      PL=      PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 2/1

Project: **No. 40140496**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/3/16

Coefficients: Cc=      Cu=

Checked by: *Robert R. Pouse*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101816009
Sample No:	40140496-009
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/18/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	50.9

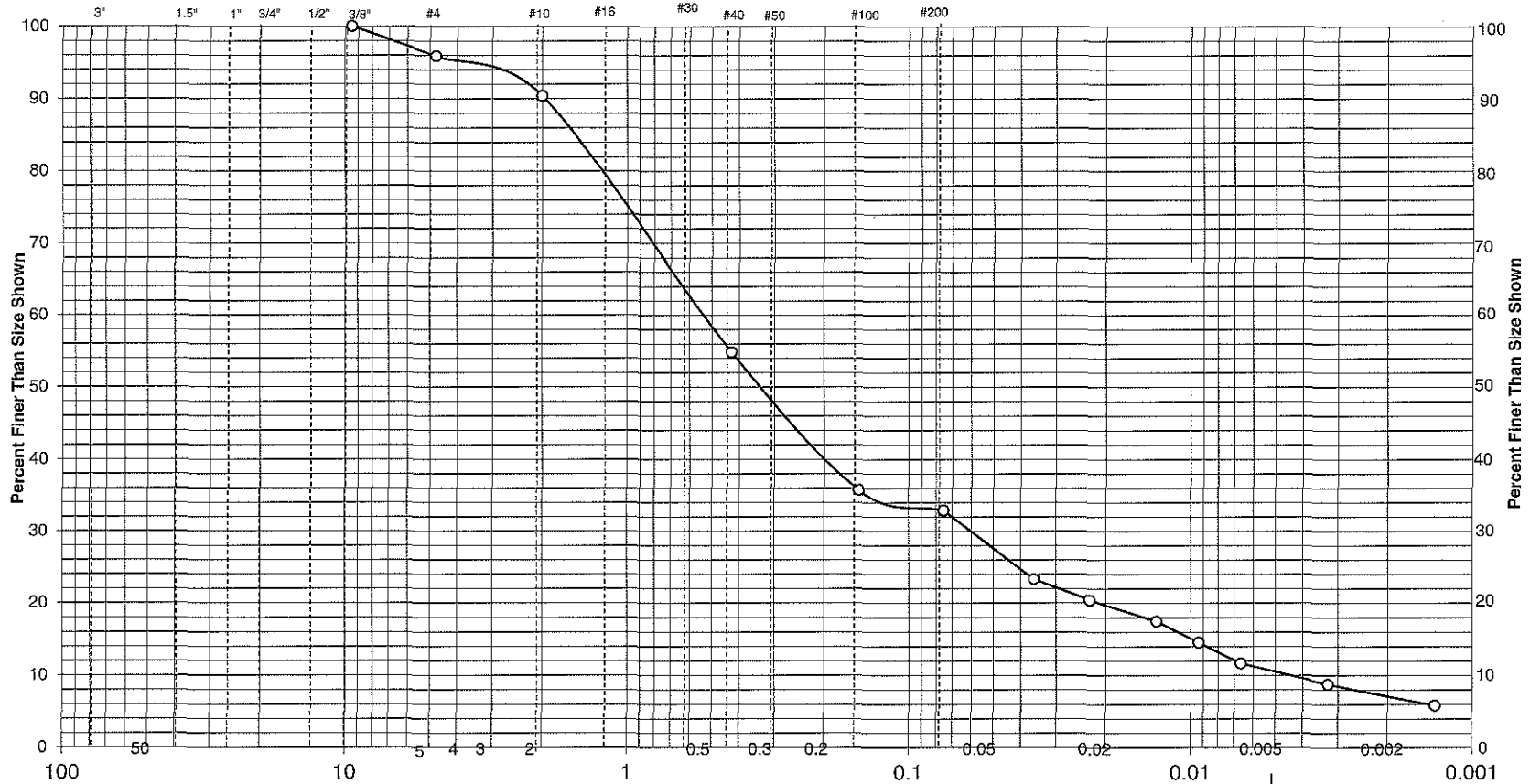
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	2.1	4.1	95.9		
#10	2.8	5.5	90.4		
#40	18.1	35.6	54.8		
#100	9.7	19.1	35.7		
#200	1.4	2.8	32.9		

REVIEWED BY:	<i>Robert R. Brown</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	4.1%	5.5%	35.6%	21.9%	22.4%	10.5%	

Soil Classification: SILTY SAND W/ORGANIC FINES, medium to fine grained, a little gravel, black (SM)

Location Sampled: 101816009

Elevation or Depth:

Date Sampled: 10/18/16

Sample Number: 40140496-009

Sampled Moisture Content (%): 185.5

Report No.: 496-9

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: Pace Analytical

Munsell Color Code: 10YR 2/1

Project: No. 40140496

Page: 2

Date Received: 10/24/16

Prepared by: Bob J. Peeters

Date: 11/3/16

Coefficients: Cc=

Cu=

Checked by:

*Robert A. Rouse*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101816011
Sample No:	40140496-010
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/18/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	68.7

Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	8.9	13.0	87.0		
#10	7.9	11.5	75.5		
#40	28.9	42.1	33.4		
#100	15.9	23.1	10.3		
#200	0.7	1.0	9.3		

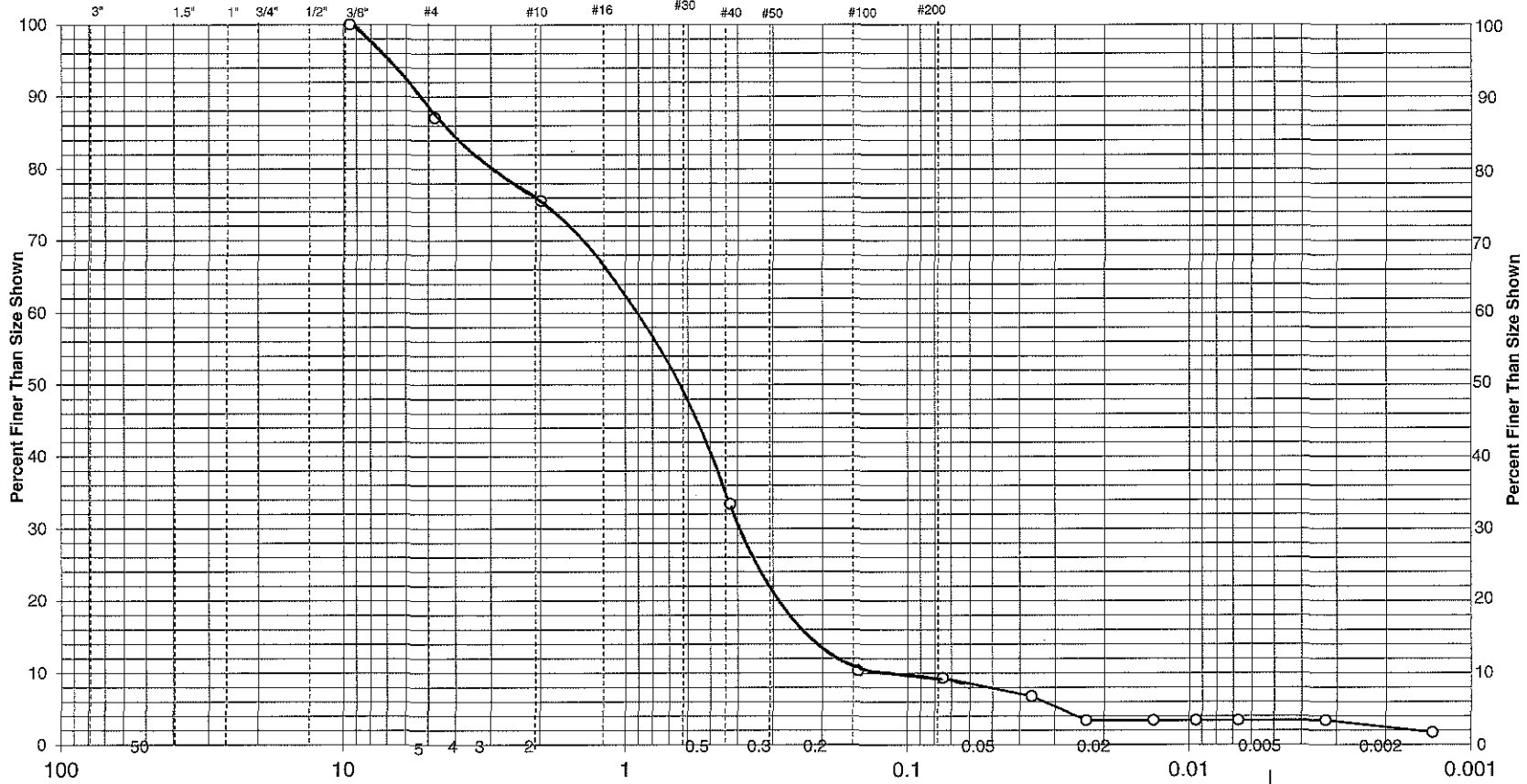
REVIEWED BY:	<i>Robert R. Poore</i>
DATE REVIEWED:	11/7/16

Remarks:



# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	13.0%	11.5%	42.1%	24.1%	5.8%	3.5%	

Soil Classification: SAND W/SILT, medium to fine to coarse grained, a little gravel, some organic fines, black (SP-SM)

Location Sampled: 101816011

Elevation or Depth:

Date Sampled: 10/18/16

Sample Number: 40140496-010

Sampled Moisture Content (%): 42.2

Report No.: 496-10

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 2/1

Project: **No. 40140496**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/3/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. House*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101816012
Sample No:	40140496-011
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/18/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	140.1

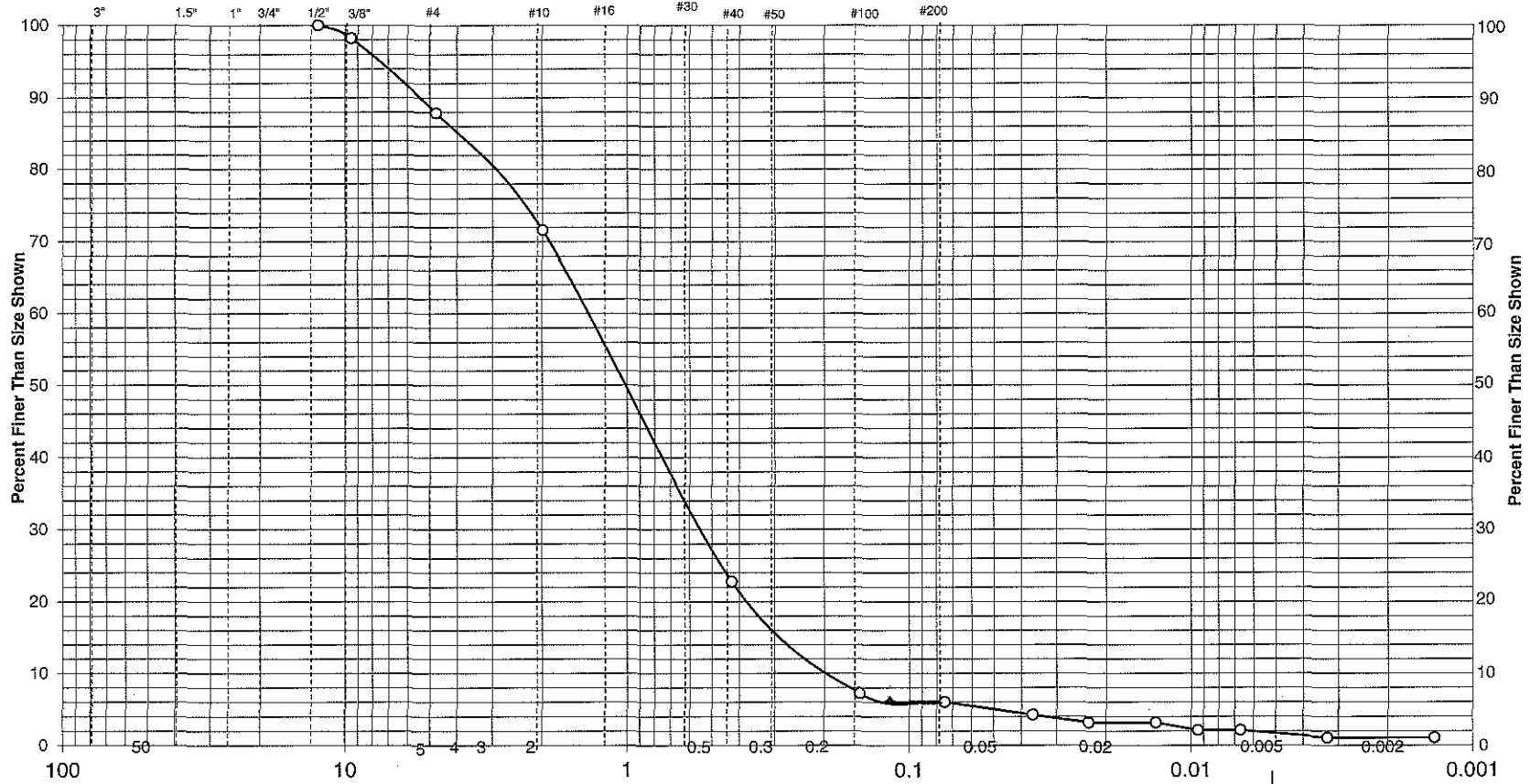
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	2.5	1.8	98.2		
#4	14.5	10.3	87.9		
#10	22.9	16.3	71.6		
#40	68.3	48.8	22.8		
#100	21.8	15.6	7.2		
#200	1.7	1.2	6.0		

REVIEWED BY:	<i>Robert R. Brown</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	12.1%	16.3%	48.8%	16.8%	4.5%		

Soil Classification: SAND W/SILT, medium to fine to coarse grained, some organic fines, a little gravel, black (SP-SM)

Location Sampled: 101816012

Elevation or Depth:

Date Sampled: 10/18/16

Sample Number: 40140496-011

Sampled Moisture Content (%): 35.1

Report No.: 496-11

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:      LL=      PL=      PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 2/1

Project: **No. 40140496**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/4/16

Coefficients: Cc=      Cu=

Checked by: *Robert A. Rouse*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101816013
Sample No:	40140496-012
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/18/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	136.6

Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	18.7	13.7	86.3		
#4	24.2	17.7	68.6		
#10	16.7	12.2	56.4		
#40	57.4	42.0	14.4		
#100	15.4	11.3	3.1		
#200	0.6	0.4	2.7		

REVIEWED BY:	<i>Robert A. Davis</i>
DATE REVIEWED:	11/7/16

Remarks:



# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101816015
Sample No:	40140496-013
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/18/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	280.8

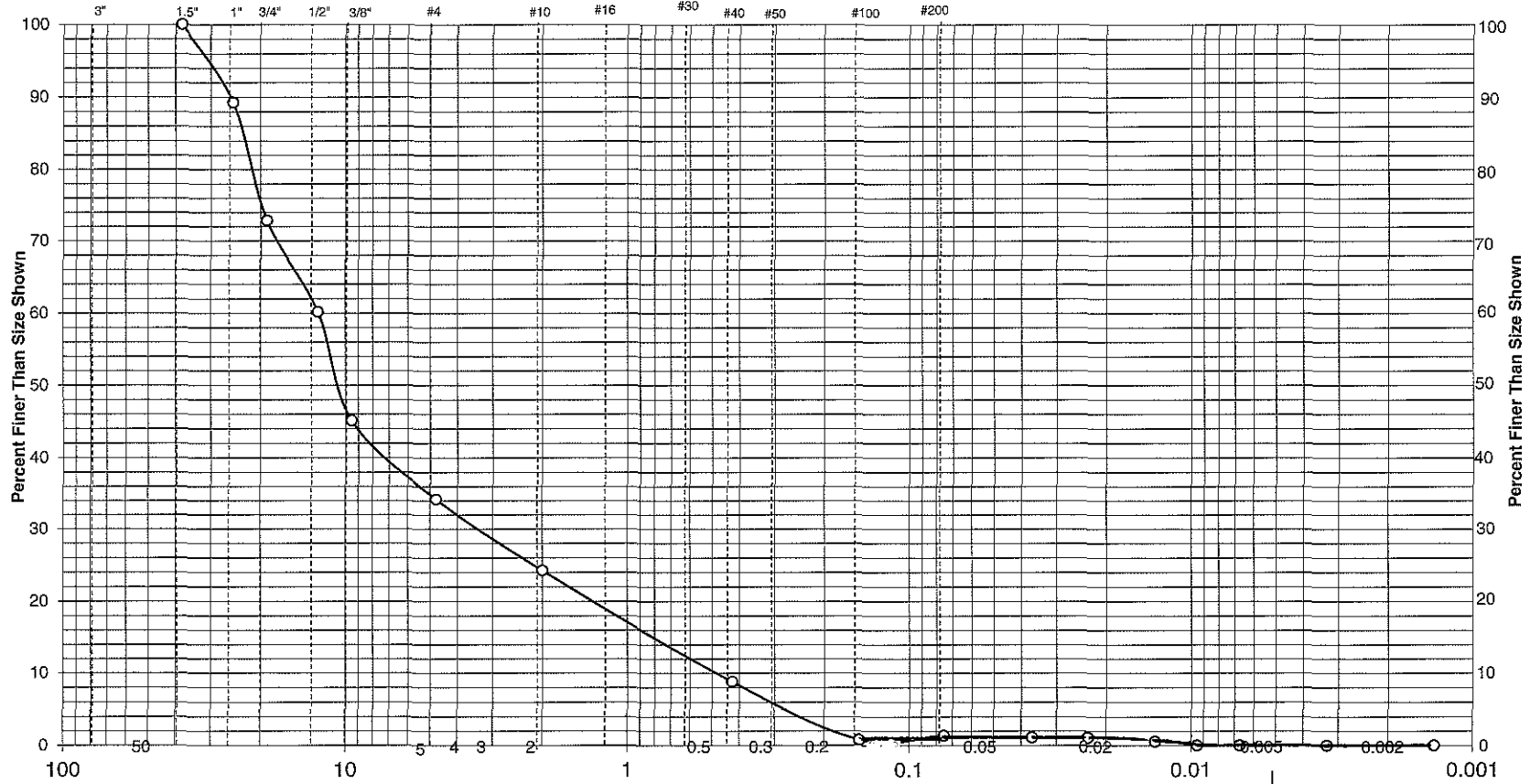
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"	0.0	0.0	100.0		
1"	30.1	10.7	89.3		
3/4"	46.1	16.4	72.9		
1/2"	35.6	12.7	60.2		
3/8"	42.5	15.1	45.1		
#4	30.7	10.9	34.2		
#10	27.7	9.9	24.3		
#40	43.6	15.5	8.8		
#100	19.7	7.0	0.8		
#200	1.0	0.4	1.4		

REVIEWED BY:	<i>Robert R. House</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
27.1%	38.7%	9.9%	15.5%	7.4%	1.4%		

Soil Classification: GRAVEL W/SAND, some organic fines, black (GP)

Location Sampled: 101816015

Elevation or Depth:

Date Sampled: 10/18/16

Sample Number: 40140496-013

Sampled Moisture Content (%): 6.6

Report No.: 496-13

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 2/1

Project: **No. 40140496**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/4/16

Coefficients: Cc=

Cu=

Checked by:

*Robert A. House*

Date: 11/7/16



# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101816016
Sample No:	40140496-014
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/18/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	91.4

Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	2.6	2.8	97.2		
#4	6.1	6.7	90.5		
#10	9.1	10.0	80.5		
#40	48.9	53.5	27.0		
#100	19.5	21.3	5.7		
#200	1.4	1.5	4.2		

REVIEWED BY:	<i>Robert A. House</i>
DATE REVIEWED:	11/7/16

Remarks:



# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140496
Location Sampled:	101816017
Sample No:	40140496-015
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/18/16

**LABORATORY DATA:**

Date Tested:	October 27-31, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	125.1

Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	20.6	16.5	83.5		
#4	4.1	3.3	80.2		
#10	16.7	13.3	66.9		
#40	55.8	44.6	22.3		
#100	20.3	16.2	6.1		
#200	1.0	0.8	5.3		

REVIEWED BY:	<i>Robert A. House</i>
DATE REVIEWED:	11/7/16

Remarks:



November 07, 2016

Andrea Salus  
NATURAL RESOURCE TECHNOLOGY  
234 W. Florida Street  
5th Floor  
Milwaukee, WI 53204

RE: Project: 2381/2 MILITARY CREEK  
Pace Project No.: 40140495

Dear Andrea Salus:

Enclosed are the analytical results for sample(s) received by the laboratory on October 20, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

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

Sincerely,



Brian Basten  
brian.basten@pacelabs.com  
Project Manager

Enclosures

cc: Data Delivery Team, Natural Resources Technologies



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140495

---

### Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky UST Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 12064

North Dakota Certification #: R-150

Virginia VELAP ID: 460263

South Carolina Certification #: 83006001

Texas Certification #: T104704529-14-1

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

USDA Soil Permit #: P330-16-00157

Federal Fish & Wildlife Permit #: LE51774A-0

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140495

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40140495001	101916018	Solid	10/19/16 09:12	10/20/16 09:50
40140495002	101916019	Solid	10/19/16 09:12	10/20/16 09:50
40140495003	101916021	Solid	10/19/16 09:37	10/20/16 09:50
40140495004	101916022	Solid	10/19/16 09:37	10/20/16 09:50
40140495005	101916024	Solid	10/19/16 10:35	10/20/16 09:50
40140495006	101916025	Solid	10/19/16 10:35	10/20/16 09:50
40140495007	101916027	Solid	10/19/16 12:09	10/20/16 09:50
40140495008	101916028	Solid	10/19/16 12:09	10/20/16 09:50

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140495

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40140495001	101916018	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	TEL	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140495002	101916019	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	TEL	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140495003	101916021	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	TEL	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140495004	101916022	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	TEL	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140495005	101916024	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	TEL	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140495006	101916025	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	TEL	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140495007	101916027	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	TEL	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140495008	101916028	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	TEL	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140495

**Sample: 101916018**      **Lab ID: 40140495001**      Collected: 10/19/16 09:12      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>4.5</b>	mg/kg	2.2	0.90	1	10/21/16 09:27	10/25/16 13:29		DC,L2
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>35.8</b>	%	0.10	0.10	1		10/28/16 14:51		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>19400</b>	mg/kg	1280	433	1		10/27/16 06:54	7440-44-0	M0

**Sample: 101916019**      **Lab ID: 40140495002**      Collected: 10/19/16 09:12      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>&lt;0.70</b>	mg/kg	1.7	0.70	1	10/21/16 09:27	10/25/16 13:35		L2
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>16.9</b>	%	0.10	0.10	1		10/28/16 14:52		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>649</b>	mg/kg	120	40.7	1		10/27/16 09:47	7440-44-0	

**Sample: 101916021**      **Lab ID: 40140495003**      Collected: 10/19/16 09:37      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>&lt;9.3</b>	mg/kg	23.2	9.3	1	10/21/16 09:27	10/25/16 11:50		D5,L2
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>91.4</b>	%	0.10	0.10	1		10/28/16 14:52		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>245000</b>	mg/kg	10700	3620	1		10/27/16 07:17	7440-44-0	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140495

**Sample: 101916022**      **Lab ID: 40140495004**      Collected: 10/19/16 09:37      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>6.5J</b>	mg/kg	8.1	3.3	1	10/21/16 09:27	10/25/16 11:59		D5,DC, L2
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>75.4</b>	%	0.10	0.10	1		10/28/16 14:52		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>128000</b>	mg/kg	3240	1100	1		10/27/16 07:23	7440-44-0	

**Sample: 101916024**      **Lab ID: 40140495005**      Collected: 10/19/16 10:35      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>12.8</b>	mg/kg	3.7	1.5	1	10/21/16 09:27	10/25/16 12:08		D5,DC, L2
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>46.3</b>	%	0.10	0.10	1		10/28/16 14:52		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>19300</b>	mg/kg	1320	449	1		10/27/16 07:29	7440-44-0	

**Sample: 101916025**      **Lab ID: 40140495006**      Collected: 10/19/16 10:35      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>54.8</b>	mg/kg	4.5	1.8	1	10/21/16 09:27	10/25/16 12:17		D5,L2
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>55.4</b>	%	0.10	0.10	1		10/28/16 14:52		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>30900</b>	mg/kg	1460	494	1		10/27/16 07:35	7440-44-0	

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### ANALYTICAL RESULTS

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140495

**Sample: 101916027**      **Lab ID: 40140495007**      Collected: 10/19/16 12:09      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b>									
Analytical Method: WI MOD DRO    Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>&lt;9.9</b>	mg/kg	24.6	9.9	1	10/21/16 09:27	10/25/16 12:26		D5,L2
<b>Percent Moisture</b>									
Analytical Method: ASTM D2974-87									
Percent Moisture	<b>91.9</b>	%	0.10	0.10	1		10/28/16 14:52		
<b>TOC via Lloyd Kahn</b>									
Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>317000</b>	mg/kg	9440	3200	1		10/27/16 07:51	7440-44-0	

**Sample: 101916028**      **Lab ID: 40140495008**      Collected: 10/19/16 12:09      Received: 10/20/16 09:50      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b>									
Analytical Method: WI MOD DRO    Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>8.2J</b>	mg/kg	11.4	4.6	1	10/25/16 09:37	10/26/16 12:09		
<b>Percent Moisture</b>									
Analytical Method: ASTM D2974-87									
Percent Moisture	<b>87.2</b>	%	0.10	0.10	1		10/28/16 14:52		
<b>TOC via Lloyd Kahn</b>									
Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>216000</b>	mg/kg	7620	2580	1		10/27/16 07:58	7440-44-0	

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140495

QC Batch:	239173	Analysis Method:	WI MOD DRO
QC Batch Method:	WI MOD DRO	Analysis Description:	WIDRO GCS
Associated Lab Samples:	40140495008		

METHOD BLANK: 1417077 Matrix: Solid

Associated Lab Samples: 40140495008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Range Organics	mg/kg	<0.80	2.0	10/26/16 10:13	

LABORATORY CONTROL SAMPLE & LCSD: 1417078 1417079

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Diesel Range Organics	mg/kg	40	28.7	32.7	72	82	70-120	13	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140495

---

QC Batch:	239683	Analysis Method:	ASTM D2974-87
QC Batch Method:	ASTM D2974-87	Analysis Description:	Dry Weight/Percent Moisture
Associated Lab Samples:	40140495001, 40140495002, 40140495003, 40140495004, 40140495005, 40140495006, 40140495007, 40140495008		

---

SAMPLE DUPLICATE: 1419965

Parameter	Units	40140819002 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	18.5	18.9	2	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: 2381/2 MILITARY CREEK  
Pace Project No.: 40140495

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-G Pace Analytical Services - Green Bay

### ANALYTE QUALIFIERS

- |    |  |
|----|--|
| D5 | The sample was re-weighed into a new container because the sample weight in the original container exceeded the method specifications. |
| DC | Chromatographic pattern inconsistent with typical Diesel Fuel.   |
| L0 | Analyte recovery in the laboratory control sample (LCS) was outside QC limits.   |
| L2 | Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results may be biased low.                                |
| M0 | Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.                                    |
| P6 | Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.  |

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 2381/2 MILITARY CREEK

Pace Project No.: 40140495

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40140495001	101916018	WI MOD DRO	238873	WI MOD DRO	238927
40140495002	101916019	WI MOD DRO	238873	WI MOD DRO	238927
40140495003	101916021	WI MOD DRO	238873	WI MOD DRO	238927
40140495004	101916022	WI MOD DRO	238873	WI MOD DRO	238927
40140495005	101916024	WI MOD DRO	238873	WI MOD DRO	238927
40140495006	101916025	WI MOD DRO	238873	WI MOD DRO	238927
40140495007	101916027	WI MOD DRO	238873	WI MOD DRO	238927
40140495008	101916028	WI MOD DRO	239173	WI MOD DRO	239267
40140495001	101916018	ASTM D2974-87	239683		
40140495002	101916019	ASTM D2974-87	239683		
40140495003	101916021	ASTM D2974-87	239683		
40140495004	101916022	ASTM D2974-87	239683		
40140495005	101916024	ASTM D2974-87	239683		
40140495006	101916025	ASTM D2974-87	239683		
40140495007	101916027	ASTM D2974-87	239683		
40140495008	101916028	ASTM D2974-87	239683		
40140495001	101916018	Lloyd Kahn	239305		
40140495002	101916019	Lloyd Kahn	239305		
40140495003	101916021	Lloyd Kahn	239305		
40140495004	101916022	Lloyd Kahn	239305		
40140495005	101916024	Lloyd Kahn	239305		
40140495006	101916025	Lloyd Kahn	239305		
40140495007	101916027	Lloyd Kahn	239305		
40140495008	101916028	Lloyd Kahn	239305		

### REPORT OF LABORATORY ANALYSIS

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COC seals: 936623, 936624  
 FedEx tracking #: 806293223845

40140495



NATURAL RESOURCE TECHNOLOGY, INC.  
 234 W. FLORIDA STREET, 5th FLOOR  
 MILWAUKEE, WI 53204  
 TEL: 414.837.3607

↕

CHAIN OF CUSTODY # 101910-1  
 DATE: 10/19/16  
 PAGE: 1 of 1

LABORATORY SAMPLES SUBMITTED TO: <b>Pace Analytical Services, Inc.</b>						CLIENT PROJECT NAME <b>Military Creek</b>				PROJECT NUMBER/TASK NUMBER <b>2381 / 2</b>																											
ADDRESS: <b>1241 Bellevue Street - Suite 9</b>						PROJECT CONTACT: <b>Andrew Millspaugh, amillspaugh@naturalrt.com</b>				QUOTE NO.: <b>00025715</b>																											
CITY: <b>Green Bay, WI 54302</b>						SAMPLER(S): (SIGNATURE) <i>Andrea Baker</i>																															
TEL: <b>(920) 469-2436</b>		FAX:		E-MAIL: <b>Brian.Basten@pacelabs.com</b>																																	
TURNAROUND TIME <input checked="" type="radio"/> STANDARD <input type="radio"/> 24 HR <input type="radio"/> 48 HR <input type="radio"/> 72 HR						REQUESTED ANALYSIS																															
Data Package: Level 2						Preservatives: A = none, B = HCL, C = H <sub>2</sub> SO <sub>4</sub> , D = HNO <sub>3</sub> , E = methanol, F = Sodium Bisulfate, G = zinc acetate, H = other		Preservation Code (pick letter) Filtered (Yor N)		Method Number and Analytes																											
SPECIAL REQUIREMENTS Send all SAFs & Reports to ..... Andrew Millspaugh, amillspaugh@naturalrt.com and ..... Data data@naturalrt.com  Please refer to the full List of Analytes for this Sediment project provided by Steve Wiskes.																																					
LAB USE ONLY	ROW	SAMPLE ID	QC SAMPLE	FIELD COMMENTS	SAMPLE		MATRIX	SAMPLE TYPE	SAMPLE INTERVAL (ft)		#cont	2,3,7,8-TCDD (EPA 1631B)	Hydrometer/Grain Size (ASTM D422, D2216 and D2487)	% Moisture/Dry Weight (D2216)	TOC (Lloyd Kahn)	WI DRO (WI Mod DRO)																					
					DATE	TIME			TOP	BOTTOM																											
001	1	101916018			10/19/16	0912	SED	Grab			5	X	X	X	X	X																					
002	2	101916019				0912	SED	Grab																													
003	3	101916021				0957	SED	Grab																													
004	4	101916022				0957	SED	Grab																													
005	5	101916024				1035	SED	Grab																													
006	6	101916025				1035	SED	Grab																													
007	7	101916027				1709	SED	Grab																													
008	8	101916028				10/19/16 1209	SED	Grab			5	X	X	X	X	X																					
	9						SED	Grab																													
	10						SED	Grab																													
	11						SED	Grab																													
	12						SED	Grab																													
	13						SED	Grab																													
	14						SED	Grab																													
	15						SED	Grab																													
Relinquished by: (Signature) <i>Andrea Baker</i> 10/19/16 1500						Received by: (Signature) <i>Pat pace</i>						Date: 10/20/16		Time: 0930																							
Relinquished by: (Signature) <i>Pat EX</i> 10/20/16 0950						Received by: (Signature) <i>Pat pace</i> 10/20/16 0950						Date: -		Time: -																							
Relinquished by: (Signature)						Received by: (Signature)						Date:		Time:																							

1-4<sup>02A</sup>  
↓

Sample Condition Upon Receipt

Pace Analytical Services, Inc.  
1241 Bellevue Street, Suite 9  
Green Bay, WI 54302

**Pace Analytical**  
Client Name: NRT

Project #: **WO# : 40140495**

Courier:  Fed Ex  UPS  Client  Pace Other:  
Tracking #: 8062 9322 3845 8102 5525 2590



Custody Seal on Cooler/Box Present:  yes  no Seals intact:  yes  no

Custody Seal on Samples Present:  yes  no Seals intact:  yes  no

Packing Material:  Bubble Wrap  Bubble Bags  None  Other

Thermometer Used NA Type of Ice:  Wet  Blue  Dry  None  Samples on ice, cooling process has begun

Cooler Temperature Uncorr: ROI Corr:      Biological Tissue is Frozen:  yes  no

Temp Blank Present:  yes  no

Person examining contents:  
Date: 10/20/16  
Initials: BJ

Temp should be above freezing to 6°C for all sample except Biota.  
Frozen Biota Samples should be received ≤ 0°C.

Comments:

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>S</u>		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO3 <input type="checkbox"/> H2SO4 <input type="checkbox"/> NaOH <input type="checkbox"/> NaOH + ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Initial when completed
		Lab Std #ID of preservative
		Date/Time:
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

**Client Notification/ Resolution:** If checked, see attached form for additional comments   
Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
Comments/ Resolution: \_\_\_\_\_

Project Manager Review: [Signature] Date: 10-20-16

# CQM, INC.

Engineering – Surveying – Material Testing

## TRANSMITTAL

TO: Brian Basten  
Pace Analytical  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

FROM: Bob Rouse  
CQM, INC.  
 \_\_\_\_\_  
 2679 Continental Drive  
 \_\_\_\_\_  
 Green Bay, WI 54311  
 \_\_\_\_\_

PHONE: (920) 465-3911

DATE: November 7, 2016

RE: Lab Test Result Reports

PROJECT: No. 40140495  
Military Creek

**WE ARE SENDING YOU:**

- |  |   |                                |
|--|---|--------------------------------|
| <input checked="" type="checkbox"/> ATTACHED | <input type="checkbox"/> UNDER SEPARATE COVER VIA |                                |
| <input type="checkbox"/> DRAWINGS            | <input type="checkbox"/> SPECIFICATIONS           | <input type="checkbox"/> CD    |
| <input type="checkbox"/> DOCUMENTS           | <input type="checkbox"/> COPY OF LETTER           | <input type="checkbox"/> _____ |

QUANTITY	DESCRIPTION
1	Lab Test Result Reports
1	Chain of Custody Record
	Invoice to be sent later

IF MATERIAL RECEIVED IS NOT AS LISTED, PLEASE NOTIFY US AT ONCE.

REMARKS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

COPY TO: \_\_\_\_\_



# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140495
Location Sampled:	101916018
Sample No:	40140495-001
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/19/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	68.8

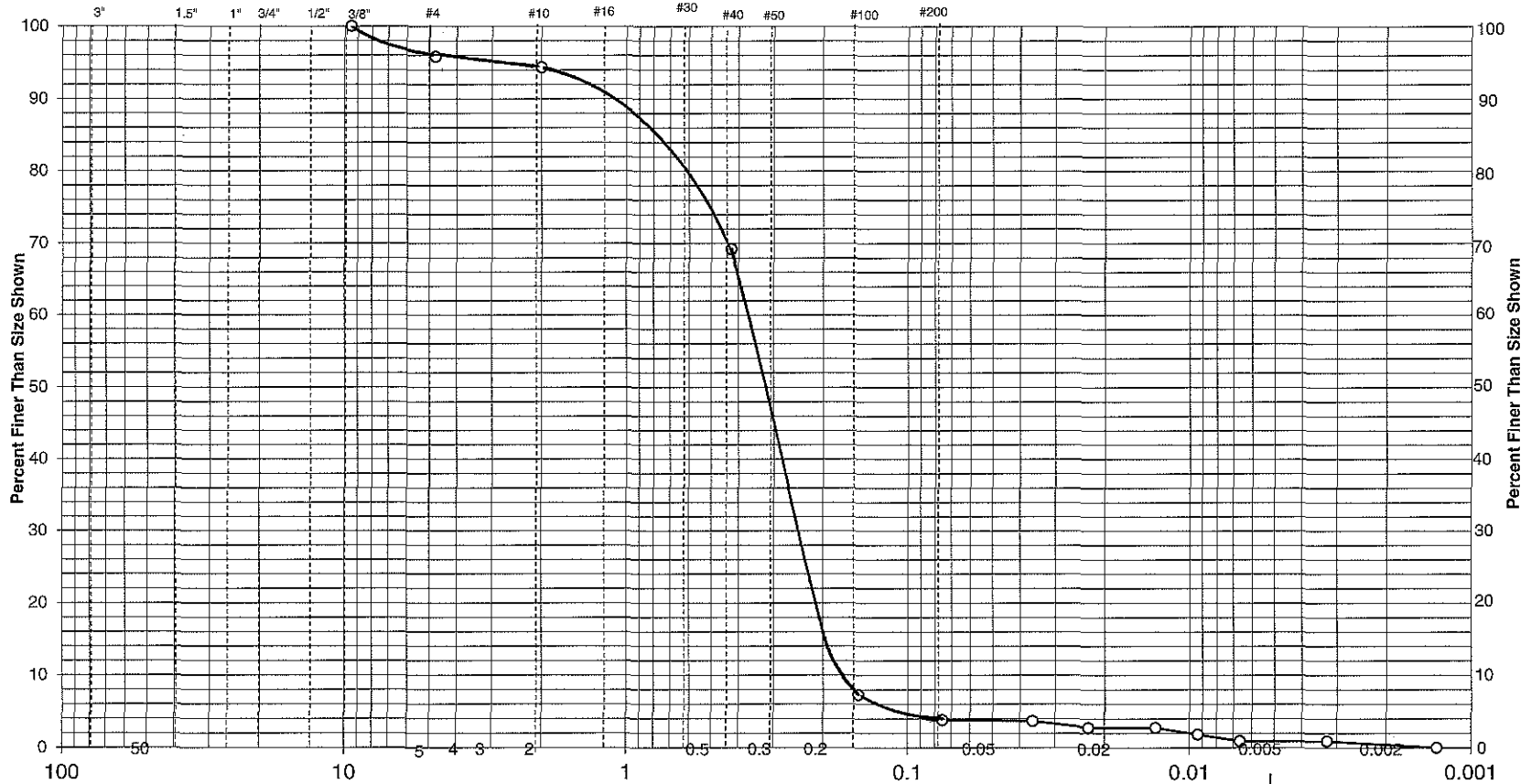
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	2.9	4.2	95.8		
#10	1.0	1.5	94.3		
#40	17.3	25.1	69.2		
#100	42.6	61.9	7.3		
#200	2.4	3.5	3.8		

REVIEWED BY:	<i>Robert A. Power</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	4.2%	1.5%	25.1%	65.4%	2.8%	1.0%	

Soil Classification: SAND, fine to medium grained, some organic fines, a little gravel, black (SP)

Location Sampled: 101916018

Elevation or Depth:

Date Sampled: 10/19/16

Sample Number: 40140495-001

Sampled Moisture Content (%): 49.9

Report No.: 495-1

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: Pace Analytical

Munsell Color Code: 10YR 2/1

Project: No. 40140495

Page: 2

Date Received: 10/24/16

Prepared by: Bob J. Peeters

Date: 11/4/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. House*

Date: 11/7/16



# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140495
Location Sampled:	101916019
Sample No:	40140495-002
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 6/3
Date Sampled:	10/19/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	163.2

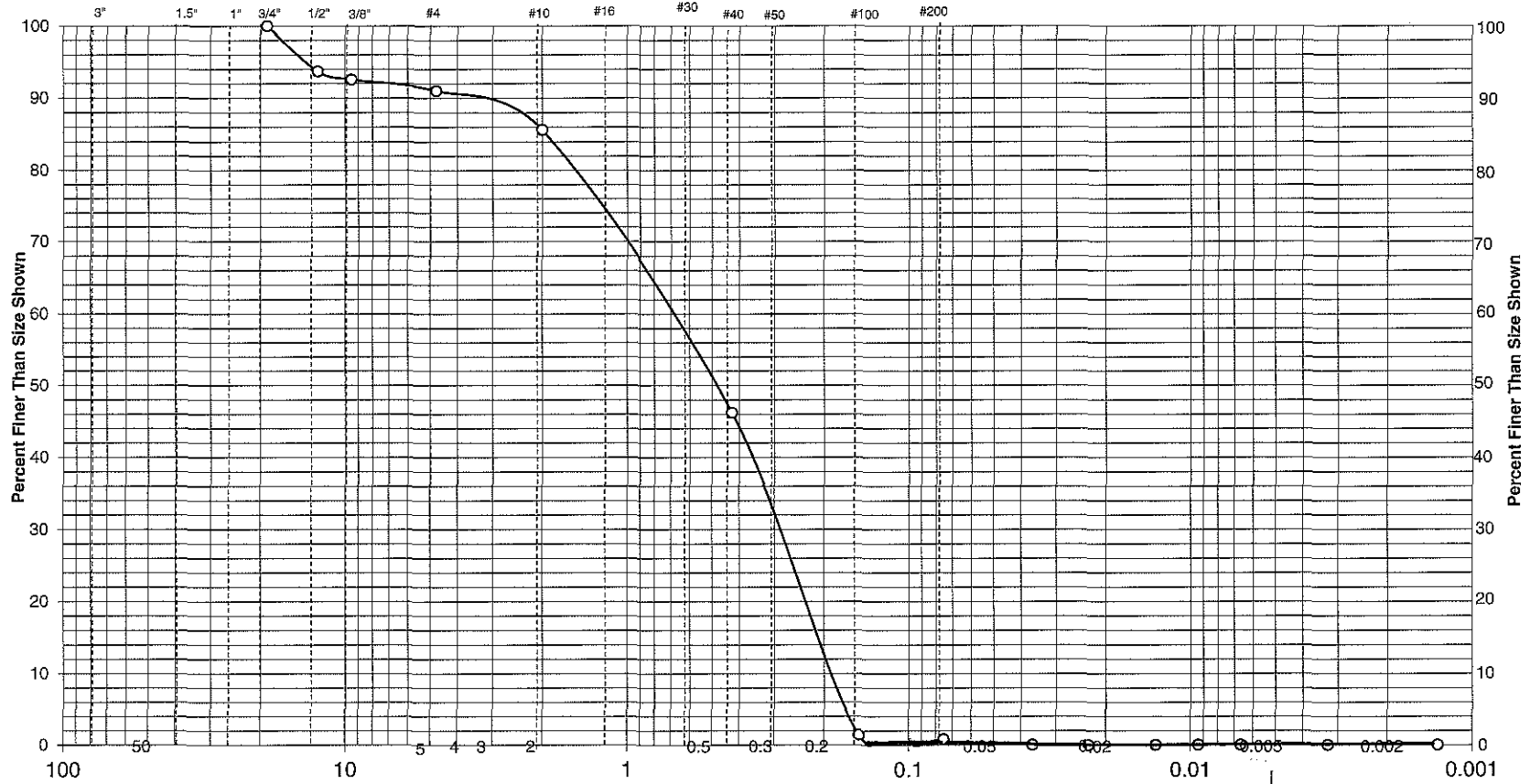
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"	0.0	0.0	100.0		
1/2"	10.3	6.3	93.7		
3/8"	1.9	1.2	92.5		
#4	2.5	1.5	91.0		
#10	8.8	5.4	85.6		
#40	64.3	39.4	46.2		
#100	73.1	44.8	1.4		
#200	1.0	0.6	0.8		

REVIEWED BY:	<i>Robert R. Rouse</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	9.0%	5.4%	39.4%	45.4%	0.8%		

Soil Classification: SAND, fine to medium grained, a little gravel, pale brown (SP)

Location Sampled: 101916019

Elevation or Depth:

Date Sampled: 10/19/16

Sample Number: 40140495-002

Sampled Moisture Content (%): 17.0

Report No.: 495-2

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 6/3

Project: **No. 40140495**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/4/16

Coefficients: Cc=

Cu=

Checked by: *Robert A. Rouse*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140495
Location Sampled:	101916021
Sample No:	40140495-003
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/19/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	24.8

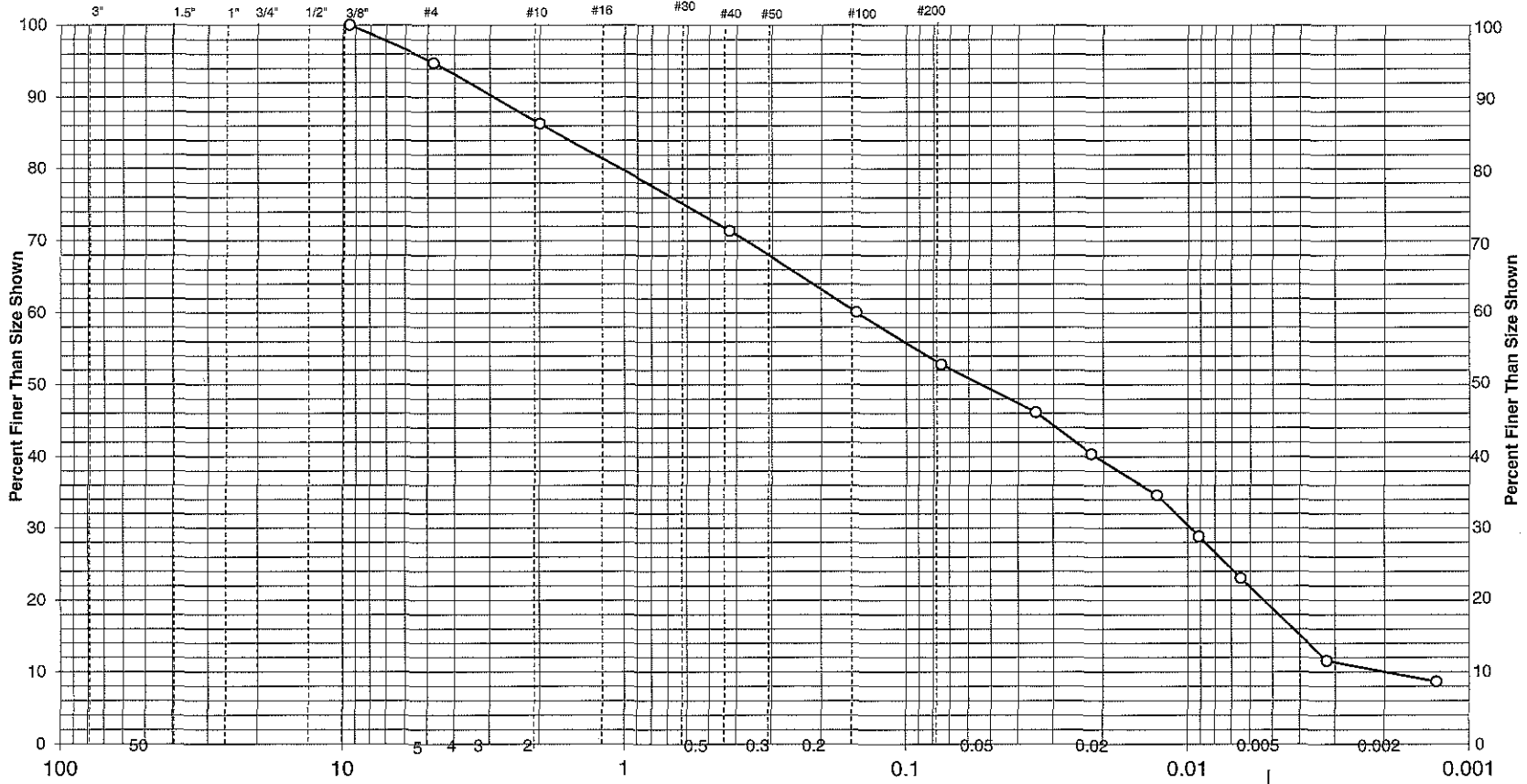
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	1.3	5.2	94.8		
#10	2.1	8.5	86.3		
#40	3.7	14.9	71.4		
#100	2.8	11.3	60.1		
#200	1.8	7.3	52.8		

REVIEWED BY:	<i>Robert R. Pouse</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	5.2%	8.5%	14.9%	18.6%	33.8%	19.0%	

Soil Classification: SANDY ORGANIC CLAY, a little gravel, black (OL)

Location Sampled: 101916021

Elevation or Depth:

Date Sampled: 10/19/16

Sample Number: 40140495-003

Sampled Moisture Content (%): 293.5

Report No.: 495-3

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 2/1

Project: **No. 40140495**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/4/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. Rouse*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140495
Location Sampled:	101916022
Sample No:	40140495-004
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/19/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	8.7

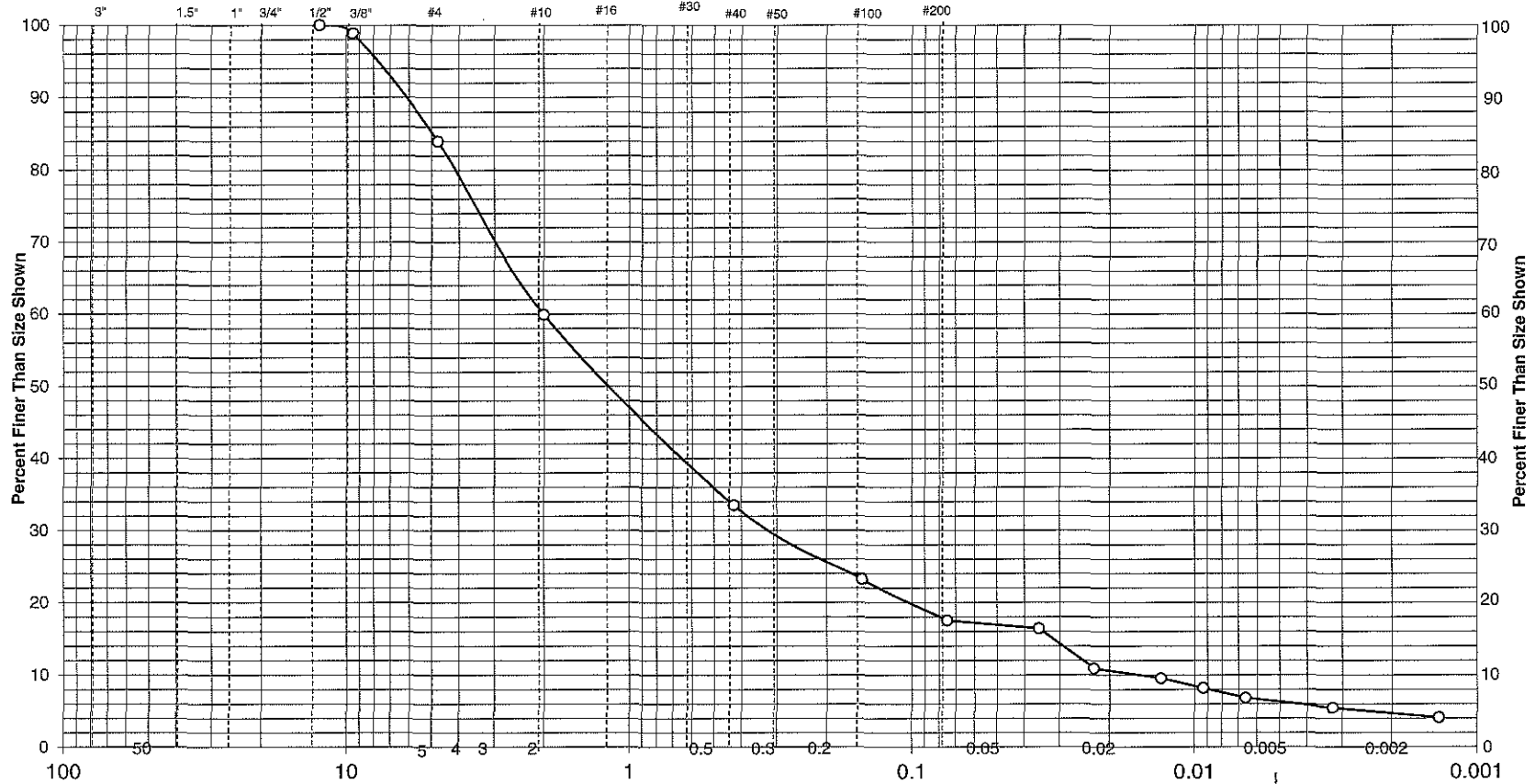
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	0.1	1.1	98.9		
#4	1.3	14.9	84.0		
#10	2.1	24.1	59.9		
#40	2.3	26.4	33.5		
#100	0.9	10.3	23.2		
#200	0.5	5.7	17.5		

REVIEWED BY:	<i>Robert R. Rowe</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	16.0%	24.1%	26.4%	16.0%	11.5%	6.0%	

Soil Classification: SILTY SAND W/ORGANIC FINES AND GRAVEL, medium to coarse to fine grained, black (SM)

Location Sampled: 101916022

Elevation or Depth:

Date Sampled: 10/19/16

Sample Number: 40140495-004

Sampled Moisture Content (%): 735.6

Report No.: 495-4

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 2/1

Project: **No. 40140495**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/4/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. House*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

### GENERAL DATA:

Client:	Pace Analytical
Project:	No. 40140495
Location Sampled:	101916024
Sample No:	40140495-005
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/19/16

### LABORATORY DATA:

Date Tested:	October 25-28, 2016
Test Performed By:	FRH

24 Hrs. Turn Around:	NO		
Washed Gradation:	YES	Dry Weight of Soil (gms):	46.5

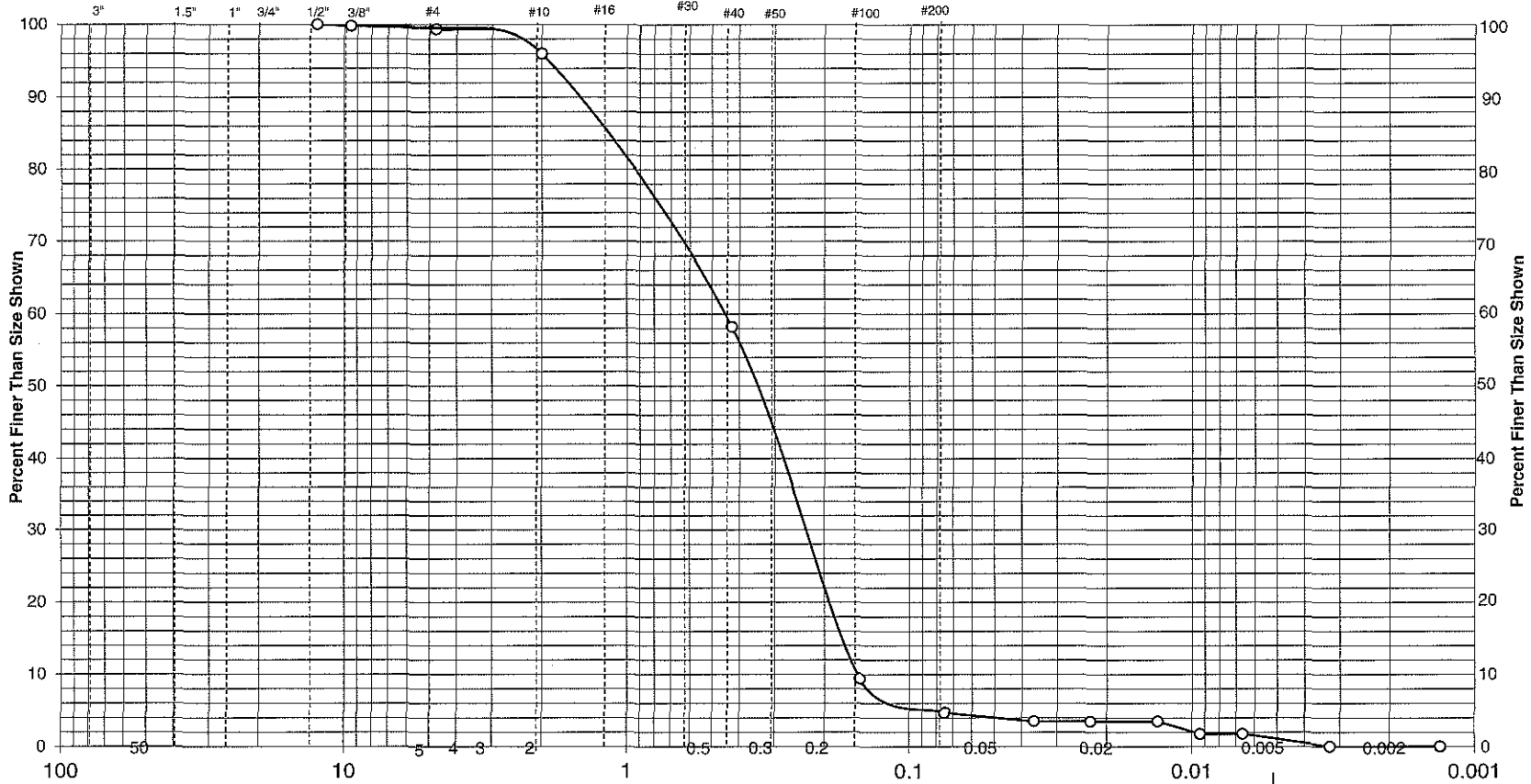
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	0.1	0.2	99.8		
#4	0.2	0.4	99.4		
#10	1.6	3.4	96.0		
#40	17.6	37.8	58.2		
#100	22.7	48.8	9.4		
#200	2.2	4.7	4.7		

REVIEWED BY:	<i>Robert A. Power</i>
DATE REVIEWED:	11/3/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	0.6%	3.4%	37.8%	53.5%	3.7%	1.0%	

Soil Classification: SAND W/ORGANIC FINES, fine to medium grained, black (SP)

Location Sampled: 101916024	Elevation or Depth:	Date Sampled: 10/19/16
Sample Number: 40140495-005	Sampled Moisture Content (%): 106.9	Report No.: 495-5

Sample Source: Military Creek **CQM, INC.**

Atterberg Limits:	LL=	PL=	PI=	Client: Pace Analytical	
Munsell Color Code: 10YR 2/1				Project: No. 40140495	Page: 2
Date Received: 10/24/16				Prepared by: Bob J. Peeters	Date: 11/4/16
Coefficients: Cc=			Cu=	Checked by: <i>Robert R. Rouse</i>	Date: 11/7/16



# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140495
Location Sampled:	101916025
Sample No:	40140495-006
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/19/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	87.8

Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	0.4	0.5	99.5		
#10	2.8	3.2	96.3		
#40	28.4	32.3	64.0		
#100	40.1	45.7	18.3		
#200	6.7	7.6	10.7		

REVIEWED BY:	<i>Robert R. Power</i>
DATE REVIEWED:	11/7/16

Remarks:



# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140495
Location Sampled:	101916027
Sample No:	40140495-007
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/19/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	9.4

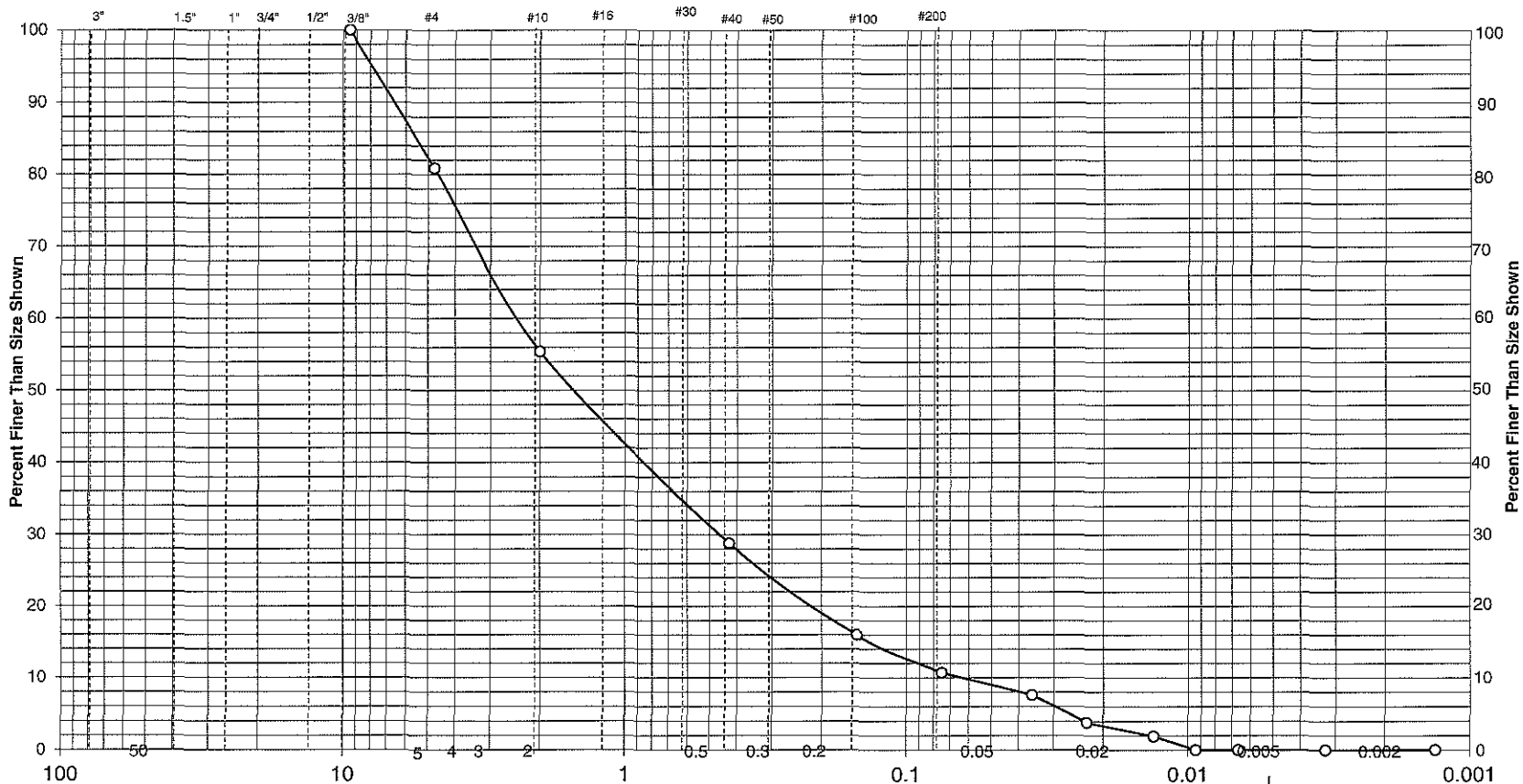
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	1.8	19.1	80.9		
#10	2.4	25.5	55.4		
#40	2.5	26.6	28.8		
#100	1.2	12.8	16.0		
#200	0.5	5.3	10.7		

REVIEWED BY:	<i>Robert R. Power</i>
DATE REVIEWED:	11/7/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	19.1%	25.5%	26.6%	18.1%	10.7%		

Soil Classification: SAND W/SILT AND ORGANIC FINES, medium to coarse to fine grained, black (SP-SM)

Location Sampled: 101916027

Elevation or Depth:

Date Sampled: 10/19/16

Sample Number: 40140495-007

Sampled Moisture Content (%): 1000.0

Report No.: 495-7

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: Pace Analytical

Munsell Color Code: 10YR 2/1

Project: No. 40140495

Page: 2

Date Received: 10/24/16

Prepared by: Bob J. Peeters

Date: 11/4/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. Rowse*

Date: 11/7/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140495
Location Sampled:	101916028
Sample No:	40140495-008
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/19/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH

24 Hrs. Turn Around:	NO		
Washed Gradation:	YES	Dry Weight of Soil (gms):	13.0

Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	0.8	6.2	93.8		
#4	2.0	15.4	78.4		
#10	2.8	21.5	56.9		
#40	3.3	25.4	31.5		
#100	1.5	11.5	20.0		
#200	0.8	6.2	13.8		

REVIEWED BY:	<i>Robert R. House</i>
DATE REVIEWED:	11/7/16

Remarks:



**Report Prepared for:**

Brian Basten  
PACE Wisconsin  
1241 Bellevue Street  
Green Bay WI 54302

**REPORT OF  
LABORATORY  
ANALYSIS FOR  
TCDD**

**Report Information:**

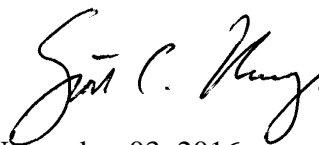
**Pace Project #: 10367095**  
**Sample Receipt Date: 10/21/2016**  
**Client Project #: 40140495**  
**Client Sub PO #: N/A**  
**State Cert #: 999407970**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 2,3,7,8-TCDD Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



November 03, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.

**Report Prepared Date:**

November 3, 2016

## **DISCUSSION**

This report presents the results from the analyses performed on eight samples submitted by a representative of Pace Analytical Services, Inc. The samples were analyzed for the presence or absence of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Method blank and field sample results presented with reporting limits corresponding to the lowest calibration point and a nominal 10-gram sample amount were included at the end of Appendix A.

The recoveries of the isotopically-labeled TCDD internal standard in the sample extracts ranged from 87-98%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native congeners was based on isotope dilution, the data were automatically corrected for recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates. In one case, due to the high moisture content of the sample, the estimated detection limit (EDL) was above the standard reporting limit; therefore, the EDL was provided and flagged "A" on the results table in Appendix A.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show that 2,3,7,8-TCDD was not detected, indicating that the sample processing steps were free of background levels of this congener.

Laboratory spike samples were also prepared using clean reference matrix that had been fortified with native standard materials. The recoveries of the spiked native TCDD ranged from 80-83% with a relative percent difference of 3.7%. These results were within the target ranges for the method. Matrix spikes were not prepared with the sample batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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# **Appendix A**

## Sample Management



**Sample Condition Upon Receipt**      **Client Name:** Pace GB      **Project #:** \_\_\_\_\_  
**Courier:**       Fed Ex       UPS       USPS       Client  
 Commercial       Pace       SpeedDee       Other: \_\_\_\_\_  
**Tracking Number:** \_\_\_\_\_

**WO#: 10367095**  
  
 10367095

**Custody Seal on Cooler/Box Present?**  Yes  No      **Seals Intact?**  Yes  No      **Optional:** Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_  
**Packing Material:**  Bubble Wrap       Bubble Bags       None       Other: \_\_\_\_\_      **Temp Blank?**  Yes  No  
**Thermometer Used:**  151401163       151401164       B88A912167504       B88A014331.0098      **Type of Ice:**  Wet       Blue       None       Samples on Ice, cooling process has begun  
**Cooler Temp Read (°C):** 0.5      **Cooler Temp Corrected (°C):** 0.7      **Biological Tissue Frozen?**  Yes  No  N/A  
**Temp should be above freezing to 6°C**      **Correction Factor:** 1.02      **Date and Initials of Person Examining Contents:** DN 10/24/16

**USDA Regulated Soil** (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, IA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
**If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.**

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A -Includes Date/Time/ID/Analysis Matrix: <u>SL</u>	12.
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**      **Field Data Required?**  Yes  No  
 Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Comments/Resolution: \_\_\_\_\_

**Project Manager Review:** Scott Unzu      **Date:** 10/24/16  
 Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).



## Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916018		
Lab Sample ID	40140495001		
Filename	F161031A_09		
Injected By	BAL		
Total Amount Extracted	15.0 g	Matrix	Solid
% Moisture	35.8	Dilution	NA
Dry Weight Extracted	9.63 g	Collected	10/19/2016 09:12
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 06:34

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	95
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	83

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range

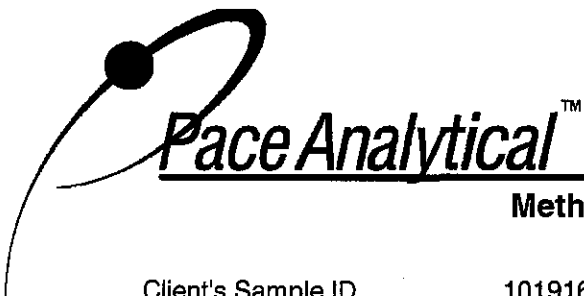
E = Exceeds calibration range

## REPORT OF LABORATORY ANALYSIS

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916019		
Lab Sample ID	40140495002		
Filename	F161031A_10		
Injected By	BAL		
Total Amount Extracted	12.8 g	Matrix	Solid
% Moisture	16.9	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	10/19/2016 09:12
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 07:23

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	87
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	74

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range  
 E = Exceeds calibration range

**REPORT OF LABORATORY ANALYSIS**

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916021		
Lab Sample ID	40140495003		
Filename	F161030B_09		
Injected By	BAL		
Total Amount Extracted	20.4 g	Matrix	Solid
% Moisture	91.4	Dilution	NA
Dry Weight Extracted	1.75 g	Collected	10/19/2016 09:37
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 17:33

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	78

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range  
 E = Exceeds calibration range

## REPORT OF LABORATORY ANALYSIS

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## Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916022		
Lab Sample ID	40140495004		
Filename	F161030B_10		
Injected By	BAL		
Total Amount Extracted	20.0 g	Matrix	Solid
% Moisture	75.4	Dilution	NA
Dry Weight Extracted	4.92 g	Collected	10/19/2016 09:37
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 18:22

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	2.4	-----	1.0	2,3,7,8-TCDD-13C	2.00	95
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	82

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range

E = Exceeds calibration range

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916024		
Lab Sample ID	40140495005		
Filename	F161030B_11		
Injected By	BAL		
Total Amount Extracted	15.9 g	Matrix	Solid
% Moisture	46.3	Dilution	NA
Dry Weight Extracted	8.54 g	Collected	10/19/2016 10:35
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 19:11

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	2.1	-----	1.0	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	77

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range  
E = Exceeds calibration range

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916025		
Lab Sample ID	40140495006		
Filename	F161030B_12		
Injected By	BAL		
Total Amount Extracted	13.5 g	Matrix	Solid
% Moisture	55.4	Dilution	NA
Dry Weight Extracted	6.02 g	Collected	10/19/2016 10:35
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:00

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	9.3	-----	1.0	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37C14	0.20	75

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range  
 E = Exceeds calibration range

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## Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916027		
Lab Sample ID	40140495007		
Filename	F161030B_13		
Injected By	BAL		
Total Amount Extracted	20.4 g	Matrix	Solid
% Moisture	91.9	Dilution	NA
Dry Weight Extracted	1.65 g	Collected	10/19/2016 12:09
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:48

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	ND	-----	2.3 A	2,3,7,8-TCDD-13C	2.00	89
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	76

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

A = Reporting Limit based on signal to noise

R = Recovery outside target range

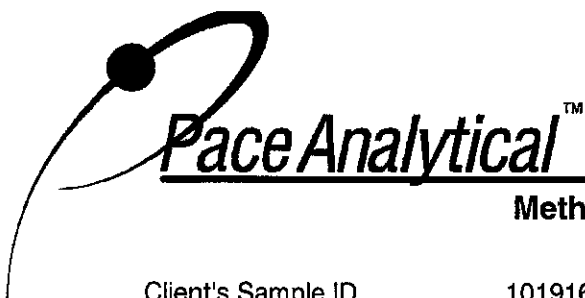
E = Exceeds calibration range

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916028		
Lab Sample ID	40140495008		
Filename	F161030B_14		
Injected By	BAL		
Total Amount Extracted	17.5 g	Matrix	Solid
% Moisture	87.2	Dilution	NA
Dry Weight Extracted	2.24 g	Collected	10/19/2016 12:09
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 21:37

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	98
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	86

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range  
 E = Exceeds calibration range

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**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52542	Matrix	Solid
Filename	F161030B_04	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 13:30
CCal Filename(s)	F161030B_01	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	87
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	76

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range

E = Exceeds calibration range

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## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

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# **Appendix B**

## Sample Analysis Summary



### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916018		
Lab Sample ID	40140495001		
Filename	F161031A_09		
Injected By	BAL		
Total Amount Extracted	15.0 g	Matrix	Solid
% Moisture	35.8	Dilution	NA
Dry Weight Extracted	9.63 g	Collected	10/19/2016 09:12
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 06:34

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	----	0.16	0.12	U	2,3,7,8-TCDD-13C	2.00	95
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	83

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
R = Recovery outside target range  
E = Exceeds calibration range  
I = Interference present

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916019		
Lab Sample ID	40140495002		
Filename	F161031A_10		
Injected By	BAL		
Total Amount Extracted	12.8 g	Matrix	Solid
% Moisture	16.9	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	10/19/2016 09:12
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 07:23

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	ND	----	0.14	2,3,7,8-TCDD-13C	2.00	87
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	74

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
 R = Recovery outside target range  
 E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916021		
Lab Sample ID	40140495003		
Filename	F161030B_09		
Injected By	BAL		
Total Amount Extracted	20.4 g	Matrix	Solid
% Moisture	91.4	Dilution	NA
Dry Weight Extracted	1.75 g	Collected	10/19/2016 09:37
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 17:33

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	0.97	----	0.63 J	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	78

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
R = Recovery outside target range  
E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916022		
Lab Sample ID	40140495004		
Filename	F161030B_10		
Injected By	BAL		
Total Amount Extracted	20.0 g	Matrix	Solid
% Moisture	75.4	Dilution	NA
Dry Weight Extracted	4.92 g	Collected	10/19/2016 09:37
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 18:22

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	2.4	----	0.50	2,3,7,8-TCDD-13C	2.00	95
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	82

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range

E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916024		
Lab Sample ID	40140495005		
Filename	F161030B_11		
Injected By	BAL		
Total Amount Extracted	15.9 g	Matrix	Solid
% Moisture	46.3	Dilution	NA
Dry Weight Extracted	8.54 g	Collected	10/19/2016 10:35
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 19:11

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	2.1	----	0.69	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	77

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916025		
Lab Sample ID	40140495006		
Filename	F161030B_12		
Injected By	BAL		
Total Amount Extracted	13.5 g	Matrix	Solid
% Moisture	55.4	Dilution	NA
Dry Weight Extracted	6.02 g	Collected	10/19/2016 10:35
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:00

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	9.3	----	0.86	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	75

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916027		
Lab Sample ID	40140495007		
Filename	F161030B_13		
Injected By	BAL		
Total Amount Extracted	20.4 g	Matrix	Solid
% Moisture	91.9	Dilution	NA
Dry Weight Extracted	1.65 g	Collected	10/19/2016 12:09
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:48

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	ND	----	2.3	2,3,7,8-TCDD-13C	2.00	89
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	76

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916028		
Lab Sample ID	40140495008		
Filename	F161030B_14		
Injected By	BAL		
Total Amount Extracted	17.5 g	Matrix	Solid
% Moisture	87.2	Dilution	NA
Dry Weight Extracted	2.24 g	Collected	10/19/2016 12:09
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 21:37

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	ND	----	0.65	2,3,7,8-TCDD-13C	2.00	98
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	86

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range

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**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52542	Matrix	Solid
Filename	F161030B_04	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 13:30
CCal Filename(s)	F161030B_01	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDD	ND	----	0.13	2,3,7,8-TCDD-13C	2.00	87
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	76

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range

E = Exceeds calibration range

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### Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-52543	Matrix	Solid
Filename	F161030B_02	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 11:54
CCal Filename	F161030B_01	Injected By	BAL
Method Blank ID	BLANK-52542		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDD	10	8.3	7.3	14.6	83
2,3,7,8-TCDD-37Cl4	10	8.1	3.7	15.8	81
2,3,7,8-TCDD-13C	100	94	25.0	141.0	94

Cs = Concentration Spiked (ng/mL)  
 Cr = Concentration Recovered (ng/mL)  
 Rec. = Recovery (Expressed as Percent)  
 Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
 R = Recovery outside of control limits  
 Nn = Value obtained from additional analysis  
 \* = See Discussion

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### Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCSD-52544	Matrix	Solid
Filename	F161030B_03	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 12:41
CCal Filename	F161030B_01	Injected By	BAL
Method Blank ID	BLANK-52542		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDD	10	8.0	7.3	14.6	80
2,3,7,8-TCDD-37Cl4	10	7.7	3.7	15.8	77
2,3,7,8-TCDD-13C	100	88	25.0	141.0	88

Cs = Concentration Spiked (ng/mL)  
 Cr = Concentration Recovered (ng/mL)  
 Rec. = Recovery (Expressed as Percent)  
 Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
 R = Recovery outside of control limits  
 Nn = Value obtained from additional analysis  
 \* = See Discussion

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**Method 1613B**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client PACE Wisconsin

Spike 1 ID LCS-52543  
 Spike 1 Filename F161030B\_02

Spike 2 ID LCSD-52544  
 Spike 2 Filename F161030B\_03

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDD	83	80	3.7

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

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November 09, 2016

Andrea Salus  
NATURAL RESOURCE TECHNOLOGY  
234 W. Florida Street  
5th Floor  
Milwaukee, WI 53204

RE: Project: 2381 MILITARY CREEK  
Pace Project No.: 40140634

Dear Andrea Salus:

Enclosed are the analytical results for sample(s) received by the laboratory on October 21, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

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

Sincerely,



Brian Basten  
brian.basten@pacelabs.com  
Project Manager

Enclosures

cc: Data Delivery Team, Natural Resources Technologies



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: 2381 MILITARY CREEK

Pace Project No.: 40140634

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### Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky UST Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 12064

North Dakota Certification #: R-150

Virginia VELAP ID: 460263

South Carolina Certification #: 83006001

Texas Certification #: T104704529-14-1

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

USDA Soil Permit #: P330-16-00157

Federal Fish & Wildlife Permit #: LE51774A-0

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: 2381 MILITARY CREEK

Pace Project No.: 40140634

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40140634001	102016030	Solid	10/20/16 09:36	10/21/16 12:18
40140634002	102016031	Solid	10/20/16 09:36	10/21/16 12:18
40140634003	102016032	Solid	10/20/16 10:12	10/21/16 12:18
40140634004	102016033	Solid	10/20/16 10:12	10/21/16 12:18
40140634005	102016035	Solid	10/20/16 11:25	10/21/16 12:18
40140634006	102016036	Solid	10/20/16 11:25	10/21/16 12:18

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: 2381 MILITARY CREEK

Pace Project No.: 40140634

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40140634001	102016030	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	2	PASI-G
40140634002	102016031	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140634003	102016032	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140634004	102016033	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140634005	102016035	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
40140634006	102016036	WI MOD DRO	CAH	1	PASI-G
		ASTM D2974-87	AH	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 2381 MILITARY CREEK

Pace Project No.: 40140634

**Sample: 102016030**      **Lab ID: 40140634001**      Collected: 10/20/16 09:36      Received: 10/21/16 12:18      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>32.8</b>	mg/kg	23.9	9.6	1	10/27/16 09:45	11/02/16 13:15		DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>92.2</b>	%	0.10	0.10	1		10/28/16 14:27		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>279000</b>	mg/kg	9510	3220	1		10/27/16 08:15	7440-44-0	
<b>Surrogates</b>									
RSD%	<b>10.7</b>	%			1		10/27/16 08:15		

**Sample: 102016031**      **Lab ID: 40140634002**      Collected: 10/20/16 09:36      Received: 10/21/16 12:18      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>27.8</b>	mg/kg	17.0	6.8	1	10/27/16 09:45	11/02/16 13:24		D5,DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>88.2</b>	%	0.10	0.10	1		10/28/16 14:27		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>226000</b>	mg/kg	6130	2080	1		10/27/16 08:39	7440-44-0	

**Sample: 102016032**      **Lab ID: 40140634003**      Collected: 10/20/16 10:12      Received: 10/21/16 12:18      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>7.7J</b>	mg/kg	15.5	6.2	1	10/27/16 09:45	11/02/16 13:33		
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>90.6</b>	%	0.10	0.10	1		10/28/16 14:27		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>146000</b>	mg/kg	7810	2650	1		10/27/16 08:45	7440-44-0	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 2381 MILITARY CREEK

Pace Project No.: 40140634

**Sample: 102016033**      **Lab ID: 40140634004**      Collected: 10/20/16 10:12      Received: 10/21/16 12:18      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>11.0J</b>	mg/kg	13.6	5.5	1	10/27/16 09:45	11/02/16 13:42		
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>87.8</b>	%	0.10	0.10	1		10/28/16 14:27		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>165000</b>	mg/kg	6670	2260	1		10/27/16 08:51	7440-44-0	P6

**Sample: 102016035**      **Lab ID: 40140634005**      Collected: 10/20/16 11:25      Received: 10/21/16 12:18      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>18.0</b>	mg/kg	14.9	6.0	1	10/27/16 09:45	11/02/16 13:50		DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>90.3</b>	%	0.10	0.10	1		10/28/16 14:28		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>268000</b>	mg/kg	9760	3310	1		10/27/16 09:21	7440-44-0	

**Sample: 102016036**      **Lab ID: 40140634006**      Collected: 10/20/16 11:25      Received: 10/21/16 12:18      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>WIDRO GCS</b> Analytical Method: WI MOD DRO      Preparation Method: WI MOD DRO									
Diesel Range Organics	<b>48.7</b>	mg/kg	11.1	4.5	1	10/27/16 09:45	11/02/16 13:59		DC
<b>Percent Moisture</b> Analytical Method: ASTM D2974-87									
Percent Moisture	<b>85.5</b>	%	0.10	0.10	1		10/28/16 14:28		
<b>TOC via Lloyd Kahn</b> Analytical Method: Lloyd Kahn									
Total Organic Carbon	<b>353000</b>	mg/kg	10400	3540	1		10/27/16 09:26	7440-44-0	

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 2381 MILITARY CREEK

Pace Project No.: 40140634

QC Batch: 239306

Analysis Method: Lloyd Kahn

QC Batch Method: Lloyd Kahn

Analysis Description: Lloyd Kahn TOC

Associated Lab Samples: 40140634001, 40140634002, 40140634003, 40140634004, 40140634005, 40140634006

METHOD BLANK: 1417713

Matrix: Solid

Associated Lab Samples: 40140634001, 40140634002, 40140634003, 40140634004, 40140634005, 40140634006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	mg/kg	<33.9	100	10/27/16 08:03	

LABORATORY CONTROL SAMPLE: 1417714

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/kg	2000	2050	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1417715 1417716

Parameter	Units	1417715		1417716		% Rec	% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		MS Result	MSD Spike Conc.	MS Result	MSD Spike Conc.								
Total Organic Carbon	mg/kg	165000	33600	207000	32600	125	197	80-120	10	20	P6		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: 2381 MILITARY CREEK

Pace Project No.: 40140634

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-G Pace Analytical Services - Green Bay

### ANALYTE QUALIFIERS

D5 The sample was re-weighed into a new container because the sample weight in the original container exceeded the method specifications.

DC Chromatographic pattern inconsistent with typical Diesel Fuel.

P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 2381 MILITARY CREEK

Pace Project No.: 40140634

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40140634001	102016030	WI MOD DRO	239502	WI MOD DRO	239569
40140634002	102016031	WI MOD DRO	239502	WI MOD DRO	239569
40140634003	102016032	WI MOD DRO	239502	WI MOD DRO	239569
40140634004	102016033	WI MOD DRO	239502	WI MOD DRO	239569
40140634005	102016035	WI MOD DRO	239502	WI MOD DRO	239569
40140634006	102016036	WI MOD DRO	239502	WI MOD DRO	239569
40140634001	102016030	ASTM D2974-87	239678		
40140634002	102016031	ASTM D2974-87	239678		
40140634003	102016032	ASTM D2974-87	239678		
40140634004	102016033	ASTM D2974-87	239678		
40140634005	102016035	ASTM D2974-87	239678		
40140634006	102016036	ASTM D2974-87	239678		
40140634001	102016030	Lloyd Kahn	239306		
40140634002	102016031	Lloyd Kahn	239306		
40140634003	102016032	Lloyd Kahn	239306		
40140634004	102016033	Lloyd Kahn	239306		
40140634005	102016035	Lloyd Kahn	239306		
40140634006	102016036	Lloyd Kahn	239306		

### REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

Pace Analytical Services, Inc.  
1241 Bellevue Street, Suite 9  
Green Bay, WI 54302

**Pace Analytical™**  
Client Name: NRT

Project #: **WO# : 40140634**

Courier:  Fed Ex  UPS  Client  Pace Other: \_\_\_\_\_  
Tracking #: \_\_\_\_\_



Custody Seal on Cooler/Box Present:  yes  no Seals intact:  yes  no

Custody Seal on Samples Present:  yes  no Seals intact:  yes  no

Packing Material:  Bubble Wrap  Bubble Bags  None  Other \_\_\_\_\_

Thermometer Used N/A Type of Ice:  Wet  Blue  Dry  None  Samples on ice, cooling process has begun

Cooler Temperature Uncorr: ROT /Corr: \_\_\_\_\_ Biological Tissue is Frozen:  yes

Temp Blank Present:  yes  no  no

Person examining contents:  
Date: 10-21-16  
Initials: SCW

Temp should be above freezing to 6°C for all sample except Biota.  
Frozen Biota Samples should be received ≤ 0°C.

Comments:

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>S</u>		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO3 <input type="checkbox"/> H2SO4 <input type="checkbox"/> NaOH <input type="checkbox"/> NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Initial when completed    Lab Std #ID of preservative    Date/Time:
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: \_\_\_\_\_ If checked, see attached form for additional comments

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
Comments/ Resolution: No MS/MSD volume received 10-21-16

Project Manager Review: [Signature] Date: 10-24-16



**Report Prepared for:**

Brian Basten  
PACE Wisconsin  
1241 Bellevue Street  
Green Bay WI 54302

**REPORT OF  
LABORATORY  
ANALYSIS FOR  
TCDD/TCDF**

**Report Prepared Date:**

November 4, 2016

**Report Information:**

**Pace Project #: 10367411**  
**Sample Receipt Date: 10/25/2016**  
**Client Project #: 40140634**  
**Client Sub PO #: N/A**  
**State Cert #: 999407970**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



November 04, 2016

Carolynne Trout, Project Manager  
(612) 607-6351  
(612) 607-6444 (fax)  
Carolynne.Trout@pacelabs.com



**Report of Laboratory Analysis**

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on six samples submitted by a representative of Pace Analytical Services, Inc. The samples were analyzed for the presence or absence of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and 2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDF) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Method blank and field sample results presented with reporting limits corresponding to the lowest calibration points and a nominal 10-gram sample amount were included in Appendix A.

The recoveries of the isotopically-labeled TCDD/TCDF internal standards in the sample extracts ranged from 67-91%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native congeners was based on isotope dilution, the data were automatically corrected for recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J", and should be regarded as estimates.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show that 2,3,7,8-TCDD and 2,3,7,8-TCDF were not detected.

A laboratory spike sample was also prepared using clean reference matrix that had been fortified with native standards. The recoveries of the native compounds ranged from 88-102%. These results were within the target ranges for the method. Matrix spikes were prepared with the sample batch using sample material from a separate project; results from these analyses will be provided upon request.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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# **Appendix A**

## Sample Management



**Sample Condition Upon Receipt**      **Client Name:** Pace 613      **Project #:** **WO#: 10367411**  
**Courier:**       Fed Ex       UPS       USPS       Client  
 Commercial       Pace       SpeeDee       Other: Walter  
**Tracking Number:** \_\_\_\_\_

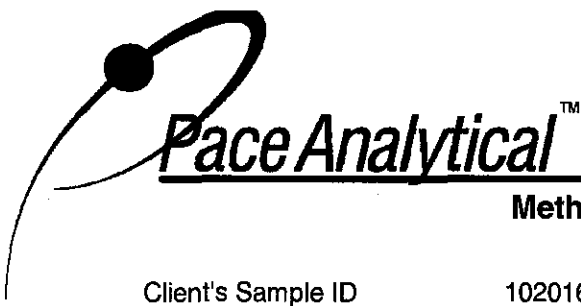
**Custody Seal on Cooler/Box Present?**  Yes       No      **Seals Intact?**  Yes       No      **Optional:** Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_  
**Packing Material:**  Bubble Wrap       Bubble Bags       None       Other: \_\_\_\_\_      **Temp Blank?**  Yes       No  
**Thermometer Used:**  151401163       151401164       B88A912167504       B88A0143310098      **Type of Ice:**  Wet       Blue       None       Samples on ice, cooling process has begun  
**Cooler Temp Read (°C):** 3.6      **Cooler Temp Corrected (°C):** 3.8      **Biological Tissue Frozen?**  Yes       No       N/A  
**Temp should be above freezing to 6°C**      **Correction Factor:** 10.2      **Date and Initials of Person Examining Contents:** 10-25-16

**USDA Regulated Soil** (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes       No      Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes       No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>SL</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Collform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**      **Field Data Required?**  Yes       No  
**Person Contacted:** \_\_\_\_\_      **Date/Time:** \_\_\_\_\_  
**Comments/Resolution:** \_\_\_\_\_

**Project Manager Review:** Scott Unge      **Date:** 10/25/16  
 Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).



**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	102016030		
Lab Sample ID	40140634001		
Filename	Y161102B_02		
Injected By	SMT		
Total Amount Extracted	29.3 g	Matrix	Solid
% Moisture	92.2	Dilution	NA
Dry Weight Extracted	2.29 g	Collected	10/20/2016 09:36
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 18:19

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.0	2,3,7,8-TCDF-13C	2.00	75
2,3,7,8-TCDD	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	91
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	85

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

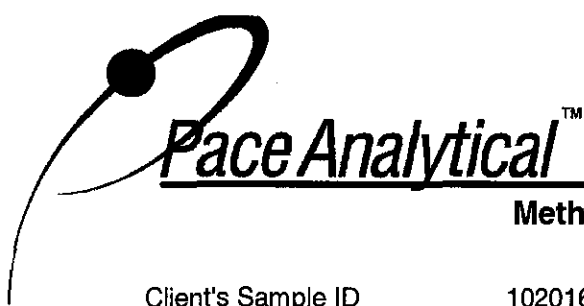
ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated

Results reported on a total weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016031		
Lab Sample ID	40140634002		
Filename	Y161102B_03		
Injected By	SMT		
Total Amount Extracted	18.1 g	Matrix	Solid
% Moisture	88.2	Dilution	NA
Dry Weight Extracted	2.14 g	Collected	10/20/2016 09:36
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 19:00

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.0	2,3,7,8-TCDF-13C	2.00	72
2,3,7,8-TCDD	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	87
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37C14	0.20	84

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

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016032		
Lab Sample ID	40140634003		
Filename	Y161102B_04		
Injected By	SMT		
Total Amount Extracted	24.6 g	Matrix	Solid
% Moisture	90.6	Dilution	NA
Dry Weight Extracted	2.31 g	Collected	10/20/2016 10:12
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 19:41

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	69
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	83
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	80

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

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range  
E = Exceeds calibration range

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## Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016033		
Lab Sample ID	40140634004		
Filename	Y161102B_05		
Injected By	SMT		
Total Amount Extracted	18.3 g	Matrix	Solid
% Moisture	87.8	Dilution	NA
Dry Weight Extracted	2.23 g	Collected	10/20/2016 10:12
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 20:22

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	67
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	79
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	75

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

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.  
 R = Recovery outside target range  
 E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016035		
Lab Sample ID	40140634005		
Filename	Y161102B_06		
Injected By	SMT		
Total Amount Extracted	23.3 g	Matrix	Solid
% Moisture	90.3	Dilution	NA
Dry Weight Extracted	2.26 g	Collected	10/20/2016 11:25
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 21:04

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	87
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	84

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

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

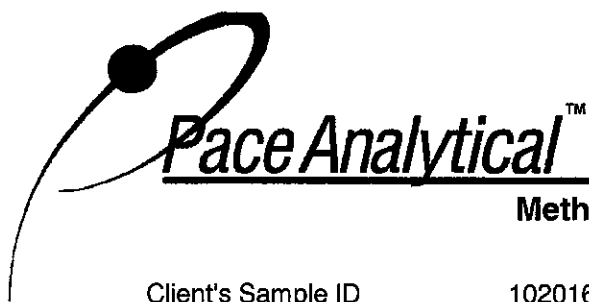
Results reported on a total weight basis and are valid to no more than 2 significant figures.  
 R = Recovery outside target range  
 E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016036		
Lab Sample ID	40140634006		
Filename	Y161102B_07		
Injected By	SMT		
Total Amount Extracted	15.2 g	Matrix	Solid
% Moisture	85.5	Dilution	NA
Dry Weight Extracted	2.20 g	Collected	10/20/2016 11:25
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 21:45

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	86
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	82

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

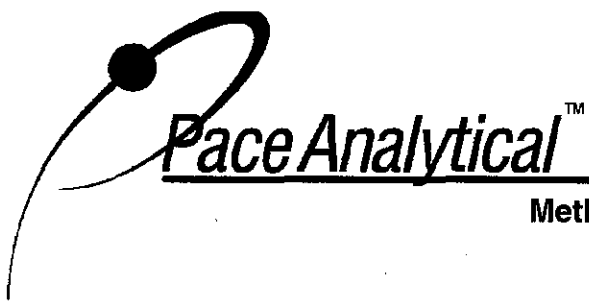
ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated

Results reported on a total weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range

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**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52586	Matrix	Solid
Filename	U161101B_12	Dilution	NA
Total Amount Extracted	20.2 g	Extracted	10/28/2016 19:00
ICAL ID	U161025	Analyzed	11/01/2016 23:24
CCal Filename(s)	U161101B_03	Injected By	SMT

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.0	2,3,7,8-TCDF-13C	2.00	75
2,3,7,8-TCDD	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	96
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37CI4	0.20	86

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

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## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

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# **Appendix B**

## Sample Analysis Summary



### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016030		
Lab Sample ID	40140634001		
Filename	Y161102B_02		
Injected By	SMT		
Total Amount Extracted	29.3 g	Matrix	Solid
% Moisture	92.2	Dilution	NA
Dry Weight Extracted	2.29 g	Collected	10/20/2016 09:36
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 18:19

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.099	----	0.046	J	2,3,7,8-TCDF-13C	2.00	75
2,3,7,8-TCDD	ND	----	0.032		2,3,7,8-TCDD-13C	2.00	91
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	85

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

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
R = Recovery outside target range  
E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016031		
Lab Sample ID	40140634002		
Filename	Y161102B_03		
Injected By	SMT		
Total Amount Extracted	18.1 g	Matrix	Solid
% Moisture	88.2	Dilution	NA
Dry Weight Extracted	2.14 g	Collected	10/20/2016 09:36
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 19:00

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.11	----	0.052	J	2,3,7,8-TCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	0.061		2,3,7,8-TCDD-13C	2.00	87
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	84

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

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
R = Recovery outside target range  
E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016032		
Lab Sample ID	40140634003		
Filename	Y161102B_04		
Injected By	SMT		
Total Amount Extracted	24.6 g	Matrix	Solid
% Moisture	90.6	Dilution	NA
Dry Weight Extracted	2.31 g	Collected	10/20/2016 10:12
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 19:41

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	----	0.071	0.038	U	2,3,7,8-TCDF-13C	2.00	69
2,3,7,8-TCDD	ND	----	0.032		2,3,7,8-TCDD-13C	2.00	83
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	80

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

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
R = Recovery outside target range  
E = Exceeds calibration range  
I = Interference present

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016033		
Lab Sample ID	40140634004		
Filename	Y161102B_05		
Injected By	SMT		
Total Amount Extracted	18.3 g	Matrix	Solid
% Moisture	87.8	Dilution	NA
Dry Weight Extracted	2.23 g	Collected	10/20/2016 10:12
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 20:22

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.16	----	0.062	J	2,3,7,8-TCDF-13C	2.00	67
2,3,7,8-TCDD	ND	----	0.088		2,3,7,8-TCDD-13C	2.00	79
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	75

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

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

J = Estimated value

R = Recovery outside target range

E = Exceeds calibration range

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	102016035		
Lab Sample ID	40140634005		
Filename	Y161102B_06		
Injected By	SMT		
Total Amount Extracted	23.3 g	Matrix	Solid
% Moisture	90.3	Dilution	NA
Dry Weight Extracted	2.26 g	Collected	10/20/2016 11:25
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 21:04

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.13	----	0.038	J	2,3,7,8-TCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	0.039		2,3,7,8-TCDD-13C	2.00	87
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37CI4	0.20	84

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

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.  
 J = Estimated value  
 R = Recovery outside target range  
 E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016036		
Lab Sample ID	40140634006		
Filename	Y161102B_07		
Injected By	SMT		
Total Amount Extracted	15.2 g	Matrix	Solid
% Moisture	85.5	Dilution	NA
Dry Weight Extracted	2.20 g	Collected	10/20/2016 11:25
ICAL ID	Y160816A	Received	10/25/2016 11:20
CCal Filename(s)	Y161102A_18	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	11/02/2016 21:45

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.24	----	0.095	J	2,3,7,8-TCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	0.094		2,3,7,8-TCDD-13C	2.00	86
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	82

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

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

J = Estimated value

R = Recovery outside target range

E = Exceeds calibration range

## REPORT OF LABORATORY ANALYSIS

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**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52586	Matrix	Solid
Filename	U161101B_12	Dilution	NA
Total Amount Extracted	20.2 g	Extracted	10/28/2016 19:00
ICAL ID	U161025	Analyzed	11/01/2016 23:24
CCal Filename(s)	U161101B_03	Injected By	SMT

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.033	2,3,7,8-TCDF-13C	2.00	75
2,3,7,8-TCDD	ND	----	0.054	2,3,7,8-TCDD-13C	2.00	96
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	86

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

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

**REPORT OF LABORATORY ANALYSIS**

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**Method 1613B Laboratory Control Spike Results**

Lab Sample ID	LCS-52587	Matrix	Solid
Filename	U161101B_08	Dilution	NA
Total Amount Extracted	20.0 g	Extracted	10/28/2016 19:00
ICAL ID	U161025	Analyzed	11/01/2016 20:19
CCal Filename	U161101B_03	Injected By	SMT
Method Blank ID	BLANK-52586		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	10	8.0	14.7	102
2,3,7,8-TCDD	10	8.8	7.3	14.6	88
2,3,7,8-TCDD-37Cl4	10	8.8	3.7	15.8	88
2,3,7,8-TCDF-13C	100	72	26.0	126.0	72
2,3,7,8-TCDD-13C	100	92	25.0	141.0	92

Cs = Concentration Spiked (ng/mL)  
 Cr = Concentration Recovered (ng/mL)  
 Rec. = Recovery (Expressed as Percent)  
 Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
 R = Recovery outside of control limits  
 Nn = Value obtained from additional analysis  
 \* = See Discussion

**REPORT OF LABORATORY ANALYSIS**

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# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140634
Location Sampled:	102016030
Sample No:	40140634-001
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/20/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	8.5

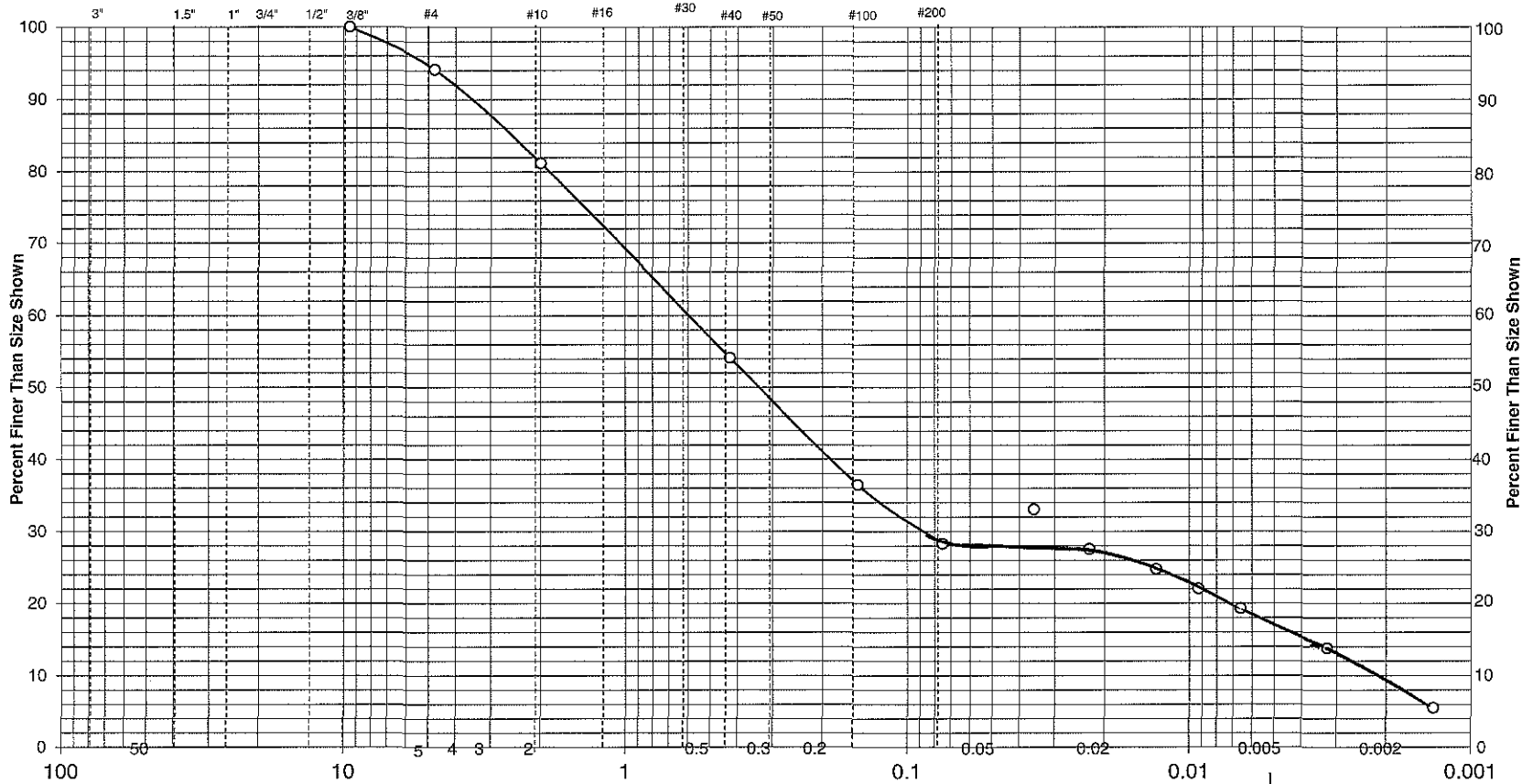
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	0.5	5.9	94.1		
#10	1.1	12.9	81.2		
#40	2.3	27.1	54.1		
#100	1.5	17.6	36.5		
#200	0.7	8.2	28.3		

REVIEWED BY:	<i>Robert A. House</i>
DATE REVIEWED:	11/8/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	5.9%	12.9%	27.1%	25.8%	11.3%	17.0%	

Soil Classification: CLAYEY SAND W/ORGANIC FINES, medium to fine to coarse grained, a little gravel, black (SC)

Location Sampled: 102016030

Elevation or Depth:

Date Sampled: 10/20/16

Sample Number: 40140634-001

Sampled Moisture Content (%): 969.4

Report No.: 634-1

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: Pace Analytical

Munsell Color Code: 10YR 2/1

Project: No. 40140634

Page: 2

Date Received: 10/24/16

Prepared by: Bob J. Peeters

Date: 11/7/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. House*

Date: 11/8/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140634
Location Sampled:	102016031
Sample No:	40140634-002
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/20/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016		
Test Performed By:	FRH		
24 Hrs. Turn Around:	NO		
Washed Gradation:	YES	Dry Weight of Soil (gms):	11.9

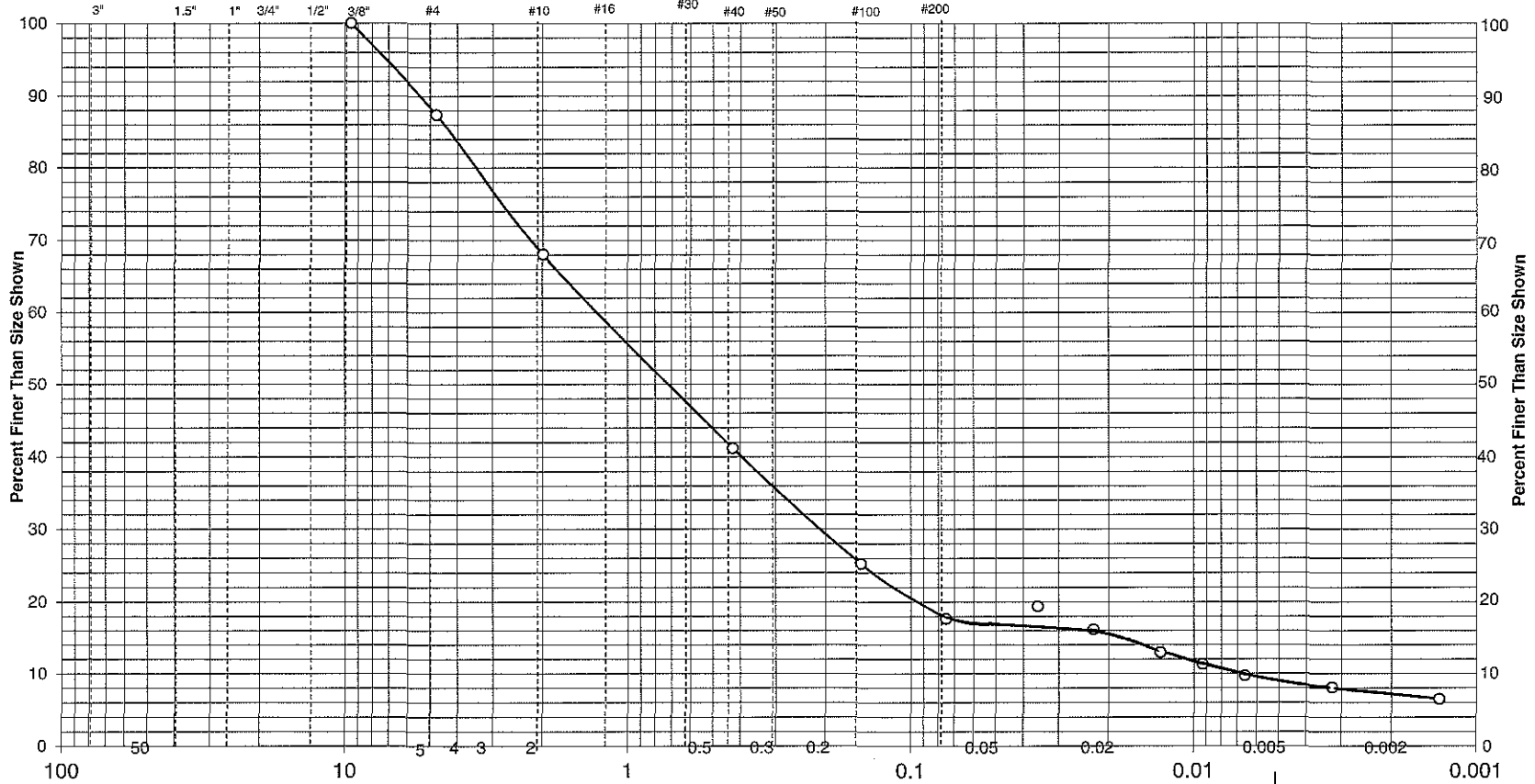
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	1.5	12.6	87.4		
#10	2.3	19.3	68.1		
#40	3.2	26.9	41.2		
#100	1.9	16.0	25.2		
#200	0.9	7.6	17.6		

REVIEWED BY:	<i>Robert R. Pouse</i>
DATE REVIEWED:	11/8/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	12.6%	19.3%	26.9%	23.6%	8.6%	9.0%	

Soil Classification: SILTY SAND W/ORGANIC FINES, medium to fine to coarse grained, a little gravel, black (SM)

Location Sampled: 102016031

Elevation or Depth:

Date Sampled: 10/20/16

Sample Number: 40140634-002

Sampled Moisture Content (%): 796.6

Report No.: 634-2

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: **Pace Analytical**

Munsell Color Code: 10YR 2/1

Project: **No. 40140634**

Page: 2

Date Received: 10/24/16

Prepared by: **Bob J. Peeters**

Date: 11/7/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. House*

Date: **11/8/16**

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140634
Location Sampled:	102016032
Sample No:	40140634-003
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/20/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	9.1

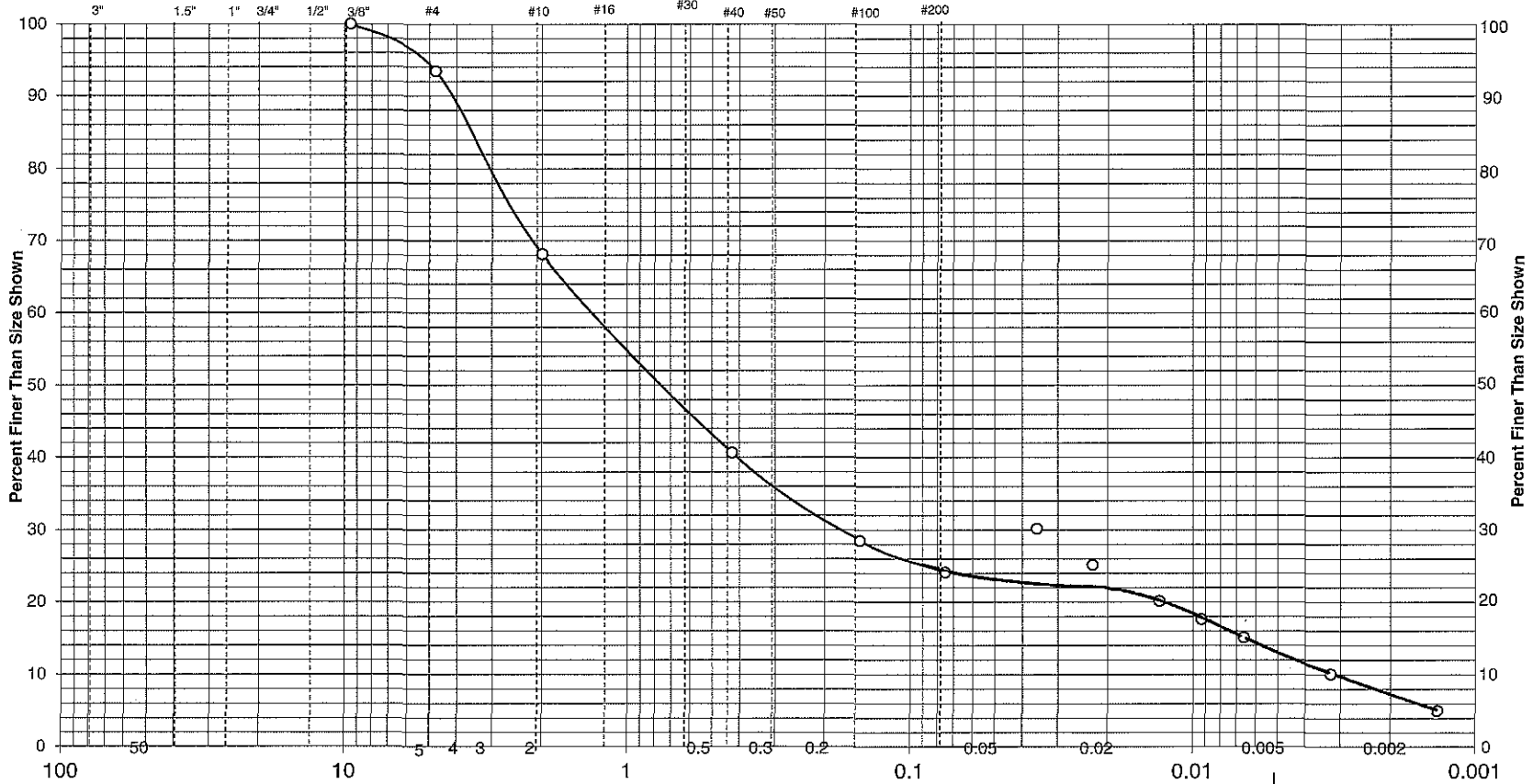
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	0.6	6.6	93.4		
#10	2.3	25.3	68.1		
#40	2.5	27.5	40.6		
#100	1.1	12.1	28.5		
#200	0.4	4.4	24.1		

REVIEWED BY:	<i>Robert R. Ponce</i>
DATE REVIEWED:	<i>11/8/16</i>

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	6.6%	25.3%	27.5%	16.5%	11.1%	13.0%	

Soil Classification: CLAYEY SAND W/ORGANIC FINES, medium to coarse to fine grained, a little gravel, black (SC)

Location Sampled: 102016032

Elevation or Depth:

Date Sampled: 10/20/16

Sample Number: 40140634-003

Sampled Moisture Content (%): 978.0

Report No.: 634-3

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: Pace Analytical

Munsell Color Code: 10YR 2/1

Project: No. 40140634

Page: 2

Date Received: 10/24/16

Prepared by: Bob J. Peeters

Date: 11/7/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. Rouse*

Date: 11/8/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140634
Location Sampled:	102016033
Sample No:	40140634-004
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/20/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	9.7

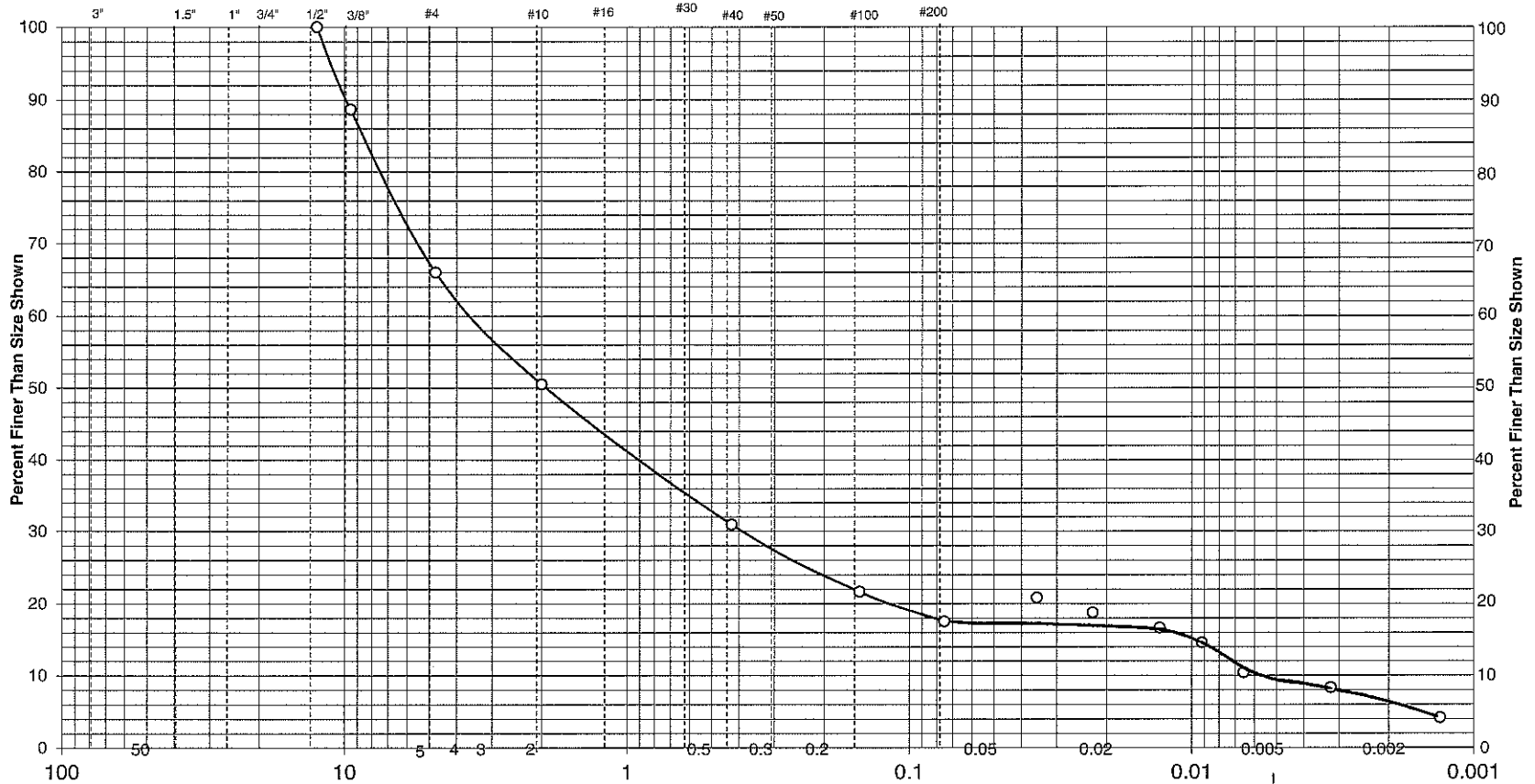
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	1.1	11.3	88.7		
#4	2.2	22.7	66.0		
#10	1.5	15.5	50.5		
#40	1.9	19.6	30.9		
#100	0.9	9.3	21.6		
#200	0.4	4.1	17.5		

REVIEWED BY:	<i>Robert R. Pomeroy</i>
DATE REVIEWED:	11/8/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	34.0%	15.5%	19.6%	13.4%	8.0%	9.5%	

Soil Classification: SILTY SAND W/ORGANIC FINES AND GRAVEL, medium to coarse to fine grained, black (SM)

Location Sampled: 102016033

Elevation or Depth:

Date Sampled: 10/20/16

Sample Number: 40140634-004

Sampled Moisture Content (%): 813.4

Report No.: 634-4

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: Pace Analytical

Munsell Color Code: 10YR 2/1

Project: No. 40140634

Page: 2

Date Received: 10/24/16

Prepared by: Bob J. Peeters

Date: 11/7/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. Rouse*

Date: 11/8/16



# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

**GENERAL DATA:**

Client:	Pace Analytical
Project:	No. 40140634
Location Sampled:	102016035
Sample No:	40140634-005
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/20/16

**LABORATORY DATA:**

Date Tested:	October 25-27, 2016
Test Performed By:	FRH
24 Hrs. Turn Around:	NO
Washed Gradation:	YES
Dry Weight of Soil (gms):	10.6

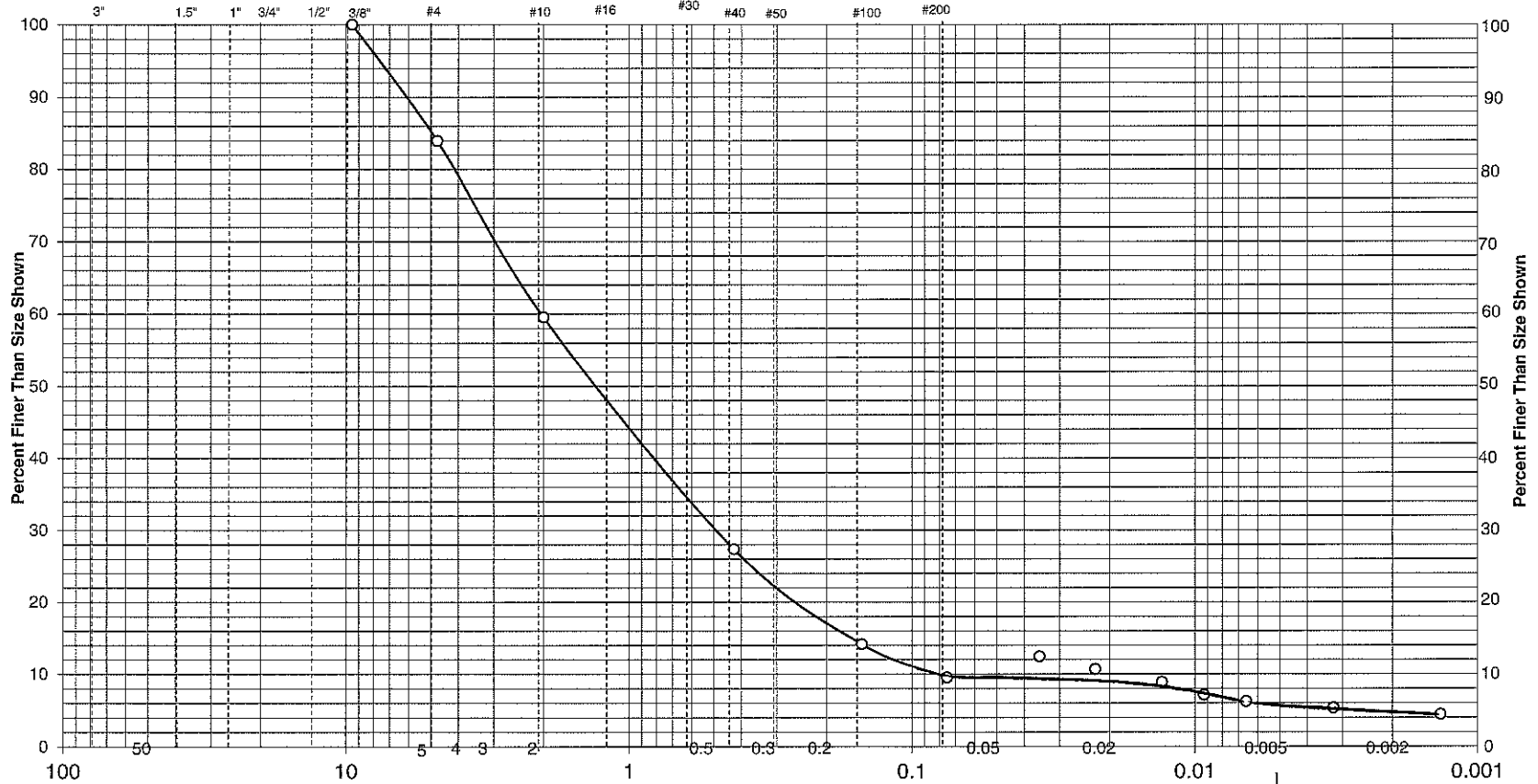
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	0.0	0.0	100.0		
#4	1.7	16.0	84.0		
#10	2.6	24.5	59.5		
#40	3.4	32.1	27.4		
#100	1.4	13.2	14.2		
#200	0.5	4.7	9.5		

REVIEWED BY:	<i>Robert A. Rouse</i>
DATE REVIEWED:	11/8/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand				
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	16.0%	24.5%	32.1%	17.9%	4.0%	5.5%

Soil Classification: SAND W/SILT AND ORGANIC FINES AND GRAVEL, medium to coarse to fine grained, black (SP-SM)

Location Sampled: 102016035

Elevation or Depth:

Date Sampled: 10/20/16

Sample Number: 40140634-005

Sampled Moisture Content (%): 786.8

Report No.: 634-5

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: Pace Analytical

Munsell Color Code: 10YR 2/1

Project: No. 40140634

Page: 2

Date Received: 10/24/16

Prepared by: Bob J. Peeters

Date: 11/7/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. Rouse*

Date: 11/8/16

# CQM, INC.

## SIEVE ANALYSIS OF COARSE TO FINE AGGREGATES (ASTM D422)

### GENERAL DATA:

Client:	Pace Analytical
Project:	No. 40140634
Location Sampled:	102016036
Sample No:	40140634-006
Depth of Sample:	
Date Received:	10/24/16
Sample Designated For:	Soil Classification
Source of Sample:	Military Creek
Munsell Color Code:	10YR 2/1
Date Sampled:	10/20/16

### LABORATORY DATA:

Date Tested:	October 25-28, 2016		
Test Performed By:	FRH		
24 Hrs. Turn Around:	NO		
Washed Gradation:	YES	Dry Weight of Soil (gms):	14.5

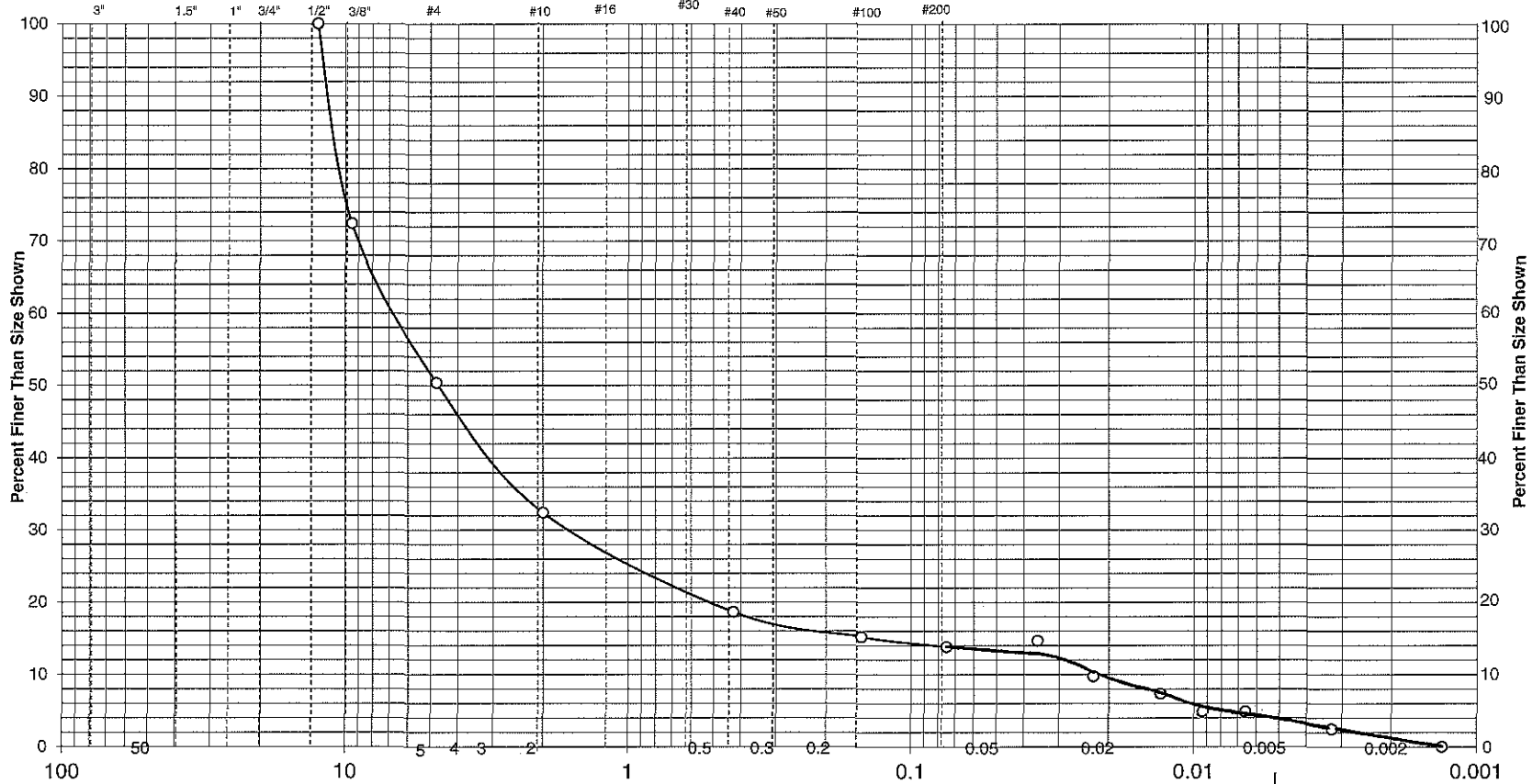
Sieve Size	Weight Retained	% Retained	% Passing	Project Specification % Passing by Weight	Source of Specification
3"					
1 1/2"					
1"					
3/4"					
1/2"	0.0	0.0	100.0		
3/8"	4.0	27.6	72.4		
#4	3.2	22.1	50.3		
#10	2.6	17.9	32.4		
#40	2.0	13.8	18.6		
#100	0.5	3.4	15.2		
#200	0.2	1.4	13.8		

REVIEWED BY:	<i>Robert A. Brown</i>
DATE REVIEWED:	11/8/16

Remarks:

# GRAIN SIZE DISTRIBUTION CURVE

U.S. Standard Sieve Sizes



Gravel		Sand					
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
	49.7%	17.9%	13.8%	4.8%	9.8%	4.0%	

Soil Classification: SILTY SAND W/GRAVEL AND ORGANIC FINES, coarse to medium grained, black (SM)

Location Sampled: 102016036

Elevation or Depth:

Date Sampled: 10/20/16

Sample Number: 40140634-006

Sampled Moisture Content (%): 602.8

Report No.: 634-6

Sample Source: Military Creek

**CQM, INC.**

Atterberg Limits:

LL=

PL=

PI=

Client: Pace Analytical

Munsell Color Code: 10YR 2/1

Project: No. 40140634

Page: 2

Date Received: 10/24/16

Prepared by: Bob J. Peeters

Date: 11/7/16

Coefficients: Cc=

Cu=

Checked by:

*Robert R. Rouse*

Date: 11/8/16

**Report Prepared for:**

Brian Basten  
PACE Wisconsin  
1241 Bellevue Street  
Green Bay WI 54302

**REPORT OF  
LABORATORY  
ANALYSIS FOR  
TCDD/TCDF**

**Report Information:**

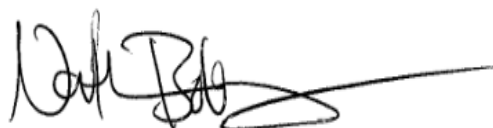
**Pace Project #: 10367095**  
**Sample Receipt Date: 10/21/2016**  
**Client Project #: 40140495**  
**Client Sub PO #: N/A**  
**State Cert #: 999407970**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



November 11, 2016

Nathan Boberg, Project Manager

(612) 607-6444 (fax)  
nathan.boberg@pacelabs.com

**Report Prepared Date:**

November 11, 2016



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on eight samples submitted by a representative of Pace Analytical Services, Inc. The samples were analyzed for the presence or absence of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and 2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDF) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Method blank and field sample results presented with reporting limits corresponding to the lowest calibration points and a nominal 10-gram sample amount were included at the end of Appendix A. This report was revised to include results for 2,3,7,8-TCDF.

The recoveries of the isotopically-labeled TCDD/TCDF internal standards in the sample extracts ranged from 68-98%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native congeners was based on isotope dilution, the data were automatically corrected for recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates. In sample 101916027, due to the high moisture content, the estimated detection limit (EDL) values were above the standard reporting limits; therefore, the EDLs were provided and flagged "A" on the results table in Appendix A. The values reported for 2,3,7,8-TCDF that were above the lowest calibration point were verified by second column confirmation analyses and flagged "V".

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show that 2,3,7,8-TCDD and 2,3,7,8-TCDF were not detected, indicating that the sample processing steps were free of background levels of these congeners.

Laboratory spike samples were also prepared using clean reference matrix that had been fortified with native standard materials. The recoveries of the native compounds ranged from 80-109% with relative percent differences of 3.7%. These results were within the target ranges for the method. Matrix spikes were not prepared with the sample batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

<b>Authority</b>	<b>Certificate #</b>	<b>Authority</b>	<b>Certificate #</b>
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367095

# **Appendix A**

## Sample Management






Sample Condition  
Upon Receipt

Client Name:  
Pace GB

Project #:

**WO#: 10367095**



10367095

Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  Speedee  Other: \_\_\_\_\_  
 Tracking Number: \_\_\_\_\_

Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No      Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_  
 Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_      Temp Blank?  Yes  No  
 Thermometer  151401163  B88A912167504      Type of Ice:  Wet  Blue  None  Samples on Ice, cooling process has begun  
 Used:  151401164  B88A0143310098  
 Cooler Temp Read (°C): 0.5      Cooler Temp Corrected (°C): 0.7      Biological Tissue Frozen?  Yes  No  N/A  
 Temp should be above freezing to 6°C      Correction Factor: +0.2      Date and Initials of Person Examining Contents: DN 10/24/16

USDA Regulated Soil (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No      Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A -Includes Date/Time/ID/Analysis Matrix: <u>SL</u>	12.
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A All containers needing EPA preservation are found to be in compliance with EPA recommendation? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl Sample # _____ Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

CLIENT NOTIFICATION/RESOLUTION      Field Data Required?  Yes  No  
 Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Comments/Resolution: \_\_\_\_\_

Project Manager Review: Scott Unge      Date: 10/24/16  
 Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52542	Matrix	Solid
Filename	F161030B_04	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 13:30
CCal Filename(s)	F161030B_01	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	74
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	87
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	76

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range

E = Exceeds calibration range

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Report No..... 10367095

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916018			
Lab Sample ID	40140495001			
Filename	F161031A_09			
Injected By	BAL			
Total Amount Extracted	15.0 g	Matrix	Solid	
% Moisture	35.8	Dilution	NA	
Dry Weight Extracted	9.63 g	Collected	10/19/2016 09:12	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 06:34	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.3	----	1.0 V	2,3,7,8-TCDF-13C	2.00	79
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	95
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37CI4	0.20	83

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range

E = Exceeds calibration range

V = Result verified by confirmation analysis

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Report No.....10367095

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916019		
Lab Sample ID	40140495002		
Filename	F161031A_10		
Injected By	BAL		
Total Amount Extracted	12.8 g	Matrix	Solid
% Moisture	16.9	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	10/19/2016 09:12
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 07:23

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	68
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	87
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	74

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
 R = Recovery outside target range  
 E = Exceeds calibration range

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Report No.....10367095

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916021		
Lab Sample ID	40140495003		
Filename	F161030B_09		
Injected By	BAL		
Total Amount Extracted	20.4 g	Matrix	Solid
% Moisture	91.4	Dilution	NA
Dry Weight Extracted	1.75 g	Collected	10/19/2016 09:37
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 17:33

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	9.9	----	1.0 V	2,3,7,8-TCDF-13C	2.00	78
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37C14	0.20	78

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range

E = Exceeds calibration range

V = Result verified by confirmation analysis

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916022		
Lab Sample ID	40140495004		
Filename	F161030B_10		
Injected By	BAL		
Total Amount Extracted	20.0 g	Matrix	Solid
% Moisture	75.4	Dilution	NA
Dry Weight Extracted	4.92 g	Collected	10/19/2016 09:37
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 18:22

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	11.0	----	1.0 V	2,3,7,8-TCDF-13C	2.00	80
2,3,7,8-TCDD	2.4	----	1.0	2,3,7,8-TCDD-13C	2.00	95
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	82

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
 R = Recovery outside target range  
 E = Exceeds calibration range  
 V = Result verified by confirmation analysis

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Report No.....10367095



**Method 1613B Sample Analysis Results**  
 Client - PACE Wisconsin

Client's Sample ID	101916024				
Lab Sample ID	40140495005				
Filename	F161030B_11				
Injected By	BAL				
Total Amount Extracted	15.9 g	Matrix	Solid		
% Moisture	46.3	Dilution	NA		
Dry Weight Extracted	8.54 g	Collected	10/19/2016 10:35		
ICAL ID	F161011	Received	10/21/2016 09:30		
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55		
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 19:11		

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	15.0	----	1.0 V	2,3,7,8-TCDF-13C	2.00	77
2,3,7,8-TCDD	2.1	----	1.0	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	77

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
 R = Recovery outside target range  
 E = Exceeds calibration range  
 V = Result verified by confirmation analysis

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916025		
Lab Sample ID	40140495006		
Filename	F161030B_12		
Injected By	BAL		
Total Amount Extracted	13.5 g	Matrix	Solid
% Moisture	55.4	Dilution	NA
Dry Weight Extracted	6.02 g	Collected	10/19/2016 10:35
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:00

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	71.0	----	1.0 V	2,3,7,8-TCDF-13C	2.00	75
2,3,7,8-TCDD	9.3	----	1.0	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	75

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
 R = Recovery outside target range  
 E = Exceeds calibration range  
 V = Result verified by confirmation analysis

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Report No.....10367095

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916027			
Lab Sample ID	40140495007			
Filename	F161030B_13			
Injected By	BAL			
Total Amount Extracted	20.4 g	Matrix	Solid	
% Moisture	91.9	Dilution	NA	
Dry Weight Extracted	1.65 g	Collected	10/19/2016 12:09	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:48	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	7.2	-----	1.8 AV		2,3,7,8-TCDF-13C	2.00	75
2,3,7,8-TCDD	ND	-----	2.3 A		2,3,7,8-TCDD-13C	2.00	89
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37CI4	0.20	76

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
 A = Reporting Limit based on signal to noise  
 R = Recovery outside target range  
 E = Exceeds calibration range  
 V = Result verified by confirmation analysis

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Report No.....10367095

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916028		
Lab Sample ID	40140495008		
Filename	F161030B_14		
Injected By	BAL		
Total Amount Extracted	17.5 g	Matrix	Solid
% Moisture	87.2	Dilution	NA
Dry Weight Extracted	2.24 g	Collected	10/19/2016 12:09
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 21:37

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.8	----	1.0 J	2,3,7,8-TCDF-13C	2.00	79
2,3,7,8-TCDD	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	98
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	86

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
 R = Recovery outside target range  
 E = Exceeds calibration range

**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367095

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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# **Appendix B**

## Sample Analysis Summary



### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916018		
Lab Sample ID	40140495001		
Filename	F161031A_09		
Injected By	BAL		
Total Amount Extracted	15.0 g	Matrix	Solid
% Moisture	35.8	Dilution	NA
Dry Weight Extracted	9.63 g	Collected	10/19/2016 09:12
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 06:34

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.3	----	0.16	V	2,3,7,8-TCDF-13C	2.00	79
2,3,7,8-TCDD	----	0.16	0.12	U	2,3,7,8-TCDD-13C	2.00	95
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	83

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
R = Recovery outside target range  
E = Exceeds calibration range  
I = Interference present  
V = Result verified by confirmation analysis

## REPORT OF LABORATORY ANALYSIS

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916019		
Lab Sample ID	40140495002		
Filename	F161031A_10		
Injected By	BAL		
Total Amount Extracted	12.8 g	Matrix	Solid
% Moisture	16.9	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	10/19/2016 09:12
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 07:23

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.13	2,3,7,8-TCDF-13C	2.00	68
2,3,7,8-TCDD	ND	----	0.14	2,3,7,8-TCDD-13C	2.00	87
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	74

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
 R = Recovery outside target range  
 E = Exceeds calibration range

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916021		
Lab Sample ID	40140495003		
Filename	F161030B_09		
Injected By	BAL		
Total Amount Extracted	20.4 g	Matrix	Solid
% Moisture	91.4	Dilution	NA
Dry Weight Extracted	1.75 g	Collected	10/19/2016 09:37
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 17:33

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	9.90	----	0.43	V	2,3,7,8-TCDF-13C	2.00	78
2,3,7,8-TCDD	0.97	----	0.63	J	2,3,7,8-TCDD-13C	2.00	90
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	78

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
R = Recovery outside target range  
E = Exceeds calibration range  
V = Result verified by confirmation analysis

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916022		
Lab Sample ID	40140495004		
Filename	F161030B_10		
Injected By	BAL		
Total Amount Extracted	20.0 g	Matrix	Solid
% Moisture	75.4	Dilution	NA
Dry Weight Extracted	4.92 g	Collected	10/19/2016 09:37
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 18:22

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	11.0	----	0.65 V	2,3,7,8-TCDF-13C	2.00	80
2,3,7,8-TCDD	2.4	----	0.50	2,3,7,8-TCDD-13C	2.00	95
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	82

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range  
V = Result verified by confirmation analysis

## REPORT OF LABORATORY ANALYSIS

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916024		
Lab Sample ID	40140495005		
Filename	F161030B_11		
Injected By	BAL		
Total Amount Extracted	15.9 g	Matrix	Solid
% Moisture	46.3	Dilution	NA
Dry Weight Extracted	8.54 g	Collected	10/19/2016 10:35
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 19:11

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	15.0	----	0.44 V	2,3,7,8-TCDF-13C	2.00	77
2,3,7,8-TCDD	2.1	----	0.69	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	77

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range  
V = Result verified by confirmation analysis

## REPORT OF LABORATORY ANALYSIS

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916025		
Lab Sample ID	40140495006		
Filename	F161030B_12		
Injected By	BAL		
Total Amount Extracted	13.5 g	Matrix	Solid
% Moisture	55.4	Dilution	NA
Dry Weight Extracted	6.02 g	Collected	10/19/2016 10:35
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:00

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	71.0	----	0.67 V	2,3,7,8-TCDF-13C	2.00	75
2,3,7,8-TCDD	9.3	----	0.86	2,3,7,8-TCDD-13C	2.00	90
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	75

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range  
V = Result verified by confirmation analysis

## REPORT OF LABORATORY ANALYSIS

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916027		
Lab Sample ID	40140495007		
Filename	F161030B_13		
Injected By	BAL		
Total Amount Extracted	20.4 g	Matrix	Solid
% Moisture	91.9	Dilution	NA
Dry Weight Extracted	1.65 g	Collected	10/19/2016 12:09
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:48

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	7.2	----	1.8 V	2,3,7,8-TCDF-13C	2.00	75
2,3,7,8-TCDD	ND	----	2.3	2,3,7,8-TCDD-13C	2.00	89
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	76

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
R = Recovery outside target range  
E = Exceeds calibration range  
V = Result verified by confirmation analysis

## REPORT OF LABORATORY ANALYSIS

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916028		
Lab Sample ID	40140495008		
Filename	F161030B_14		
Injected By	BAL		
Total Amount Extracted	17.5 g	Matrix	Solid
% Moisture	87.2	Dilution	NA
Dry Weight Extracted	2.24 g	Collected	10/19/2016 12:09
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 21:37

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.8	----	0.72	J	2,3,7,8-TCDF-13C	2.00	79
2,3,7,8-TCDD	ND	----	0.65		2,3,7,8-TCDD-13C	2.00	98
					Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
					Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	86

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value

R = Recovery outside target range

E = Exceeds calibration range

## REPORT OF LABORATORY ANALYSIS

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**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52542	Matrix	Solid
Filename	F161030B_04	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 13:30
CCal Filename(s)	F161030B_01	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.079	2,3,7,8-TCDF-13C	2.00	74
2,3,7,8-TCDD	ND	----	0.130	2,3,7,8-TCDD-13C	2.00	87
				Recovery Standard 1,2,3,4-TCDD-13C	2.00	NA
				Cleanup Standard 2,3,7,8-TCDD-37Cl4	0.20	76

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.  
 R = Recovery outside target range  
 E = Exceeds calibration range

**REPORT OF LABORATORY ANALYSIS**

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**Method 1613B Laboratory Control Spike Results**

Lab Sample ID	LCS-52543	Matrix	Solid
Filename	F161030B_02	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 11:54
CCal Filename	F161030B_01	Injected By	BAL
Method Blank ID	BLANK-52542		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	8.0	14.7	105
2,3,7,8-TCDD	10	8.3	7.3	14.6	83
2,3,7,8-TCDD-37Cl4	10	8.1	3.7	15.8	81
2,3,7,8-TCDF-13C	100	81	26.0	126.0	81
2,3,7,8-TCDD-13C	100	94	25.0	141.0	94

Cs = Concentration Spiked (ng/mL)  
Cr = Concentration Recovered (ng/mL)  
Rec. = Recovery (Expressed as Percent)  
Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
R = Recovery outside of control limits  
Nn = Value obtained from additional analysis  
\* = See Discussion

**REPORT OF LABORATORY ANALYSIS**

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**Method 1613B Laboratory Control Spike Results**

Lab Sample ID	LCSD-52544	Matrix	Solid
Filename	F161030B_03	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 12:41
CCal Filename	F161030B_01	Injected By	BAL
Method Blank ID	BLANK-52542		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	8.0	14.7	109
2,3,7,8-TCDD	10	8.0	7.3	14.6	80
2,3,7,8-TCDD-37Cl4	10	7.7	3.7	15.8	77
2,3,7,8-TCDF-13C	100	73	26.0	126.0	73
2,3,7,8-TCDD-13C	100	88	25.0	141.0	88

Cs = Concentration Spiked (ng/mL)  
 Cr = Concentration Recovered (ng/mL)  
 Rec. = Recovery (Expressed as Percent)  
 Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
 R = Recovery outside of control limits  
 Nn = Value obtained from additional analysis  
 \* = See Discussion

**REPORT OF LABORATORY ANALYSIS**

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**Method 1613B**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client PACE Wisconsin

Spike 1 ID LCS-52543  
 Spike 1 Filename F161030B\_02

Spike 2 ID LCSD-52544  
 Spike 2 Filename F161030B\_03

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	105	109	3.7
2,3,7,8-TCDD	83	80	3.7

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

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**Report Prepared for:**

Brian Basten  
PACE Wisconsin  
1241 Bellevue Street  
Suite 9  
Green Bay WI 54302

**REPORT OF  
LABORATORY  
ANALYSIS FOR  
PCDD/PCDF**

**Report Prepared Date:**

December 22, 2016

**Report Information:**


**Pace Project #: 10367411**  
**Sample Receipt Date: 10/25/2016**  
**Client Project #: 40140634**  
**Client Sub PO #: N/A**  
**State Cert #: 999407970**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



January 06, 2017

Carolynne Trout, Project Manager  
(612) 607-6351  
(612) 607-6444 (fax)  
Carolynne.Trout@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on six samples submitted by a representative of Pace Analytical Services, Inc. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentrations (EMPCs) were treated as positives in the toxic equivalence calculations. Method blank and field sample results presented with reporting limits set to correspond to the lowest calibration points and a nominal 10-gram sample amount were included at the end of Appendix A. This report was revised to provide results for all tetra through octa-chlorinated PCDDs and PCDFs.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 52-97%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to contain trace levels of selected congeners. These levels were below the calibration range of the method. The concentrations reported for the affected congeners in the field samples were higher than the corresponding blank concentrations by one or more orders of magnitude. These results indicate that the sample processing steps did not contribute significantly to the levels reported for the field samples.

A laboratory spike sample was also prepared using clean reference matrix that had been fortified with native standards. The recoveries of the native compounds ranged from 88-124%. These results were within the target ranges for the method. Matrix spikes were prepared with the sample batch using sample material from a separate project; results from these analyses will be provided upon request.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

<b>Authority</b>	<b>Certificate #</b>	<b>Authority</b>	<b>Certificate #</b>
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367411

# **Appendix A**

## Sample Management

# Chain of Custody

10367411



Workorder: 40140634    Workorder Name: 2381 MILITARY CREEK    Owner Received Date: 10/21/2016    Results Requested By: 11/4/2016

Report To:		Subcontract To:					Requested Analysis:												LAB USE ONLY																																																																																																																																																							
Brian Basten Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302		Pace Analytical Minnesota 1700 Elm Street SE Suite 200 Minneapolis, MN 55414 Phone (612)607-1700					<table border="1"> <tr> <th colspan="12">Preserved Containers</th> </tr> <tr> <th>Unpreserved</th> <th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th> <th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th> </tr> <tr> <td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>												Preserved Containers												Unpreserved																							X																							X																							X																							X																							X																								
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Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Unpreserved																																																																																																																																																																				
1	102016030	PS	10/20/2016 09:36	40140634001	Solid	1																21																																																																																																																																																				
2	102016031	PS	10/20/2016 09:36	40140634002	Solid	1																22																																																																																																																																																				
3	102016032	PS	10/20/2016 10:12	40140634003	Solid	1																23																																																																																																																																																				
4	102016033	RQS	10/20/2016 10:12	40140634004	Solid	1																24																																																																																																																																																				
5	102016035	PS	10/20/2016 11:25	40140634005	Solid	1																25																																																																																																																																																				
6	102016036	PS	10/20/2016 11:25	40140634006	Solid	1																26																																																																																																																																																				
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Cooler Temperature on Receipt		28 °C	Custody Seal <input checked="" type="checkbox"/> or N		Received on Ice <input checked="" type="checkbox"/> or N		Samples Intact <input checked="" type="checkbox"/> or N																																																																																																																																																																			

\*\*\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.  
This chain of custody is considered complete as is since this information is available in the owner laboratory.

Report No.....10367411\_1613B    Revision 1    Page 5 of 23

**Sample Condition Upon Receipt**      **Client Name:** Pace G13      **Project #:** **WO#: 10367411**  
**Courier:**       Fed Ex       UPS       USPS       Client  
 Commercial       Pace       Speedee       Other: Walter  
**Tracking Number:** \_\_\_\_\_

**Custody Seal on Cooler/Box Present?**  Yes       No      **Seals Intact?**  Yes       No      **Optional:** Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_  
**Packing Material:**  Bubble Wrap       Bubble Bags       None       Other: \_\_\_\_\_      **Temp Blank?**  Yes       No  
**Thermometer**       151401163       888A912167504      **Type of Ice:**  Wet       Blue       None       Samples on ice, cooling process has begun  
**Used:**  151401164       888A0143310098  
**Cooler Temp Read (°C):** 3.6      **Cooler Temp Corrected (°C):** 3.8      **Biological Tissue Frozen?**  Yes       No       N/A  
**Temp should be above freezing to 6°C**      **Correction Factor:** -0.2      **Date and Initials of Person Examining Contents:** 10-25-16 [initials]  
**USDA Regulated Soil** (  N/A, water sample)  
**Did samples originate in a quarantine zone within the United States:** AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes       No  
**Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?**  Yes       No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>SL</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl <2; NaOH >9 Sulfide, NaOH >12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>5mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**      **Field Data Required?**  Yes       No  
**Person Contacted:** \_\_\_\_\_ **Date/Time:** \_\_\_\_\_  
**Comments/Resolution:** \_\_\_\_\_

**Project Manager Review:** Scott Unzu      **Date:** 10/25/16  
 Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52586	Matrix	Solid
Filename	U161101B_12	Dilution	NA
Total Amount Extracted	20.2 g	Extracted	10/28/2016 19:00
ICAL ID	U161025	Analyzed	11/01/2016 23:24
CCal Filename(s)	U161101B_03	Injected By	SMT

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	96
				1,2,3,7,8-PeCDF-13C	2.00	73
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	73
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	91
				1,2,3,4,7,8-HxCDF-13C	2.00	72
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	70
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	77
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	85
				1,2,3,4,7,8-HxCDD-13C	2.00	83
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	85
				1,2,3,4,7,8,9-HpCDF-13C	2.00	93
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	101
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	88
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	86
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.00 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	ND	----	10.0			

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

**REPORT OF LABORATORY ANALYSIS**

Report No.....10367411

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016030		
Lab Sample ID	40140634001		
Filename	U161201A_04		
Injected By	SMT		
Total Amount Extracted	29.3 g	Matrix	Solid
% Moisture	92.2	Dilution	NA
Dry Weight Extracted	2.29 g	Collected	10/20/2016 09:36
ICAL ID	U161025	Received	10/25/2016 11:20
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 20:01

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.5	----	1.0 J	2,3,7,8-TCDF-13C	2.00	83
Total TCDF	3.8	----	1.0 J	2,3,7,8-TCDD-13C	2.00	97
				1,2,3,7,8-PeCDF-13C	2.00	85
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	84
Total TCDD	1.0	----	1.0 J	1,2,3,7,8-PeCDD-13C	2.00	97
				1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	82
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	84
				1,2,3,4,7,8-HxCDD-13C	2.00	86
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	69
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	70
				1,2,3,4,7,8,9-HpCDF-13C	2.00	82
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	85
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	79
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	8.3	----	5.0 J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	100
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	10.0	----	5.0 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.79 ng/Kg		
Total HpCDF	35.0	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	27.0	----	5.0			
Total HpCDD	44.0	----	5.0			
OCDF	29.0	----	10.0 J			
OCDD	230.0	----	10.0			

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

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

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

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367411

## Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016031		
Lab Sample ID	40140634002		
Filename	U161201A_05		
Injected By	SMT		
Total Amount Extracted	18.1 g	Matrix	Solid
% Moisture	88.2	Dilution	NA
Dry Weight Extracted	2.14 g	Collected	10/20/2016 09:36
ICAL ID	U161025	Received	10/25/2016 11:20
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 20:47

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.1	----	1.0 J	2,3,7,8-TCDF-13C	2.00	78
Total TCDF	1.1	----	1.0 J	2,3,7,8-TCDD-13C	2.00	92
				1,2,3,7,8-PeCDF-13C	2.00	82
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	80
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	93
				1,2,3,4,7,8-HxCDF-13C	2.00	79
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	74
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	57
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	84
				1,2,3,4,7,8-HxCDD-13C	2.00	76
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	69
				1,2,3,4,7,8,9-HpCDF-13C	2.00	79
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	82
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	80
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	96
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.13 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	13.0	----	10.0 J			

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

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

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## REPORT OF LABORATORY ANALYSIS

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Report No.....10367411

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	102016032		
Lab Sample ID	40140634003		
Filename	U161201A_06		
Injected By	SMT		
Total Amount Extracted	24.6 g	Matrix	Solid
% Moisture	90.6	Dilution	NA
Dry Weight Extracted	2.31 g	Collected	10/20/2016 10:12
ICAL ID	U161025	Received	10/25/2016 11:20
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 21:33

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.4	----	1.0 J	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	9.9	----	1.0	2,3,7,8-TCDD-13C	2.00	90
				1,2,3,7,8-PeCDF-13C	2.00	80
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	78
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	92
				1,2,3,4,7,8-HxCDF-13C	2.00	76
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	71
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	54
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	81
				1,2,3,4,7,8-HxCDD-13C	2.00	77
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	60
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	65
				1,2,3,4,7,8,9-HpCDF-13C	2.00	77
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	79
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	73
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	9.1	----	5.0 J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	92
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	12.0	----	5.0 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 1.0 ng/Kg		
Total HpCDF	42.0	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	39.0	----	5.0			
Total HpCDD	64.0	----	5.0			
OCDF	34.0	----	10.0 J			
OCDD	370.0	----	10.0			

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

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

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J = Estimated value

**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367411

### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016033		
Lab Sample ID	40140634004		
Filename	U161201A_07		
Injected By	SMT		
Total Amount Extracted	18.3 g	Matrix	Solid
% Moisture	87.8	Dilution	NA
Dry Weight Extracted	2.23 g	Collected	10/20/2016 10:12
ICAL ID	U161025	Received	10/25/2016 11:20
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 22:20

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.4	----	1.0 J	2,3,7,8-TCDF-13C	2.00	72
Total TCDF	2.6	----	1.0 J	2,3,7,8-TCDD-13C	2.00	84
				1,2,3,7,8-PeCDF-13C	2.00	77
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	87
				1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	68
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	52
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	75
				1,2,3,4,7,8-HxCDD-13C	2.00	78
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	59
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	62
				1,2,3,4,7,8,9-HpCDF-13C	2.00	73
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	75
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	71
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	5.3	----	5.0 J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
				2,3,7,8-TCDD-37Cl4	0.20	83
1,2,3,4,7,8-HxCDD	ND	----	5.0			
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	7.1	----	5.0 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.67 ng/Kg		
Total HpCDF	24.0	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	20.0	----	5.0 J			
Total HpCDD	35.0	----	5.0			
OCDF	27.0	----	10.0 J			
OCDD	230.0	----	10.0			

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

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

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

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367411

### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016035		
Lab Sample ID	40140634005		
Filename	U161201A_08		
Injected By	SMT		
Total Amount Extracted	23.3 g	Matrix	Solid
% Moisture	90.3	Dilution	NA
Dry Weight Extracted	2.26 g	Collected	10/20/2016 11:25
ICAL ID	U161025	Received	10/25/2016 11:20
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 23:06

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.2	----	1.0 J	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	2.3	----	1.0 J	2,3,7,8-TCDD-13C	2.00	93
				1,2,3,7,8-PeCDF-13C	2.00	84
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	81
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	94
				1,2,3,4,7,8-HxCDF-13C	2.00	82
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	59
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	85
				1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	65
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	66
				1,2,3,4,7,8,9-HpCDF-13C	2.00	78
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	81
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	75
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	99
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.14 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	29.0	----	10.0 J			

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

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

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

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367411

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	102016036		
Lab Sample ID	40140634006		
Filename	U161201A_09		
Injected By	SMT		
Total Amount Extracted	15.2 g	Matrix	Solid
% Moisture	85.5	Dilution	NA
Dry Weight Extracted	2.20 g	Collected	10/20/2016 11:25
ICAL ID	U161025	Received	10/25/2016 11:20
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 23:52

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.3	----	1.0 J	2,3,7,8-TCDF-13C	2.00	78
Total TCDF	2.4	----	1.0 J	2,3,7,8-TCDD-13C	2.00	92
				1,2,3,7,8-PeCDF-13C	2.00	81
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	79
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	92
				1,2,3,4,7,8-HxCDF-13C	2.00	79
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	74
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	62
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	82
				1,2,3,4,7,8-HxCDD-13C	2.00	80
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	64
				1,2,3,4,7,8,9-HpCDF-13C	2.00	73
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	62
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	92
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.13 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	ND	----	10.0			

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

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

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

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Report No.....10367411

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

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# **Appendix B**

## Sample Analysis Summary





### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016030			
Lab Sample ID	40140634001			
Filename	U161201A_04			
Injected By	SMT			
Total Amount Extracted	29.3 g	Matrix	Solid	
% Moisture	92.2	Dilution	NA	
Dry Weight Extracted	2.29 g	Collected	10/20/2016 09:36	
ICAL ID	U161025	Received	10/25/2016 11:20	
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00	
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 20:01	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.50	----	0.32	J	2,3,7,8-TCDF-13C	2.00	83
Total TCDF	6.20	----	0.32		2,3,7,8-TCDD-13C	2.00	97
					1,2,3,7,8-PeCDF-13C	2.00	85
2,3,7,8-TCDD	ND	----	0.36		2,3,4,7,8-PeCDF-13C	2.00	84
Total TCDD	1.00	----	0.36	J	1,2,3,7,8-PeCDD-13C	2.00	97
					1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	ND	----	0.31		1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	0.62	----	0.23	J	2,3,4,6,7,8-HxCDF-13C	2.00	82
Total PeCDF	5.20	----	0.27	J	1,2,3,7,8,9-HxCDF-13C	2.00	84
					1,2,3,4,7,8-HxCDD-13C	2.00	86
1,2,3,7,8-PeCDD	ND	----	0.45		1,2,3,6,7,8-HxCDD-13C	2.00	69
Total PeCDD	ND	----	0.45		1,2,3,4,6,7,8-HpCDF-13C	2.00	70
					1,2,3,4,7,8,9-HpCDF-13C	2.00	82
1,2,3,4,7,8-HxCDF	1.40	----	0.38	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	85
1,2,3,6,7,8-HxCDF	----	0.52	0.38	I	OCDD-13C	4.00	79
2,3,4,6,7,8-HxCDF	0.71	----	0.30	J			
1,2,3,7,8,9-HxCDF	0.47	----	0.35	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	16.00	----	0.35	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.55	----	0.21	J	2,3,7,8-TCDD-37Cl4	0.20	100
1,2,3,6,7,8-HxCDD	1.40	----	0.27	J			
1,2,3,7,8,9-HxCDD	0.64	----	0.26	J			
Total HxCDD	7.80	----	0.25	J			
1,2,3,4,6,7,8-HpCDF	10.00	----	0.28	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	1.10	----	0.47	J	Equivalence: 1.7 ng/Kg		
Total HpCDF	36.00	----	0.38		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	27.00	----	0.37				
Total HpCDD	44.00	----	0.37				
OCDF	29.00	----	0.23	J			
OCDD	230.00	----	0.27				

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

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

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

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	102016031			
Lab Sample ID	40140634002			
Filename	U161201A_05			
Injected By	SMT			
Total Amount Extracted	18.1 g	Matrix	Solid	
% Moisture	88.2	Dilution	NA	
Dry Weight Extracted	2.14 g	Collected	10/20/2016 09:36	
ICAL ID	U161025	Received	10/25/2016 11:20	
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00	
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 20:47	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.10	----	0.29 J		2,3,7,8-TCDF-13C	2.00	78
Total TCDF	1.80	----	0.29 J		2,3,7,8-TCDD-13C	2.00	92
					1,2,3,7,8-PeCDF-13C	2.00	82
2,3,7,8-TCDD	ND	----	0.28		2,3,4,7,8-PeCDF-13C	2.00	80
Total TCDD	ND	----	0.28		1,2,3,7,8-PeCDD-13C	2.00	93
					1,2,3,4,7,8-HxCDF-13C	2.00	79
1,2,3,7,8-PeCDF	ND	----	0.49		1,2,3,6,7,8-HxCDF-13C	2.00	74
2,3,4,7,8-PeCDF	ND	----	0.24		2,3,4,6,7,8-HxCDF-13C	2.00	57
Total PeCDF	0.91	----	0.36 J		1,2,3,7,8,9-HxCDF-13C	2.00	84
					1,2,3,4,7,8-HxCDD-13C	2.00	76
1,2,3,7,8-PeCDD	ND	----	0.23		1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	ND	----	0.23		1,2,3,4,6,7,8-HpCDF-13C	2.00	69
					1,2,3,4,7,8,9-HpCDF-13C	2.00	79
1,2,3,4,7,8-HxCDF	0.23	----	0.18 J		1,2,3,4,6,7,8-HpCDD-13C	2.00	82
1,2,3,6,7,8-HxCDF	ND	----	0.17		OCDD-13C	4.00	80
2,3,4,6,7,8-HxCDF	ND	----	0.22				
1,2,3,7,8,9-HxCDF	ND	----	0.16		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	0.23	----	0.18 J		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.26		2,3,7,8-TCDD-37Cl4	0.20	96
1,2,3,6,7,8-HxCDD	ND	----	0.29				
1,2,3,7,8,9-HxCDD	ND	----	0.26				
Total HxCDD	0.85	----	0.27 J				
1,2,3,4,6,7,8-HpCDF	----	0.70	0.25 U		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.29		Equivalence: 0.18 ng/Kg		
Total HpCDF	1.30	----	0.27 J		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	2.00	----	0.33 J				
Total HpCDD	4.10	----	0.33 J				
OCDF	----	1.70	0.42 U				
OCDD	13.00	----	0.57 J				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value

I = Interference present

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	102016032			
Lab Sample ID	40140634003			
Filename	U161201A_06			
Injected By	SMT			
Total Amount Extracted	24.6 g	Matrix	Solid	
% Moisture	90.6	Dilution	NA	
Dry Weight Extracted	2.31 g	Collected	10/20/2016 10:12	
ICAL ID	U161025	Received	10/25/2016 11:20	
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00	
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 21:33	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.40	----	0.33	J	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	10.00	----	0.33		2,3,7,8-TCDD-13C	2.00	90
					1,2,3,7,8-PeCDF-13C	2.00	80
2,3,7,8-TCDD	ND	----	0.41		2,3,4,7,8-PeCDF-13C	2.00	78
Total TCDD	ND	----	0.41		1,2,3,7,8-PeCDD-13C	2.00	92
					1,2,3,4,7,8-HxCDF-13C	2.00	76
1,2,3,7,8-PeCDF	ND	----	0.55		1,2,3,6,7,8-HxCDF-13C	2.00	71
2,3,4,7,8-PeCDF	0.73	----	0.31	J	2,3,4,6,7,8-HxCDF-13C	2.00	54
Total PeCDF	2.20	----	0.43	J	1,2,3,7,8,9-HxCDF-13C	2.00	81
					1,2,3,4,7,8-HxCDD-13C	2.00	77
1,2,3,7,8-PeCDD	ND	----	0.42		1,2,3,6,7,8-HxCDD-13C	2.00	60
Total PeCDD	1.00	----	0.42	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	65
					1,2,3,4,7,8,9-HpCDF-13C	2.00	77
1,2,3,4,7,8-HxCDF	1.50	----	0.32	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	79
1,2,3,6,7,8-HxCDF	----	0.73	0.25	IJ	OCDD-13C	4.00	73
2,3,4,6,7,8-HxCDF	1.10	----	0.27	J			
1,2,3,7,8,9-HxCDF	0.71	----	0.27	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	18.00	----	0.28	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	----	0.46	0.24	IJ	2,3,7,8-TCDD-37Cl4	0.20	92
1,2,3,6,7,8-HxCDD	2.10	----	0.37	J			
1,2,3,7,8,9-HxCDD	0.92	----	0.24	J			
Total HxCDD	10.00	----	0.28	J			
1,2,3,4,6,7,8-HpCDF	12.00	----	0.19	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	----	1.30	0.35	IJ	Equivalence: 2.2 ng/Kg		
Total HpCDF	42.00	----	0.27		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	39.00	----	0.48				
Total HpCDD	64.00	----	0.48				
OCDF	34.00	----	0.36	J			
OCDD	370.00	----	0.51				

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

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

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

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016033			
Lab Sample ID	40140634004			
Filename	U161201A_07			
Injected By	SMT			
Total Amount Extracted	18.3 g	Matrix	Solid	
% Moisture	87.8	Dilution	NA	
Dry Weight Extracted	2.23 g	Collected	10/20/2016 10:12	
ICAL ID	U161025	Received	10/25/2016 11:20	
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00	
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 22:20	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.40	----	0.28	J	2,3,7,8-TCDF-13C	2.00	72
Total TCDF	3.20	----	0.28	J	2,3,7,8-TCDD-13C	2.00	84
					1,2,3,7,8-PeCDF-13C	2.00	77
2,3,7,8-TCDD	ND	----	0.60		2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	0.99	----	0.60	J	1,2,3,7,8-PeCDD-13C	2.00	87
					1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	----	0.48		1,2,3,6,7,8-HxCDF-13C	2.00	68
2,3,4,7,8-PeCDF	0.65	----	0.22	J	2,3,4,6,7,8-HxCDF-13C	2.00	52
Total PeCDF	4.10	----	0.35	J	1,2,3,7,8,9-HxCDF-13C	2.00	75
					1,2,3,4,7,8-HxCDD-13C	2.00	78
1,2,3,7,8-PeCDD	ND	----	0.35		1,2,3,6,7,8-HxCDD-13C	2.00	59
Total PeCDD	ND	----	0.35		1,2,3,4,6,7,8-HpCDF-13C	2.00	62
					1,2,3,4,7,8,9-HpCDF-13C	2.00	73
1,2,3,4,7,8-HxCDF	0.87	----	0.37	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	75
1,2,3,6,7,8-HxCDF	0.52	----	0.30	J	OCDD-13C	4.00	71
2,3,4,6,7,8-HxCDF	ND	----	0.26				
1,2,3,7,8,9-HxCDF	ND	----	0.26		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	10.00	----	0.30	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.24		2,3,7,8-TCDD-37Cl4	0.20	83
1,2,3,6,7,8-HxCDD	0.82	----	0.29	J			
1,2,3,7,8,9-HxCDD	0.40	----	0.36	J			
Total HxCDD	4.50	----	0.30	J			
1,2,3,4,6,7,8-HpCDF	7.10	----	0.21	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	----	0.60	0.32	I	Equivalence: 1.3 ng/Kg		
Total HpCDF	24.00	----	0.26		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	20.00	----	0.29	J			
Total HpCDD	35.00	----	0.29				
OCDF	27.00	----	0.49	J			
OCDD	230.00	----	0.53				

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

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

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

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	102016035			
Lab Sample ID	40140634005			
Filename	U161201A_08			
Injected By	SMT			
Total Amount Extracted	23.3 g	Matrix	Solid	
% Moisture	90.3	Dilution	NA	
Dry Weight Extracted	2.26 g	Collected	10/20/2016 11:25	
ICAL ID	U161025	Received	10/25/2016 11:20	
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00	
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 23:06	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.2	----	0.30	J	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	3.6	----	0.30	J	2,3,7,8-TCDD-13C	2.00	93
					1,2,3,7,8-PeCDF-13C	2.00	84
2,3,7,8-TCDD	ND	----	0.34		2,3,4,7,8-PeCDF-13C	2.00	81
Total TCDD	ND	----	0.34		1,2,3,7,8-PeCDD-13C	2.00	94
					1,2,3,4,7,8-HxCDF-13C	2.00	82
1,2,3,7,8-PeCDF	ND	----	0.45		1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	ND	----	0.25		2,3,4,6,7,8-HxCDF-13C	2.00	59
Total PeCDF	ND	----	0.35		1,2,3,7,8,9-HxCDF-13C	2.00	85
					1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	ND	----	0.30		1,2,3,6,7,8-HxCDD-13C	2.00	65
Total PeCDD	ND	----	0.30		1,2,3,4,6,7,8-HpCDF-13C	2.00	66
					1,2,3,4,7,8,9-HpCDF-13C	2.00	78
1,2,3,4,7,8-HxCDF	ND	----	0.21		1,2,3,4,6,7,8-HpCDD-13C	2.00	81
1,2,3,6,7,8-HxCDF	ND	----	0.23		OCDD-13C	4.00	75
2,3,4,6,7,8-HxCDF	ND	----	0.28				
1,2,3,7,8,9-HxCDF	ND	----	0.27		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.25		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.27		2,3,7,8-TCDD-37Cl4	0.20	99
1,2,3,6,7,8-HxCDD	ND	----	0.29				
1,2,3,7,8,9-HxCDD	ND	----	0.26				
Total HxCDD	ND	----	0.27				
1,2,3,4,6,7,8-HpCDF	1.0	----	0.25	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.32		Equivalence: 0.19 ng/Kg		
Total HpCDF	2.8	----	0.28	J	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	3.6	----	0.33	J			
Total HpCDD	6.5	----	0.33	J			
OCDF	2.6	----	0.47	J			
OCDD	29.0	----	0.38	J			

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

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

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

## REPORT OF LABORATORY ANALYSIS

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	102016036			
Lab Sample ID	40140634006			
Filename	U161201A_09			
Injected By	SMT			
Total Amount Extracted	15.2 g	Matrix	Solid	
% Moisture	85.5	Dilution	NA	
Dry Weight Extracted	2.20 g	Collected	10/20/2016 11:25	
ICAL ID	U161025	Received	10/25/2016 11:20	
CCal Filename(s)	U161130B_15	Extracted	10/28/2016 19:00	
Method Blank ID	BLANK-52586	Analyzed	12/01/2016 23:52	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.30	----	0.27	J	2,3,7,8-TCDF-13C	2.00	78
Total TCDF	3.60	----	0.27	J	2,3,7,8-TCDD-13C	2.00	92
					1,2,3,7,8-PeCDF-13C	2.00	81
2,3,7,8-TCDD	ND	----	0.34		2,3,4,7,8-PeCDF-13C	2.00	79
Total TCDD	0.52	----	0.34	J	1,2,3,7,8-PeCDD-13C	2.00	92
					1,2,3,4,7,8-HxCDF-13C	2.00	79
1,2,3,7,8-PeCDF	ND	----	0.34		1,2,3,6,7,8-HxCDF-13C	2.00	74
2,3,4,7,8-PeCDF	ND	----	0.22		2,3,4,6,7,8-HxCDF-13C	2.00	62
Total PeCDF	ND	----	0.28		1,2,3,7,8,9-HxCDF-13C	2.00	82
					1,2,3,4,7,8-HxCDD-13C	2.00	80
1,2,3,7,8-PeCDD	ND	----	0.26		1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	ND	----	0.26		1,2,3,4,6,7,8-HpCDF-13C	2.00	64
					1,2,3,4,7,8,9-HpCDF-13C	2.00	73
1,2,3,4,7,8-HxCDF	ND	----	0.16		1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	----	0.16		OCDD-13C	4.00	62
2,3,4,6,7,8-HxCDF	ND	----	0.22				
1,2,3,7,8,9-HxCDF	ND	----	0.23		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.19		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.32		2,3,7,8-TCDD-37Cl4	0.20	92
1,2,3,6,7,8-HxCDD	ND	----	0.32				
1,2,3,7,8,9-HxCDD	ND	----	0.25				
Total HxCDD	ND	----	0.30				
1,2,3,4,6,7,8-HpCDF	0.47	----	0.21	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.24		Equivalence: 0.16 ng/Kg		
Total HpCDF	0.47	----	0.22	J	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	1.00	----	0.29	J			
Total HpCDD	2.40	----	0.29	J			
OCDF	----	0.66	0.52	IJ			
OCDD	6.20	----	0.92	J			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
I = Interference present

**REPORT OF LABORATORY ANALYSIS**

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**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52586	Matrix	Solid
Filename	U161101B_12	Dilution	NA
Total Amount Extracted	20.2 g	Extracted	10/28/2016 19:00
ICAL ID	U161025	Analyzed	11/01/2016 23:24
CCal Filename(s)	U161101B_03	Injected By	SMT

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.033	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	ND	----	0.033	2,3,7,8-TCDD-13C	2.00	96
				1,2,3,7,8-PeCDF-13C	2.00	73
2,3,7,8-TCDD	ND	----	0.054	2,3,4,7,8-PeCDF-13C	2.00	73
Total TCDD	ND	----	0.054	1,2,3,7,8-PeCDD-13C	2.00	91
				1,2,3,4,7,8-HxCDF-13C	2.00	72
1,2,3,7,8-PeCDF	ND	----	0.067	1,2,3,6,7,8-HxCDF-13C	2.00	70
2,3,4,7,8-PeCDF	ND	----	0.036	2,3,4,6,7,8-HxCDF-13C	2.00	77
Total PeCDF	ND	----	0.051	1,2,3,7,8,9-HxCDF-13C	2.00	85
				1,2,3,4,7,8-HxCDD-13C	2.00	83
1,2,3,7,8-PeCDD	ND	----	0.053	1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	ND	----	0.053	1,2,3,4,6,7,8-HpCDF-13C	2.00	85
				1,2,3,4,7,8,9-HpCDF-13C	2.00	93
1,2,3,4,7,8-HxCDF	ND	----	0.031	1,2,3,4,6,7,8-HpCDD-13C	2.00	101
1,2,3,6,7,8-HxCDF	ND	----	0.030	OCDD-13C	4.00	88
2,3,4,6,7,8-HxCDF	ND	----	0.028			
1,2,3,7,8,9-HxCDF	ND	----	0.025	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.029	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.038	2,3,7,8-TCDD-37Cl4	0.20	86
1,2,3,6,7,8-HxCDD	ND	----	0.034			
1,2,3,7,8,9-HxCDD	ND	----	0.024			
Total HxCDD	ND	----	0.032			
1,2,3,4,6,7,8-HpCDF	0.027	----	0.021 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.024	Equivalence: 0.0010 ng/Kg		
Total HpCDF	0.027	----	0.023 J	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	0.057	----	0.019 J			
Total HpCDD	0.057	----	0.019 J			
OCDF	ND	----	0.051			
OCDD	----	0.17	0.047 IJ			

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

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

**REPORT OF LABORATORY ANALYSIS**

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### Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-52587	Matrix	Solid
Filename	U161101B_08	Dilution	NA
Total Amount Extracted	20.0 g	Extracted	10/28/2016 19:00
ICAL ID	U161025	Analyzed	11/01/2016 20:19
CCal Filename	U161101B_03	Injected By	SMT
Method Blank ID	BLANK-52586		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	10	7.5	15.8	102
2,3,7,8-TCDD	10	8.8	6.7	15.8	88
1,2,3,7,8-PeCDF	50	51	40.0	67.0	101
2,3,4,7,8-PeCDF	50	55	34.0	80.0	110
1,2,3,7,8-PeCDD	50	50	35.0	71.0	99
1,2,3,4,7,8-HxCDF	50	55	36.0	67.0	110
1,2,3,6,7,8-HxCDF	50	53	42.0	65.0	106
2,3,4,6,7,8-HxCDF	50	53	35.0	78.0	107
1,2,3,7,8,9-HxCDF	50	53	39.0	65.0	107
1,2,3,4,7,8-HxCDD	50	53	35.0	82.0	106
1,2,3,6,7,8-HxCDD	50	62	38.0	67.0	124
1,2,3,7,8,9-HxCDD	50	59	32.0	81.0	117
1,2,3,4,6,7,8-HpCDF	50	56	41.0	61.0	112
1,2,3,4,7,8,9-HpCDF	50	51	39.0	69.0	102
1,2,3,4,6,7,8-HpCDD	50	51	35.0	70.0	101
OCDF	100	100	63.0	170.0	101
OCDD	100	110	78.0	144.0	112
2,3,7,8-TCDD-37Cl4	10	8.8	3.1	19.1	88
2,3,7,8-TCDF-13C	100	72	22.0	152.0	72
2,3,7,8-TCDD-13C	100	92	20.0	175.0	92
1,2,3,7,8-PeCDF-13C	100	74	21.0	192.0	74
2,3,4,7,8-PeCDF-13C	100	71	13.0	328.0	71
1,2,3,7,8-PeCDD-13C	100	87	21.0	227.0	87
1,2,3,4,7,8-HxCDF-13C	100	71	19.0	202.0	71
1,2,3,6,7,8-HxCDF-13C	100	72	21.0	159.0	72
2,3,4,6,7,8-HxCDF-13C	100	75	22.0	176.0	75
1,2,3,7,8,9-HxCDF-13C	100	83	17.0	205.0	83
1,2,3,4,7,8-HxCDD-13C	100	85	21.0	193.0	85
1,2,3,6,7,8-HxCDD-13C	100	68	25.0	163.0	68
1,2,3,4,6,7,8-HpCDF-13C	100	84	21.0	158.0	84
1,2,3,4,7,8,9-HpCDF-13C	100	90	20.0	186.0	90
1,2,3,4,6,7,8-HpCDD-13C	100	100	26.0	166.0	101
OCDD-13C	200	170	26.0	397.0	84

Cs = Concentration Spiked (ng/mL)  
 Cr = Concentration Recovered (ng/mL)  
 Rec. = Recovery (Expressed as Percent)  
 Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
 R = Recovery outside of control limits  
 Nn = Value obtained from additional analysis  
 \* = See Discussion

## REPORT OF LABORATORY ANALYSIS

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**Report Prepared for:**

Brian Basten  
PACE Wisconsin  
1241 Bellevue Street  
Suite 9  
Green Bay WI 54302

**REPORT OF  
LABORATORY  
ANALYSIS FOR  
PCDD/PCDF**

**Report Prepared Date:**

December 29, 2016

**Report Information:**

**Pace Project #: 10367095**  
**Sample Receipt Date: 10/21/2016**  
**Client Project #: 40140495**  
**Client Sub PO #: N/A**  
**State Cert #: 999407970**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



January 06, 2017

Carolynne Trout, Project Manager  
(612) 607-6351  
(612) 607-6444 (fax)  
Carolynne.Trout@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on eight samples submitted by a representative of Pace Analytical Services, Inc. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentrations (EMPCs) were treated as positives in the toxic equivalence calculations. Method blank and field sample results presented with reporting limits set to correspond to the lowest calibration points and a nominal 10-gram sample amount were included at the end of Appendix A. "Revision 1" of this report was prepared to include results for 2,3,7,8-TCDF. The current revision was prepared to provide results for all tetra through octa-chlorinated PCDDs and PCDFs.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 48-98%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained or "P" where polychlorinated diphenyl ethers were present. Concentrations below the calibration range were flagged "J" and should be regarded as estimates. Concentrations above the calibration range were flagged "E" and should also be regarded as estimates. Values obtained from analyses of diluted extracts were flagged "D". Values obtained from separate analyses were flagged "N2". In sample 101916027, due to the high moisture content, the estimated detection limit (EDL) values were above the standard reporting limits; therefore, the EDLs were provided and flagged "A" on the results table in Appendix A. The values reported for 2,3,7,8-TCDF that were above the lowest calibration point were verified by second column confirmation analyses and flagged "V".

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show that PCDDs and PCDFs were not detected. These results indicate that the sample processing steps did not contribute significantly to the levels reported for the field samples.

Laboratory spike samples were also prepared using clean reference matrix that had been fortified with native standard materials. The recoveries of the native compounds ranged from 80-120% with relative percent differences of 0.9-5.8%. These results were within the target ranges for the method. Matrix spikes were not prepared with the sample batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367095


# **Appendix A**

## Sample Management



**Sample Condition Upon Receipt**    **Client Name:** Pace GB    **Project #:** \_\_\_\_\_  
**Courier:**     Fed Ex     UPS     USPS     Client  
 Commercial     Pace     SpeeDee     Other: \_\_\_\_\_  
**Tracking Number:** \_\_\_\_\_

**WO#: 10367095**



10367095

**Custody Seal on Cooler/Box Present?**  Yes     No    **Seals Intact?**  Yes     No    **Optional:** Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_  
**Packing Material:**  Bubble Wrap     Bubble Bags     None     Other: \_\_\_\_\_    **Temp Blank?**  Yes     No  
**Thermometer Used:**  151401163     151401164     B88A912167504     B88A014331.0098    **Type of Ice:**  Wet     Blue     None     Samples on ice, cooling process has begun  
**Cooler Temp Read (°C):** 0.5    **Cooler Temp Corrected (°C):** 0.7    **Biological Tissue Frozen?**  Yes     No     N/A  
**Temp should be above freezing to 6°C**    **Correction Factor:** 1.02    **Date and Initials of Person Examining Contents:** DM 10/24/16

**USDA Regulated Soil** (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?     Yes     No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?     Yes     No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>SL</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**    **Field Data Required?**  Yes     No  
 Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Comments/Resolution: \_\_\_\_\_

**Project Manager Review:** Scott Unzu    **Date:** 10/24/16  
 Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52542	Matrix	Solid
Filename	F161030B_04	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 13:30
CCal Filename(s)	F161030B_01	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	74
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	87
				1,2,3,7,8-PeCDF-13C	2.00	78
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	80
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	82
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	83
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	83
				1,2,3,4,7,8-HxCDD-13C	2.00	75
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	64
				1,2,3,4,7,8,9-HpCDF-13C	2.00	62
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	50
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.00 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	ND	----	10.0			

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367095

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916018		
Lab Sample ID	40140495001		
Filename	F161031A_09		
Injected By	BAL		
Total Amount Extracted	15.0 g	Matrix	Solid
% Moisture	35.8	Dilution	NA
Dry Weight Extracted	9.63 g	Collected	10/19/2016 09:12
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 06:34

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.3	----	1.0 V	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	18.0	----	1.0	2,3,7,8-TCDD-13C	2.00	95
				1,2,3,7,8-PeCDF-13C	2.00	74
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	69
Total TCDD	2.7	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	81
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	8.0	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	85
2,3,4,7,8-PeCDF	15.0	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	86
Total PeCDF	210.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	84
				1,2,3,4,7,8-HxCDD-13C	2.00	78
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	79
Total PeCDD	15.0	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	71
				1,2,3,4,7,8,9-HpCDF-13C	2.00	75
1,2,3,4,7,8-HxCDF	58.0	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	95
1,2,3,6,7,8-HxCDF	24.0	----	5.0	OCDD-13C	4.00	66
2,3,4,6,7,8-HxCDF	25.0	----	5.0			
1,2,3,7,8,9-HxCDF	20.0	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	970.0	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	10.0	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	83
1,2,3,6,7,8-HxCDD	65.0	----	5.0			
1,2,3,7,8,9-HxCDD	25.0	----	5.0			
Total HxCDD	310.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	580.0	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	52.0	----	5.0	Equivalence: 72 ng/Kg		
Total HpCDF	2500.0	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	1600.0	----	5.0			
Total HpCDD	2700.0	----	5.0			
OCDF	2300.0	----	10.0			
OCDD	17000.0	----	10.0 E			

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

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

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E = Exceeds calibration range

V = Result verified by confirmation analysis

**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367095



**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916019		
Lab Sample ID	40140495002		
Filename	F161031A_10		
Injected By	BAL		
Total Amount Extracted	12.8 g	Matrix	Solid
% Moisture	16.9	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	10/19/2016 09:12
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 07:23

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	68
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	87
				1,2,3,7,8-PeCDF-13C	2.00	68
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	63
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	74
				1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	74
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	73
				1,2,3,4,7,8-HxCDD-13C	2.00	72
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	67
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	61
				1,2,3,4,7,8,9-HpCDF-13C	2.00	61
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	78
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	48
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	74
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.25 ng/Kg		
Total HpCDF	13	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	11	----	5.0			
Total HpCDD	20	----	5.0			
OCDF	16	----	10.0			
OCDD	120	----	10.0			

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

ND = Not Detected  
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 NC = Not Calculated

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**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367095

### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916021		
Lab Sample ID	40140495003		
Filename	F161030B_09		
Injected By	BAL		
Total Amount Extracted	20.4 g	Matrix	Solid
% Moisture	91.4	Dilution	NA
Dry Weight Extracted	1.75 g	Collected	10/19/2016 09:37
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 17:33

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	9.9	----	1.0 V	2,3,7,8-TCDF-13C	2.00	78
Total TCDF	89.0	----	1.0	2,3,7,8-TCDD-13C	2.00	90
				1,2,3,7,8-PeCDF-13C	2.00	76
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	73
Total TCDD	12.0	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	79
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	41.0	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	78
2,3,4,7,8-PeCDF	93.0	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	81
Total PeCDF	1100.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	82
				1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	15.0	----	5.0 J	1,2,3,6,7,8-HxCDD-13C	2.00	69
Total PeCDD	96.0	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	63
				1,2,3,4,7,8,9-HpCDF-13C	2.00	68
1,2,3,4,7,8-HxCDF	290.0	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	81
1,2,3,6,7,8-HxCDF	110.0	----	5.0	OCDD-13C	4.00	62
2,3,4,6,7,8-HxCDF	130.0	----	5.0			
1,2,3,7,8,9-HxCDF	110.0	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	4800.0	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	48.0	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	78
1,2,3,6,7,8-HxCDD	340.0	----	5.0			
1,2,3,7,8,9-HxCDD	110.0	----	5.0			
Total HxCDD	1400.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	2600.0	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	210.0	----	5.0	Equivalence: 360 ng/Kg		
Total HpCDF	11000.0	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	7800.0	----	5.0			
Total HpCDD	13000.0	----	5.0			
OCDF	9600.0	----	10.0			
OCDD	73000.0	----	10.0 E			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value

E = Exceeds calibration range

V = Result verified by confirmation analysis

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367095

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916022		
Lab Sample ID	40140495004		
Filename	F161030B_10		
Injected By	BAL		
Total Amount Extracted	20.0 g	Matrix	Solid
% Moisture	75.4	Dilution	NA
Dry Weight Extracted	4.92 g	Collected	10/19/2016 09:37
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 18:22

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	11.0	----	1.0 V	2,3,7,8-TCDF-13C	2.00	80
Total TCDF	240.0	----	1.0	2,3,7,8-TCDD-13C	2.00	95
				1,2,3,7,8-PeCDF-13C	2.00	79
2,3,7,8-TCDD	2.4	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	53.0	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	81
				1,2,3,4,7,8-HxCDF-13C	2.00	87
1,2,3,7,8-PeCDF	76.0	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	79
2,3,4,7,8-PeCDF	170.0	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	84
Total PeCDF	2700.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	82
				1,2,3,4,7,8-HxCDD-13C	2.00	81
1,2,3,7,8-PeCDD	42.0	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD	380.0	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	71 DN2
				1,2,3,4,7,8,9-HpCDF-13C	2.00	82 DN2
1,2,3,4,7,8-HxCDF	890.0	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	86 DN2
1,2,3,6,7,8-HxCDF	360.0	----	5.0	OCDD-13C	4.00	85 DN2
2,3,4,6,7,8-HxCDF	390.0	----	5.0			
1,2,3,7,8,9-HxCDF	190.0	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	15000.0	----	5.0 E	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	160.0	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	82
1,2,3,6,7,8-HxCDD	960.0	----	5.0			
1,2,3,7,8,9-HxCDD	310.0	----	5.0			
Total HxCDD	4700.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	12000.0	----	5.0 DN2	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	960.0	----	5.0 DN2	Equivalence: 1200 ng/Kg		
Total HpCDF	58000.0	----	5.0 DN2	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	31000.0	----	5.0 DN2			
Total HpCDD	54000.0	----	5.0 DN2			
OCDF	53000.0	----	10.0 DN2			
OCDD	310000.0	----	10.0 EDN2			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

E = Exceeds calibration range

D = Result obtained from analysis of diluted sample

Nn = Value obtained from additional analysis

V = Result verified by confirmation analysis

**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367095

**Method 1613B Sample Analysis Results**  
 Client - PACE Wisconsin

Client's Sample ID	101916024		
Lab Sample ID	40140495005		
Filename	F161030B_11		
Injected By	BAL		
Total Amount Extracted	15.9 g	Matrix	Solid
% Moisture	46.3	Dilution	NA
Dry Weight Extracted	8.54 g	Collected	10/19/2016 10:35
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 19:11

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	15.0	----	1.0 V	2,3,7,8-TCDF-13C	2.00	77
Total TCDF	300.0	----	1.0	2,3,7,8-TCDD-13C	2.00	90
				1,2,3,7,8-PeCDF-13C	2.00	78
2,3,7,8-TCDD	2.1	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	95.0	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	83
				1,2,3,4,7,8-HxCDF-13C	2.00	85
1,2,3,7,8-PeCDF	----	77	5.0 P	1,2,3,6,7,8-HxCDF-13C	2.00	81
2,3,4,7,8-PeCDF	190.0	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	84
Total PeCDF	2400.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	87
				1,2,3,4,7,8-HxCDD-13C	2.00	79
1,2,3,7,8-PeCDD	27.0	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	380.0	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	71
				1,2,3,4,7,8,9-HpCDF-13C	2.00	76
1,2,3,4,7,8-HxCDF	620.0	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	94
1,2,3,6,7,8-HxCDF	230.0	----	5.0	OCDD-13C	4.00	93 DN2
2,3,4,6,7,8-HxCDF	280.0	----	5.0			
1,2,3,7,8,9-HxCDF	250.0	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	10000.0	----	5.0 E	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	100.0	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	740.0	----	5.0			
1,2,3,7,8,9-HxCDD	230.0	----	5.0			
Total HxCDD	3400.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	5700.0	----	5.0 E	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	570.0	----	5.0	Equivalence: 780 ng/Kg		
Total HpCDF	24000.0	----	5.0 E	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	17000.0	----	5.0 E			
Total HpCDD	27000.0	----	5.0 E			
OCDF	18000.0	----	10.0 DN2			
OCDD	170000.0	----	10.0 EDN2			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

P = PCDE Interference

E = Exceeds calibration range

D = Result obtained from analysis of diluted sample

Nn = Value obtained from additional analysis

V = Result verified by confirmation analysis

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Report No.....10367095

### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916025		
Lab Sample ID	40140495006		
Filename	F161030B_12		
Injected By	BAL		
Total Amount Extracted	13.5 g	Matrix	Solid
% Moisture	55.4	Dilution	NA
Dry Weight Extracted	6.02 g	Collected	10/19/2016 10:35
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:00

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	71.0	----	1.0 V	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	1600.0	----	1.0	2,3,7,8-TCDD-13C	2.00	90
				1,2,3,7,8-PeCDF-13C	2.00	74
2,3,7,8-TCDD	9.3	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	72
Total TCDD	490.0	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	81
				1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	270.0	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	77
2,3,4,7,8-PeCDF	820.0	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	11000.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	80
				1,2,3,4,7,8-HxCDD-13C	2.00	78
1,2,3,7,8-PeCDD	89.0	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	69
Total PeCDD	1900.0	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	70 DN2
				1,2,3,4,7,8,9-HpCDF-13C	2.00	87 DN2
1,2,3,4,7,8-HxCDF	2500.0	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	93 DN2
1,2,3,6,7,8-HxCDF	1000.0	----	5.0	OCDD-13C	4.00	96 DN2
2,3,4,6,7,8-HxCDF	1200.0	----	5.0			
1,2,3,7,8,9-HxCDF	1100.0	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	47000.0	----	5.0 E	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	370.0	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	75
1,2,3,6,7,8-HxCDD	2800.0	----	5.0			
1,2,3,7,8,9-HxCDD	780.0	----	5.0			
Total HxCDD	13000.0	----	5.0 E			
1,2,3,4,6,7,8-HpCDF	27000.0	----	5.0 DN2	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	2500.0	----	5.0 DN2	Equivalence: 3200 ng/Kg		
Total HpCDF	120000.0	----	5.0 EDN2	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	75000.0	----	5.0 EDN2			
Total HpCDD	120000.0	----	5.0 EDN2			
OCDF	65000.0	----	10.0 DN2			
OCDD	570000.0	----	10.0 EDN2			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

E = Exceeds calibration range

D = Result obtained from analysis of diluted sample

Nn = Value obtained from additional analysis

V = Result verified by confirmation analysis

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367095

### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916027		
Lab Sample ID	40140495007		
Filename	F161030B_13		
Injected By	BAL		
Total Amount Extracted	20.4 g	Matrix	Solid
% Moisture	91.9	Dilution	NA
Dry Weight Extracted	1.65 g	Collected	10/19/2016 12:09
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:48

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	7.2	----	1.80 AV	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	120.0	----	1.8	2,3,7,8-TCDD-13C	2.00	89
				1,2,3,7,8-PeCDF-13C	2.00	77
2,3,7,8-TCDD	ND	----	2.30 A	2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	26.0	----	2.3	1,2,3,7,8-PeCDD-13C	2.00	82
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	29.0	----	5.0 J	1,2,3,6,7,8-HxCDF-13C	2.00	80
2,3,4,7,8-PeCDF	67.0	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	81
Total PeCDF	880.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	82
				1,2,3,4,7,8-HxCDD-13C	2.00	77
1,2,3,7,8-PeCDD	11.0	----	5.0 J	1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	140.0	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	66
				1,2,3,4,7,8,9-HpCDF-13C	2.00	72
1,2,3,4,7,8-HxCDF	250.0	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	86
1,2,3,6,7,8-HxCDF	110.0	----	5.0	OCDD-13C	4.00	65
2,3,4,6,7,8-HxCDF	110.0	----	5.0			
1,2,3,7,8,9-HxCDF	76.0	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	3600.0	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	47.0	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	260.0	----	5.0			
1,2,3,7,8,9-HxCDD	100.0	----	5.0			
Total HxCDD	1400.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	2200.0	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	200.0	----	5.0	Equivalence: 310 ng/Kg		
Total HpCDF	9100.0	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	6500.0	----	5.0			
Total HpCDD	11000.0	----	5.0			
OCDF	8000.0	----	10.0			
OCDD	72000.0	----	10.0 E			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
A = Reporting Limit based on signal to noise  
E = Exceeds calibration range  
V = Result verified by confirmation analysis

## REPORT OF LABORATORY ANALYSIS

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916028		
Lab Sample ID	40140495008		
Filename	F161030B_14		
Injected By	BAL		
Total Amount Extracted	17.5 g	Matrix	Solid
% Moisture	87.2	Dilution	NA
Dry Weight Extracted	2.24 g	Collected	10/19/2016 12:09
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 21:37

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.8	----	1.0 J	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	13.0	----	1.0	2,3,7,8-TCDD-13C	2.00	98
				1,2,3,7,8-PeCDF-13C	2.00	82
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	77
Total TCDD	2.2	----	1.0 J	1,2,3,7,8-PeCDD-13C	2.00	87
				1,2,3,4,7,8-HxCDF-13C	2.00	83
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	84
2,3,4,7,8-PeCDF	5.3	----	5.0 J	2,3,4,6,7,8-HxCDF-13C	2.00	85
Total PeCDF	61.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	86
				1,2,3,4,7,8-HxCDD-13C	2.00	83
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD	8.2	----	5.0 J	1,2,3,4,6,7,8-HpCDF-13C	2.00	69
				1,2,3,4,7,8,9-HpCDF-13C	2.00	71
1,2,3,4,7,8-HxCDF	17.0	----	5.0 J	1,2,3,4,6,7,8-HpCDD-13C	2.00	89
1,2,3,6,7,8-HxCDF	9.0	----	5.0 J	OCDD-13C	4.00	58
2,3,4,6,7,8-HxCDF	8.3	----	5.0 J			
1,2,3,7,8,9-HxCDF	5.8	----	5.0 J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	300.0	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	86
1,2,3,6,7,8-HxCDD	18.0	----	5.0 J			
1,2,3,7,8,9-HxCDD	7.2	----	5.0 J			
Total HxCDD	100.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	150.0	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	14.0	----	5.0 J	Equivalence: 22 ng/Kg		
Total HpCDF	640.0	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	470.0	----	5.0			
Total HpCDD	810.0	----	5.0			
OCDF	540.0	----	10.0			
OCDD	5700.0	----	10.0			

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

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

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

**REPORT OF LABORATORY ANALYSIS**

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## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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# **Appendix B**

## Sample Analysis Summary



### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916018			
Lab Sample ID	40140495001			
Filename	F161031A_09			
Injected By	BAL			
Total Amount Extracted	15.0 g	Matrix	Solid	
% Moisture	35.8	Dilution	NA	
Dry Weight Extracted	9.63 g	Collected	10/19/2016 09:12	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 06:34	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.3	----	0.160	V	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	18.0	----	0.160		2,3,7,8-TCDD-13C	2.00	95
					1,2,3,7,8-PeCDF-13C	2.00	74
2,3,7,8-TCDD	----	0.16	0.120	U	2,3,4,7,8-PeCDF-13C	2.00	69
Total TCDD	3.8	----	0.120		1,2,3,7,8-PeCDD-13C	2.00	81
					1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	8.0	----	0.200		1,2,3,6,7,8-HxCDF-13C	2.00	85
2,3,4,7,8-PeCDF	15.0	----	0.160		2,3,4,6,7,8-HxCDF-13C	2.00	86
Total PeCDF	220.0	----	0.180		1,2,3,7,8,9-HxCDF-13C	2.00	84
					1,2,3,4,7,8-HxCDD-13C	2.00	78
1,2,3,7,8-PeCDD	2.6	----	0.110	J	1,2,3,6,7,8-HxCDD-13C	2.00	79
Total PeCDD	21.0	----	0.110		1,2,3,4,6,7,8-HpCDF-13C	2.00	71
					1,2,3,4,7,8,9-HpCDF-13C	2.00	75
1,2,3,4,7,8-HxCDF	58.0	----	0.500		1,2,3,4,6,7,8-HpCDD-13C	2.00	95
1,2,3,6,7,8-HxCDF	24.0	----	0.460		OCDD-13C	4.00	66
2,3,4,6,7,8-HxCDF	25.0	----	0.460				
1,2,3,7,8,9-HxCDF	20.0	----	0.490		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	970.0	----	0.480		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	10.0	----	0.600		2,3,7,8-TCDD-37Cl4	0.20	83
1,2,3,6,7,8-HxCDD	65.0	----	0.690				
1,2,3,7,8,9-HxCDD	25.0	----	0.540				
Total HxCDD	310.0	----	0.610				
1,2,3,4,6,7,8-HpCDF	580.0	----	0.160		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	52.0	----	0.130		Equivalence: 73 ng/Kg		
Total HpCDF	2500.0	----	0.150		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	1600.0	----	0.084				
Total HpCDD	2700.0	----	0.084				
OCDF	2300.0	----	0.140				
OCDD	17000.0	----	0.150	E			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value

E = Exceeds calibration range

I = Interference present

V = Result verified by confirmation analysis

## REPORT OF LABORATORY ANALYSIS

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916019		
Lab Sample ID	40140495002		
Filename	F161031A_10		
Injected By	BAL		
Total Amount Extracted	12.8 g	Matrix	Solid
% Moisture	16.9	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	10/19/2016 09:12
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 07:23

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.120	2,3,7,8-TCDF-13C	2.00	68
Total TCDF	ND	----	0.120	2,3,7,8-TCDD-13C	2.00	87
				1,2,3,7,8-PeCDF-13C	2.00	68
2,3,7,8-TCDD	ND	----	0.120	2,3,4,7,8-PeCDF-13C	2.00	63
Total TCDD	ND	----	0.120	1,2,3,7,8-PeCDD-13C	2.00	74
				1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	----	0.110	1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	0.24	----	0.076 J	2,3,4,6,7,8-HxCDF-13C	2.00	74
Total PeCDF	0.24	----	0.094 J	1,2,3,7,8,9-HxCDF-13C	2.00	73
				1,2,3,4,7,8-HxCDD-13C	2.00	72
1,2,3,7,8-PeCDD	ND	----	0.080	1,2,3,6,7,8-HxCDD-13C	2.00	67
Total PeCDD	0.18	----	0.080 J	1,2,3,4,6,7,8-HpCDF-13C	2.00	61
				1,2,3,4,7,8,9-HpCDF-13C	2.00	61
1,2,3,4,7,8-HxCDF	----	0.40	0.110 U	1,2,3,4,6,7,8-HpCDD-13C	2.00	78
1,2,3,6,7,8-HxCDF	----	0.23	0.130 U	OCDD-13C	4.00	48
2,3,4,6,7,8-HxCDF	----	0.21	0.100 U			
1,2,3,7,8,9-HxCDF	ND	----	0.150	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	5.80	----	0.120 J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.160	2,3,7,8-TCDD-37Cl4	0.20	74
1,2,3,6,7,8-HxCDD	----	0.47	0.130 U			
1,2,3,7,8,9-HxCDD	0.21	----	0.130 J			
Total HxCDD	1.50	----	0.140 J			
1,2,3,4,6,7,8-HpCDF	4.60	----	0.120 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	0.38	----	0.170 J	Equivalence: 0.57 ng/Kg		
Total HpCDF	18.00	----	0.150	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	11.00	----	0.240			
Total HpCDD	20.00	----	0.240			
OCDF	16.00	----	0.240			
OCDD	120.00	----	0.390			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value

I = Interference present

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916021			
Lab Sample ID	40140495003			
Filename	F161030B_09			
Injected By	BAL			
Total Amount Extracted	20.4 g	Matrix	Solid	
% Moisture	91.4	Dilution	NA	
Dry Weight Extracted	1.75 g	Collected	10/19/2016 09:37	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 17:33	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	9.90	----	0.46	V	2,3,7,8-TCDF-13C	2.00	78
Total TCDF	89.00	----	0.46		2,3,7,8-TCDD-13C	2.00	90
					1,2,3,7,8-PeCDF-13C	2.00	76
2,3,7,8-TCDD	0.97	----	0.62	J	2,3,4,7,8-PeCDF-13C	2.00	73
Total TCDD	13.00	----	0.62		1,2,3,7,8-PeCDD-13C	2.00	79
					1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	41.00	----	0.22		1,2,3,6,7,8-HxCDF-13C	2.00	78
2,3,4,7,8-PeCDF	93.00	----	0.27		2,3,4,6,7,8-HxCDF-13C	2.00	81
Total PeCDF	1100.00	----	0.24		1,2,3,7,8,9-HxCDF-13C	2.00	82
					1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	15.00	----	0.33	J	1,2,3,6,7,8-HxCDD-13C	2.00	69
Total PeCDD	99.00	----	0.33		1,2,3,4,6,7,8-HpCDF-13C	2.00	63
					1,2,3,4,7,8,9-HpCDF-13C	2.00	68
1,2,3,4,7,8-HxCDF	290.00	----	1.50		1,2,3,4,6,7,8-HpCDD-13C	2.00	81
1,2,3,6,7,8-HxCDF	110.00	----	1.40		OCDD-13C	4.00	62
2,3,4,6,7,8-HxCDF	130.00	----	1.40				
1,2,3,7,8,9-HxCDF	110.00	----	1.60		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	4800.00	----	1.50		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	48.00	----	2.30		2,3,7,8-TCDD-37Cl4	0.20	78
1,2,3,6,7,8-HxCDD	340.00	----	1.40				
1,2,3,7,8,9-HxCDD	110.00	----	1.40				
Total HxCDD	1400.00	----	1.70				
1,2,3,4,6,7,8-HpCDF	2600.00	----	0.25		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	210.00	----	0.39		Equivalence: 360 ng/Kg		
Total HpCDF	11000.00	----	0.32		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	7800.00	----	0.30				
Total HpCDD	13000.00	----	0.30				
OCDF	9600.00	----	0.75				
OCDD	73000.00	----	0.31	E			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

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J = Estimated value

E = Exceeds calibration range

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916022			
Lab Sample ID	40140495004			
Filename	F161030B_10			
Injected By	BAL			
Total Amount Extracted	20.0 g	Matrix	Solid	
% Moisture	75.4	Dilution	NA	
Dry Weight Extracted	4.92 g	Collected	10/19/2016 09:37	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 18:22	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	11.0	----	0.650	V	2,3,7,8-TCDF-13C	2.00	80
Total TCDF	240.0	----	0.650		2,3,7,8-TCDD-13C	2.00	95
					1,2,3,7,8-PeCDF-13C	2.00	79
2,3,7,8-TCDD	2.4	----	0.500		2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	54.0	----	0.500		1,2,3,7,8-PeCDD-13C	2.00	81
					1,2,3,4,7,8-HxCDF-13C	2.00	87
1,2,3,7,8-PeCDF	76.0	----	0.290		1,2,3,6,7,8-HxCDF-13C	2.00	79
2,3,4,7,8-PeCDF	170.0	----	0.120		2,3,4,6,7,8-HxCDF-13C	2.00	84
Total PeCDF	2700.0	----	0.210		1,2,3,7,8,9-HxCDF-13C	2.00	82
					1,2,3,4,7,8-HxCDD-13C	2.00	81
1,2,3,7,8-PeCDD	42.0	----	0.083		1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD	380.0	----	0.083		1,2,3,4,6,7,8-HpCDF-13C	2.00	71 DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	82 DN2
1,2,3,4,7,8-HxCDF	890.0	----	1.400		1,2,3,4,6,7,8-HpCDD-13C	2.00	86 DN2
1,2,3,6,7,8-HxCDF	360.0	----	2.100		OCDD-13C	4.00	85 DN2
2,3,4,6,7,8-HxCDF	390.0	----	1.000				
1,2,3,7,8,9-HxCDF	190.0	----	1.700		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	15000.0	----	1.500	E	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	160.0	----	1.900		2,3,7,8-TCDD-37Cl4	0.20	82
1,2,3,6,7,8-HxCDD	960.0	----	1.700				
1,2,3,7,8,9-HxCDD	310.0	----	1.800				
Total HxCDD	4700.0	----	1.800				
1,2,3,4,6,7,8-HpCDF	12000.0	----	0.300	DN2	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	960.0	----	0.440	DN2	Equivalence: 1200 ng/Kg		
Total HpCDF	58000.0	----	0.370	DN2	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	31000.0	----	0.630	DN2			
Total HpCDD	54000.0	----	0.630	DN2			
OCDF	53000.0	----	0.700	DN2			
OCDD	310000.0	----	1.200	EDN2			

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

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NA = Not Applicable  
NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

E = Exceeds calibration range  
D = Result obtained from analysis of diluted sample  
Nn = Value obtained from additional analysis  
V = Result verified by confirmation analysis

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916024			
Lab Sample ID	40140495005			
Filename	F161030B_11			
Injected By	BAL			
Total Amount Extracted	15.9 g	Matrix	Solid	
% Moisture	46.3	Dilution	NA	
Dry Weight Extracted	8.54 g	Collected	10/19/2016 10:35	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 19:11	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	15.0	----	0.440	V	2,3,7,8-TCDF-13C	2.00	77
Total TCDF	300.0	----	0.440		2,3,7,8-TCDD-13C	2.00	90
					1,2,3,7,8-PeCDF-13C	2.00	78
2,3,7,8-TCDD	2.1	----	0.370		2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	96.0	----	0.370		1,2,3,7,8-PeCDD-13C	2.00	83
					1,2,3,4,7,8-HxCDF-13C	2.00	85
1,2,3,7,8-PeCDF	----	77	0.170	P	1,2,3,6,7,8-HxCDF-13C	2.00	81
2,3,4,7,8-PeCDF	190.0	----	0.150		2,3,4,6,7,8-HxCDF-13C	2.00	84
Total PeCDF	2400.0	----	0.160		1,2,3,7,8,9-HxCDF-13C	2.00	87
					1,2,3,4,7,8-HxCDD-13C	2.00	79
1,2,3,7,8-PeCDD	27.0	----	0.110		1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	390.0	----	0.110		1,2,3,4,6,7,8-HpCDF-13C	2.00	71
					1,2,3,4,7,8,9-HpCDF-13C	2.00	76
1,2,3,4,7,8-HxCDF	620.0	----	0.680		1,2,3,4,6,7,8-HpCDD-13C	2.00	94
1,2,3,6,7,8-HxCDF	230.0	----	0.880		OCDD-13C	4.00	93 DN2
2,3,4,6,7,8-HxCDF	280.0	----	0.880				
1,2,3,7,8,9-HxCDF	250.0	----	0.980		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	10000.0	----	0.850	E	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	100.0	----	1.100		2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	740.0	----	1.200				
1,2,3,7,8,9-HxCDD	230.0	----	1.100				
Total HxCDD	3400.0	----	1.100				
1,2,3,4,6,7,8-HpCDF	5700.0	----	0.073	E	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	570.0	----	0.097		Equivalence: 780 ng/Kg		
Total HpCDF	24000.0	----	0.085	E	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	17000.0	----	0.250	E			
Total HpCDD	27000.0	----	0.250	E			
OCDF	18000.0	----	1.300	DN2			
OCDD	170000.0	----	1.400	EDN2			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

P = PCDE Interference

E = Exceeds calibration range

D = Result obtained from analysis of diluted sample

Nn = Value obtained from additional analysis

V = Result verified by confirmation analysis

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101916025			
Lab Sample ID	40140495006			
Filename	F161030B_12			
Injected By	BAL			
Total Amount Extracted	13.5 g	Matrix	Solid	
% Moisture	55.4	Dilution	NA	
Dry Weight Extracted	6.02 g	Collected	10/19/2016 10:35	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:00	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	71.0	----	0.67 V	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	1600.0	----	0.67	2,3,7,8-TCDD-13C	2.00	90
				1,2,3,7,8-PeCDF-13C	2.00	74
2,3,7,8-TCDD	9.3	----	0.86	2,3,4,7,8-PeCDF-13C	2.00	72
Total TCDD	490.0	----	0.86	1,2,3,7,8-PeCDD-13C	2.00	81
				1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	270.0	----	0.44	1,2,3,6,7,8-HxCDF-13C	2.00	77
2,3,4,7,8-PeCDF	820.0	----	0.35	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	11000.0	----	0.39	1,2,3,7,8,9-HxCDF-13C	2.00	80
				1,2,3,4,7,8-HxCDD-13C	2.00	78
1,2,3,7,8-PeCDD	89.0	----	0.17	1,2,3,6,7,8-HxCDD-13C	2.00	69
Total PeCDD	1900.0	----	0.17	1,2,3,4,6,7,8-HpCDF-13C	2.00	70 DN2
				1,2,3,4,7,8,9-HpCDF-13C	2.00	87 DN2
1,2,3,4,7,8-HxCDF	2500.0	----	3.20	1,2,3,4,6,7,8-HpCDD-13C	2.00	93 DN2
1,2,3,6,7,8-HxCDF	1000.0	----	3.30	OCDD-13C	4.00	96 DN2
2,3,4,6,7,8-HxCDF	1200.0	----	2.70			
1,2,3,7,8,9-HxCDF	1100.0	----	4.40	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	47000.0	----	3.40 E	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	370.0	----	0.26	2,3,7,8-TCDD-37Cl4	0.20	75
1,2,3,6,7,8-HxCDD	2800.0	----	0.29			
1,2,3,7,8,9-HxCDD	780.0	----	0.26			
Total HxCDD	13000.0	----	0.27 E			
1,2,3,4,6,7,8-HpCDF	27000.0	----	2.30 DN2	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	2500.0	----	3.70 DN2	Equivalence: 3200 ng/Kg		
Total HpCDF	120000.0	----	3.00 EDN2	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	75000.0	----	2.80 EDN2			
Total HpCDD	120000.0	----	2.80 EDN2			
OCDF	65000.0	----	2.60 DN2			
OCDD	570000.0	----	3.80 EDN2			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

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NA = Not Applicable

NC = Not Calculated

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E = Exceeds calibration range

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916027			
Lab Sample ID	40140495007			
Filename	F161030B_13			
Injected By	BAL			
Total Amount Extracted	20.4 g	Matrix	Solid	
% Moisture	91.9	Dilution	NA	
Dry Weight Extracted	1.65 g	Collected	10/19/2016 12:09	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 20:48	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	7.2	----	1.80	V	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	120.0	----	1.80		2,3,7,8-TCDD-13C	2.00	89
					1,2,3,7,8-PeCDF-13C	2.00	77
2,3,7,8-TCDD	ND	----	2.30		2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	26.0	----	2.30		1,2,3,7,8-PeCDD-13C	2.00	82
					1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	29.0	----	0.48	J	1,2,3,6,7,8-HxCDF-13C	2.00	80
2,3,4,7,8-PeCDF	67.0	----	0.61		2,3,4,6,7,8-HxCDF-13C	2.00	81
Total PeCDF	890.0	----	0.54		1,2,3,7,8,9-HxCDF-13C	2.00	82
					1,2,3,4,7,8-HxCDD-13C	2.00	77
1,2,3,7,8-PeCDD	11.0	----	1.00	J	1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	140.0	----	1.00		1,2,3,4,6,7,8-HpCDF-13C	2.00	66
					1,2,3,4,7,8,9-HpCDF-13C	2.00	72
1,2,3,4,7,8-HxCDF	250.0	----	2.50		1,2,3,4,6,7,8-HpCDD-13C	2.00	86
1,2,3,6,7,8-HxCDF	110.0	----	1.80		OCDD-13C	4.00	65
2,3,4,6,7,8-HxCDF	110.0	----	1.80				
1,2,3,7,8,9-HxCDF	76.0	----	1.80		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	3600.0	----	1.90		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	47.0	----	2.80		2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	260.0	----	1.80				
1,2,3,7,8,9-HxCDD	100.0	----	1.80				
Total HxCDD	1400.0	----	2.10				
1,2,3,4,6,7,8-HpCDF	2200.0	----	1.10		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	200.0	----	1.80		Equivalence: 310 ng/Kg		
Total HpCDF	9100.0	----	1.40		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	6500.0	----	1.90				
Total HpCDD	11000.0	----	1.90				
OCDF	8000.0	----	1.30				
OCDD	72000.0	----	3.00	E			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
E = Exceeds calibration range  
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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101916028		
Lab Sample ID	40140495008		
Filename	F161030B_14		
Injected By	BAL		
Total Amount Extracted	17.5 g	Matrix	Solid
% Moisture	87.2	Dilution	NA
Dry Weight Extracted	2.24 g	Collected	10/19/2016 12:09
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_01	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/30/2016 21:37

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.8	----	0.72	J	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	14.0	----	0.72		2,3,7,8-TCDD-13C	2.00	98
					1,2,3,7,8-PeCDF-13C	2.00	82
2,3,7,8-TCDD	ND	----	0.65		2,3,4,7,8-PeCDF-13C	2.00	77
Total TCDD	2.2	----	0.65	J	1,2,3,7,8-PeCDD-13C	2.00	87
					1,2,3,4,7,8-HxCDF-13C	2.00	83
1,2,3,7,8-PeCDF	2.2	----	0.35	J	1,2,3,6,7,8-HxCDF-13C	2.00	84
2,3,4,7,8-PeCDF	5.3	----	0.22	J	2,3,4,6,7,8-HxCDF-13C	2.00	85
Total PeCDF	68.0	----	0.29		1,2,3,7,8,9-HxCDF-13C	2.00	86
					1,2,3,4,7,8-HxCDD-13C	2.00	83
1,2,3,7,8-PeCDD	----	1.1	0.61	IJ	1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD	9.6	----	0.61	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	69
					1,2,3,4,7,8,9-HpCDF-13C	2.00	71
1,2,3,4,7,8-HxCDF	17.0	----	1.00	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	89
1,2,3,6,7,8-HxCDF	9.0	----	1.00	J	OCDD-13C	4.00	58
2,3,4,6,7,8-HxCDF	8.3	----	0.64	J			
1,2,3,7,8,9-HxCDF	5.8	----	1.30	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	300.0	----	1.00		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	3.9	----	1.40	J	2,3,7,8-TCDD-37Cl4	0.20	86
1,2,3,6,7,8-HxCDD	18.0	----	1.00	J			
1,2,3,7,8,9-HxCDD	7.2	----	0.70	J			
Total HxCDD	110.0	----	1.00				
1,2,3,4,6,7,8-HpCDF	150.0	----	0.77		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	14.0	----	0.66	J	Equivalence: 23 ng/Kg		
Total HpCDF	640.0	----	0.72		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	470.0	----	1.30				
Total HpCDD	810.0	----	1.30				
OCDF	540.0	----	1.20				
OCDD	5700.0	----	2.10				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value

I = Interference present

**REPORT OF LABORATORY ANALYSIS**

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**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52542	Matrix	Solid
Filename	F161030B_04	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 13:30
CCal Filename(s)	F161030B_01	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.079	2,3,7,8-TCDF-13C	2.00	74
Total TCDF	ND	----	0.079	2,3,7,8-TCDD-13C	2.00	87
				1,2,3,7,8-PeCDF-13C	2.00	78
2,3,7,8-TCDD	ND	----	0.130	2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	ND	----	0.130	1,2,3,7,8-PeCDD-13C	2.00	80
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	----	0.049	1,2,3,6,7,8-HxCDF-13C	2.00	82
2,3,4,7,8-PeCDF	ND	----	0.033	2,3,4,6,7,8-HxCDF-13C	2.00	83
Total PeCDF	ND	----	0.041	1,2,3,7,8,9-HxCDF-13C	2.00	83
				1,2,3,4,7,8-HxCDD-13C	2.00	75
1,2,3,7,8-PeCDD	ND	----	0.059	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	ND	----	0.059	1,2,3,4,6,7,8-HpCDF-13C	2.00	64
				1,2,3,4,7,8,9-HpCDF-13C	2.00	62
1,2,3,4,7,8-HxCDF	ND	----	0.035	1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	----	0.032	OCDD-13C	4.00	50
2,3,4,6,7,8-HxCDF	ND	----	0.043			
1,2,3,7,8,9-HxCDF	ND	----	0.058	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.042	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.057	2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	ND	----	0.067			
1,2,3,7,8,9-HxCDD	ND	----	0.083			
Total HxCDD	ND	----	0.069			
1,2,3,4,6,7,8-HpCDF	ND	----	0.037	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.056	Equivalence: 0.00024 ng/Kg		
Total HpCDF	ND	----	0.047	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	0.062			
Total HpCDD	ND	----	0.062			
OCDF	ND	----	0.140			
OCDD	----	0.24	0.150 J			

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
I = Interference present

**REPORT OF LABORATORY ANALYSIS**

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### Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-52543	Matrix	Solid
Filename	F161030B_02	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 11:54
CCal Filename	F161030B_01	Injected By	BAL
Method Blank ID	BLANK-52542		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	105
2,3,7,8-TCDD	10	8.3	6.7	15.8	83
1,2,3,7,8-PeCDF	50	57	40.0	67.0	115
2,3,4,7,8-PeCDF	50	60	34.0	80.0	120
1,2,3,7,8-PeCDD	50	50	35.0	71.0	100
1,2,3,4,7,8-HxCDF	50	60	36.0	67.0	119
1,2,3,6,7,8-HxCDF	50	56	42.0	65.0	112
2,3,4,6,7,8-HxCDF	50	53	35.0	78.0	106
1,2,3,7,8,9-HxCDF	50	52	39.0	65.0	104
1,2,3,4,7,8-HxCDD	50	59	35.0	82.0	118
1,2,3,6,7,8-HxCDD	50	58	38.0	67.0	115
1,2,3,7,8,9-HxCDD	50	58	32.0	81.0	117
1,2,3,4,6,7,8-HpCDF	50	52	41.0	61.0	103
1,2,3,4,7,8,9-HpCDF	50	48	39.0	69.0	96
1,2,3,4,6,7,8-HpCDD	50	45	35.0	70.0	91
OCDF	100	110	63.0	170.0	109
OCDD	100	100	78.0	144.0	101
2,3,7,8-TCDD-37Cl4	10	8.1	3.1	19.1	81
2,3,7,8-TCDF-13C	100	81	22.0	152.0	81
2,3,7,8-TCDD-13C	100	94	20.0	175.0	94
1,2,3,7,8-PeCDF-13C	100	86	21.0	192.0	86
2,3,4,7,8-PeCDF-13C	100	81	13.0	328.0	81
1,2,3,7,8-PeCDD-13C	100	92	21.0	227.0	92
1,2,3,4,7,8-HxCDF-13C	100	80	19.0	202.0	80
1,2,3,6,7,8-HxCDF-13C	100	90	21.0	159.0	90
2,3,4,6,7,8-HxCDF-13C	100	89	22.0	176.0	89
1,2,3,7,8,9-HxCDF-13C	100	91	17.0	205.0	91
1,2,3,4,7,8-HxCDD-13C	100	77	21.0	193.0	77
1,2,3,6,7,8-HxCDD-13C	100	76	25.0	163.0	76
1,2,3,4,6,7,8-HpCDF-13C	100	68	21.0	158.0	68
1,2,3,4,7,8,9-HpCDF-13C	100	69	20.0	186.0	69
1,2,3,4,6,7,8-HpCDD-13C	100	81	26.0	166.0	81
OCDD-13C	200	110	26.0	397.0	55

Cs = Concentration Spiked (ng/mL)  
Cr = Concentration Recovered (ng/mL)  
Rec. = Recovery (Expressed as Percent)  
Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
R = Recovery outside of control limits  
Nn = Value obtained from additional analysis  
\* = See Discussion

## REPORT OF LABORATORY ANALYSIS

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## Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCSD-52544	Matrix	Solid
Filename	F161030B_03	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 12:41
CCal Filename	F161030B_01	Injected By	BAL
Method Blank ID	BLANK-52542		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	109
2,3,7,8-TCDD	10	8.0	6.7	15.8	80
1,2,3,7,8-PeCDF	50	55	40.0	67.0	110
2,3,4,7,8-PeCDF	50	59	34.0	80.0	118
1,2,3,7,8-PeCDD	50	49	35.0	71.0	98
1,2,3,4,7,8-HxCDF	50	57	36.0	67.0	114
1,2,3,6,7,8-HxCDF	50	55	42.0	65.0	110
2,3,4,6,7,8-HxCDF	50	53	35.0	78.0	105
1,2,3,7,8,9-HxCDF	50	49	39.0	65.0	99
1,2,3,4,7,8-HxCDD	50	57	35.0	82.0	115
1,2,3,6,7,8-HxCDD	50	59	38.0	67.0	117
1,2,3,7,8,9-HxCDD	50	58	32.0	81.0	116
1,2,3,4,6,7,8-HpCDF	50	51	41.0	61.0	102
1,2,3,4,7,8,9-HpCDF	50	47	39.0	69.0	94
1,2,3,4,6,7,8-HpCDD	50	45	35.0	70.0	90
OCDF	100	110	63.0	170.0	110
OCDD	100	110	78.0	144.0	107
2,3,7,8-TCDD-37Cl4	10	7.7	3.1	19.1	77
2,3,7,8-TCDF-13C	100	73	22.0	152.0	73
2,3,7,8-TCDD-13C	100	88	20.0	175.0	88
1,2,3,7,8-PeCDF-13C	100	77	21.0	192.0	77
2,3,4,7,8-PeCDF-13C	100	74	13.0	328.0	74
1,2,3,7,8-PeCDD-13C	100	81	21.0	227.0	81
1,2,3,4,7,8-HxCDF-13C	100	75	19.0	202.0	75
1,2,3,6,7,8-HxCDF-13C	100	79	21.0	159.0	79
2,3,4,6,7,8-HxCDF-13C	100	79	22.0	176.0	79
1,2,3,7,8,9-HxCDF-13C	100	81	17.0	205.0	81
1,2,3,4,7,8-HxCDD-13C	100	67	21.0	193.0	67
1,2,3,6,7,8-HxCDD-13C	100	70	25.0	163.0	70
1,2,3,4,6,7,8-HpCDF-13C	100	61	21.0	158.0	61
1,2,3,4,7,8,9-HpCDF-13C	100	62	20.0	186.0	62
1,2,3,4,6,7,8-HpCDD-13C	100	73	26.0	166.0	73
OCDD-13C	200	98	26.0	397.0	49

Cs = Concentration Spiked (ng/mL)  
Cr = Concentration Recovered (ng/mL)  
Rec. = Recovery (Expressed as Percent)  
Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
R = Recovery outside of control limits  
Nn = Value obtained from additional analysis  
\* = See Discussion

## REPORT OF LABORATORY ANALYSIS

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**Method 1613B**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client PACE Wisconsin

Spike 1 ID LCS-52543  
 Spike 1 Filename F161030B\_02

Spike 2 ID LCSD-52544  
 Spike 2 Filename F161030B\_03

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	105	109	3.7
2,3,7,8-TCDD	83	80	3.7
1,2,3,7,8-PeCDF	115	110	4.4
2,3,4,7,8-PeCDF	120	118	1.7
1,2,3,7,8-PeCDD	100	98	2.0
1,2,3,4,7,8-HxCDF	119	114	4.3
1,2,3,6,7,8-HxCDF	112	110	1.8
2,3,4,6,7,8-HxCDF	106	105	0.9
1,2,3,7,8,9-HxCDF	104	99	4.9
1,2,3,4,7,8-HxCDD	118	115	2.6
1,2,3,6,7,8-HxCDD	115	117	1.7
1,2,3,7,8,9-HxCDD	117	116	0.9
1,2,3,4,6,7,8-HpCDF	103	102	1.0
1,2,3,4,7,8,9-HpCDF	96	94	2.1
1,2,3,4,6,7,8-HpCDD	91	90	1.1
OCDF	109	110	0.9
OCDD	101	107	5.8

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

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**Report Prepared for:**

Brian Basten  
PACE Wisconsin  
1241 Bellevue Street  
Suite 9  
Green Bay WI 54302

**REPORT OF  
LABORATORY  
ANALYSIS FOR  
PCDD/PCDF**

**Report Prepared Date:**

January 5, 2017

**Report Information:**

**Pace Project #: 10367089**  
**Sample Receipt Date: 10/21/2016**  
**Client Project #: 40140496**  
**Client Sub PO #: N/A**  
**State Cert #: 999407970**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



January 06, 2017

Carolynne Trout, Project Manager  
(612) 607-6351  
(612) 607-6444 (fax)  
Carolynne.Trout@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on fifteen samples submitted by a representative of Pace Analytical Services, Inc. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentrations (EMPCs) were treated as positives in the toxic equivalence calculations. Method blank and field sample results presented with reporting limits set to correspond to the lowest calibration points and a nominal 10-gram sample amount were included at the end of Appendix A. "Revision 1" of this report was prepared to include results for 2,3,7,8-TCDF. The current revision was prepared to provide results for all tetra through octa-chlorinated PCDDs and PCDFs.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 49-96%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates. Concentrations above the calibration range were flagged "E" and should also be regarded as estimates. Values obtained from analyses of diluted extracts were flagged "D". Values obtained from separate analyses were flagged "N2". The values reported for 2,3,7,8-TCDF that were above the lowest calibration point were verified by second column confirmation analyses and flagged "V".

A laboratory method blank was prepared and analyzed with each sample batch as part of our routine quality control procedures. The results show two of the three blanks to contain trace levels of selected congeners. These levels were below the calibration range for the method. Sample levels similar to the corresponding blank levels were flagged "B" on the results tables and may be, at least partially, attributed to the background. It should be noted that levels less than ten times the background are not generally considered to be statistically different from the background.

Laboratory and matrix spike samples were also prepared using clean sand or sample matrix that had been fortified with native standard materials. The recoveries of the native compounds generally ranged from 80-127% with relative percent differences (RPDs) of 0.3-32.4%. The background-subtracted recovery values obtained for 1,2,3,4,6,7,8-HpCDF, HpCDD, OCDF, and OCDD in the matrix spike and/or matrix spike duplicate were outside the target ranges. Also, the RPD values obtained for 1,2,3,4,6,7,8-HpCDF, HpCDD, and OCDD in the matrix spike analyses were above the 20% target upper limit. These deviations may be due to the levels of the affected congeners in the sample material and/or sample inhomogeneity. Matrix spikes were prepared with one of the 10/26/2016 extraction batches using sample material from a separate project; results from these analyses will be provided upon request. Matrix spikes were not prepared with the remaining 10/26/2016 sample batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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# **Appendix A**

## Sample Management



10367089

					Comments
Transfers	Released By	Date/Time	Received By	Date/Time	
1	<i>[Signature]</i>	10/20/16	<i>[Signature]</i>	10/21/16	
2					
3					
Cooler Temperature on Receipt <i>07</i> °C		Custody Seal <input checked="" type="checkbox"/> or N		Received on Ice <input checked="" type="checkbox"/> or N	Samples Intact <input checked="" type="checkbox"/> or N

\*\*\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.  
 This chain of custody is considered complete as is since this information is available in the owner laboratory.

<b>Sample Condition Upon Receipt</b>	<b>Client Name:</b> <u>Pace GB</u>	<b>Project #:</b>	<b>WO# : 10367089</b>
<b>Courier:</b>	<input type="checkbox"/> Fed Ex	<input type="checkbox"/> UPS	<input type="checkbox"/> USPS
<input checked="" type="checkbox"/> Commercial	<input type="checkbox"/> Pace	<input type="checkbox"/> SpeeDee	<input type="checkbox"/> Client
<b>Tracking Number:</b>	<input type="checkbox"/> Other: _____		



<b>Custody Seal on Cooler/Box Present?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<b>Seals Intact?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<b>Optional:</b> Proj. Due Date: _____ Proj. Name: _____	
<b>Packing Material:</b>	<input type="checkbox"/> Bubble Wrap	<input checked="" type="checkbox"/> Bubble Bags	<input type="checkbox"/> None	<input type="checkbox"/> Other: _____	<b>Temp Blank?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<b>Thermometer Used:</b>	<input checked="" type="checkbox"/> 151401163	<input type="checkbox"/> B88A912167504	<b>Type of Ice:</b>	<input checked="" type="checkbox"/> Wet	<input type="checkbox"/> Blue	<input type="checkbox"/> None	<input type="checkbox"/> Samples on Ice, cooling process has begun
	<input type="checkbox"/> 151401164	<input type="checkbox"/> B88A0143310098					
<b>Cooler Temp Read (°C):</b>	<u>0.5</u>	<b>Cooler Temp Corrected (°C):</b>	<u>0.7</u>	<b>Biological Tissue Frozen?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
<b>Temp should be above freezing to 6°C</b>		<b>Correction Factor:</b>	<u>+0.2</u>	<b>Date and Initials of Person Examining Contents:</b>	<u>DN 10/21/16</u>		

**USDA Regulated Soil** (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A 1.
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A 2.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A 3.
Sampler Name and/or Signature on COC?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A 4.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A 5.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A 6.
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A 7.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A 8.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A 9.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A 10.
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A 11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A 12.
-Includes Date/Time/ID/Analysis Matrix: <u>SL</u>	
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A 13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Sample #
Exceptions: VOA, Colliform, TOC, Oil and Grease, DRO/8015 (water) DOC	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A 14.
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A 15.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Pace Trip Blank Lot # (if purchased):	

**CLIENT NOTIFICATION/RESOLUTION** Field Data Required?  Yes  No

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/Resolution: \_\_\_\_\_

**Project Manager Review:** William Boberg Date: 10/21/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office ( i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52534	Matrix	Solid
Filename	U161029A_02	Dilution	NA
Total Amount Extracted	20.6 g	Extracted	10/26/2016 15:55
ICAL ID	U161025	Analyzed	10/29/2016 06:54
CCal Filename(s)	U161028B_16	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	92
				1,2,3,7,8-PeCDF-13C	2.00	77
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	78
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	85
				1,2,3,4,7,8-HxCDF-13C	2.00	75
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	77
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	78
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	86
				1,2,3,4,7,8-HxCDD-13C	2.00	72
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	70
				1,2,3,4,7,8,9-HpCDF-13C	2.00	74
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	81
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	64
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	100
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.00 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	ND	----	10.0			

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

**REPORT OF LABORATORY ANALYSIS**

Report No.....10367089

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**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52542	Matrix	Solid
Filename	F161030B_04	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 13:30
CCal Filename(s)	F161030B_01	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	74
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	87
				1,2,3,7,8-PeCDF-13C	2.00	78
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	80
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	82
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	83
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	83
				1,2,3,4,7,8-HxCDD-13C	2.00	75
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	64
				1,2,3,4,7,8,9-HpCDF-13C	2.00	62
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	50
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.00 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	ND	----	10.0			

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

**REPORT OF LABORATORY ANALYSIS**

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**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52558	Matrix	Solid
Filename	U161101B_15	Dilution	NA
Total Amount Extracted	20.4 g	Extracted	10/27/2016 16:25
ICAL ID	U161025	Analyzed	11/02/2016 01:42
CCal Filename(s)	U161101B_03	Injected By	SMT

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	92
				1,2,3,7,8-PeCDF-13C	2.00	85
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	80
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	99
				1,2,3,4,7,8-HxCDF-13C	2.00	76
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	74
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	78
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	78
				1,2,3,4,7,8-HxCDD-13C	2.00	84
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	75
				1,2,3,4,7,8,9-HpCDF-13C	2.00	79
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	90
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	75
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	84
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.00 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	ND	----	10.0			

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

Results reported on a total weight basis and are valid to no more than 2 significant figures.

**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367089

## Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101716001		
Lab Sample ID	40140496001		
Filename	F161031A_02		
Injected By	BAL		
Total Amount Extracted	12.1 g	Matrix	Solid
% Moisture	14.5	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	10/17/2016 13:44
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 00:52

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	73
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	88
				1,2,3,7,8-PeCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	68
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	78
				1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	76
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	79
				1,2,3,4,7,8-HxCDD-13C	2.00	72
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	62
				1,2,3,4,7,8,9-HpCDF-13C	2.00	67
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	78
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	49
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.038 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	38	----	10.0			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

## REPORT OF LABORATORY ANALYSIS

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101716002		
Lab Sample ID	40140496002		
Filename	F161031A_03		
Injected By	BAL		
Total Amount Extracted	12.4 g	Matrix	Solid
% Moisture	5.2	Dilution	NA
Dry Weight Extracted	11.8 g	Collected	10/17/2016 13:44
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 01:41

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	67
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	82
				1,2,3,7,8-PeCDF-13C	2.00	66
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	62
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	71
				1,2,3,4,7,8-HxCDF-13C	2.00	69
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	71
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	71
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	72
				1,2,3,4,7,8-HxCDD-13C	2.00	66
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	65
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	62
				1,2,3,4,7,8,9-HpCDF-13C	2.00	60
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	76
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	49
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	72
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.051 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	51	----	10.0			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

**REPORT OF LABORATORY ANALYSIS**

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## Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101716003		
Lab Sample ID	40140496003		
Filename	F161031A_04		
Injected By	BAL		
Total Amount Extracted	12.2 g	Matrix	Solid
% Moisture	17.1	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	10/17/2016 13:19
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 02:30

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	74
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	90
				1,2,3,7,8-PeCDF-13C	2.00	74
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	68
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	81
				1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	79
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	78
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	78
				1,2,3,4,7,8-HxCDD-13C	2.00	75
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	68
				1,2,3,4,7,8,9-HpCDF-13C	2.00	65
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	83
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	50
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.011 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	11	----	10.0			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

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## Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101716004		
Lab Sample ID	40140496004		
Filename	F161031A_05		
Injected By	BAL		
Total Amount Extracted	12.4 g	Matrix	Solid
% Moisture	14.8	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	10/17/2016 13:19
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 03:19

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	65
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	77
				1,2,3,7,8-PeCDF-13C	2.00	66
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	62
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	75
				1,2,3,4,7,8-HxCDF-13C	2.00	68
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	73
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	72
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	70
				1,2,3,4,7,8-HxCDD-13C	2.00	69
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	61
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	60
				1,2,3,4,7,8,9-HpCDF-13C	2.00	62
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	49
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	65
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.093 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	6.4	----	5.0			
Total HpCDD	6.4	----	5.0			
OCDF	ND	----	10.0			
OCDD	30.0	----	10.0			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367089

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101716005			
Lab Sample ID	40140496005			
Filename	F161031A_06			
Injected By	BAL			
Total Amount Extracted	12.5 g	Matrix	Solid	
% Moisture	9.0	Dilution	NA	
Dry Weight Extracted	11.4 g	Collected	10/17/2016 14:32	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 04:08	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	64
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	77
				1,2,3,7,8-PeCDF-13C	2.00	66
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	63
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	71
				1,2,3,4,7,8-HxCDF-13C	2.00	67
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	68
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	68
Total PeCDF	23	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	69
				1,2,3,4,7,8-HxCDD-13C	2.00	63
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	64
Total PeCDD	20	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	59
				1,2,3,4,7,8,9-HpCDF-13C	2.00	61
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	60
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	320	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	67
1,2,3,6,7,8-HxCDD	14	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	150	----	5.0			
1,2,3,4,6,7,8-HpCDF	360	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	14	----	5.0	Equivalence: 28 ng/Kg		
Total HpCDF	1800	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	880	----	5.0			
Total HpCDD	1400	----	5.0			
OCDF	2500	----	10.0			
OCDD	12000	----	10.0 E			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
 E = Exceeds calibration range

**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367089

### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101716006		
Lab Sample ID	40140496006		
Filename	F161031A_07		
Injected By	BAL		
Total Amount Extracted	12.3 g	Matrix	Solid
% Moisture	13.1	Dilution	NA
Dry Weight Extracted	10.7 g	Collected	10/17/2016 14:32
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 04:56

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	66
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	81
				1,2,3,7,8-PeCDF-13C	2.00	67
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	64
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	72
				1,2,3,4,7,8-HxCDF-13C	2.00	67
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	72
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	74
				1,2,3,4,7,8-HxCDD-13C	2.00	67
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	60
				1,2,3,4,7,8,9-HpCDF-13C	2.00	63
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	78
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	50
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	69
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.012 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	12	----	10.0			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367089

### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101716007		
Lab Sample ID	40140496007		
Filename	F161031A_08		
Injected By	BAL		
Total Amount Extracted	12.3 g	Matrix	Solid
% Moisture	13.6	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	10/17/2016 14:33
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52534	Analyzed	10/31/2016 05:45

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	71
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	88
				1,2,3,7,8-PeCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	68
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	80
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	76
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	82
				1,2,3,4,7,8-HxCDD-13C	2.00	70
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	64
				1,2,3,4,7,8,9-HpCDF-13C	2.00	69
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	84
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	51
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	74
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.028 ng/Kg		
Total HpCDF	ND	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	5.0			
Total HpCDD	ND	----	5.0			
OCDF	ND	----	10.0			
OCDD	28	----	10.0			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367089

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816008		
Lab Sample ID	40140496008		
Filename	Y161102A_04		
Injected By	SMT		
Total Amount Extracted	22.4 g	Matrix	Solid
% Moisture	92.0	Dilution	NA
Dry Weight Extracted	1.79 g	Collected	10/18/2016 14:42
ICAL ID	Y160816A	Received	10/21/2016 09:30
CCal Filename(s)	Y161101B_19	Extracted	10/27/2016 16:25
Method Blank ID	BLANK-52558	Analyzed	11/02/2016 07:14

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	9.9	----	1.0 V	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	210.0	----	1.0	2,3,7,8-TCDD-13C	2.00	92
				1,2,3,7,8-PeCDF-13C	2.00	72
2,3,7,8-TCDD	2.1	----	1.0 J	2,3,4,7,8-PeCDF-13C	2.00	64
Total TCDD	50.0	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	80
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	63.0	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	71
2,3,4,7,8-PeCDF	130.0	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	76
Total PeCDF	1800.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	70
				1,2,3,4,7,8-HxCDD-13C	2.00	83
1,2,3,7,8-PeCDD	26.0	----	5.0 J	1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	290.0	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	76
				1,2,3,4,7,8,9-HpCDF-13C	2.00	82
1,2,3,4,7,8-HxCDF	460.0	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	96
1,2,3,6,7,8-HxCDF	300.0	----	5.0	OCDD-13C	4.00	68 DN2
2,3,4,6,7,8-HxCDF	300.0	----	5.0			
1,2,3,7,8,9-HxCDF	200.0	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	9600.0	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	110.0	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	87
1,2,3,6,7,8-HxCDD	690.0	----	5.0			
1,2,3,7,8,9-HxCDD	220.0	----	5.0			
Total HxCDD	3400.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	7900.0	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	680.0	----	5.0	Equivalence: 800 ng/Kg		
Total HpCDF	34000.0	----	5.0 E	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	18000.0	----	5.0 E			
Total HpCDD	31000.0	----	5.0 E			
OCDF	34000.0	----	10.0 DN2			
OCDD	190000.0	----	10.0 DN2			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
 E = Exceeds calibration range  
 D = Result obtained from analysis of diluted sample  
 Nn = Value obtained from additional analysis  
 V = Result verified by confirmation analysis

**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367089

### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101816009		
Lab Sample ID	40140496009		
Filename	Y161102A_05		
Injected By	SMT		
Total Amount Extracted	17.4 g	Matrix	Solid
% Moisture	77.3	Dilution	NA
Dry Weight Extracted	3.95 g	Collected	10/18/2016 14:42
ICAL ID	Y160816A	Received	10/21/2016 09:30
CCal Filename(s)	Y161101B_19	Extracted	10/27/2016 16:25
Method Blank ID	BLANK-52558	Analyzed	11/02/2016 07:55

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	5.6	----	1.0 V	2,3,7,8-TCDF-13C	2.00	67
Total TCDF	190.0	----	1.0	2,3,7,8-TCDD-13C	2.00	82
				1,2,3,7,8-PeCDF-13C	2.00	57
2,3,7,8-TCDD	2.1	----	1.0 J	2,3,4,7,8-PeCDF-13C	2.00	50
Total TCDD	52.0	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	61
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	67.0	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	66
2,3,4,7,8-PeCDF	110.0	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	1900.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	58
				1,2,3,4,7,8-HxCDD-13C	2.00	81
1,2,3,7,8-PeCDD	33.0	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	63
Total PeCDD	360.0	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	55
				1,2,3,4,7,8,9-HpCDF-13C	2.00	54
1,2,3,4,7,8-HxCDF	300.0	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	64
1,2,3,6,7,8-HxCDF	400.0	----	5.0	OCDD-13C	4.00	79 DN2
2,3,4,6,7,8-HxCDF	370.0	----	5.0			
1,2,3,7,8,9-HxCDF	160.0	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	14000.0	----	5.0 E	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	140.0	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	810.0	----	5.0			
1,2,3,7,8,9-HxCDD	280.0	----	5.0			
Total HxCDD	4700.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	11000.0	----	5.0 E	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	920.0	----	5.0	Equivalence: 1000 ng/Kg		
Total HpCDF	49000.0	----	5.0 E	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	25000.0	----	5.0 E			
Total HpCDD	48000.0	----	5.0 E			
OCDF	49000.0	----	10.0 DN2			
OCDD	270000.0	----	10.0 EDN2			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
E = Exceeds calibration range  
D = Result obtained from analysis of diluted sample  
Nn = Value obtained from additional analysis  
V = Result verified by confirmation analysis

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367089



## Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101816011		
Lab Sample ID	40140496010		
Filename	U161201A_10		
Injected By	SMT		
Total Amount Extracted	12.7 g	Matrix	Solid
% Moisture	24.6	Dilution	NA
Dry Weight Extracted	9.58 g	Collected	10/18/2016 11:33
ICAL ID	U161025	Received	10/21/2016 09:30
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 00:38

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	74
Total TCDF	1.1	----	1.0	2,3,7,8-TCDD-13C	2.00	88
				1,2,3,7,8-PeCDF-13C	2.00	78
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	83
				1,2,3,4,7,8-HxCDF-13C	2.00	80
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	71
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	56
Total PeCDF	42.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	69
				1,2,3,4,7,8-HxCDD-13C	2.00	58
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	58
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	57
				1,2,3,4,7,8,9-HpCDF-13C	2.00	64
1,2,3,4,7,8-HxCDF	12.0	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	70
1,2,3,6,7,8-HxCDF	5.0	----	5.0 J	OCDD-13C	4.00	63
2,3,4,6,7,8-HxCDF	6.3	----	5.0			
1,2,3,7,8,9-HxCDF	5.0	----	5.0 J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	230.0	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	90
1,2,3,6,7,8-HxCDD	15.0	----	5.0			
1,2,3,7,8,9-HxCDD	5.8	----	5.0			
Total HxCDD	81.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	100.0	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	9.6	----	5.0	Equivalence: 12 ng/Kg		
Total HpCDF	420.0	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	290.0	----	5.0			
Total HpCDD	520.0	----	5.0			
OCDF	310.0	----	10.0			
OCDD	2500.0	----	10.0			

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

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

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

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367089

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816012			
Lab Sample ID	40140496011			
Filename	U161201A_11			
Injected By	SMT			
Total Amount Extracted	12.6 g	Matrix	Solid	
% Moisture	28.0	Dilution	NA	
Dry Weight Extracted	9.07 g	Collected	10/18/2016 12:45	
ICAL ID	U161025	Received	10/21/2016 09:30	
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25	
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 01:25	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	73
Total TCDF	9.0	----	1.0	2,3,7,8-TCDD-13C	2.00	83
				1,2,3,7,8-PeCDF-13C	2.00	82
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	86
				1,2,3,4,7,8-HxCDF-13C	2.00	75
1,2,3,7,8-PeCDF	5.4	----	5.0 J	1,2,3,6,7,8-HxCDF-13C	2.00	64
2,3,4,7,8-PeCDF	11.0	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	70
Total PeCDF	110.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	63
				1,2,3,4,7,8-HxCDD-13C	2.00	80
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	58
Total PeCDD	6.9	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	59
				1,2,3,4,7,8,9-HpCDF-13C	2.00	66
1,2,3,4,7,8-HxCDF	35.0	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	73
1,2,3,6,7,8-HxCDF	17.0	----	5.0	OCDD-13C	4.00	74
2,3,4,6,7,8-HxCDF	6.4	----	5.0			
1,2,3,7,8,9-HxCDF	16.0	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	620.0	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	5.3	----	5.0 J	2,3,7,8-TCDD-37Cl4	0.20	86
1,2,3,6,7,8-HxCDD	39.0	----	5.0			
1,2,3,7,8,9-HxCDD	11.0	----	5.0			
Total HxCDD	160.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	360.0	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	35.0	----	5.0	Equivalence: 44 ng/Kg		
Total HpCDF	1500.0	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	950.0	----	5.0			
Total HpCDD	1700.0	----	5.0			
OCDF	1200.0	----	10.0			
OCDD	11000.0	----	10.0 E			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value

E = Exceeds calibration range

**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367089

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816013		
Lab Sample ID	40140496012		
Filename	U161201A_12		
Injected By	SMT		
Total Amount Extracted	12.4 g	Matrix	Solid
% Moisture	21.6	Dilution	NA
Dry Weight Extracted	9.72 g	Collected	10/18/2016 12:45
ICAL ID	U161025	Received	10/21/2016 09:30
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 02:11

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	70
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	81
				1,2,3,7,8-PeCDF-13C	2.00	79
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	84
				1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	63
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	67
				1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	62
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	57
				1,2,3,4,7,8,9-HpCDF-13C	2.00	63
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	67
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	64
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	83
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	ND	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.12 ng/Kg		
Total HpCDF	5.8	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	5.8	----	5.0			
Total HpCDD	5.8	----	5.0			
OCDF	ND	----	10.0			
OCDD	65.0	----	10.0			

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

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

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**REPORT OF LABORATORY ANALYSIS**

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Report No.....10367089

### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101816015		
Lab Sample ID	40140496013		
Filename	U161201A_13		
Injected By	SMT		
Total Amount Extracted	12.6 g	Matrix	Solid
% Moisture	8.6	Dilution	NA
Dry Weight Extracted	11.5 g	Collected	10/18/2016 10:17
ICAL ID	U161025	Received	10/21/2016 09:30
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 02:57

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	1.1	----	1.0	2,3,7,8-TCDD-13C	2.00	87
				1,2,3,7,8-PeCDF-13C	2.00	80
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	88
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	67
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	72
Total PeCDF	15.0	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	68
				1,2,3,4,7,8-HxCDD-13C	2.00	82
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	59
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	57
				1,2,3,4,7,8,9-HpCDF-13C	2.00	65
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	69
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	65
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	64.0	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	88
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	15.0	----	5.0			
1,2,3,4,6,7,8-HpCDF	41.0	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 2.6 ng/Kg		
Total HpCDF	160.0	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	110.0	----	5.0			
Total HpCDD	190.0	----	5.0			
OCDF	130.0	----	10.0			
OCDD	970.0	----	10.0			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367089

## Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101816016		
Lab Sample ID	40140496014		
Filename	U161201A_14		
Injected By	SMT		
Total Amount Extracted	15.1 g	Matrix	Solid
% Moisture	58.7	Dilution	NA
Dry Weight Extracted	6.24 g	Collected	10/18/2016 10:17
ICAL ID	U161025	Received	10/21/2016 09:30
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 03:43

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	80
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	93
				1,2,3,7,8-PeCDF-13C	2.00	88
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	78
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	93
				1,2,3,4,7,8-HxCDF-13C	2.00	82
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	71
				1,2,3,4,7,8-HxCDD-13C	2.00	88
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	63
				1,2,3,4,7,8,9-HpCDF-13C	2.00	70
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	75
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	70
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	19	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	94
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	21	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 1.3 ng/Kg		
Total HpCDF	77	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	45	----	5.0			
Total HpCDD	80	----	5.0			
OCDF	85	----	10.0			
OCDD	510	----	10.0			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

## REPORT OF LABORATORY ANALYSIS

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Report No.....10367089

**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816017		
Lab Sample ID	40140496015		
Filename	U161201A_15		
Injected By	SMT		
Total Amount Extracted	13.1 g	Matrix	Solid
% Moisture	38.7	Dilution	NA
Dry Weight Extracted	8.03 g	Collected	10/18/2016 10:18
ICAL ID	U161025	Received	10/21/2016 09:30
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 04:30

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	1.0	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	ND	----	1.0	2,3,7,8-TCDD-13C	2.00	91
				1,2,3,7,8-PeCDF-13C	2.00	87
2,3,7,8-TCDD	ND	----	1.0	2,3,4,7,8-PeCDF-13C	2.00	79
Total TCDD	ND	----	1.0	1,2,3,7,8-PeCDD-13C	2.00	92
				1,2,3,4,7,8-HxCDF-13C	2.00	83
1,2,3,7,8-PeCDF	ND	----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	ND	----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	75
Total PeCDF	ND	----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	74
				1,2,3,4,7,8-HxCDD-13C	2.00	90
1,2,3,7,8-PeCDD	ND	----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	ND	----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	63
				1,2,3,4,7,8,9-HpCDF-13C	2.00	71
1,2,3,4,7,8-HxCDF	ND	----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	76
1,2,3,6,7,8-HxCDF	ND	----	5.0	OCDD-13C	4.00	70
2,3,4,6,7,8-HxCDF	ND	----	5.0			
1,2,3,7,8,9-HxCDF	ND	----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	15	----	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	5.0	2,3,7,8-TCDD-37Cl4	0.20	93
1,2,3,6,7,8-HxCDD	ND	----	5.0			
1,2,3,7,8,9-HxCDD	ND	----	5.0			
Total HxCDD	ND	----	5.0			
1,2,3,4,6,7,8-HpCDF	15	----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	5.0	Equivalence: 0.94 ng/Kg		
Total HpCDF	55	----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	38	----	5.0			
Total HpCDD	65	----	5.0			
OCDF	57	----	10.0			
OCDD	360	----	10.0			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

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Report No.....10367089

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

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# **Appendix B**

## Sample Analysis Summary





**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101716001			
Lab Sample ID	40140496001			
Filename	F161031A_02			
Injected By	BAL			
Total Amount Extracted	12.1 g	Matrix	Solid	
% Moisture	14.5	Dilution	NA	
Dry Weight Extracted	10.3 g	Collected	10/17/2016 13:44	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 00:52	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.16	----	0.063	J	2,3,7,8-TCDF-13C	2.00	73
Total TCDF	0.66	----	0.063	J	2,3,7,8-TCDD-13C	2.00	88
					1,2,3,7,8-PeCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	0.095		2,3,4,7,8-PeCDF-13C	2.00	68
Total TCDD	0.15	----	0.095	J	1,2,3,7,8-PeCDD-13C	2.00	78
					1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	----	0.071	0.062	IJ	1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	----	0.093	0.043	IJ	2,3,4,6,7,8-HxCDF-13C	2.00	76
Total PeCDF	0.71	----	0.053	J	1,2,3,7,8,9-HxCDF-13C	2.00	79
					1,2,3,4,7,8-HxCDD-13C	2.00	72
1,2,3,7,8-PeCDD	ND	----	0.057		1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	0.17	----	0.057	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	62
					1,2,3,4,7,8,9-HpCDF-13C	2.00	67
1,2,3,4,7,8-HxCDF	0.16	----	0.140	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	78
1,2,3,6,7,8-HxCDF	ND	----	0.130		OCDD-13C	4.00	49
2,3,4,6,7,8-HxCDF	ND	----	0.130				
1,2,3,7,8,9-HxCDF	ND	----	0.160		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	2.50	----	0.140	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.160		2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	0.21	----	0.160	J			
1,2,3,7,8,9-HxCDD	ND	----	0.170				
Total HxCDD	0.88	----	0.160	J			
1,2,3,4,6,7,8-HpCDF	----	1.400	0.120	IJ	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.150		Equivalence: 0.20 ng/Kg		
Total HpCDF	4.00	----	0.130	J	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	4.00	----	0.280	J			
Total HpCDD	7.00	----	0.280	J			
OCDF	5.50	----	0.150	J			
OCDD	38.00	----	0.170				

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

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

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

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101716002			
Lab Sample ID	40140496002			
Filename	F161031A_03			
Injected By	BAL			
Total Amount Extracted	12.4 g	Matrix	Solid	
% Moisture	5.2	Dilution	NA	
Dry Weight Extracted	11.8 g	Collected	10/17/2016 13:44	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 01:41	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.120	2,3,7,8-TCDF-13C	2.00	67
Total TCDF	ND	----	0.120	2,3,7,8-TCDD-13C	2.00	82
				1,2,3,7,8-PeCDF-13C	2.00	66
2,3,7,8-TCDD	ND	----	0.100	2,3,4,7,8-PeCDF-13C	2.00	62
Total TCDD	ND	----	0.100	1,2,3,7,8-PeCDD-13C	2.00	71
				1,2,3,4,7,8-HxCDF-13C	2.00	69
1,2,3,7,8-PeCDF	ND	----	0.054	1,2,3,6,7,8-HxCDF-13C	2.00	71
2,3,4,7,8-PeCDF	0.11	----	0.059 J	2,3,4,6,7,8-HxCDF-13C	2.00	71
Total PeCDF	0.11	----	0.056 J	1,2,3,7,8,9-HxCDF-13C	2.00	72
				1,2,3,4,7,8-HxCDD-13C	2.00	66
1,2,3,7,8-PeCDD	ND	----	0.052	1,2,3,6,7,8-HxCDD-13C	2.00	65
Total PeCDD	0.16	----	0.052 J	1,2,3,4,6,7,8-HpCDF-13C	2.00	62
				1,2,3,4,7,8,9-HpCDF-13C	2.00	60
1,2,3,4,7,8-HxCDF	0.13	----	0.075 J	1,2,3,4,6,7,8-HpCDD-13C	2.00	76
1,2,3,6,7,8-HxCDF	----	0.13	0.076 J	OCDD-13C	4.00	49
2,3,4,6,7,8-HxCDF	ND	----	0.086			
1,2,3,7,8,9-HxCDF	ND	----	0.072	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	1.90	----	0.077 J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.160	2,3,7,8-TCDD-37Cl4	0.20	72
1,2,3,6,7,8-HxCDD	----	0.14	0.110 J			
1,2,3,7,8,9-HxCDD	0.21	----	0.140 J			
Total HxCDD	0.53	----	0.140 J			
1,2,3,4,6,7,8-HpCDF	1.30	----	0.110 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.150	Equivalence: 0.23 ng/Kg		
Total HpCDF	4.90	----	0.130 J	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	4.10	----	0.220 J			
Total HpCDD	7.50	----	0.220 J			
OCDF	5.10	----	0.150 J			
OCDD	51.00	----	0.200			

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

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

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

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101716003		
Lab Sample ID	40140496003		
Filename	F161031A_04		
Injected By	BAL		
Total Amount Extracted	12.2 g	Matrix	Solid
% Moisture	17.1	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	10/17/2016 13:19
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 02:30

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.20	----	0.082	J	2,3,7,8-TCDF-13C	2.00	74
Total TCDF	0.20	----	0.082	J	2,3,7,8-TCDD-13C	2.00	90
					1,2,3,7,8-PeCDF-13C	2.00	74
2,3,7,8-TCDD	ND	----	0.085		2,3,4,7,8-PeCDF-13C	2.00	68
Total TCDD	ND	----	0.085		1,2,3,7,8-PeCDD-13C	2.00	81
					1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	----	0.050		1,2,3,6,7,8-HxCDF-13C	2.00	79
2,3,4,7,8-PeCDF	ND	----	0.040		2,3,4,6,7,8-HxCDF-13C	2.00	78
Total PeCDF	0.14	----	0.045	J	1,2,3,7,8,9-HxCDF-13C	2.00	78
					1,2,3,4,7,8-HxCDD-13C	2.00	75
1,2,3,7,8-PeCDD	ND	----	0.041		1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD	ND	----	0.041		1,2,3,4,6,7,8-HpCDF-13C	2.00	68
					1,2,3,4,7,8,9-HpCDF-13C	2.00	65
1,2,3,4,7,8-HxCDF	ND	----	0.100		1,2,3,4,6,7,8-HpCDD-13C	2.00	83
1,2,3,6,7,8-HxCDF	ND	----	0.088		OCDD-13C	4.00	50
2,3,4,6,7,8-HxCDF	ND	----	0.077				
1,2,3,7,8,9-HxCDF	ND	----	0.097		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	0.96	----	0.092	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.059		2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	ND	----	0.077				
1,2,3,7,8,9-HxCDD	ND	----	0.060				
Total HxCDD	0.47	----	0.065	J			
1,2,3,4,6,7,8-HpCDF	0.70	----	0.098	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.140		Equivalence: 0.055 ng/Kg		
Total HpCDF	2.20	----	0.120	J	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	1.50	----	0.170	J			
Total HpCDD	2.70	----	0.170	J			
OCDF	1.70	----	0.140	J			
OCDD	11.00	----	0.110				

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

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

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

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101716004		
Lab Sample ID	40140496004		
Filename	F161031A_05		
Injected By	BAL		
Total Amount Extracted	12.4 g	Matrix	Solid
% Moisture	14.8	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	10/17/2016 13:19
ICAL ID	F161011	Received	10/21/2016 09:30
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 03:19

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.33	2,3,7,8-TCDF-13C	2.00	65
Total TCDF	ND	----	0.33	2,3,7,8-TCDD-13C	2.00	77
				1,2,3,7,8-PeCDF-13C	2.00	66
2,3,7,8-TCDD	ND	----	0.26	2,3,4,7,8-PeCDF-13C	2.00	62
Total TCDD	ND	----	0.26	1,2,3,7,8-PeCDD-13C	2.00	75
				1,2,3,4,7,8-HxCDF-13C	2.00	68
1,2,3,7,8-PeCDF	ND	----	0.14	1,2,3,6,7,8-HxCDF-13C	2.00	73
2,3,4,7,8-PeCDF	----	0.17	0.12 J	2,3,4,6,7,8-HxCDF-13C	2.00	72
Total PeCDF	ND	----	0.13	1,2,3,7,8,9-HxCDF-13C	2.00	70
				1,2,3,4,7,8-HxCDD-13C	2.00	69
1,2,3,7,8-PeCDD	ND	----	0.14	1,2,3,6,7,8-HxCDD-13C	2.00	61
Total PeCDD	ND	----	0.14	1,2,3,4,6,7,8-HpCDF-13C	2.00	60
				1,2,3,4,7,8,9-HpCDF-13C	2.00	62
1,2,3,4,7,8-HxCDF	----	0.20	0.19 J	1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	----	0.17	OCDD-13C	4.00	49
2,3,4,6,7,8-HxCDF	ND	----	0.19			
1,2,3,7,8,9-HxCDF	ND	----	0.27	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	0.88	----	0.20 J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.27	----	0.20 J	2,3,7,8-TCDD-37Cl4	0.20	65
1,2,3,6,7,8-HxCDD	0.55	----	0.19 J			
1,2,3,7,8,9-HxCDD	ND	----	0.20			
Total HxCDD	1.90	----	0.19 J			
1,2,3,4,6,7,8-HpCDF	1.40	----	0.28 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.34	Equivalence: 0.30 ng/Kg		
Total HpCDF	4.40	----	0.31 J	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	6.40	----	0.47			
Total HpCDD	9.50	----	0.47			
OCDF	----	2.40	0.38 J			
OCDD	30.00	----	0.26			

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

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

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

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101716005			
Lab Sample ID	40140496005			
Filename	F161031A_06			
Injected By	BAL			
Total Amount Extracted	12.5 g	Matrix	Solid	
% Moisture	9.0	Dilution	NA	
Dry Weight Extracted	11.4 g	Collected	10/17/2016 14:32	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 04:08	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.26	----	0.160	J	2,3,7,8-TCDF-13C	2.00	64
Total TCDF	0.76	----	0.160	J	2,3,7,8-TCDD-13C	2.00	77
					1,2,3,7,8-PeCDF-13C	2.00	66
2,3,7,8-TCDD	ND	----	0.095		2,3,4,7,8-PeCDF-13C	2.00	63
Total TCDD	0.20	----	0.095	J	1,2,3,7,8-PeCDD-13C	2.00	71
					1,2,3,4,7,8-HxCDF-13C	2.00	67
1,2,3,7,8-PeCDF	0.10	----	0.075	J	1,2,3,6,7,8-HxCDF-13C	2.00	68
2,3,4,7,8-PeCDF	0.27	----	0.068	J	2,3,4,6,7,8-HxCDF-13C	2.00	68
Total PeCDF	25.00	----	0.072		1,2,3,7,8,9-HxCDF-13C	2.00	69
					1,2,3,4,7,8-HxCDD-13C	2.00	63
1,2,3,7,8-PeCDD	ND	----	0.088		1,2,3,6,7,8-HxCDD-13C	2.00	64
Total PeCDD	20.00	----	0.088		1,2,3,4,6,7,8-HpCDF-13C	2.00	59
					1,2,3,4,7,8,9-HpCDF-13C	2.00	61
1,2,3,4,7,8-HxCDF	2.50	----	0.240	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	1.40	----	0.260	J	OCDD-13C	4.00	60
2,3,4,6,7,8-HxCDF	2.40	----	0.270	J			
1,2,3,7,8,9-HxCDF	----	0.33	0.300	I	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	330.00	----	0.270		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.48	----	0.250	J	2,3,7,8-TCDD-37Cl4	0.20	67
1,2,3,6,7,8-HxCDD	14.00	----	0.260				
1,2,3,7,8,9-HxCDD	1.40	----	0.230	J			
Total HxCDD	150.00	----	0.250				
1,2,3,4,6,7,8-HpCDF	360.00	----	0.770		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	14.00	----	0.860		Equivalence: 29 ng/Kg		
Total HpCDF	1800.00	----	0.820		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	880.00	----	0.074				
Total HpCDD	1400.00	----	0.074				
OCDF	2500.00	----	0.120				
OCDD	12000.00	----	0.088	E			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value

E = Exceeds calibration range

I = Interference present

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101716006			
Lab Sample ID	40140496006			
Filename	F161031A_07			
Injected By	BAL			
Total Amount Extracted	12.3 g	Matrix	Solid	
% Moisture	13.1	Dilution	NA	
Dry Weight Extracted	10.7 g	Collected	10/17/2016 14:32	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52542	Analyzed	10/31/2016 04:56	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.24	----	0.130	J	2,3,7,8-TCDF-13C	2.00	66
Total TCDF	0.51	----	0.130	J	2,3,7,8-TCDD-13C	2.00	81
					1,2,3,7,8-PeCDF-13C	2.00	67
2,3,7,8-TCDD	ND	----	0.180		2,3,4,7,8-PeCDF-13C	2.00	64
Total TCDD	0.57	----	0.180	J	1,2,3,7,8-PeCDD-13C	2.00	72
					1,2,3,4,7,8-HxCDF-13C	2.00	67
1,2,3,7,8-PeCDF	ND	----	0.079		1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	----	0.090	0.065	IJ	2,3,4,6,7,8-HxCDF-13C	2.00	72
Total PeCDF	ND	----	0.072		1,2,3,7,8,9-HxCDF-13C	2.00	74
					1,2,3,4,7,8-HxCDD-13C	2.00	67
1,2,3,7,8-PeCDD	ND	----	0.084		1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	0.59	----	0.084	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	60
					1,2,3,4,7,8,9-HpCDF-13C	2.00	63
1,2,3,4,7,8-HxCDF	ND	----	0.093		1,2,3,4,6,7,8-HpCDD-13C	2.00	78
1,2,3,6,7,8-HxCDF	ND	----	0.073		OCDD-13C	4.00	50
2,3,4,6,7,8-HxCDF	ND	----	0.069				
1,2,3,7,8,9-HxCDF	ND	----	0.100		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	0.34	----	0.085	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.120		2,3,7,8-TCDD-37Cl4	0.20	69
1,2,3,6,7,8-HxCDD	ND	----	0.120				
1,2,3,7,8,9-HxCDD	ND	----	0.120				
Total HxCDD	0.78	----	0.120	J			
1,2,3,4,6,7,8-HpCDF	----	0.600	0.093	IJ	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.130		Equivalence: 0.10 ng/Kg		
Total HpCDF	ND	----	0.110		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	1.30	----	0.160	J			
Total HpCDD	2.50	----	0.160	J			
OCDF	----	1.900	0.140	IJ			
OCDD	12.00	----	0.320				

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

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

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

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101716007			
Lab Sample ID	40140496007			
Filename	F161031A_08			
Injected By	BAL			
Total Amount Extracted	12.3 g	Matrix	Solid	
% Moisture	13.6	Dilution	NA	
Dry Weight Extracted	10.6 g	Collected	10/17/2016 14:33	
ICAL ID	F161011	Received	10/21/2016 09:30	
CCal Filename(s)	F161030B_16	Extracted	10/26/2016 15:55	
Method Blank ID	BLANK-52534	Analyzed	10/31/2016 05:45	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.19	2,3,7,8-TCDF-13C	2.00	71
Total TCDF	1.60	----	0.19 J	2,3,7,8-TCDD-13C	2.00	88
				1,2,3,7,8-PeCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	0.24	2,3,4,7,8-PeCDF-13C	2.00	68
Total TCDD	ND	----	0.24	1,2,3,7,8-PeCDD-13C	2.00	80
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	----	0.16	1,2,3,6,7,8-HxCDF-13C	2.00	76
2,3,4,7,8-PeCDF	----	0.22	0.12 U	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	1.20	----	0.14 J	1,2,3,7,8,9-HxCDF-13C	2.00	82
				1,2,3,4,7,8-HxCDD-13C	2.00	70
1,2,3,7,8-PeCDD	ND	----	0.14	1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD	ND	----	0.14	1,2,3,4,6,7,8-HpCDF-13C	2.00	64
				1,2,3,4,7,8,9-HpCDF-13C	2.00	69
1,2,3,4,7,8-HxCDF	----	0.18	0.12 U	1,2,3,4,6,7,8-HpCDD-13C	2.00	84
1,2,3,6,7,8-HxCDF	0.15	----	0.13 J	OCDD-13C	4.00	51
2,3,4,6,7,8-HxCDF	0.12	----	0.11 J			
1,2,3,7,8,9-HxCDF	ND	----	0.13	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	0.26	----	0.12 J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.11	2,3,7,8-TCDD-37Cl4	0.20	74
1,2,3,6,7,8-HxCDD	----	0.16	0.13 U			
1,2,3,7,8,9-HxCDD	ND	----	0.11			
Total HxCDD	0.92	----	0.12 J			
1,2,3,4,6,7,8-HpCDF	1.40	----	0.13 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.20	Equivalence: 0.25 ng/Kg		
Total HpCDF	5.70	----	0.16 J	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	2.90	----	0.15 J			
Total HpCDD	5.40	----	0.15 J			
OCDF	5.80	----	0.24 J			
OCDD	28.00	----	0.28			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816008			
Lab Sample ID	40140496008			
Filename	Y161102A_04			
Injected By	SMT			
Total Amount Extracted	22.4 g	Matrix	Solid	
% Moisture	92.0	Dilution	NA	
Dry Weight Extracted	1.79 g	Collected	10/18/2016 14:42	
ICAL ID	Y160816A	Received	10/21/2016 09:30	
CCal Filename(s)	Y161101B_19	Extracted	10/27/2016 16:25	
Method Blank ID	BLANK-52558	Analyzed	11/02/2016 07:14	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	9.9	----	0.59	V	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	210.0	----	0.59		2,3,7,8-TCDD-13C	2.00	92
					1,2,3,7,8-PeCDF-13C	2.00	72
2,3,7,8-TCDD	2.1	----	0.76	J	2,3,4,7,8-PeCDF-13C	2.00	64
Total TCDD	51.0	----	0.76		1,2,3,7,8-PeCDD-13C	2.00	80
					1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	63.0	----	0.63		1,2,3,6,7,8-HxCDF-13C	2.00	71
2,3,4,7,8-PeCDF	130.0	----	0.55		2,3,4,6,7,8-HxCDF-13C	2.00	76
Total PeCDF	1800.0	----	0.59		1,2,3,7,8,9-HxCDF-13C	2.00	70
					1,2,3,4,7,8-HxCDD-13C	2.00	83
1,2,3,7,8-PeCDD	26.0	----	0.37	J	1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	290.0	----	0.37		1,2,3,4,6,7,8-HpCDF-13C	2.00	76
					1,2,3,4,7,8,9-HpCDF-13C	2.00	82
1,2,3,4,7,8-HxCDF	460.0	----	2.40		1,2,3,4,6,7,8-HpCDD-13C	2.00	96
1,2,3,6,7,8-HxCDF	300.0	----	1.40		OCDD-13C	4.00	68 DN2
2,3,4,6,7,8-HxCDF	300.0	----	1.90				
1,2,3,7,8,9-HxCDF	200.0	----	3.20		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	9600.0	----	2.20		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	110.0	----	1.90		2,3,7,8-TCDD-37Cl4	0.20	87
1,2,3,6,7,8-HxCDD	690.0	----	1.80				
1,2,3,7,8,9-HxCDD	220.0	----	1.60				
Total HxCDD	3400.0	----	1.70				
1,2,3,4,6,7,8-HpCDF	7900.0	----	3.90		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	680.0	----	4.50		Equivalence: 800 ng/Kg		
Total HpCDF	34000.0	----	4.20	E	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	18000.0	----	0.46	E			
Total HpCDD	31000.0	----	0.46	E			
OCDF	34000.0	----	5.70	DN2			
OCDD	190000.0	----	9.40	DN2			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
E = Exceeds calibration range  
D = Result obtained from analysis of diluted sample  
Nn = Value obtained from additional analysis  
V = Result verified by confirmation analysis

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816009			
Lab Sample ID	40140496009			
Filename	Y161102A_05			
Injected By	SMT			
Total Amount Extracted	17.4 g	Matrix	Solid	
% Moisture	77.3	Dilution	NA	
Dry Weight Extracted	3.95 g	Collected	10/18/2016 14:42	
ICAL ID	Y160816A	Received	10/21/2016 09:30	
CCal Filename(s)	Y161101B_19	Extracted	10/27/2016 16:25	
Method Blank ID	BLANK-52558	Analyzed	11/02/2016 07:55	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	5.6	----	0.50	V	2,3,7,8-TCDF-13C	2.00	67
Total TCDF	190.0	----	0.50		2,3,7,8-TCDD-13C	2.00	82
					1,2,3,7,8-PeCDF-13C	2.00	57
2,3,7,8-TCDD	2.1	----	0.57	J	2,3,4,7,8-PeCDF-13C	2.00	50
Total TCDD	52.0	----	0.57		1,2,3,7,8-PeCDD-13C	2.00	61
					1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	67.0	----	0.64		1,2,3,6,7,8-HxCDF-13C	2.00	66
2,3,4,7,8-PeCDF	110.0	----	0.29		2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	1900.0	----	0.47		1,2,3,7,8,9-HxCDF-13C	2.00	58
					1,2,3,4,7,8-HxCDD-13C	2.00	81
1,2,3,7,8-PeCDD	33.0	----	0.33		1,2,3,6,7,8-HxCDD-13C	2.00	63
Total PeCDD	370.0	----	0.33		1,2,3,4,6,7,8-HpCDF-13C	2.00	55
					1,2,3,4,7,8,9-HpCDF-13C	2.00	54
1,2,3,4,7,8-HxCDF	300.0	----	2.40		1,2,3,4,6,7,8-HpCDD-13C	2.00	64
1,2,3,6,7,8-HxCDF	400.0	----	1.90		OCDD-13C	4.00	79 DN2
2,3,4,6,7,8-HxCDF	370.0	----	1.70				
1,2,3,7,8,9-HxCDF	160.0	----	2.20		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	14000.0	----	2.10	E	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	140.0	----	1.60		2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	810.0	----	1.40				
1,2,3,7,8,9-HxCDD	280.0	----	1.30				
Total HxCDD	4700.0	----	1.40				
1,2,3,4,6,7,8-HpCDF	11000.0	----	3.20	E	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	920.0	----	3.50		Equivalence: 1000 ng/Kg		
Total HpCDF	49000.0	----	3.40	E	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	25000.0	----	0.64	E			
Total HpCDD	48000.0	----	0.64	E			
OCDF	49000.0	----	2.20	DN2			
OCDD	270000.0	----	3.50	EDN2			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value  
E = Exceeds calibration range  
D = Result obtained from analysis of diluted sample  
Nn = Value obtained from additional analysis  
V = Result verified by confirmation analysis

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816011			
Lab Sample ID	40140496010			
Filename	U161201A_10			
Injected By	SMT			
Total Amount Extracted	12.7 g	Matrix	Solid	
% Moisture	24.6	Dilution	NA	
Dry Weight Extracted	9.58 g	Collected	10/18/2016 11:33	
ICAL ID	U161025	Received	10/21/2016 09:30	
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25	
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 00:38	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.54	----	0.120	J	2,3,7,8-TCDF-13C	2.00	74
Total TCDF	5.60	----	0.120		2,3,7,8-TCDD-13C	2.00	88
					1,2,3,7,8-PeCDF-13C	2.00	78
2,3,7,8-TCDD	ND	----	0.110		2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	0.28	----	0.110	BJ	1,2,3,7,8-PeCDD-13C	2.00	83
					1,2,3,4,7,8-HxCDF-13C	2.00	80
1,2,3,7,8-PeCDF	1.90	----	0.240	J	1,2,3,6,7,8-HxCDF-13C	2.00	71
2,3,4,7,8-PeCDF	4.10	----	0.120	J	2,3,4,6,7,8-HxCDF-13C	2.00	56
Total PeCDF	51.00	----	0.180		1,2,3,7,8,9-HxCDF-13C	2.00	69
					1,2,3,4,7,8-HxCDD-13C	2.00	58
1,2,3,7,8-PeCDD	0.73	----	0.110	J	1,2,3,6,7,8-HxCDD-13C	2.00	58
Total PeCDD	6.80	----	0.110		1,2,3,4,6,7,8-HpCDF-13C	2.00	57
					1,2,3,4,7,8,9-HpCDF-13C	2.00	64
1,2,3,4,7,8-HxCDF	12.00	----	0.081		1,2,3,4,6,7,8-HpCDD-13C	2.00	70
1,2,3,6,7,8-HxCDF	5.00	----	0.066	J	OCDD-13C	4.00	63
2,3,4,6,7,8-HxCDF	6.30	----	0.110				
1,2,3,7,8,9-HxCDF	5.00	----	0.096	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	230.00	----	0.088		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	2.80	----	0.240	J	2,3,7,8-TCDD-37Cl4	0.20	90
1,2,3,6,7,8-HxCDD	15.00	----	0.190				
1,2,3,7,8,9-HxCDD	5.80	----	0.240				
Total HxCDD	87.00	----	0.220				
1,2,3,4,6,7,8-HpCDF	100.00	----	0.250		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	9.60	----	0.270		Equivalence: 15 ng/Kg		
Total HpCDF	420.00	----	0.260		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	290.00	----	0.140				
Total HpCDD	520.00	----	0.140				
OCDF	310.00	----	0.180				
OCDD	2500.00	----	0.170				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value

B = Less than 10x higher than method blank level

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816012			
Lab Sample ID	40140496011			
Filename	U161201A_11			
Injected By	SMT			
Total Amount Extracted	12.6 g	Matrix	Solid	
% Moisture	28.0	Dilution	NA	
Dry Weight Extracted	9.07 g	Collected	10/18/2016 12:45	
ICAL ID	U161025	Received	10/21/2016 09:30	
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25	
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 01:25	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.96	----	0.260	J	2,3,7,8-TCDF-13C	2.00	73
Total TCDF	11.00	----	0.260		2,3,7,8-TCDD-13C	2.00	83
					1,2,3,7,8-PeCDF-13C	2.00	82
2,3,7,8-TCDD	ND	----	0.160		2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	0.80	----	0.160	J	1,2,3,7,8-PeCDD-13C	2.00	86
					1,2,3,4,7,8-HxCDF-13C	2.00	75
1,2,3,7,8-PeCDF	5.40	----	0.130	J	1,2,3,6,7,8-HxCDF-13C	2.00	64
2,3,4,7,8-PeCDF	11.00	----	0.110		2,3,4,6,7,8-HxCDF-13C	2.00	70
Total PeCDF	120.00	----	0.120		1,2,3,7,8,9-HxCDF-13C	2.00	63
					1,2,3,4,7,8-HxCDD-13C	2.00	80
1,2,3,7,8-PeCDD	1.50	----	0.140	J	1,2,3,6,7,8-HxCDD-13C	2.00	58
Total PeCDD	13.00	----	0.140		1,2,3,4,6,7,8-HpCDF-13C	2.00	59
					1,2,3,4,7,8,9-HpCDF-13C	2.00	66
1,2,3,4,7,8-HxCDF	35.00	----	0.190		1,2,3,4,6,7,8-HpCDD-13C	2.00	73
1,2,3,6,7,8-HxCDF	17.00	----	0.220		OCDD-13C	4.00	74
2,3,4,6,7,8-HxCDF	6.40	----	0.180				
1,2,3,7,8,9-HxCDF	16.00	----	0.180		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	630.00	----	0.190		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	5.30	----	0.230	J	2,3,7,8-TCDD-37Cl4	0.20	86
1,2,3,6,7,8-HxCDD	39.00	----	0.180				
1,2,3,7,8,9-HxCDD	11.00	----	0.260				
Total HxCDD	170.00	----	0.220				
1,2,3,4,6,7,8-HpCDF	360.00	----	0.084		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	35.00	----	0.130		Equivalence: 45 ng/Kg		
Total HpCDF	1500.00	----	0.100		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	950.00	----	0.084				
Total HpCDD	1700.00	----	0.084				
OCDF	1200.00	----	0.120				
OCDD	11000.00	----	0.160	E			

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

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

Results reported on a dry weight basis and are valid to no more than 2 significant figures.  
J = Estimated value  
E = Exceeds calibration range

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816013			
Lab Sample ID	40140496012			
Filename	U161201A_12			
Injected By	SMT			
Total Amount Extracted	12.4 g	Matrix	Solid	
% Moisture	21.6	Dilution	NA	
Dry Weight Extracted	9.72 g	Collected	10/18/2016 12:45	
ICAL ID	U161025	Received	10/21/2016 09:30	
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25	
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 02:11	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.20	----	0.082	J	2,3,7,8-TCDF-13C	2.00	70
Total TCDF	0.52	----	0.082	J	2,3,7,8-TCDD-13C	2.00	81
					1,2,3,7,8-PeCDF-13C	2.00	79
2,3,7,8-TCDD	ND	----	0.083		2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	ND	----	0.083		1,2,3,7,8-PeCDD-13C	2.00	84
					1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	----	0.085		1,2,3,6,7,8-HxCDF-13C	2.00	63
2,3,4,7,8-PeCDF	ND	----	0.070		2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	0.34	----	0.077	J	1,2,3,7,8,9-HxCDF-13C	2.00	67
					1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	ND	----	0.078		1,2,3,6,7,8-HxCDD-13C	2.00	62
Total PeCDD	ND	----	0.078		1,2,3,4,6,7,8-HpCDF-13C	2.00	57
					1,2,3,4,7,8,9-HpCDF-13C	2.00	63
1,2,3,4,7,8-HxCDF	----	0.14	0.100	IJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	67
1,2,3,6,7,8-HxCDF	0.14	----	0.092	J	OCDD-13C	4.00	64
2,3,4,6,7,8-HxCDF	0.17	----	0.062	J			
1,2,3,7,8,9-HxCDF	ND	----	0.084		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	1.80	----	0.085	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.083		2,3,7,8-TCDD-37Cl4	0.20	83
1,2,3,6,7,8-HxCDD	0.18	----	0.099	J			
1,2,3,7,8,9-HxCDD	ND	----	0.091				
Total HxCDD	1.50	----	0.091	J			
1,2,3,4,6,7,8-HpCDF	2.70	----	0.073	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	0.21	----	0.088	J	Equivalence: 0.24 ng/Kg		
Total HpCDF	8.70	----	0.081		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	5.80	----	0.086				
Total HpCDD	9.90	----	0.086				
OCDF	9.40	----	0.210	J			
OCDD	65.00	----	0.180				

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

ND = Not Detected  
NA = Not Applicable  
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I = Interference present

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816015			
Lab Sample ID	40140496013			
Filename	U161201A_13			
Injected By	SMT			
Total Amount Extracted	12.6 g	Matrix	Solid	
% Moisture	8.6	Dilution	NA	
Dry Weight Extracted	11.5 g	Collected	10/18/2016 10:17	
ICAL ID	U161025	Received	10/21/2016 09:30	
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25	
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 02:57	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.25	----	0.075	J	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	3.90	----	0.160		2,3,7,8-TCDD-13C	2.00	87
					1,2,3,7,8-PeCDF-13C	2.00	80
2,3,7,8-TCDD	ND	----	0.091		2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	0.71	----	0.091	J	1,2,3,7,8-PeCDD-13C	2.00	88
					1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	0.61	----	0.110	J	1,2,3,6,7,8-HxCDF-13C	2.00	67
2,3,4,7,8-PeCDF	1.60	----	0.091	J	2,3,4,6,7,8-HxCDF-13C	2.00	72
Total PeCDF	22.00	----	0.098		1,2,3,7,8,9-HxCDF-13C	2.00	68
					1,2,3,4,7,8-HxCDD-13C	2.00	82
1,2,3,7,8-PeCDD	0.32	----	0.085	J	1,2,3,6,7,8-HxCDD-13C	2.00	59
Total PeCDD	2.10	----	0.085	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	57
					1,2,3,4,7,8,9-HpCDF-13C	2.00	65
1,2,3,4,7,8-HxCDF	3.40	----	0.077	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	69
1,2,3,6,7,8-HxCDF	1.60	----	0.090	J	OCDD-13C	4.00	65
2,3,4,6,7,8-HxCDF	2.20	----	0.095	J			
1,2,3,7,8,9-HxCDF	1.40	----	0.079	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	73.00	----	0.086		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.10	----	0.130	J	2,3,7,8-TCDD-37Cl4	0.20	88
1,2,3,6,7,8-HxCDD	5.00	----	0.044				
1,2,3,7,8,9-HxCDD	1.60	----	0.043	J			
Total HxCDD	24.00	----	0.073				
1,2,3,4,6,7,8-HpCDF	41.00	----	0.120		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	3.70	----	0.110	J	Equivalence: 5.3 ng/Kg		
Total HpCDF	160.00	----	0.120		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	110.00	----	0.093				
Total HpCDD	190.00	----	0.093				
OCDF	130.00	----	0.110				
OCDD	970.00	----	0.170				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

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### Method 1613B Sample Analysis Results

Client - PACE Wisconsin

Client's Sample ID	101816016			
Lab Sample ID	40140496014			
Filename	U161201A_14			
Injected By	SMT			
Total Amount Extracted	15.1 g	Matrix	Solid	
% Moisture	58.7	Dilution	NA	
Dry Weight Extracted	6.24 g	Collected	10/18/2016 10:17	
ICAL ID	U161025	Received	10/21/2016 09:30	
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25	
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 03:43	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.40	----	0.16	J	2,3,7,8-TCDF-13C	2.00	80
Total TCDF	1.90	----	0.16	J	2,3,7,8-TCDD-13C	2.00	93
					1,2,3,7,8-PeCDF-13C	2.00	88
2,3,7,8-TCDD	ND	----	0.20		2,3,4,7,8-PeCDF-13C	2.00	78
Total TCDD	ND	----	0.20		1,2,3,7,8-PeCDD-13C	2.00	93
					1,2,3,4,7,8-HxCDF-13C	2.00	82
1,2,3,7,8-PeCDF	ND	----	0.14		1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	0.31	----	0.10	J	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	4.20	----	0.12	J	1,2,3,7,8,9-HxCDF-13C	2.00	71
					1,2,3,4,7,8-HxCDD-13C	2.00	88
1,2,3,7,8-PeCDD	ND	----	0.11		1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	0.56	----	0.11	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	63
					1,2,3,4,7,8,9-HpCDF-13C	2.00	70
1,2,3,4,7,8-HxCDF	1.30	----	0.14	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	75
1,2,3,6,7,8-HxCDF	0.56	----	0.14	J	OCDD-13C	4.00	70
2,3,4,6,7,8-HxCDF	0.78	----	0.13	J			
1,2,3,7,8,9-HxCDF	0.36	----	0.17	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	23.00	----	0.15		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.40	----	0.21	J	2,3,7,8-TCDD-37Cl4	0.20	94
1,2,3,6,7,8-HxCDD	1.70	----	0.18	J			
1,2,3,7,8,9-HxCDD	0.72	----	0.28	J			
Total HxCDD	10.00	----	0.22	J			
1,2,3,4,6,7,8-HpCDF	21.00	----	0.23		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	1.60	----	0.26	J	Equivalence: 2.0 ng/Kg		
Total HpCDF	78.00	----	0.25		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	45.00	----	0.11				
Total HpCDD	80.00	----	0.11				
OCDF	85.00	----	0.25				
OCDD	510.00	----	0.42				

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

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

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J = Estimated value

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**Method 1613B Sample Analysis Results**

Client - PACE Wisconsin

Client's Sample ID	101816017			
Lab Sample ID	40140496015			
Filename	U161201A_15			
Injected By	SMT			
Total Amount Extracted	13.1 g	Matrix	Solid	
% Moisture	38.7	Dilution	NA	
Dry Weight Extracted	8.03 g	Collected	10/18/2016 10:18	
ICAL ID	U161025	Received	10/21/2016 09:30	
CCal Filename(s)	U161130B_15	Extracted	10/27/2016 16:25	
Method Blank ID	BLANK-52558	Analyzed	12/02/2016 04:30	

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.34	----	0.120	J	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	2.10	----	0.120	J	2,3,7,8-TCDD-13C	2.00	91
					1,2,3,7,8-PeCDF-13C	2.00	87
2,3,7,8-TCDD	ND	----	0.120		2,3,4,7,8-PeCDF-13C	2.00	79
Total TCDD	ND	----	0.120		1,2,3,7,8-PeCDD-13C	2.00	92
					1,2,3,4,7,8-HxCDF-13C	2.00	83
1,2,3,7,8-PeCDF	0.18	----	0.150	J	1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	0.45	----	0.099	J	2,3,4,6,7,8-HxCDF-13C	2.00	75
Total PeCDF	6.00	----	0.120	J	1,2,3,7,8,9-HxCDF-13C	2.00	74
					1,2,3,4,7,8-HxCDD-13C	2.00	90
1,2,3,7,8-PeCDD	ND	----	0.092		1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	0.89	----	0.092	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	63
					1,2,3,4,7,8,9-HpCDF-13C	2.00	71
1,2,3,4,7,8-HxCDF	1.20	----	0.110	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	76
1,2,3,6,7,8-HxCDF	0.46	----	0.120	J	OCDD-13C	4.00	70
2,3,4,6,7,8-HxCDF	----	0.60	0.120	I			
1,2,3,7,8,9-HxCDF	0.44	----	0.120	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	19.00	----	0.120		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.41	----	0.062	J	2,3,7,8-TCDD-37Cl4	0.20	93
1,2,3,6,7,8-HxCDD	1.60	----	0.075	J			
1,2,3,7,8,9-HxCDD	0.63	----	0.092	J			
Total HxCDD	9.90	----	0.076	J			
1,2,3,4,6,7,8-HpCDF	15.00	----	0.180		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	1.20	----	0.160	J	Equivalence: 1.8 ng/Kg		
Total HpCDF	56.00	----	0.170		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	38.00	----	0.065				
Total HpCDD	65.00	----	0.065				
OCDF	57.00	----	0.170				
OCDD	360.00	----	0.180				

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

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

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J = Estimated value  
I = Interference present

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### Method 1613B Blank Analysis Results

Lab Sample ID	BLANK-52534	Matrix	Solid
Filename	U161029A_02	Dilution	NA
Total Amount Extracted	20.6 g	Extracted	10/26/2016 15:55
ICAL ID	U161025	Analyzed	10/29/2016 06:54
CCal Filename(s)	U161028B_16	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.054	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	ND	----	0.054	2,3,7,8-TCDD-13C	2.00	92
				1,2,3,7,8-PeCDF-13C	2.00	77
2,3,7,8-TCDD	ND	----	0.067	2,3,4,7,8-PeCDF-13C	2.00	78
Total TCDD	ND	----	0.067	1,2,3,7,8-PeCDD-13C	2.00	85
				1,2,3,4,7,8-HxCDF-13C	2.00	75
1,2,3,7,8-PeCDF	ND	----	0.055	1,2,3,6,7,8-HxCDF-13C	2.00	77
2,3,4,7,8-PeCDF	ND	----	0.035	2,3,4,6,7,8-HxCDF-13C	2.00	78
Total PeCDF	ND	----	0.045	1,2,3,7,8,9-HxCDF-13C	2.00	86
				1,2,3,4,7,8-HxCDD-13C	2.00	72
1,2,3,7,8-PeCDD	ND	----	0.045	1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	ND	----	0.045	1,2,3,4,6,7,8-HpCDF-13C	2.00	70
				1,2,3,4,7,8,9-HpCDF-13C	2.00	74
1,2,3,4,7,8-HxCDF	ND	----	0.032	1,2,3,4,6,7,8-HpCDD-13C	2.00	81
1,2,3,6,7,8-HxCDF	ND	----	0.033	OCDD-13C	4.00	64
2,3,4,6,7,8-HxCDF	ND	----	0.033			
1,2,3,7,8,9-HxCDF	ND	----	0.039	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.034	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.043	2,3,7,8-TCDD-37Cl4	0.20	100
1,2,3,6,7,8-HxCDD	ND	----	0.039			
1,2,3,7,8,9-HxCDD	ND	----	0.040			
Total HxCDD	ND	----	0.041			
1,2,3,4,6,7,8-HpCDF	ND	----	0.028	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.036	Equivalence: 0.00073 ng/Kg		
Total HpCDF	ND	----	0.032	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	0.055	----	0.040 J			
Total HpCDD	0.055	----	0.040 J			
OCDF	ND	----	0.074			
OCDD	0.180	----	0.085 J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.

J = Estimated value

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### Method 1613B Blank Analysis Results

Lab Sample ID	BLANK-52542	Matrix	Solid
Filename	F161030B_04	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 13:30
CCal Filename(s)	F161030B_01	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.079	2,3,7,8-TCDF-13C	2.00	74
Total TCDF	ND	----	0.079	2,3,7,8-TCDD-13C	2.00	87
				1,2,3,7,8-PeCDF-13C	2.00	78
2,3,7,8-TCDD	ND	----	0.130	2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	ND	----	0.130	1,2,3,7,8-PeCDD-13C	2.00	80
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	----	0.049	1,2,3,6,7,8-HxCDF-13C	2.00	82
2,3,4,7,8-PeCDF	ND	----	0.033	2,3,4,6,7,8-HxCDF-13C	2.00	83
Total PeCDF	ND	----	0.041	1,2,3,7,8,9-HxCDF-13C	2.00	83
				1,2,3,4,7,8-HxCDD-13C	2.00	75
1,2,3,7,8-PeCDD	ND	----	0.059	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	ND	----	0.059	1,2,3,4,6,7,8-HpCDF-13C	2.00	64
				1,2,3,4,7,8,9-HpCDF-13C	2.00	62
1,2,3,4,7,8-HxCDF	ND	----	0.035	1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	----	0.032	OCDD-13C	4.00	50
2,3,4,6,7,8-HxCDF	ND	----	0.043			
1,2,3,7,8,9-HxCDF	ND	----	0.058	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.042	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.057	2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	ND	----	0.067			
1,2,3,7,8,9-HxCDD	ND	----	0.083			
Total HxCDD	ND	----	0.069			
1,2,3,4,6,7,8-HpCDF	ND	----	0.037	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.056	Equivalence: 0.00024 ng/Kg		
Total HpCDF	ND	----	0.047	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	0.062			
Total HpCDD	ND	----	0.062			
OCDF	ND	----	0.140			
OCDD	----	0.24	0.150 J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

EDL = Estimated Detection Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.

J = Estimated value

I = Interference present

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**Method 1613B Blank Analysis Results**

Lab Sample ID	BLANK-52558	Matrix	Solid
Filename	U161101B_15	Dilution	NA
Total Amount Extracted	20.4 g	Extracted	10/27/2016 16:25
ICAL ID	U161025	Analyzed	11/02/2016 01:42
CCal Filename(s)	U161101B_03	Injected By	SMT

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.031	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	ND	----	0.031	2,3,7,8-TCDD-13C	2.00	92
				1,2,3,7,8-PeCDF-13C	2.00	85
2,3,7,8-TCDD	ND	----	0.033	2,3,4,7,8-PeCDF-13C	2.00	80
Total TCDD	0.042	----	0.033 J	1,2,3,7,8-PeCDD-13C	2.00	99
				1,2,3,4,7,8-HxCDF-13C	2.00	76
1,2,3,7,8-PeCDF	ND	----	0.039	1,2,3,6,7,8-HxCDF-13C	2.00	74
2,3,4,7,8-PeCDF	ND	----	0.023	2,3,4,6,7,8-HxCDF-13C	2.00	78
Total PeCDF	ND	----	0.031	1,2,3,7,8,9-HxCDF-13C	2.00	78
				1,2,3,4,7,8-HxCDD-13C	2.00	84
1,2,3,7,8-PeCDD	ND	----	0.029	1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD	ND	----	0.029	1,2,3,4,6,7,8-HpCDF-13C	2.00	75
				1,2,3,4,7,8,9-HpCDF-13C	2.00	79
1,2,3,4,7,8-HxCDF	ND	----	0.027	1,2,3,4,6,7,8-HpCDD-13C	2.00	90
1,2,3,6,7,8-HxCDF	ND	----	0.023	OCDD-13C	4.00	75
2,3,4,6,7,8-HxCDF	ND	----	0.021			
1,2,3,7,8,9-HxCDF	ND	----	0.026	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.024	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.036	2,3,7,8-TCDD-37Cl4	0.20	84
1,2,3,6,7,8-HxCDD	ND	----	0.035			
1,2,3,7,8,9-HxCDD	ND	----	0.037			
Total HxCDD	ND	----	0.036			
1,2,3,4,6,7,8-HpCDF	ND	----	0.036	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.038	Equivalence: 0.00063 ng/Kg		
Total HpCDF	ND	----	0.037	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	----	0.046	0.028 U			
Total HpCDD	0.076	----	0.028 J			
OCDF	ND	----	0.055			
OCDD	----	0.170	0.061 U			

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

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

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### Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-52535	Matrix	Solid
Filename	U161028B_01	Dilution	NA
Total Amount Extracted	20.0 g	Extracted	10/26/2016 15:55
ICAL ID	U161025	Analyzed	10/28/2016 17:37
CCal Filename	U161028A_11	Injected By	BAL
Method Blank ID	BLANK-52534		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	10	7.5	15.8	102
2,3,7,8-TCDD	10	8.7	6.7	15.8	87
1,2,3,7,8-PeCDF	50	53	40.0	67.0	106
2,3,4,7,8-PeCDF	50	57	34.0	80.0	114
1,2,3,7,8-PeCDD	50	48	35.0	71.0	96
1,2,3,4,7,8-HxCDF	50	56	36.0	67.0	111
1,2,3,6,7,8-HxCDF	50	54	42.0	65.0	107
2,3,4,6,7,8-HxCDF	50	52	35.0	78.0	104
1,2,3,7,8,9-HxCDF	50	49	39.0	65.0	97
1,2,3,4,7,8-HxCDD	50	56	35.0	82.0	112
1,2,3,6,7,8-HxCDD	50	58	38.0	67.0	116
1,2,3,7,8,9-HxCDD	50	59	32.0	81.0	118
1,2,3,4,6,7,8-HpCDF	50	57	41.0	61.0	113
1,2,3,4,7,8,9-HpCDF	50	51	39.0	69.0	101
1,2,3,4,6,7,8-HpCDD	50	48	35.0	70.0	97
OCDF	100	100	63.0	170.0	101
OCDD	100	110	78.0	144.0	108
2,3,7,8-TCDD-37Cl4	10	9.0	3.1	19.1	90
2,3,7,8-TCDF-13C	100	77	22.0	152.0	77
2,3,7,8-TCDD-13C	100	92	20.0	175.0	92
1,2,3,7,8-PeCDF-13C	100	77	21.0	192.0	77
2,3,4,7,8-PeCDF-13C	100	76	13.0	328.0	76
1,2,3,7,8-PeCDD-13C	100	83	21.0	227.0	83
1,2,3,4,7,8-HxCDF-13C	100	76	19.0	202.0	76
1,2,3,6,7,8-HxCDF-13C	100	75	21.0	159.0	75
2,3,4,6,7,8-HxCDF-13C	100	80	22.0	176.0	80
1,2,3,7,8,9-HxCDF-13C	100	90	17.0	205.0	90
1,2,3,4,7,8-HxCDD-13C	100	81	21.0	193.0	81
1,2,3,6,7,8-HxCDD-13C	100	68	25.0	163.0	68
1,2,3,4,6,7,8-HpCDF-13C	100	74	21.0	158.0	74
1,2,3,4,7,8,9-HpCDF-13C	100	83	20.0	186.0	83
1,2,3,4,6,7,8-HpCDD-13C	100	91	26.0	166.0	91
OCDD-13C	200	150	26.0	397.0	76

Cs = Concentration Spiked (ng/mL)  
 Cr = Concentration Recovered (ng/mL)  
 Rec. = Recovery (Expressed as Percent)  
 Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
 R = Recovery outside of control limits  
 Nn = Value obtained from additional analysis  
 \* = See Discussion

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## Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-52543	Matrix	Solid
Filename	F161030B_02	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 11:54
CCal Filename	F161030B_01	Injected By	BAL
Method Blank ID	BLANK-52542		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	105
2,3,7,8-TCDD	10	8.3	6.7	15.8	83
1,2,3,7,8-PeCDF	50	57	40.0	67.0	115
2,3,4,7,8-PeCDF	50	60	34.0	80.0	120
1,2,3,7,8-PeCDD	50	50	35.0	71.0	100
1,2,3,4,7,8-HxCDF	50	60	36.0	67.0	119
1,2,3,6,7,8-HxCDF	50	56	42.0	65.0	112
2,3,4,6,7,8-HxCDF	50	53	35.0	78.0	106
1,2,3,7,8,9-HxCDF	50	52	39.0	65.0	104
1,2,3,4,7,8-HxCDD	50	59	35.0	82.0	118
1,2,3,6,7,8-HxCDD	50	58	38.0	67.0	115
1,2,3,7,8,9-HxCDD	50	58	32.0	81.0	117
1,2,3,4,6,7,8-HpCDF	50	52	41.0	61.0	103
1,2,3,4,7,8,9-HpCDF	50	48	39.0	69.0	96
1,2,3,4,6,7,8-HpCDD	50	45	35.0	70.0	91
OCDF	100	110	63.0	170.0	109
OCDD	100	100	78.0	144.0	101
2,3,7,8-TCDD-37Cl4	10	8.1	3.1	19.1	81
2,3,7,8-TCDF-13C	100	81	22.0	152.0	81
2,3,7,8-TCDD-13C	100	94	20.0	175.0	94
1,2,3,7,8-PeCDF-13C	100	86	21.0	192.0	86
2,3,4,7,8-PeCDF-13C	100	81	13.0	328.0	81
1,2,3,7,8-PeCDD-13C	100	92	21.0	227.0	92
1,2,3,4,7,8-HxCDF-13C	100	80	19.0	202.0	80
1,2,3,6,7,8-HxCDF-13C	100	90	21.0	159.0	90
2,3,4,6,7,8-HxCDF-13C	100	89	22.0	176.0	89
1,2,3,7,8,9-HxCDF-13C	100	91	17.0	205.0	91
1,2,3,4,7,8-HxCDD-13C	100	77	21.0	193.0	77
1,2,3,6,7,8-HxCDD-13C	100	76	25.0	163.0	76
1,2,3,4,6,7,8-HpCDF-13C	100	68	21.0	158.0	68
1,2,3,4,7,8,9-HpCDF-13C	100	69	20.0	186.0	69
1,2,3,4,6,7,8-HpCDD-13C	100	81	26.0	166.0	81
OCDD-13C	200	110	26.0	397.0	55

Cs = Concentration Spiked (ng/mL)  
Cr = Concentration Recovered (ng/mL)  
Rec. = Recovery (Expressed as Percent)  
Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
R = Recovery outside of control limits  
Nn = Value obtained from additional analysis  
\* = See Discussion

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### Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-52559	Matrix	Solid
Filename	U161101B_18	Dilution	NA
Total Amount Extracted	20.1 g	Extracted	10/27/2016 16:25
ICAL ID	U161025	Analyzed	11/02/2016 04:01
CCal Filename	U161101B_03	Injected By	SMT
Method Blank ID	BLANK-52558		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	9.6	7.5	15.8	96
2,3,7,8-TCDD	10	8.5	6.7	15.8	85
1,2,3,7,8-PeCDF	50	49	40.0	67.0	97
2,3,4,7,8-PeCDF	50	52	34.0	80.0	104
1,2,3,7,8-PeCDD	50	48	35.0	71.0	95
1,2,3,4,7,8-HxCDF	50	54	36.0	67.0	107
1,2,3,6,7,8-HxCDF	50	52	42.0	65.0	103
2,3,4,6,7,8-HxCDF	50	49	35.0	78.0	97
1,2,3,7,8,9-HxCDF	50	50	39.0	65.0	101
1,2,3,4,7,8-HxCDD	50	54	35.0	82.0	109
1,2,3,6,7,8-HxCDD	50	57	38.0	67.0	114
1,2,3,7,8,9-HxCDD	50	56	32.0	81.0	112
1,2,3,4,6,7,8-HpCDF	50	54	41.0	61.0	107
1,2,3,4,7,8,9-HpCDF	50	50	39.0	69.0	100
1,2,3,4,6,7,8-HpCDD	50	48	35.0	70.0	97
OCDF	100	95	63.0	170.0	95
OCDD	100	110	78.0	144.0	106
2,3,7,8-TCDD-37Cl4	10	8.1	3.1	19.1	81
2,3,7,8-TCDF-13C	100	67	22.0	152.0	67
2,3,7,8-TCDD-13C	100	83	20.0	175.0	83
1,2,3,7,8-PeCDF-13C	100	77	21.0	192.0	77
2,3,4,7,8-PeCDF-13C	100	73	13.0	328.0	73
1,2,3,7,8-PeCDD-13C	100	90	21.0	227.0	90
1,2,3,4,7,8-HxCDF-13C	100	70	19.0	202.0	70
1,2,3,6,7,8-HxCDF-13C	100	67	21.0	159.0	67
2,3,4,6,7,8-HxCDF-13C	100	75	22.0	176.0	75
1,2,3,7,8,9-HxCDF-13C	100	76	17.0	205.0	76
1,2,3,4,7,8-HxCDD-13C	100	80	21.0	193.0	80
1,2,3,6,7,8-HxCDD-13C	100	63	25.0	163.0	63
1,2,3,4,6,7,8-HpCDF-13C	100	75	21.0	158.0	75
1,2,3,4,7,8,9-HpCDF-13C	100	81	20.0	186.0	81
1,2,3,4,6,7,8-HpCDD-13C	100	91	26.0	166.0	91
OCDD-13C	200	160	26.0	397.0	78

Cs = Concentration Spiked (ng/mL)  
 Cr = Concentration Recovered (ng/mL)  
 Rec. = Recovery (Expressed as Percent)  
 Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
 R = Recovery outside of control limits  
 Nn = Value obtained from additional analysis  
 \* = See Discussion

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### Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCSD-52544	Matrix	Solid
Filename	F161030B_03	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	10/26/2016 15:55
ICAL ID	F161011	Analyzed	10/30/2016 12:41
CCal Filename	F161030B_01	Injected By	BAL
Method Blank ID	BLANK-52542		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	109
2,3,7,8-TCDD	10	8.0	6.7	15.8	80
1,2,3,7,8-PeCDF	50	55	40.0	67.0	110
2,3,4,7,8-PeCDF	50	59	34.0	80.0	118
1,2,3,7,8-PeCDD	50	49	35.0	71.0	98
1,2,3,4,7,8-HxCDF	50	57	36.0	67.0	114
1,2,3,6,7,8-HxCDF	50	55	42.0	65.0	110
2,3,4,6,7,8-HxCDF	50	53	35.0	78.0	105
1,2,3,7,8,9-HxCDF	50	49	39.0	65.0	99
1,2,3,4,7,8-HxCDD	50	57	35.0	82.0	115
1,2,3,6,7,8-HxCDD	50	59	38.0	67.0	117
1,2,3,7,8,9-HxCDD	50	58	32.0	81.0	116
1,2,3,4,6,7,8-HpCDF	50	51	41.0	61.0	102
1,2,3,4,7,8,9-HpCDF	50	47	39.0	69.0	94
1,2,3,4,6,7,8-HpCDD	50	45	35.0	70.0	90
OCDF	100	110	63.0	170.0	110
OCDD	100	110	78.0	144.0	107
2,3,7,8-TCDD-37Cl4	10	7.7	3.1	19.1	77
2,3,7,8-TCDF-13C	100	73	22.0	152.0	73
2,3,7,8-TCDD-13C	100	88	20.0	175.0	88
1,2,3,7,8-PeCDF-13C	100	77	21.0	192.0	77
2,3,4,7,8-PeCDF-13C	100	74	13.0	328.0	74
1,2,3,7,8-PeCDD-13C	100	81	21.0	227.0	81
1,2,3,4,7,8-HxCDF-13C	100	75	19.0	202.0	75
1,2,3,6,7,8-HxCDF-13C	100	79	21.0	159.0	79
2,3,4,6,7,8-HxCDF-13C	100	79	22.0	176.0	79
1,2,3,7,8,9-HxCDF-13C	100	81	17.0	205.0	81
1,2,3,4,7,8-HxCDD-13C	100	67	21.0	193.0	67
1,2,3,6,7,8-HxCDD-13C	100	70	25.0	163.0	70
1,2,3,4,6,7,8-HpCDF-13C	100	61	21.0	158.0	61
1,2,3,4,7,8,9-HpCDF-13C	100	62	20.0	186.0	62
1,2,3,4,6,7,8-HpCDD-13C	100	73	26.0	166.0	73
OCDD-13C	200	98	26.0	397.0	49

Cs = Concentration Spiked (ng/mL)  
 Cr = Concentration Recovered (ng/mL)  
 Rec. = Recovery (Expressed as Percent)  
 Control Limit Reference: Method 1613, Table 6, 10/94 Revision  
 R = Recovery outside of control limits  
 Nn = Value obtained from additional analysis  
 \* = See Discussion

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**Method 1613B**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client PACE Wisconsin

Spike 1 ID LCS-52543  
Spike 1 Filename F161030B\_02

Spike 2 ID LCSD-52544  
Spike 2 Filename F161030B\_03

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	105	109	3.7
2,3,7,8-TCDD	83	80	3.7
1,2,3,7,8-PeCDF	115	110	4.4
2,3,4,7,8-PeCDF	120	118	1.7
1,2,3,7,8-PeCDD	100	98	2.0
1,2,3,4,7,8-HxCDF	119	114	4.3
1,2,3,6,7,8-HxCDF	112	110	1.8
2,3,4,6,7,8-HxCDF	106	105	0.9
1,2,3,7,8,9-HxCDF	104	99	4.9
1,2,3,4,7,8-HxCDD	118	115	2.6
1,2,3,6,7,8-HxCDD	115	117	1.7
1,2,3,7,8,9-HxCDD	117	116	0.9
1,2,3,4,6,7,8-HpCDF	103	102	1.0
1,2,3,4,7,8,9-HpCDF	96	94	2.1
1,2,3,4,6,7,8-HpCDD	91	90	1.1
OCDF	109	110	0.9
OCDD	101	107	5.8

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

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### Method 1613B Spiked Sample Report

Client - PACE Wisconsin

Client's Sample ID	101816012-MS	Matrix	Solid
Lab Sample ID	40140496011-MS	Dilution	NA
Filename	U161227B_14	Extracted	10/27/2016 16:25
Total Amount Extracted	12.5 g	Analyzed	12/28/2016 11:22
ICAL ID	U161025	Injected By	BAL
CCal Filename(s)	U161227A_18		
Method Blank ID	BLANK-52558		

Native Isomers	Qs (ng)	Qm (ng)	% Rec.	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.20	0.19	94	2,3,7,8-TCDF-13C	2.00	75
Total TCDF				2,3,7,8-TCDD-13C	2.00	89
				1,2,3,7,8-PeCDF-13C	2.00	67
2,3,7,8-TCDD	0.20	0.17	84	2,3,4,7,8-PeCDF-13C	2.00	63
Total TCDD				1,2,3,7,8-PeCDD-13C	2.00	74
				1,2,3,4,7,8-HxCDF-13C	2.00	72
1,2,3,7,8-PeCDF	1.00	0.99	99	1,2,3,6,7,8-HxCDF-13C	2.00	74
2,3,4,7,8-PeCDF	1.00	1.09	109	2,3,4,6,7,8-HxCDF-13C	2.00	76
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.00	73
				1,2,3,4,7,8-HxCDD-13C	2.00	81
1,2,3,7,8-PeCDD	1.00	0.97	97	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.00	66
				1,2,3,4,7,8,9-HpCDF-13C	2.00	69
1,2,3,4,7,8-HxCDF	1.00	1.23	123	1,2,3,4,6,7,8-HpCDD-13C	2.00	74
1,2,3,6,7,8-HxCDF	1.00	1.12	112	OCDD-13C	4.00	67
2,3,4,6,7,8-HxCDF	1.00	1.06	106			
1,2,3,7,8,9-HxCDF	1.00	1.03	103	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF				1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.00	1.04	104	2,3,7,8-TCDD-37Cl4	0.20	82
1,2,3,6,7,8-HxCDD	1.00	1.41	141			
1,2,3,7,8,9-HxCDD	1.00	1.18	118			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.00	3.60	360			
1,2,3,4,7,8,9-HpCDF	1.00	1.24	124			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.00	7.92	792			
Total HpCDD						
OCDF	2.00	11.43	572			
OCDD	2.00	76.89	3845 E			

Qs = Quantity Spiked                      Qm = Quantity Measured                      Rec. = Recovery (Expressed as Percent)  
 %REC = Percent Recovered  
 RPD = The difference between the two values divided by the mean value

## REPORT OF LABORATORY ANALYSIS

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### Method 1613B Spiked Sample Report

Client - PACE Wisconsin

Client's Sample ID	101816012-MSD	Matrix	Solid
Lab Sample ID	40140496011-MSD	Dilution	NA
Filename	U161227B_15	Extracted	10/27/2016 16:25
Total Amount Extracted	12.5 g	Analyzed	12/28/2016 12:07
ICAL ID	U161025	Injected By	BAL
CCal Filename(s)	U161227A_18		
Method Blank ID	BLANK-52558		

Native Isomers	Qs (ng)	Qm (ng)	% Rec.	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.20	0.20	98	2,3,7,8-TCDF-13C	2.00	80
Total TCDF				2,3,7,8-TCDD-13C	2.00	94
				1,2,3,7,8-PeCDF-13C	2.00	74
2,3,7,8-TCDD	0.20	0.17	84	2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD				1,2,3,7,8-PeCDD-13C	2.00	83
				1,2,3,4,7,8-HxCDF-13C	2.00	74
1,2,3,7,8-PeCDF	1.00	0.99	99	1,2,3,6,7,8-HxCDF-13C	2.00	74
2,3,4,7,8-PeCDF	1.00	1.11	111	2,3,4,6,7,8-HxCDF-13C	2.00	77
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.00	71
				1,2,3,4,7,8-HxCDD-13C	2.00	84
1,2,3,7,8-PeCDD	1.00	0.95	95	1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.00	68
				1,2,3,4,7,8,9-HpCDF-13C	2.00	71
1,2,3,4,7,8-HxCDF	1.00	1.46	146	1,2,3,4,6,7,8-HpCDD-13C	2.00	80
1,2,3,6,7,8-HxCDF	1.00	1.16	116	OCDD-13C	4.00	76
2,3,4,6,7,8-HxCDF	1.00	1.09	109			
1,2,3,7,8,9-HxCDF	1.00	1.14	114	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF				1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.00	1.12	112	2,3,7,8-TCDD-37Cl4	0.20	95
1,2,3,6,7,8-HxCDD	1.00	1.43	143			
1,2,3,7,8,9-HxCDD	1.00	1.17	117			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.00	4.99	499			
1,2,3,4,7,8,9-HpCDF	1.00	1.38	138			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.00	9.99	999			
Total HpCDD						
OCDF	2.00	13.06	653			
OCDD	2.00	99.99	5000 E			

Qs = Quantity Spiked                      Qm = Quantity Measured                      Rec. = Recovery (Expressed as Percent)

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

## REPORT OF LABORATORY ANALYSIS

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### Method 1613 Spike Sample Results

Client - PACE Wisconsin

Client Sample ID	101816012					<u>Dry Weights</u>	
Lab Sample ID	40140496011	Sample Filename	U161201A_11	Sample Amount	9.07 g		
MS ID	40140496011-MS	MS Filename	U161227B_14	MS Amount	9.0 g		
MSD ID	40140496011-MSD	MSD Filename	U161227B_15	MSD Amount	9.0 g		

Analyte	Sample Conc. ng/Kg	MS/MSD Qs (ng)	MS Qm (ng)	MSD Qm (ng)	RPD	Background Subtracted		
						MS % Rec.	MSD % Rec.	RPD
2,3,7,8-TCDF	0.957	0.20	0.19	0.20	3.7	90	94	3.8
2,3,7,8-TCDD	0.000	0.20	0.17	0.17	0.3	84	84	0.3
1,2,3,7,8-PeCDF	5.382	1.00	0.99	0.99	0.6	95	94	0.6
2,3,4,7,8-PeCDF	10.762	1.00	1.09	1.11	2.2	99	102	2.4
1,2,3,7,8-PeCDD	1.451	1.00	0.97	0.95	2.5	96	93	2.6
1,2,3,4,7,8-HxCDF	35.154	1.00	1.23	1.46	17.5	91	115	22.9
1,2,3,6,7,8-HxCDF	16.564	1.00	1.12	1.16	3.0	97	101	3.5
2,3,4,6,7,8-HxCDF	6.393	1.00	1.06	1.09	2.6	100	103	2.7
1,2,3,7,8,9-HxCDF	16.348	1.00	1.03	1.14	9.9	89	99	11.4
1,2,3,4,7,8-HxCDD	5.292	1.00	1.04	1.12	7.5	99	107	7.8
1,2,3,6,7,8-HxCDD	39.207	1.00	1.41	1.43	1.1	106	108	1.5
1,2,3,7,8,9-HxCDD	10.862	1.00	1.18	1.17	0.3	108	107	0.3
1,2,3,4,6,7,8-HpCDF	355.814	1.00	3.60	4.99	32.4	40	179	127.5
1,2,3,4,7,8,9-HpCDF	35.455	1.00	1.24	1.38	10.1	93	106	13.3
1,2,3,4,6,7,8-HpCDD	950.589	1.00	7.92	9.99	23.1	0	144	200.0
OCDF	1169.231	2.00	11.43	13.06	13.3	45	127	94.5
OCDD	11002.369	2.00	76.89	99.99	26.1	0	49	200.0

#### Definitions

MS = Matrix Spike	CDD = Chlorinated dibenzo-p-dioxin
MSD = Matrix Spike Duplicate	CDF = Chlorinated dibenzo-p-furan
Qm = Quantity Measured	T = Tetra
Qs = Quantity Spiked	Pe = Penta
% Rec. = Percent Recovery	Hx = Hexa
RPD = Relative Percent Difference	Hp = Hepta
NA = Not Applicable	O = Octa
NC = Not Calculated	