Site Investigation Report
Wood Waste Burning Soil Sampling

BRRTS No. 02-37-000006

Wauleco, Inc.
Wausau, Wisconsin

October 2019

Prepared For
Wauleco, Inc.

Prepared By
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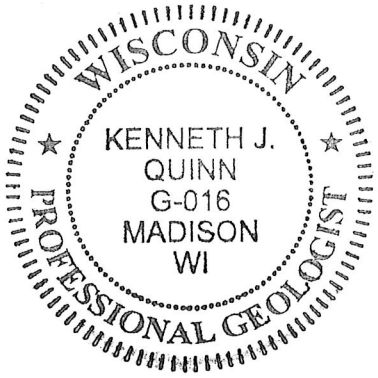
Professional Certification

"I, Kenneth J. Quinn, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs.NR 700 to 726, Wis. Admin. Code."



Senior Project Hydrogeologist / G-016

P.G. Stamp

Section 2
Background and Executive Summary

Background

This Site Investigation Report constitutes the final in a series of reports and technical memoranda submitted by Wauleco, Inc. ("Wauleco") on the topic of historical wood burning at the Wauleco site. These reports are in response to a letter from the Wisconsin Department of Natural Resources ("WDNR" or the "Department") dated January 15, 2019 requesting information and a work plan to identify aerial deposition of contaminants that may have resulted from the historical combustion of wood waste generated at the Wauleco facility.

- The WDNR's request for information and a work plan was prompted when the Department received information regarding historical burning of wood waste at the Wauleco site.
- This information consisted of an undated newspaper clipping, an excerpt of a report filed in contested litigation, and a 1984 document which contains the phrase "the wood scraps are burned."

The Department's letter was directed to Wauleco as the current owner of the site. In response to the Department's request, Wauleco undertook an extensive review of its historical documents. It summarized its findings and conclusions about historical wood burning in a letter to the Department dated March 15, 2019. These conclusions included:

- Wood was burned at the facility for heat and steam. The site had two boilers-- one gas and one wood—that exhausted at one stack.
- The records indicate that after 1970 the site predominantly relied on the gas fired boiler for heat and steam. Accordingly, wood waste incineration dramatically declined by the early 1970s and completely ceased in 1987.
- In a letter from the facility to WDNR in 1971, Harris-Crestline reported that wood was burned at the rate of 300 to 500 pounds per hour, based on an eight-hour operation day. This would convert to 48,000-80,000 pounds (or 24 to 40 tons) per month, much less than the "up to 400 tons" suggested in the undated newspaper clipping provided to the Department as evidence of Wauleco's historic woodburning practices.
- The facility interacted with WDNR concerning these operations, and obtained permits for the former wood-fired boiler.
- The window manufacturing processes at the facility were such that kiln-dried lumber was cut and milled before being surface coated with PCP. Thus, the overwhelming majority of wood burned on-site was not surface coated with PCP (and correspondingly less products of incomplete combustion (PICs), such as dioxins, would be expected to be produced).

Following the analysis of documents, Wauleco also undertook a thorough review of stack information and historical wind patterns in an effort to identify where materials from the Wauleco site would have been most likely deposited. Wauleco submitted its wind pattern assessment to the Department for review and approval. This analysis was also posted by WDNR on Wauleco's BRRTS site. The Department approved the analysis on May 31, 2019. Highlights include:

- The presence of Wausau's Rib Mountain provides for a very steady distinct prevailing wind pattern in the vicinity of Wauleco. These wind patterns and boiler stack exhaust parameters were used in a computer model to identify areas most likely to be affected by aerial deposition from Wauleco.
- Based on the air model results, the maximum predicted aerial distribution is along the primary axes, shown in the four colored lines below:

Based on the wind direction frequency patterns as reflected in the air modeling results, 10 sample locations were selected specifically to reflect predicted Wauleco distribution patterns. The primary axis would represent the position of the maximum predicted aerial distribution within the pattern. Aerial distributions would be maximized along these axes and would diminish with increasing distance from the building and in directions perpendicular to the axes.

Based on these predicted distributions, 10 samples were collected consisting of: (A) three samples to the southeast along the primary axis, with the samples targeted in areas closer to the former Wauleco facility in areas that have not been disturbed; (B) three samples to the northwest along the primary axis, with the samples targeted in areas closer to the former Wauleco facility in areas that have not been disturbed; and (C) four samples (in two pairs) perpendicular to the primary axis, targeted in areas that have not been disturbed.

Additionally, Wauleco's historical review also identified numerous sources other than Wauleco that should be considered.

- A review of Sanborn Fire Maps and historical aerial photographs was conducted. Numerous potential burning sources (i.e., 63 total sites/stacks) were observed within an approximate one square mile area of the Wauleco site.
- Common burning sources identified by the U.S. EPA as sources of dioxins and furans are also present in the area, including but not limited to the following:
  - City of Wausau's incinerator
  - Marathon Rubber
  - Railroads
  - Yard waste burning and residential waste burn barrels
  - Vehicle traffic
  - Urban conditions

Accordingly, Wauleco's sampling plan proposed 25 additional samples to be collected in areas outside of Wauleco's area of expected maximum aerial distribution patterns and targeted at these other potential sources of dioxins and furans in the area. Wauleco submitted its proposed sampling plan to the Department for review and approval. The sampling plan was also posted by the WDNR on Wauleco's BRRTS site. WDNR approved the work plan but did request one additional sample be collected in the vicinity of 117/120 River Street. Wauleco added this additional sampling location to the work plan for a total of 36 samples. Sampling was carried out on August 13 and 14, 2019 in accordance with the work plan.

Wauleco has taken this request from the Department in earnest. It has invested significant time and resources in responding to the Department's January 15, 2019 letter. Wauleco now respectfully presents the final results, and its conclusions, in regard to surface soil samples. Our review has concluded that to the extent there are locations in the area that have reports of dioxins and furans that exceed WDNR standards, these locations would not appear to be associated with historical practices at the Wauleco property.

Executive Summary (Soil Sample Results)

As described above, Wauleco collected 36 surface soil samples (0 to 6-inches below ground surface) for analysis of dioxins and furans.

Results of the soil samples are summarized as follows:

- **RCL Comparison:** For the 36 surface soil samples collected for this investigation, comparing dioxin and furan results to the WDNR's residential direct contact RCLs (see Section 6.5.1):
  - There are no WDNR residential direct contact RCL exceedances for the samples collected within the area of maximum predicted historical aerial distribution from wood burning at the former plant on the Wauleco property (the O-Series samples).
  - There were five WDNR residential direct RCL exceedances for the sample locations targeted at various background sources (the N-Series samples) consisting of:
    - **Sample ID N2-3:** A sample collected to represent potential yard waste burning and burn barrels.
    - **Sample IDs N4-1, N4-2, and N4-3:** All three samples collected along the railroad tracks.
    - **Sample ID N5-4:** A sample collected to represent vehicle traffic.
- **TEQ Comparison:** Of the combined 64 samples collected previously by others and in this investigation by Wauleco, the ten highest TEQ values are summarized below as follows (see Section 6.5.2):

NO.	SAMPLE IDENTIFIER	TEQ VALUE (ng/kg)	COMMENT
1	Culv. In	105.65	Sample in area of railroad tracks
2	Culv. Out	87.70	Sample in area of railroad tracks
3	N4-3	62.50	Sample in area of railroad tracks
4	1003 Emter	46.10	Sample in area of railroad tracks(1)
5	N4-2	44.00	Sample in area of railroad tracks
6	117 River St. 1	43.69	Samples adjacent to an alley(2)
	117 River St. 2	42.40	
7	N4-1	22.20	Sample in area of railroad tracks
8	N2-3	21.60	Sample in an alley
9	N2-2	19.30	Sample in an alley
10	O-09	17.45	Sample in an alley

Footnotes:

(1) 1003 Emter St. sample collected at "edge of railroad grade", per CWE notes dated 12/4/08 attached to an email dated May 9, 2018.

(2) 117 River St. samples collected "Near fence on south property line, near SW corner of lot" per CWE notes dated 12/4/08 attached to an email dated May 9, 2018.

Observations of these 10 highest TEQ values include the following:

- Six of the seven highest TEQ values (Nos. 1, 2, 3, 4, 5, and 7 in table above) were collected in areas of railroad tracks. This is consistent with the EPA document (EPA 2003b) that identified railroad corridors, with and without power poles, as possible sources of dioxins/furans.
- The next four highest TEQ values (Nos. 6, 8, 9, and 10 in table above) were collected in or adjacent to alleys. Samples collected in or adjacent to alleys, which is the furthest point of a backyard, would typically be the most representative location of historical yard waste burning and residential burn barrels. Detections of dioxins/furans in areas like this is consistent with the EPA document (EPA 2003a) that identified yard waste burning and residential burn barrels as one of the three most prevalent sources of environmental releases of dioxins/furans.
- The two highest TEQ values were at samples Culv. In and Culv. Out, which were collected from the inlet and outlet of a stormwater culvert constructed beneath the former railroad tracks. These areas would be expected to accumulate fine soil-like debris from the former railroad tracks, contributing to the higher TEQ values.

The only two O-Series samples (O-05 and O-09) that exceeded the EPA's regional screening level for dioxin in soil of 4.8 ng/kg, appear unrelated to aerial deposition from wood burning at the Wauleco site. These two samples were part of four samples collected in pairs. The pairs were placed in locations perpendicular to, and equidistant from, the Wauleco primary axis that represents the maximum predicted aerial distribution within the pattern. The purpose of these pairings is to identify whether sources of dioxins and furans other than the target site (i.e., Wauleco) are contributing factors. Thus, the air dispersion model would predict that sample pairs should each have similar findings if they are indeed equally impacted by the Wauleco site. However, the pairs to these O-Series samples (O-04 and O-10, respectively) did not produce similar measured values, suggesting there is an additional contributing source of dioxins and furans. The O-05 and O-09 sample results are consistent with the results from other samples collected in alleyways in the N2, yard waste burning and residential burn barrel, series of samples.

The 36 TEQs associated with this sampling were all less than the 87.7 ng/kg TEQ value for the sample Culvert Outlet that DHS used in its cancer and non-cancer risk assessments, as discussed in the DHS letters dated August 20, 2018 (Appendix D) and February 7, 2019 (Appendix E).

Based on the evaluation presented in this report, conclusions are as follows:

- None of the O-Series samples exceeded a WDNR RCL.
- The only two O-Series samples (O-05 and O-09) TEQs that exceeded an EPA screening value were in alley ways and very similar to the concentrations of other alley way samples unassociated with the Wauleco property. The air dispersion model would predict that

sample pairs should each have similar results if they are indeed equally impacted by the Wauleco site. However:

- The pairs of these O-Series samples (O-04 and O-10, respectively) did not produce similar measured values, suggesting there is an additional contributing source of dioxins and furans.
- The O-05 and O-09 sample results are consistent with the results from other samples collected in alley ways in the N2, yard waste burning and residential burn barrel, series of samples, suggesting that the source of dioxins in these samples is from yard waste and residential burn barrels.

- Wauleco has thoroughly responded to the WDNR's January 15, 2019 letter. It went through a robust process to identify meaningful data points related to Wauleco's past wood waste burning practices. This allowed Wauleco to review relevant data in order to understand the potential impact past wood waste burning practices at the site may have had on area surface soils. The evidence collected and analyzed demonstrates that to the extent there are locations in the area that have reports of dioxins and furans that exceed WDNR standards, these locations would not appear to be associated with historical practices at the Wauleco property.

Section 3
General Information

Consistent with NR 716.15(2)(c), Wisc. Admin. Code, the following information is provided:

1. **Project Title and Purpose:**

   Project Title: Site Investigation Report, Wood Waste Burning Soil Sampling

   Purpose: This Site Investigation Report (SI Report) has been prepared to document background information, the work performed, the investigation methods used and the results of 36 surface soil samples collected associated with evaluating past wood burning activities and emissions from a stack associated with the Wauleco Project Site.

   The work summarized in this SI Report was performed pursuant to a Site Investigation Work Plan (SI Work Plan) dated March 15, 2019 and two addenda, dated April 4, 2019 and May 16, 2019. This SI Work Plan and addenda were approved by the Wisconsin Department of Natural Resources (WDNR or Department) by May 31, 2019.

   The purpose of the SI Work Plan was to respond to a request from the Department in a letter dated January 15, 2019 "to address aerial deposition of contaminants associated with the combustion of wood waste generated at the facility." We understand that the Department's concern associated with historical combustion of wood waste is that dioxins and furans may have been formed, emitted from the air discharge and aerially deposited to the soil downwind of the air emission stack. Therefore, the constituents of potential concern (COPCs) summarized in this SI Report are dioxins and furans.

   This SI Report was prepared in consideration of the requirements of NR 716.15 Wisc. Admin. Code, for a Site Investigation Report, as applicable.

2. **Site Address and Location:**

   Wauleco, Inc.
   125 Rosecrans Street
   Wausau, WI 54402
   Marathon County
   N½ of SE¼ of Section 35, Township 29 North, Range 7 East

3. **Responsible Party:**

Wauleco, Inc.
1800 North Point Drive
Stevens Point, WI 54481

Contact: Mr. Evan Schreiner
(715) 346-8530

4. **Name of the Consultant Involved with the Project:**

TRC Environmental Corporation
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Madison, WI 53717

Mr. Bruce Iverson
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biverson@trcsolutions.com

5. **Site Location Map:** See Figure 1

Section 4
Background Information

Consistent with NR 716.15(2)(d), Wisc. Admin. Code, the following background information is provided:

4.1 Introduction

The Wauleco, Inc. (Wauleco) facility is located at 125 Rosecrans Street, Wausau, Wisconsin (Figure 1). The property is located in an area of mixed industrial and residential land use. The property is the location of a former window and patio door manufacturer from the early 1900s to the early 1990s. Manufacturing operations ceased in March 1991 and nearly all site buildings were demolished by 1993.

Figure 2 presents an aerial photograph of the operation from 1974 to illustrate the configuration of site features at that point in time. Figure 3 presents the same aerial photograph, but showing additional surrounding site features.

As was common in the wood window manufacturing industry, surface coating on the exterior portions of wood windows manufactured at the site was performed using a wood preservative trade named Woodtox Preprime, manufactured by Kopper Chemical and Coating Company. Woodtox Preprime, commonly referred to as Penta, was a 5% solution of pentachlorophenol (PCP) dissolved in 85% mineral spirits, and 10% inerts. Penta was used at the site from approximately 1944 until 1986.

As was also common in the wood window manufacturing industry, the facility incinerated wood waste for a period of time to fuel on-site boilers that provided heat for the facility. These boilers were retired from service in about 1987.

The SI Work Plan presented an investigation approach to address questions raised by WDNR in its January 15, 2019 letter concerning the historical combustion of wood waste at the facility. Wauleco's SI Work Plan and addenda were approved by WDNR by May 31, 2019; this SI Report summarizes the results of the approach described in the WDNR- approved SI Work Plan.

Additional information regarding wood waste management activities, and history of facility operations are included in:

- Wauleco's March 15, 2019 response to the WDNR's letter, see Section 4.2.
- The WDNR's Bureau for Remediation and Redevelopment Tracking System (BRRTS) site for #02-37-000006.

4.2 Wauleco's Response to WDNR's Letter

The WDNR's January 15, 2019 letter not only requested performance of this site investigation, but also contained a comprehensive request for information concerning historical wood burning operations at the Wauleco project site and associated responsive documents. In response to the WDNR's letter, on behalf of Wauleco, Michael Best submitted a letter dated March 15, 2019 (Michael Best, 2019) with responsive documents and conclusions concerning those documents with regard to historical wood burning operations:

- It appears that there were two boilers present at the facility – one wood-fired and one natural gas-fired. These boilers are referred to in the documents as boilers #21 (wood) and #22 (gas). Both were connected to an on-site stack.
- The overwhelming majority of wood burned on-site was uncoated, kiln dried lumber, which would be expected to produce less products of incomplete combustion (PICs).
- The volume of wood waste burned decreased dramatically after 1970, with all wood burning ceasing by 1987, and appears to be much less than the volume suggested in the WDNR January 15, 2019 letter.
- To the extent there was any wood burned that had been surface coated, it would have been a very small percentage by comparison to the uncoated wood scraps and sawdust generated by the ripping/milling process prior to any surface coating.

In addition, as discussed in the historical documents (WCO-WW000216) kiln dried lumber was received at the site. Waste wood burned in Wauleco's boiler therefore would primarily be kiln dried wood. The EPA document EPA/600/SR-98/013 (EPA 1998) states "The slightly lower SVOC concentrations for the treated wood tests compared to those for the untreated wood tests also suggest that the combustion of the drier treated wood fuel produces lower PICs [products of incomplete combustion]. More moisture released during the combustion of the "green" untreated wood fuel may lower the localized combustion zone temperature and cause more PIC formation." Dioxins and furans are listed as PICs, their formation would be reduced at Wauleco due to the use of kiln dried lumber (in comparison to lumber with a higher moisture content).

4.3 Site Investigation Work Plan

In response to the WDNR's January 15, 2019 letter, the following documents were also submitted to the WDNR:

- **SI Work Plan dated March 15, 2019 (TRC 2019a).** This document provided background information on Wauleco and previous dioxin sampling conducted in the area, provided a site description, discussed the sampling and analysis strategy (including aerial deposition modeling methodology, background sampling, and data gap sampling), surface soil sampling procedures, and proposed schedule.

- **Technical Memorandum – Work Plan Addendum No. 1 to Site Investigation Work Plan dated April 5, 2019 (SI Work Plan Addendum 1; TRC 2019b).** This document proposed model input parameters to be used in the preparation of an air dispersion model. See Section 4.7.1 for additional information on SI Work Plan Addendum 1.
- **Technical Memorandum – Work Plan Addendum No. 2 to Site Investigation Work Plan dated May 16, 2019 (SI Work Plan Addendum 2; TRC 2019c).** This document presented the results of the air dispersion modeling based on four cases of wood burning operations, to predict the expected patterns of potential aerial distributions of emissions from historical operations at Wauleco. The document also proposed the locations of 25 background surface soil samples, and 10 data gap surface soil samples. See Section 4.7.2 for additional information on SI Work Plan Addendum 2.

Based on the SI Work Plan, and Addenda 1 and 2, 35 subface soil samples were proposed to be collected.

4.3.1 WDNR Approval of SI Work Plan and Addendums

WDNR approvals of the SI Work Plan and Addenda were received in the following documents:

- WDNR letter dated April 16, 2019 approved the SI Work Plan and SI Work Plan Addendum 1.
- WDNR email dated May 31, 2019 approved the SI Work Plan Addendum 2, requesting one additional soil sample location to be collected in the vicinity of 117/120 River Street.

Thus, WDNR approved of the 35 proposed sample locations, plus one additional location. Therefore, this SI Report summarizes the methods used to collect and analyze these 36 soil samples and presents the results.

4.3.2 Previous Soil Sampling Summarized in SI Work Plan

The SI Work Plan summarized the results of four previous soil investigations conducted by others in the area, summarized in three reports, including the following:

- During June of 2006, CWE, Inc. (CWE) collected three soil samples, and during December of 2008, CWE collected nine soil samples, as summarized in the CWE Memorandum dated July 8, 2009, see Appendix A.
- During August of 2017, AECOM collected 12 soil samples at six locations along Thomas Street, as summarized in the AECOM Memorandum dated September 21, 2017, see Appendix B.

– During January 2018, Sand Creek Consultants (SCC) collected four soil sample along Thomas Street, as summarized in the SCC letter dated February 6, 2018, see Appendix C[1].

The results of these 28 soil samples, collected at 22 sample locations, are summarized in Table 1, and depicted on Figure 4.

The Wisconsin Department of Health Services (DHS) issued two letters to the City of Wausau based on DHS's review of the results:

– Letter dated August 20, 2018, see Appendix D.

– Letter dated February 7, 2019, see Appendix E.

4.4 Other Potential Burning Sources In The Area

Wauleco/TRC conducted a review of Sanborn Fire Maps and historical aerial photographs. These activities are summarized in the following subsections.

4.4.1 Sanborn Fire Map Review

TRC's approach for reviewing Sanborn Fire Maps and observations are summarized as follows:

4.4.1.1 Approach - Review of Historical Documents

TRC ordered Sanborn Fire Maps from EDR, for sites located within the study area (an approximate one square mile area west of the Wisconsin River, including the Wauleco Project Site – as shown on Figure 5). Based on the information provided by EDR, TRC reviewed approximately 159 pages of historical Sanborn Fire Map documents from the years 1884 to 1967 for evidence of potential burning sources.

Due to the nature of Sanborn mapping activities, gaps are present across the study area, either due to map availability in a given year, or the limited coverage of Wausau that was covered in a Sanborn mapping publication.

[1] SCC's Table 1 compared total dioxin and furan results to WDNR Residual Contaminant Levels (RCLs). Per the WDNR, this comparison of totals analysis to an individual congener RCL standard is incorrect. Rather, comparison of individual congeners results to the individual RCL standard is the correct approach. WDNR confirmed this interpretation with staff from U.S. EPA Region V.

4.4.1.2 Summary of Observations – Potential Burning Sources

Table 2 summarizes the potential burning sources observed based on the Sanborn Fire Map review, including the following observations:

- 18 potential burning sources were observed, including the location of the current Wauleco Project Site which is identified as Site No. 1 on Table 1.
- At the 18 locations, there may have been various burning sources present over time, based on various operations conducted at the location.
- The Site No. listed on Table 2, is an arbitrary numbering system established by TRC based on TRC's understanding of the location. Over time, street names changed, so the data was organized by location rather than a specific address.
- The potential fuel source at each location is noted based on the following:
    1. The fuel source recorded on the Sanborn Fire Map; and,
    2. The potential fuel source based on TRC's interpretation of information included on the Sanborn Fire Map. For example, if the map noted an "Oil House" we interpreted that oil was likely present on-site and could be a potential fuel source.
- The specific Sanborn Fire Maps associated with each location are included in Appendices F-1 to F-11. Note, only those Sanborn Fire Maps that showed evidence of a potential burning source are included in Appendices F-1 to F-11

Figure 5 shows the location of these 18 potential burning sources.

4.4.2 Historical Aerial Photograph Review

TRC's approach for reviewing historical aerial photographs and observations are summarized as follows:

4.4.2.1 Approach - Review of Historical Aerial Photographs

TRC ordered historical aerial photographs from various sources (e.g., WisDOT, Marathon County, USGS), for sites located within the study area (an approximate one square mile area west of the Wisconsin River, including the Wauleco Project Site – as shown on Figure 5). Based on the information provided, TRC's forensic cartologist reviewed georeferenced, digitally-scanned aerial photographs from the years 1965 (aerial photographs from as earlier as 1938 were cataloged, but the resolution was insufficient to reliably identify

stacks) to 2000 for evidence of potential burning sources based on the following methodology/approach:

- Aerial photo images were approximately georeferenced to allow geographic overlay and comparison
- A 1,000' x 1,000' research reference grid was established to allow systematic review
- Images were reviewed in GIS software, at a scale of 1:1000 or greater on 4k resolution monitor
- The following years were reviewed:
    1. **1965** - WisDOT
    2. **1974** - Marathon County and WisDOT
    3. **1978** – WisDOT
    4. **1979** - WisDOT
    5. **1980** - USGS
    6. **1987** - WisDOT
    7. **2000** - Marathon County
- Observations were categorized into Small Stack or Stack, defined below.
    1. **Small Stack:** rooftop, school, or other clear stack visible in aerials, bigger than residential, but not clearly large industrial stack
    2. **Stack:** clear large industrial stack (i.e., large stack)
- After review of the years, the Small Stacks and Stacks were refined into a separate layer for inclusion on Figure 5 and Table 3.

4.4.2.2 Summary of Observations – Potential Stack Locations Observed

Table 3 summarizes the potential stack locations observed based on the historical aerial photograph review, including the following observations:

- 55 potential stacks, other than the Wauleco Project Site, from historical aerial photograph observations, consisting of:
    1. 22 large stacks were identified, other than the Wauleco Project Site, were identified from historical aerial photograph observations.
    2. 33 small/rooftop stacks were identified from historical aerial photograph observations.

3. 9 of the large stacks appear to be the same/similar location as sites observed in the Sanborn Fire Map review, so these sites are subtracted from the total to avoid double-counting.

- Residential fire places were NOT included in the observations; there were some higher resolution aerials from which TRC could observe these features.

Figure 5 shows the 56 potential stack locations, including the Wauleco Project Site.

4.4.3 Summary of Sanborn Fire Map and Historical Aerial Photograph Review

Numerous potential burning sources (i.e., 63 sites/stacks) were observed in documents based on a review of sites within an approximate one square mile area of the Wauleco Project Site, summarized as follows:

- 17 potential burning sources, other than the Wauleco Project Site, were identified from Sanborn Fire Map observations.
- 55 potential stacks, other than the Wauleco Site, from historical aerial photograph observations, consisting of:
    1. 22 large stacks were identified, other than the Wauleco Site, were identified from historical aerial photograph observations.
    2. 33 small/rooftop stacks were identified from historical aerial photograph observations.
    3. 9 of the large stacks appear to be the same/similar location as site observed in the Sanborn Fire Map review, so these sites are subtracted from the total to avoid double-counting.
- 63 total potential burning sources (not including the Wauleco Project Site)

The potential burning sources are shown on Figure 5, and observations are summarized in Tables 2 and 3, for Sanborn Fire Maps and historical aerial photographs, respectively. Note, the 63 total other potential burning sources does NOT include residential fire places; chimneys on homes could potentially be identified in some of the highest resolution aerial photography. These were not cataloged in this study because the majority of homes in the area have chimneys and the frequency of use and material burned is not known.

4.5 Other Sources of Dioxins and Furans in Urban Environments

As described in the SI Work Plan, the constituents of concern for aerial deposition of burning wood during window frame manufacturing operations are dioxins and furans. However, there are many other sources of dioxins and furans in urban environments, several of which are present in Wausau and in the area of the Wauleco project site. As described by EPA (2003a, Table 4-2) there are numerous sources of dioxins/furans (e.g., EPA, 2003a Table 4.2 is 4 pages long). Those that may be relevant to the Wausau area and in the vicinity of the Wauleco site include:

- Waste Incineration, like municipal solid waste, and medical waste.
- Power/Energy Generation, including combustion of vehicle fuel (i.e., transportation), coal, oil, and wood.
- Other high temperature sources, like cement kilns or cigarette combustion.
- Minimally controlled or uncontrolled combustion including:
  - Backyard burning of residential waste in barrels
  - Yard waste burning
- Chemical Manufacturing/Processing Sources, like:
  - Bleached chemical wood pulp and paper mills
  - Publicly Owned Treatment Works (POTW) for municipal wastewater.

As described by EPA (2003a) "Approximately 70% of all quantifiable environmental releases were contributed by air emissions from just three source categories in 1995: municipal waste incinerators (representing 38% of total environmental releases); backyard burning of refuse in barrels (19%); and medical waste incinerators (14%)." This report also presents a summary of North American levels in environmental media and food (EPA, 2003a Table 4-4).

EPA 2003b identified railroad corridors, with and without power poles, as possible sources of dioxins/furans due to the presence of treated railroad ties and treated wood power poles (see pages 8-31 through 8-32).

In addition to the 63 potential additional burning sources identified in Section 4.4, common sources identified by the U.S. EPA as sources of dioxins and furans that are present in the area, as follows:

Table A
Potential Sources

NO.	FACILITY	LOCATION	WHY INCLUDED
1	City of Wausau Incinerator	At the site of the City's WWTP. Incinerator operated from about 1939 until 1976 (Becher-Hoppe 1990).	Facility type identified in EPA, 2003a.
2	Marathon Rubber	Northwest corner of Sherman St. and S. 5th Ave. Facility operated "during much of the 20th century" until 2001, and contained a stack, boiler and coal building. Refer to the BRRTS Marathon Rubber Closure document (WDNR BRRTS 2003).	Marathon Rubber was a manufacturer of rubber garments (waders, raincoats, etc.). Operation of a coal fired boiler and its practice of burning solid waste as supplemental fuel to the boiler (WDNR BRRTS 2003).
3	Railroads	Several locations, e.g., the rail line along the River east of Wauleco.	Potential source of dioxins/furans identified in EPA, 2003b.
4	Yard waste burning and residential waste burn barrels	Potentially throughout the residential areas	Practice type identified in EPA, 2003a.
5	Vehicle Traffic	All roads, especially principal thoroughfares, like Thomas St. and 1st Ave.	Potential source of dioxins/furans identified in EPA, 2003a.
6	Urban Conditions	Non-specific	As described in EPA, 2003a urban soils contain dioxins.

4.6 Summary of Other Potential Sources

The numerous potential dioxin and furan sources in the area discussed in Sections 4.4 and 4.5 illustrates the ubiquitous nature of dioxin and furans in the environment, particularly in urban settings.

4.7 Air Dispersion Modeling Results

SI Work Plan Addenda 1 and 2 presented details regarding the air dispersion modeling approach, inputs, and results. Key items from these documents are summarized in the following subsections.

4.7.1 SI Work Plan Addendum 1

As discussed in the SI Work Plan Addendum 1, four versions of the air dispersion model were run consisting of the following scenarios:

1. **Boiler 21** - wood boiler only for 12 months/year, 16 hours/day (two shifts)
2. **Boiler 21** - wood boiler only for 7 cold months/year, 16 hours/day (two shifts)
3. **Boilers 21 and 22** - wood and gas boilers for 12 months/year, 16 hours/day (two shifts)
4. **Boilers 21 and 22** - wood and gas boilers for 7 cold months/year, 16 hours/day (two shifts)

The purpose of this approach was to identify areas where the highest expected occurrence of potential distribution of particulates would be. With that information, soil sampling to close gaps (hence the reference to Data Gap Samples in Section 5.4), could be targeted in those areas of highest expected distribution.

4.7.2 SI Work Plan Addendum 2

As discussed in the SI Work Plan Addendum 2, a model was executed for each of four cases described above in Section 4.7.1. The model was used to contour the predicted long-term (representative of a 5-year or longer time period) distributions. The overall maximum predicted aerial depositions for the four model cases run occurred at the boundary of the former Wauleco facility.

A review of the output of the air dispersion model for the four cases indicated that the maximum predicted aerial distributions are confined to areas close to the former Wauleco facility. Predicted distributions decreased with increasing distance away from the Wauleco boundary. Based on this consistent pattern across all four model runs, a primary axis line is shown on Figures 6 and 7 for each of the four cases. The primary axis would represent the position of the maximum predicted aerial distribution for a given distance away from Wauleco. The axes of maximum distributions are generally aligned northwest (NW) and southeast (SE) of the building structure (see axes depicted on Figures 6 and 7). This directional pattern is attributable to the dominant wind direction frequency for winds in the area that shows relative high frequencies of southeast and northwest winds.

Based upon the modeling results, if Wauleco was a significant source of measured soil concentrations of dioxins and furans:

- Concentrations would be maximized along these axes but would diminish with increasing distance from the building along those axes and in directions perpendicular to the axes.
- Paired samples on opposite sides of the axes and perpendicular to the axes (e.g., two sets of paired samples: 1) O-04 and O-05; and 2) O-09 and O-10; see Figures 6 and 7), would have similar dioxin and furan results. If the results are not similar, the measured concentrations would indicate that other dioxin and furan influences have occurred at these locations.

Section 5
Methods of Investigation

Consistent with NR 716.15(2)(e), Wisc. Admin. Code, methods of investigation are summarized in this section.

The surface soil investigation was performed in accordance with the SI Work Plan (TRC, 2019a), SI Work Plan Addendum 1 (TRC, 2019b), SI Work Plan Addendum 2 (TRC, 2019c), and the WDNR approvals. The following subsections summarize the scope of work performed and the associated investigation methods.

5.1 Access Permission and Permits with City

Prior to performing the soil sampling field work, TRC obtained permission from the City of Wausau to collect soil samples on City property, and secured a Street Privilege Permit from the City.

5.2 Kick-off Meetings

Prior to performing the soil sampling field work, TRC conducted kick-off meetings with field staff on the following dates:

- **Initial Kick-off Meeting on August 2, 2019:** An initial kick-off meeting was conducted approximately one week prior to performing the field work. Topics discussed during the meeting included reviewing the scope of work, discussing the sampling equipment required, coordinating contacting Diggers Hotline, identifying items needed to perform the work, asking questions, etc. Conducting this meeting at this time provided sufficient time for field staff to gather and coordinate the items needed, familiarize themselves with the scope of work, etc.
- **Follow-up Kick-off Meeting on August 12, 2019:** A follow-up kick-off meeting was conducted the day before performing the field work to refresh staff on project requirements. The topics discussed were similar to the initial kick-off meeting, and to assess that items needed prior to performing the work were completed.

5.3 Rationale For Depth of Surface Soil Samples

Surface soil samples were collected from 36 locations from a depth of 0 to 6-inches below ground surface. This sampling depth was based on the following rationale:

- The DHS letter dated February 7, 2019, see Appendix E, page 4, stated that "The major dioxin exposure pathway for both Riverside Park users and residents in the Thomas Street area is ingestion of dioxins-containing soil through normal hand-to-mouth activities."

- Several U.S. EPA guidance documents provide recommendations on the depth of soil sampling to assess the potential ingestion exposure or direct contact pathway (e.g., EPA 2014 and EPA 1995). Recommendations vary from the top 12 inches to the top 3 to 4 inches (EPA 2014), In addition, the EPA 1995 guidance document states that TCDD at a heavily studied dioxin site, Times Beach Mo., that most of the TCDD remained in the top 15 cm (i.e., 6 inches) of the surface. Given that other dioxins/furans are somewhat more mobile than TCDD, the potential age of a potential release, and in order to avoid missing any potential dioxins/furans, sampling for this study was conducted from 0 to 6 inches below the surface.

5.4 Work Performed

Surface soil samples were collected from 36 locations on August 13 and 14, 2019, see Figure 6. Care was taken to avoid collecting samples in areas that appeared to have been obviously disturbed. The condition of sample locations is shown in the photographs included in Appendix G.

The 36 locations included the following 25 background sample locations as summarized in Table B:

Table B
Background Sample Locations

AREA NO.	FACILITY	SAMPLE LOCATIONS	NUMBER OF SAMPLES
N1	City Incinerator	Samples collected NW and SE of the former incinerator stack in street R-O-Ws.	5
N2	Yard waste and residential waste burn barrels	A neighborhood similar to the neighborhood close to Wauleco was selected as much outside of the five other potential background locations as possible. Two areas were selected west of Wauleco.	5
N3	Marathon Rubber	Two samples each, to the SE and NW, along the principal wind patterns.	4
N4	Railroads	Samples collected along former rail lines that are currently owned by the City (for ease of access). The only rail line owned by the City appears to be the line along the River east of Wauleco and 3M.	3
N5	Vehicle Traffic	Samples collected along Third Street, where the street has not been reconstructed for the last 20 years.	4
N6	Urban Conditions	Samples collected within Wausau, in areas outside of the Wauleco modelled area to provide a range of concentrations for urban conditions in Wausau.	4
		Total	**25**

The 36 locations included the following 10 data gap sample locations (i.e., area of maximum predicted historical aerial distribution) as summarized in Table C:

Table C
Data Gap Sample Locations

AREA NO.	SAMPLE LOCATIONS	NUMBER OF SAMPLES
O-01, 02, and 03	These samples are located south of Thomas St., due to its reconstruction, and located on terraces close to the axis.	3 along primary axis to SE
O-06, 07, and 08	These samples are located north of 3M so that the samples avoid the probable rail line sources in this area.	3 along primary axis to NW
O-04 and 05, and O-09 and 10	Two samples on a line perpendicular to the primary axis through the NW portion of the axis, with one in Riverside Park and one on S. 3rd Avenue. Two samples are also on a line perpendicular to the primary axis through the SE portion of the axis, with samples proposed on Cleveland Ave. and the alley between Edwards and Thomas Streets.	4 offset from the primary axis
	Total	**10**

The 36 locations included the following WDNR requested sample location as summarized in Table D:

Table D
WDNR Requested Sample Location

AREA NO.	SAMPLE LOCATION	NUMBER OF SAMPLES
N7	117/120 River Street	1
	Total	**1**

Photographs of each sample location are included in the photo log in Appendix G.

5.5 Surface Soil Sampling Methods

A new shovel and hand tools were used to collect a soil sample from 0 to 6-inches, excluding the vegetative layer at the surface. Each soil sample was described in a field log in accordance with the Unified Soil Classification System (USCS), see Appendix H.

The material from each sample interval was placed into a separate, pre-cleaned, stainless-steel mixing container for processing. Once the sample material was in the mixing container, the

sample was homogenized by thorough mixing with a stainless-steel spoon. The homogenized material was placed in appropriately labeled laboratory sample containers (4 oz. amber glass jars) and placed on ice for transport to the analytical laboratory.

Excess soil material was used to backfill the soil sample hole. The soil sample equipment and any other non-dedicated, non-disposable sampling equipment was decontaminated in accordance with Section 5.7 prior to collecting the next sample.

5.5.1 Sample Identification

Each sample of soil collected from the soil borings was assigned a unique alpha-numeric sample descriptor identifying the sample location. The sample ID and depth of collection was recorded in the field notes.

5.5.2 Sample Shipment and Laboratory Analysis

Samples were placed on ice immediately after collection, stored in a refrigerator until all samples were collected, then shipped to Pace Analytical Laboratory (a Wisconsin certified laboratory). The samples were shipped overnight to the laboratory under proper chain of custody.

The samples were analyzed by EPA Method 1613B, reporting the 17 dioxin and furan congeners that are 2,3,7,8-substituted and the associated homolog groups. The laboratory was asked to run the sample undiluted to avoid elevated detection limits. If dilution was necessary, the laboratory would run the sample a second time at a dilution or to correct QA/QC problems.

5.5.3 Sample Locations

The final locations of the soil samples was documented using differential global positioning system (GPS) techniques. A Trimble Geoexplorer handheld GPS unit, with H-Star technology enabled, was used to locate these samples. When collecting GPS location data, field staff continuously logged a sample position until the predicted post-processed accuracy is better than 1 foot, or 30 position readings had been collected. Data collected with the Trimble GPS unit was post-processed through the software program Trimble Pathfinder Office using nearby reference station Global Navigation Satellite System (GNSS) reference data, as available. GPS and survey data was projected into the State Plane Wisconsin Central coordinate system (NAD83, US Feet).

5.5.4 Sample Location Abandonment

Holes resulting from sample collection were backfilled with excess soil from sampling at that location. Abandonment in accordance with NR 141 Wis. Admin. Code was not required due to the shallow depths of sample collection (<10 feet below ground surface).

5.6 Surface Soil Sample Quality Assurance/Quality Control (QA/QC) Samples

The condition of each cooler was evaluated upon receipt at the laboratory. Samples received on ice are considered preserved at the correct temperature (4°C, ± 2°). Temperature blanks were used to assess whether the sample temperature was maintained during sample transport. Temperature blanks consisted of a sample container, generally polyethylene, filled with tap water. One temperature blank was transported with each cooler containing sample containers.

As specified in NR 716.13(6)(b) Wisc. Admin. Code, one temperature blank was included for every shipping container. Additional QA/QC samples for soil samples were not specified in NR 716.13(6), Wisc. Admin. Code.

5.7 Decontamination of Equipment

Equipment decontamination included the following:

5.7.1 Single-Use Sampling Equipment

The materials used were new and clean, and were placed in plastic for transport to the sample site. Once used, single-use equipment was placed in plastic bags and managed as investigative derived waste (IDW) material. Single-use equipment included the following:

- Disposable gloves
- Paper towels

5.7.2 Non-dedicated Sampling Equipment

Non-dedicated equipment used for sample collection or sample processing was new or cleaned before its initial use in the field and cleaned again before use at each subsequent sampling site. Equipment subject to this decontamination procedure includes the following:

- Shovel
- Mixing bowls

The general procedure for decontaminating sample-contacting equipment was as follows:

- Scrape off as much loose material as possible
- Wash with detergent/potable water solution, using a brush made of inert material to remove any particles or surface film.
- Rinse thoroughly with potable water.
- Rinse with distilled water from an off-site source.
- Allow equipment to air dry prior to next use.
- Wrap equipment for transport with inert material (plastic wrap or bag) to prevent direct contact with potentially contaminated material.

Sample containers (jars) were provided by the laboratory as cleaned appropriately for dioxin/furan sampling.

Decontamination was performed in 5-gallon buckets and managed as IDW pending soil sample analytical results (Section 5.8). Decontamination water was changed out for new, clean solutions several times per sampling day.

A photo of decontamination procedures is shown in photograph No. 76 in Appendix G.

5.8 Investigation Derived Waste (IDW)

IDW streams generated during this investigation included decontamination fluids and general refuse (e.g., used personal protective equipment, single-use sampling equipment, and trash).

Decontamination fluids were containerized in sealed 5-gallon pails. The pails were emptied into a 55-gallon drum and was sealed, labeled with the date and contents, and staged at the Wauleco Project Site pending soil sample analytical results. Based on the soil sample analytical results, the decontamination water was added to drums of soil cuttings that will be disposed at a landfill.

General refuse was collected in sealed trash bags and placed in a waste dumpster for disposal as a solid waste.

Section 6
Investigation Results

Consistent with NR 716.15(3), Wisc. Admin. Code, investigation results are summarized in this section.

6.1 Information Collected During Scoping Stage – NR 716.07

The information collected during the scoping stage pursuant to NR 716.07 is summarized in Section 4.

6.2 Description of Sequence of Activities

The 36 surface soil samples were collected in the following order:

- **Sample Area N6:** N6-1, N6-2, N6-4, N6-3
- **Sample Area N2:** N2-1, N2-2, N2-4, N2-3, N2-5
- **Sample Area N5:** N5-2, N5-1, N5-3, N5-4
- **Sample Area N3:** N3-4, N3-3, N3-2, N3-1
- **Sample Area N1:** N1-2, N1-3, N1-1, N1-5, N1-4
- **Sample Area O:** O-10, O-9, O-1, O-4, O-5, O-6, O-8, O-7, O-3, O-2
- **Sample Area N7:** N7-1
- **Sample Area N4:** N4-3, N4-2, N4-1

6.3 Field Data

Field data, including photographs and a Field Log are included in Appendices G and H, respectively. The 36 soil sample locations are shown on Figures 6 and 7, and coordinates of soil sample locations are summarized in Table 4.

6.4 Laboratory Results

Laboratory reports are included in Appendix I, and results are summarized in Table 5. A data usability assessment was performed of the laboratory data results. The data usability assessment concluded that the laboratory data results are useable, see Appendix J.

6.5 Interpretation of Data

Based on the laboratory results, data was interpreted by comparing results to the following:

- **RCLs:** Results were compared to NR 720 Wisc. Admin. Code non-industrial (e.g., residential) and industrial direct contact residual contaminant levels (RCLs).
- **TEQs:** Results were compared to the U.S. EPA regional screening level for dioxin in residential soils based on the Toxicity Equivalence (TEQ) of 4.8 ng/kg.

Results are summarized in the following subsections.

6.5.1 RCL Comparison

A comparison of the dioxin and furan concentrations results to non-industrial (i.e., residential) direct contact RCLs reveals the following (see Figure 6 and Table 5):

- **O-Series Samples:** The O-Series surface soil samples (i.e., those within the area of maximum predicted historical aerial distribution from wood burning at the former plant on the Wauleco property) were all less than residential direct contact RCLs.
- **N-Series Background Samples:**
  - **N1 - City Incinerator:** All five samples were less than residential direct contact RCLs.
  - **N2 - Yard Waste Burning and Residential Burn Barrels:** One of five samples exceeded a residential direct contact RCL.
  - **N3 - Former Marathon Rubber Facility:** All four samples were less than residential direct contact RCLs.
  - **N4 - Railroad Tracks/Source:** All three samples exceeded a residential direct contact RCL.
  - **N5 - Vehicle Traffic:** One of the four samples exceeded a residential direct contact RCL.
  - **N6 - Urban Conditions:** All four samples were less than residential direct contact RCLs.
- **N7-1 - WDNR Requested Sample:** The sample 117/120 River St. was less than residential direct contact RCLs.

In summary, for the 36 surface soil samples collected, comparing dioxin and furan results to the WDNR's residential direct contact RCLs:

- There are no WDNR residential direct contact RCL exceedances for the O-Series samples (i.e., samples collected from the area of maximum predicted historical aerial distribution from wood burning at the former plant on the Wauleco property).

– There were five WDNR residential direct contact RCL exceedances for the N-Series/background sample locations consisting of:

  - **N2-3:** A sample collected to represent potential yard waste burning and burn barrels.
  - **N4-1, N4-2, and N4-3:** All three samples collected along the railroad tracks.
  - **N5-4:** A sample collected to represent vehicle traffic.

6.5.2 TEQ Comparison

The TEQ for dioxins and furans was calculated using the toxic equivalent factors (TEF) published by both the World Health Organization (2005) and the U.S. Environmental Protection Agency (2007). The TEQ values for the 36 surface soils collected for this sampling event are included in Table 5, shown on Figure 7, and summarized below in Table E as follows (the yellow highlighted values are those that exceed the EPA regional screening level for dioxin in residential soils of 4.8 ng/kg):

Table E
TEQ Values

SAMPLE IDENTIFIER	TEQ VALUE (ng/kg)	COMMENT
N1-1	2.32	
N1-2	10.5	Sample in area of former City incinerator
N1-3	0.99	
N1-4	1.30	
N1-5	2.92	
N2-1	2.74	
N2-2	19.3	Sample in an alley
N2-3	21.6	Sample in an alley
N2-4	14.1	Sample in an alley
N2-5	3.72	
N3-1	5.36	Sample in area of former Marathon Rubber facility
N3-2	8.70	Sample in area of former Marathon Rubber facility
N3-3	0.74	
N3-4	0.27	
N4-1	22.2	Sample in area of RR
N4-2	44.0	Sample in area of RR
N4-3	62.5	Sample is area of RR
N5-1	2.24	

Table E
TEQ Values

SAMPLE IDENTIFIER	TEQ VALUE (ng/kg)	COMMENT
N5-2	4.25	
N5-3	6.10	Sample in area of vehicle traffic
N5-4	16.6	Sample in area of vehicle traffic
N6-1	1.72	
N6-2	5.97	Sample in area to represent urban conditions
N6-3	2.08	
N6-4	2.84	
N7-1	6.99	Sample requested by WDNR
O-01	0.93	
O-02	1.26	
O-03	2.59	
O-04	3.03	
O-05	6.62	Sample in an alley, paired sample is O-04
O-06	3.46	
O-07	0.37	
O-08	1.71	
O-09	17.45	Sample in an alley, paired sample is O-10
O-10	3.55	
Total Number of Samples		**36**

The TEQ values:

- For the 25 background samples (N1 through N6 series samples) results ranged from 0.27 ng/kg to 62.5 ng/kg. 62.5 ng/kg was the highest TEQ result in this sampling.
- For the one WDNR requested sample (117/120 River Street) the result is 6.99 ng/kg. Based on the samples previously collected by others, the TEQ results were reported as:
  - 117 River St. 1 = 43.69 ng/kg
  - 117 River St. 2 = 42.40 ng/kg
  - 120 River St. 1.88 ng/kg
- For the 10 O-Series data gap samples, results ranged from 0.37 ng/kg to 17.45 ng/kg. Only two O-Series sample results exceeded the EPA regional screening level for dioxin in residential soils of 4.8 ng/kg).

– The O-Series paired samples (i.e., O-04/05 and O-09/10) TEQ results which contained the two results that exceeded the residential risk screening level were not similar, as the air dispersion model would predict that they should be (see Section 4.7.2) if Wauleco was the primary source of the measured values. For example:

  - O-04 collected along Cleveland Avenue = 3.03 and O-05 collected in an alley way = 6.62
  - O-09 collected in an alley way = 17.45 and O-10 collected in Riverside Park = 3.55

  In each of the two paired cases the higher measured values correspond to areas likely exposed to more vehicular traffic and possible residential refuse burning.

The TEQ values for the 28 historical samples collected by others are summarized below in Table F. The yellow highlighted values are those that exceed the EPA regional screening level for dioxin in residential soils of 4.8 ng/kg:

Table F
Historical Samples TEQ Values

SAMPLE IDENTIFIER	TEQ VALUE (ng/kg)	COMMENT
Culv. In.	105.65	Sample in area of RR
Culv. Out.	87.70	Sample in area of RR
122 River St.	11.72	Sample adjacent to RR(1)
1003 Emter	46.10	Sample in area of RR(2)
130 River St.	2.75	
141 River St.	1.34	
120 River St.	1.88	
117 River St. 1	43.69	Sample near alley(3)
117 River St. 2	42.40	Sample near alley(3)
N7-1	6.99	
Fern Island	4.23	
Oak Island	0.58	
Weston	0.01	
B-101 – 140 E. Thomas St.	15.44	Sample along Thomas Street
B-102 – 138 E. Thomas St.	4.25	
B-103 – 120 E. Thomas St	2.37	
B-104 – 110 E. Thomas St	3.27	

Table F
Historical Samples TEQ Values

SAMPLE IDENTIFIER	TEQ VALUE (ng/kg)	COMMENT
B-1	0.00	
B-1	0.00	
B-2	3.74	
B-2	0.04	
B-3	2.82	
B-3	0.00	
B-4	0.01	
B-5	0.00	
B-5	0.00	
B-6	0.00	
B-4	0.00	
B-6	0.00	
Total Number of Samples		**28**

Footnotes:

(1) 120 River Street sample collected "…near NW corner of lot, by fence, south of tracks", per CWE notes dated 12/4/08 attached to an email dated May 9, 2018.

(2) 1003 Emter St. sample collected at "edge of railroad grade", per CWE notes dated 12/4/08 attached to an email dated May 9, 2018.

(3) 117 River St. samples collected "Near fence on south property line, near SW corner of lot" per CWE notes dated 12/4/08 attached to an email dated May 9, 2018.

Of the 64 total samples collected previously by others and in this investigation by Wauleco, the ten highest TEQ sample values are summarized below in Table G as follows:

Table G
10 Highest TEQ Values of 64 Samples

NO.	SAMPLE IDENTIFIER	TEQ VALUE (ng/kg)	COMMENT
1	Culv. In	105.65	Sample in area of railroad tracks
2	Culv. Out	87.70	Sample in area of railroad tracks
3	N4-3	62.50	Sample in area of railroad tracks
4	1003 Emter	46.10	Sample in area of railroad tracks(1)
5	N4-2	44.00	Sample in area of railroad tracks
6	117 River St. 1	43.69	Samples adjacent to an alley(2)
	117 River St. 2	42.40	

Table G
10 Highest TEQ Values of 64 Samples

NO.	SAMPLE IDENTIFIER	TEQ VALUE (ng/kg)	COMMENT
7	N4-1	22.20	Sample in area of railroad tracks
8	N2-3	21.60	Sample in an alley
9	N2-2	19.30	Sample in an alley
10	O-09	17.45	Sample in an alley

Footnotes:

(1) 1003 Emter St. sample collected at "edge of railroad grade", per CWE notes dated 12/4/08 attached to an email dated May 9, 2018.

(2) 117 River St. samples collected "Near fence on south property line, near SW corner of lot" per CWE notes dated 12/4/08 attached to an email dated May 9, 2018.

Observations of these 10 highest TEQ values include the following:

- Six of the seven highest TEQ values (Nos. 1, 2, 3, 4, 5, and 7 in Table G) were collected in areas of railroad tracks. This is consistent with the EPA document (EPA 2003b) that identified railroad corridors, with and without power poles, as possible sources of dioxins/furans due to the presence of treated railroad ties and treated wood poles.
- The next four highest TEQ values (Nos. 6, 8, 9, and 10 in Table G) were collected in or adjacent to alleys. Samples collected in or adjacent to alleys, which is the furthest point of a backyard, would typically be the most likely potential location of yard waste burning and residential burn barrels. Detections of dioxins/furans in areas like this is consistent with the EPA document (EPA 2003a) that identified yard waste burning and residential burn barrels as one of the three main sources of environmental releases of dioxins/furans.
- The two highest TEQ values were at samples Culv. In and Culv. Out, which were collected from the inlet and outlet of a stormwater culvert under the former railroad tracks. These areas would be expected to accumulate fine soil-like debris from the former railroad tracks, such as weathered particles of creosote treated railroad ties.

The only two O-Series samples (O-05 and O-09) that exceeded the EPA's regional screening level for dioxin in soil of 4.8 ng/kg, appear unrelated to aerial deposition from wood burning at the Wauleco site. These two samples were part of four samples collected in pairs. The pairs were placed in locations perpendicular to, and equidistant from, the Wauleco primary axis that represents the maximum predicted aerial distribution within the pattern. The purpose of these pairings is to identify whether sources of dioxins and furans other than the target site (i.e., Wauleco) are contributing

factors. Thus, the air dispersion model would predict that sample pairs should each have similar finding if they are indeed equally impacted by the Wauleco site. However, the pairs of these O-Series samples (O-04 and O-10, respectively) did not produce similar measured values, suggesting there is an additional contributing source of dioxins and furans. The O-05 and O-09 sample results are consistent with the results from other samples collected in alleyways in the N2, yard waste burning and residential burn barrel, series of samples.

The 36 TEQs associated with this sampling were all less than the 87.7 ng/kg TEQ value for the sample Culvert Outlet that DHS used in its cancer and non-cancer risk assessments, as discussed in the DHS letters dated August 20, 2018 (Appendix D) and February 7, 2019 (Appendix E).

Section 7
Findings and Conclusions

Consistent with NR 716.15(2)(6), Wisc. Admin. Code, findings and conclusions are summarized in this section.

7.1 Findings

This Site Investigation Report summarizes background information, the methods used, and the results of the 36 surface soil samples collected. The Report also provides the results of all previously reported dioxin sampling results. Background information included material on potential burning sources in the area, which included the following:

- Wauleco's documents contained the following information on historical wood burning operations (see Section 4.2):
  - It appears that there were two boilers present at the facility – one wood-fired and one natural gas-fired. These boilers are referred to in the documents as boilers #21 (wood) and #22 (gas). Both were connected to an on-site stack.
  - The overwhelming majority of wood burned on-site was uncoated, kiln dried lumber, which would be expected to produce less products of incomplete combustion (PICs).
  - The volume of wood waste burned decreased dramatically after 1970, with all wood burning ceasing by 1987, and appears to be much less than the volume suggested in the WDNR January 15, 2019 letter.
  - To the extent there was any wood burned that had been surface coated, it would have been a very small percentage by comparison to the uncoated wood scraps and sawdust generated by the ripping/milling process prior to any surface coating.
- A review of Sanborn Fire Maps and historical aerial photographs was conducted. Numerous potential burning sources (i.e., 63 sites/stacks) were observed in documents based on a review of sites within an approximate one square mile area of the Wauleco Project Site, summarized as follows (see Section 4.4):
  - 17 potential burning sources, other than the Wauleco Project Site, were identified from Sanborn Fire Map observations.
  - 55 potential stacks, other than the Wauleco Site, from historical aerial photograph observations, consisting of:
    1. 22 large stacks were identified, other than the Wauleco Site, were identified from historical aerial photograph observations.

2. 33 small/rooftop stacks were identified from historical aerial photograph observations.
3. 9 of the large stacks appear to be the same/similar location as sites observed in the Sanborn Fire Map review, so these sites are subtracted from the total.

– 63 total potential burning sources (not including the Wauleco Project Site).

The potential burning sources are shown on Figure 5, and observations are summarized in Tables 2 and 3, for Sanborn Fire Maps and historical aerial photographs, respectively.

- In addition to the 63 potential additional burning sources identified in Section 4.4, common sources identified by the U.S. EPA as sources of dioxins and furans that are present in the area, such as the following (see Section 4.5):

NO.	FACILITY	LOCATION	WHY INCLUDED
1	City of Wausau Incinerator	At the site of the City's WWTP. Incinerator operated from about 1939 until 1976 (Becher-Hoppe 1990).	Facility type identified in EPA, 2003a.
2	Marathon Rubber	Northwest corner of Sherman St. and S. 5th Ave. Facility operated "during much of the 20th century" until 2001, and contained a stack, boiler and coal building. Refer to the BRRTS Marathon Rubber Closure document (WDNR BRRTS 2003).	Marathon Rubber was a manufacturer of rubber garments (waders, raincoats, etc.). Operation of a coal fired boiler and its practice of burning solid waste as supplemental fuel to the boiler (WDNR BRRTS 2003).
3	Railroads	Several locations, e.g., the rail line along the River east of Wauleco.	Potential source of dioxins/furans identified in EPA, 2003b.
4	Yard waste burning and residential waste burn barrels	Potentially throughout the residential areas	Practice type identified in EPA, 2003a.
5	Vehicle Traffic	All roads, especially principal thoroughfares, like Thomas St. and 1st Ave.	Potential source of dioxins/furans identified in EPA, 2003a
6	Urban Conditions	Non-specific	As described in EPA, 2003a urban soils contain dioxins.

- In consideration of the other potential sources in the area, as discussed in Sections 4.4 and 4.5, and the ubiquitous nature of dioxins and furans in the environment, the dioxins and furans detected based on the results discussed in this SI Report are not unexpected.

Results of the soil samples are summarized as follows:

- **RCL Comparison:** For the 36 surface soil samples collected for this investigation, comparing dioxin and furan results to the WDNR's residential direct contact RCLs (see Section 6.5.1):
  - There are no WDNR residential direct contact RCL exceedances for the O-Series samples (i.e., samples from the area of maximum predicted historical aerial distribution from wood burning at the former plant on the Wauleco property).
  - There were five WDNR residential direct RCL exceedances for the N-Series/background sample locations consisting of:
    - **N2-3:** A sample collected to represent potential yard waste burning and burn barrels.
    - **N4-1, N4-2, and N4-3:** All three samples collected along the railroad tracks.
    - **N5-4:** A sample collected to represent vehicle traffic.
- **TEQ Comparison:** Of the 64 samples collected by others and Wauleco, the ten highest TEQ values are summarized below as follows (see Section 6.5.2):

NO.	SAMPLE IDENTIFIER	TEQ VALUE (ng/kg)	COMMENT
1	Culv. In	105.65	Sample in area of railroad tracks
2	Culv. Out	87.70	Sample in area of railroad tracks
3	N4-3	62.50	Sample in area of railroad tracks
4	1003 Emter	46.10	Sample in area of railroad tracks(1)
5	N4-2	44.00	Sample in area of railroad tracks
6	117 River St. 1	43.69	Samples adjacent to an alley(2)
	117 River St. 2	42.40	
7	N4-1	22.20	Sample in area of railroad tracks
8	N2-3	21.60	Sample in an alley
9	N2-2	19.30	Sample in an alley
10	O-09	17.45	Sample in an alley

Footnotes:

(1) 1003 Emter St. sample collected at "edge of railroad grade", per CWE notes dated 12/4/08 attached to an email dated May 9, 2018.

(2) 117 River St. samples collected "Near fence on south property line, near SW corner of lot" per CWE notes dated 12/4/08 attached to an email dated May 9, 2018.

Observations of these 10 highest TEQ values include the following:

- Six of the seven highest TEQ values (Nos. 1, 2, 3, 4, 5, and 7 in table above) were collected in areas of railroad tracks. This is consistent with the EPA document (EPA 2003b) that identified railroad corridors, with and without power poles, as possible sources of dioxins/furans due to the presence of treated railroad ties and treated wood poles.
- The next four highest TEQ values (Nos. 6, 8, 9, and 10 in table above) were collected in or adjacent to alleys. Samples collected in or adjacent to alleys, which is the furthest point of a backyard, this would typically be the potential location of yard waste burning and residential burn barrels. Detections of dioxins/furans in area like this is consistent with the EPA document (EPA 2003a) that identified yard waste burning and residential burn barrels as one of the three main sources of environmental releases of dioxins/furans.
- The two highest TEQ values were at samples Culv. In and Culv. Out, which were both from the inlet and outlet of a stormwater culvert under the former railroad tracks. These areas would be expected to accumulate fine soil-like debris from the former railroad tracks, such as weathered particles of creosote treated railroad ties.

The only two O-Series samples (O5 and O9) that exceeded the EPA's regional screening level for dioxin in soil of 4.8 ng/kg, appear unrelated to aerial deposition from wood burning at the Wauleco site. These two samples were part of four samples collected in pairs. The pairs were placed in locations perpendicular to, and equidistant from, the Wauleco primary axis that represents the maximum predicted aerial distribution within the pattern. The purpose of these pairings is to identify whether sources of dioxins and furans other than the target site (i.e., Wauleco) are contributing factors. Thus, the air dispersion model would predict that sample pairs should each have similar finding if they are indeed equally impacted by the Wauleco site. However, the pairs of these O-Series samples (O4 and O10, respectively) did not produce similar measured values, suggesting there is an additional contributing source of dioxins and furans. The O5 and O9 sample results are consistent with the results from other samples collected in alleyways in the N2, yard waste burning and residential burn barrel, series of samples.

The 36 TEQs associated with this sampling were all less than the 87.7 ng/kg TEQ value for the sample Culvert Outlet that DHS used in its cancer and non-cancer risk assessments, as discussed in the DHS letters dated August 20, 2018 (Appendix D) and February 7, 2019 (Appendix E).

7.2 Conclusions

Based on the evaluation presented above, conclusions are as follows:

- None of the O-Series samples exceeded a WDNR RCL.
- The only two O-Series samples (O-05 and O-09) TEQs that exceeded an EPA screening value were in alley ways and very similar to the concentrations of other alley way samples

unassociated with the Wauleco property. **T**he air dispersion model would predict that sample pairs should each have similar finding if they are indeed equally impacted by the Wauleco site. However:

  - The pairs of these O-Series samples (O-04 and O-10, respectively) did not produce similar measured values, suggesting there is an additional contributing source of dioxins and furans.
  - The O-05 and O-09 sample results are consistent with the results from other samples collected in alley ways in the N2, yard waste burning and residential burn barrel, series of samples.

- Wauleco has thoroughly responded to the WDNR's January 15, 2019 letter. It went through a robust process to identify meaningful data points related to Wauleco's past wood waste burning practices. This allowed Wauleco to review relevant data in order to understand the potential impact past wood waste burning practices at the site may have had on area surface soils. The evidence collected and analyzed demonstrates that to the extent there are locations in the area that have reports of dioxins and furans that exceed WDNR standards, these locations would not appear to be associated with historical practices at the Wauleco property.

Section 8
References

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Table 1
Analytical Results of Soil Samples Collected from the Neighborhood East of Wauleco
Wausau, Wisconsin

ANALYTE	UNITS	NR 720 SOIL RCLs[1] NON-INDUSTRIAL DIRECT CONTACT[2]	NR 720 SOIL RCLs[1] INDUSTRIAL DIRECT CONTACT[2]	CONSULTANT/INVESTIGATION, SAMPLE LOCATION ID, SAMPLE DEPTH (FT BGS), SAMPLE DATE																										
				CWE 2006[3]			CWE 2008[3]									AECOM[4]													Sand Creek Consultants[5]			
				122E	Culv. In.	Culv. Out.	1003 Emt	130 Riv	141 Riv	120 Riv	117 Riv 1	117 Riv 2	Fern	Oak	Weston	B-1	B-1	B-2	B-2	B-3	B-3	B-4	B-4	B-5	B-5	B-6	B-6	B-101	B-102	B-103	B-104
				0.33-0.5[6]	0.33-0.5[6]	0.33-0.5[6]	0.33-0.5[6]	0.33-0.5[6]	0.33-0.5[6]	0.33-0.5[6]	0.33-0.5[6]	0.33-0.5[6]	0.33-0.5[6]	0.33-0.5[6]	0.33-0.5[6]	1-4	4-6	1-4	6-8	1-2	10-12	1-2	10-12	1-4	10-12	1-4	8-10	0.67[7]	0.67[7]	0.67[7]	0.67[7]
				6/13/2006			12/4/2008									8/25/2017													1/9/2018			
DIOXIN CONGENERS																															
2,3,7,8-TCDD	ng/kg	4.82	21.8	<0.99	2.1	<2.0	<1	<1.8	<1	<1	<1	<1	<1	<1	<1	<0.63	<0.15	<2.6 D	<0.10	<0.064	<0.10	<0.094	<0.094	<0.079	<0.079	<0.11	<0.071	< 0.28	<0.41	<0.23	<0.23
1,2,3,7,8-PeCDD	ng/kg	4.93	22.3	<4.9	**15**	**11**	<5	<5	<5	<5	**5.1**	**5.6**	<5	<5	<5	<0.18	<0.15	<1.4 D	<0.085	0.45 J	<0.11	<0.046	<0.084	<0.062	<0.069	<0.087	<0.075	2.3 J	0.74 EIJ	0.48 EIJ	0.56 J
1,2,3,4,7,8-HxCDD	ng/kg	49.3	223	6.3	48	23	<5	<5	<5	<5	12	15	<5	<5	<5	<0.11	<0.11	<2.1 D	<0.12	<0.20 IJ	<0.097	<0.055	<0.075	<0.069	<0.054	<0.096	<0.066	3.10	1.1 J	0.55 EIJ	0.69 J
1,2,3,6,7,8-HxCDD	ng/kg	49.3	223	17	**140**	**83**	15	6.0	<5	<5	41	44	5.6	<5	<5	<0.10	<0.11	<1.9 IJD	<0.11 IJ	3.5 J	<0.086	<0.093	<0.061	<0.055	<0.054	<0.087	<0.081	15	4.2 J	2.2 J	3.6 J
1,2,3,7,8,9-HxCDD	ng/kg	49.3	223	11	**60**	36	6.8	5.5	<5	<5	25	27	<5	<5	<5	<0.082	<0.12	<2.0 D	<0.12	1.9 J	<0.099	<0.094	<0.071	<0.061	<0.053	<0.090	<0.073	7.6	2.4 J	1.4 J	1.9 J
1,2,3,4,6,7,8-HpCDD	ng/kg	484	2190	270	**2400**	**1400**	260	95	87	120	**1100**	**1100**	170	30	<5	0.20 J	0.12 J	140 D	2.0 J	65	<0.14	0.46 J	<0.18 IJ	0.28 J	<0.13 IJ	<0.16 IJ	<0.15 IJ	290	85	50	81
OCDD	ng/kg	16400	74400	1600	**17000**	9300	3000	700	630	830	7600	8200	1200	270	24	0.99 BJ	0.70 BJ	7500 D	50	520	0.27 BJ	3.1 J	5.4 J	4.6 J	6.0 J	5.6 J	6.4 J	2000	570	380	650
FURAN CONGENERS																															
2,3,7,8-TCDF	ng/kg	48.4	219	1.7 T	6.7	7.3	2	<3.9	<1	<1	3.5	3.7	1.4	<1	<1	<0.54	<0.18	<2.5 D	<0.096	<1000.080 IJ	<0.095	<0.11	<0.071	<0.068	<0.052	<0.11	<0.090	2.9 V	0.87 J	<0.46	<0.26
1,2,3,7,8-PeCDF	ng/kg	164	744	<4.9	13	8.7	<5	<5	<5	<5	<5	<5	<5	<5	<5	<0.27	<0.17	<1.3 D	<0.12	0.31 J	<0.075	<0.057	<0.097	<0.096	<0.087	<0.19	<0.12	2.0 J	0.70 J	<0.52	0.42 J
2,3,4,7,8-PeCDF	ng/kg	16.4	74.4	5.7	**45**	**80**	**76**	<5	<5	<5	16	16	<5	<5	<5	<0.20	<0.20	<1.4 D	<0.082	0.95 J	<0.063	<0.033	<0.049	<0.056	<0.049	<0.10	<0.060	9.8	2.0 J	1.1 J	1.2 J
1,2,3,4,7,8-HxCDF	ng/kg	48.5	220	7.3	32	35	24	<5	<5	<5	37 T	12	<5	<5	<5	<0.086	<0.12	<2.0 D	<0.098	1.4 J	<0.11	<0.061	<0.054	<0.041	<0.040	<0.065	<0.074	5.8	2.0 EIJ	1.3 J	1.5 J
1,2,3,6,7,8-HxCDF	ng/kg	48.5	220	5.4	34	33	26	<5	<5	<5	19	17	5.9 T	<5	<5	<0.084	<0.11	<2.0 D	<0.087	1.6 J	<0.086	<0.061	<0.045 IJ	<0.030	<0.036	<0.053	<0.071	6.7	1.8 J	0.99 J	1.2 J
2,3,4,6,7,8-HxCDF	ng/kg	49.3	223	9.0	**59**	**75**	**100**	<5	<5	<5	29	23	<5	<5	<5	<0.085	<0.10	<2.5 D	<0.075	1.8 J	<0.086	<0.068	<0.039	<0.040	<0.037	<0.055	<0.063	11 EP	2.7 J	1.2 J	1.6 J
1,2,3,7,8,9-HxCDF	ng/kg	49.3	223	<4.9	14	11	6.4	<5	<5	<5	<5	5.0	<5	<5	<5	<0.12	<0.15	<4.1 D	<0.13	<0.13 IJ	<0.18	<0.13	<0.056	<0.049	<0.045	<0.068	<0.058	1.3 J	0.36 J	<0.12	<0.20
1,2,3,4,6,7,8-HpCDF	ng/kg	490	2220	94	**550**	480	160	43	27	42	350	350	83	19	<5	<0.074	<0.084	9.1 JD	0.22 J	23	<0.057	0.19 J	<0.055	0.048 J	0.068 J	<0.093	0.11 J	120	30	17	26
1,2,3,4,7,8,9-HpCDF	ng/kg	490	2220	8.5	40	31	13	<5	<5	<5	20	20	<5	<5	<5	<0.085	<0.11	<3.1 D	<0.13	1.0 J	<0.096	<0.57	<0.074	<0.054 IJ	<0.059	0.13 J	<0.074	4.0 J	0.96 EIJ	0.81 J	1.0 J
OCDF	ng/kg	16400	74400	130	950	710	170	49	36	53	520	550	170	34	<10	<0.17	<0.14	<3.0 IJD	0.51 J	33	<0.14	0.23 J	<0.17	<0.13	<0.14 IJ	0.26 J	0.11 IJ	190	36	19	42
PENTACHLOROPHENOL																															
Pentachlorophenol (PCP)	ug/kg	1020	3970	--	--	--	--	--	--	--	--	--	--	--	--	<40.5	<37.7	<39.9	<38.6	<39.7	<37.8	<40.3	<37.9	<37.5	<38.4	<38.4	<39.1	--	--	--	--

Footnotes:

[1] RCLs from WDNR RCL Spreadsheet (December 2018 Update).

[2] Value is the generic RCL for exposure by direct contact.

[3] From CWE letter titled "July 2009 Memorandum Regarding PCP and Dioxin Concentrations" dated July 8, 2009.

[4] From AECOM memorandum titled "Results for Phase 2 Environmental Sampling Investigation, Thomas Street Phase II" dated September 21, 2017. Note that samples were also analyzed for 2-chlorophenol, 2,4-dichlorophenol, phenol, 2,3,4,6-tetrachlorophenol, 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol, which were not detected.

[5] From Sand Creek Consultants (SCC) letter titled "Thomas Street Proposed Construction Corridor" dated February 6, 2018. Note that the results presented here match those from the SCC summary table and one of the enclosed lab reports. In another enclosed lab report for the same samples, the results reported as J-flagged here are reported as not detected.

[6] Depth of 0.33-0.5 feet is approximate. The CWE letter notes that dioxin/furan concentrations measured in soil samples were found at the base of the A horizon, generally 4 to 6 inches below the land surface.

[7] The Sand Creek Consultants letter notes that soil samples were collected from depths of approximately 8 inches, near the base of the topsoil, after first drilling 4 to 5 inches through the frost layer.

Prepared by: L. Auner, 2/18/2019
Checked by: B. Wachholz, 2/25/2019
Revised by: L. Auner, 3/8/2019

Abbreviations:

TCDD: Tetrachlorodibenzo-p-dioxin
PeCDD: Pentachlorodibenzo-p-dioxin
HxCDD: Hexachlorodibenzo-p-dioxin
HpCDD: Heptachlorodibenzo-p-dioxin
OCDD: Octachlorodibenzo-p-dioxin
TCDF: Tetrachlorodibenzofuran
PeCDF: Pentachlorodibenzofuran
HxCDF: Hexachlorodibenzofuran
HpCDF: Heptachlorodibenzofuran
OCDF: Octachlorodibenzofuran

Notes:

1. RCL = NR 720 Residual Contaminant Level
2. ng/kg: nanograms per kilogram; equivalent to parts per trillion
3. ug/kg = micrograms per kilogram, equivalent to ppb
4. **Bold blue** values indicate concentration exceeds Non-Industrial Direct-Contact RCL
5. **Bold purple** values indicate concentration exceeds Industrial Direct-Contact RCL
6. -- = Not analyzed or not included in report referenced
7. TRC has not performed a data validation/data usability review of others' analytical results.

Data Qualifiers:

J = Estimated value
B = Less than 10x higher than the method blank level
E = Estimated maximum possible concentration
T = Estimated maximum concentraion
I = Interference present
P = PCDE interference
D =Result obtained from analysis of diluted sample
V = Results verified by confirmation analysis

Table 2
Sanborn Fire Map Review[1] - Summary of Potential Burning Sources in Area of Wauleco
Wausau, Wisconsin

SITE NO. [2]	MAP YEAR	STREET/ADDRESS/LOCATION DESCRIPTION [3]	POTENTIAL FUEL SOURCE		FACILITY NAME [4]	FACILITY USES	SANBORN FIRE INSURANCE MAP INCLUDED IN APPENDIX	PDF FILE	PDF PAGE NO. [5]
			RECORDED FUEL SOURCE SHOWN ON SANBORN MAP	POTENTIAL ADDITIONAL FUEL SOURCE					
1	1898	(Note, this is the Wauleco Site) East of railroad tracks, north of Thomas St, west of Cleveland Ave, and south of Rosecrans	Waste		Wausau Novelty Co. Mfrs of Furniture & Wooden Ware Novelties	Steam Dry Kiln, Boiler Room, Boxed Steam Pipe, 2 Engines	1	5633330.3_1.pdf	14
	1904, 1912		Slabs[6] and Refuse/Waste			Hot Air Dry Kiln, Boiler Room, Engine & Steam Coils, Boxed Steam Pipe		5633330.3_1.pdf	13, 12
	1923		Waste			Hot Air Dry Kilns, Steam Coils, Engines, Boiler Room		5633330.3_1.pdf	11
	1950		Waste		Geo. Silbernagel & Sons Co. MFRS of Doors, Windows, & Mouldings	Engine Room, Boiler Room, Dry Room		5633330.3_1.pdf	10
	1954, 1961, 1963, 1967		Waste		The Silcrest Co. MFRS of Doors, Windows & Mouldings	Dry Room, Engines, Boiler Room (Cyclone in Boiler Room since 1961)		5633330.3_1.pdf	9, 8, 7, 6
2	1898	Between 1001 and 1034 S. 2nd Ave on map (now S. 1st Ave), on east side of street, west side of railroad tracks, north of Thomas St and south of Rosecrans	Wood		Eichert and Werle Manufacturers of Quartz Sand	Rock Crusher, lumber piles	2	5633330.3_1.pdf	14
	1904	1007 and 1015 S. 2nd Ave (now 1st Ave), east of street, west of railroad tracks, north of Thomas St, south of Rosecrans	Slabs[6] and Coal		Wausau Sand Paper Co. Sand Paper Factory	Rock Crusher, Drying & Gluing Room, Cutting Room, Engines		5633330.3_1.pdf	13
	1912		Steam and Hot Air for heat	Oil		Engines, Cutting Room, Drying & Gluing Room, Oil House		5633330.3_1.pdf	12
	1923		Coal	Oil		Oil House		5633330.3_1.pdf	11
	1950, 1954		Coal		Wausau Motor Parts Co MFRS of Piston Rings	Welding, Boiler Room		5633330.3_1.pdf	10, 9
	1961, 1963, 1967	1015 Harrison Blvd (now 1st Ave), east of street, west of railroad tracks, north of Thomas St, south of Rosecrans	Unknown		Minnesota Mining & MFG Finished Product W. Ho. (i.e., 3M)	Welding, Boiler Room		5633330.3_1.pdf	8, 7, 6

Footnotes:

(1) Based on TRC's review of 159 pages of Sanborn Fire Insurance Maps of a one square mile area that included the Wauleco site, from 1884 to 1967.

(2) Site Numbers are TRC's arbitrary numbering system based on TRC's understanding of location

(3) Location Description sometimes varies for the same Site due to changes in road names or visible reference points on each map.

(4) Name of business operating at the Site (location can change over time)

(5) Page Numbers are shown on the bottom right-hand side of each pdf Sandborn Map within the Appendices.

(6) Slabs are assumed to be slabs of wood.

Table 2
Sanborn Fire Map Review[1] - Summary of Potential Burning Sources in Area of Wauleco
Wausau, Wisconsin

SITE NO. [2]	MAP YEAR	STREET/ADDRESS/LOCATION DESCRIPTION [3]	POTENTIAL FUEL SOURCE		FACILITY NAME [4]	FACILITY USES	SANBORN FIRE INSURANCE MAP INCLUDED IN APPENDIX	PDF FILE	PDF PAGE NO. [5]
			RECORDED FUEL SOURCE SHOWN ON SANBORN MAP	POTENTIAL ADDITIONAL FUEL SOURCE					
3	1898	SE corner of intersection of W Thomas St and railroad tracks.	Waste	Coal	Underwood Veneer Co. (While not listed on Sanborn Maps, this facility was also Connor Forest Products)	Coal Storage, Air Drying Sheds, Roller Dryer, Dry Kilns	3	5633330.3_1.pdf	14
	1904		Waste			Dry Kilns, Engines, Steam Coils, Air Drying Sheds, Roller Dryer		5633330.3_1.pdf	13
	1912		Waste			Engines, Veneer Drier, Waste Vault, 50,000-Gallon W.T		5633330.3_1.pdf	12
	1923, 1950, 1954, 1961		Waste	Wood		Iron Veneer Dryer, Motor, Steam Dry Kilns, 40,000-gallon W.T., Boiler Room, Wood Waste room		5633330.3_1.pdf	11, 10, 9, 8
	1963, 1967	133 Thomas St., SE corner of intersection of W Thomas St and railroad tracks.	Waste	Oil, Wood		Iron Veneer Dryer, Wood Waste, 40,000-gallon WT, Dry Room, Oil Room		5633330.3_1.pdf	7, 6
	1898, 1904, 1912, 1923, 1950, 1954, 1961, 1963, 1967	SE corner of intersection of W Thomas St and railroad tracks. West of Cleveland Ave	Waste	Coal		Veneer Mill, Dry Kilns, Coal Room, Engines, Boiler Room		5633330.3_50.pdf	14, 13, 12, 11, 10, 9, 8, 7, 6
4	1923	East of railroad tracks, north of Rosecrans, west of River and former Cleveland Ave	Coal		Wausau Abrasives Co. Quartz & Emery Grading Plant	Unknown	4	5633330.3_1.pdf	11
	1923	South of Sherman st, North of Rosecrans, East of 1st Ave. Railroad tracks bordering west and NE sides of Site	Coal			Blacksmith shop		5633330.3_32.pdf	11
	1950, 1954, 1961, 1963, 1967	East of railroad tracks, north of Rosecrans, west of River and former Cleveland Ave	Coal		Minnesota Mining & MFG Co. (i.e., 3M) / Wausau Plant Roofing Granule Divn, Quartz Coloring & Grading Plant	Rotary Heater, Crude Crushing, Silos		5633330.3_1.pdf	10, 9, 8, 7, 6
	1950, 1954, 1961, 1963, 1967	South of Sherman st, North of Rosecrans, East of 1st Ave. Railroad tracks bordering west and NE sides of Site	Coal			Boiler Room, Rotary Heater, Crude Crushing, Silos		5633330.3_32.pdf	10, 9, 8, 7, 6
5	1950, 1954, 1961	Northeast of intersection of Rosecrans St and former railroad tracks/Cleveland Ave, SE of River	Unknown		Cold Storage Plant / 1961: National Dairy Products Corp. Kraft Food Divn	Boiler Room	5	5633330.3_1.pdf	10, 9, 8
	1950, 1954, 1961		Unknown			Boiler Room		5633330.3_32.pdf	10, 9, 8
6	1950, 1954, 1961, 1963, 1967	1308 West st, north of street, south of railroad tracks	Unknown	Oil	Contractors Storage	Repair shop, Boiler Room, Oil House	6	5633330.3_19.pdf	9, 8, 7, 6, 5

Footnotes:

(1) Based on TRC's review of 159 pages of Sanborn Fire Insurance Maps of a one square mile area that included the Wauleco site, from 1884 to 1967.

(2) Site Numbers are TRC's arbitrary numbering system based on TRC's understanding of location

(3) Location Description sometimes varies for the same Site due to changes in road names or visible reference points on each map.

(4) Name of business operating at the Site (location can change over time)

(5) Page Numbers are shown on the bottom right-hand side of each pdf Sandborn Map within the Appendices.

(6) Slabs are assumed to be slabs of wood.

Table 2
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Wausau, Wisconsin

SITE NO. [2]	MAP YEAR	STREET/ADDRESS/LOCATION DESCRIPTION [3]	POTENTIAL FUEL SOURCE		FACILITY NAME [4]	FACILITY USES	SANBORN FIRE INSURANCE MAP INCLUDED IN APPENDIX	PDF FILE	PDF PAGE NO. [5]
			RECORDED FUEL SOURCE SHOWN ON SANBORN MAP	POTENTIAL ADDITIONAL FUEL SOURCE					
7	1950	1212 West st, north of street, south of railroad tracks.	Coal		Marathon Foundry & Machine Co. Foundry	Boiler Room, Coal Room, Core Oven	7	5633330.3_19.pdf	9
	1954, 1961, 1963, 1967		Coal		The Wausau MFG Co. MFRS of Tank Turrets	Boiler Room, Coal Room, Iron Yard, Core Oven		5633330.3_19.pdf	8, 7, 6, 5
8	1923, 1950, 1954, 1961, 1963, 1967	Northwest corner of intersection of S 10th Ave and West Street. South of railroad tracks.	Coal		Wausau Iron Works Structural Iron Work	Coal Shed, Motor, Boiler Room	8	5633330.3_20.pdf	10, 9, 8, 7, 6, 5
9	1954, 1961, 1963, 1967	Southwest corner of intersection of S. 7th Ave and the railroad tracks. North of Pardee St	Unknown		Marathon County Park Dept / Wausau Brewing Co.	Boiler House	9	5633330.3_21.pdf	9, 8, 7, 6
10	1923, 1950, 1954, 1961, 1963, 1967	Northwest corner of intersection of Sherman St and S. 5th Ave. South of railroad tracks	Coal		Marathon Rubber Products Co. Mfrs of Rubberized Raincoats & Clothing	Boiler Room, Coal Room	10	5633330.3_31.pdf	11, 10, 9, 8, 7, 6
11	1898, 1904, 1912	NE of railroad tracks and SE of River. South of Sherman St, north of Rosecrans	Waste	Oil	1898: Wausau Furniture Co. 1904: Curtis & Yale Co. Hardwood, Flooring & Screen Door Factory	Blacksmith shop, Oil House, Engine, Dry Kiln, Boiler Room	11	5633330.3_32.pdf	14, 13, 12
	1923		Coal		Northern Milling Co. Flour & Feed Mill	Boiler Room, Motors, Engines		5633330.3_32.pdf	11
12	1898	East of S 2nd Ave (now 1st Ave), West of River, North of railroad tracks and Sherman St, South of West St	Wood		Aug. Schwentkofske Planing Mill & Jobbing Shop	Engine, Furnace, Tan Bark	12	5633330.3_32.pdf	14
13	1891, 1898	NE of railroad tracks and SE of River. North of Sherman St, South of West St	Tan Bark		J. A. Porter Tanning Co.	55 HP Engine, Furnace, Dry Room	13	5633330.3_32.pdf	15, 14

Footnotes:

(1) Based on TRC's review of 159 pages of Sanborn Fire Insurance Maps of a one square mile area that included the Wauleco site, from 1884 to 1967.

(2) Site Numbers are TRC's arbitrary numbering system based on TRC's understanding of location

(3) Location Description sometimes varies for the same Site due to changes in road names or visible reference points on each map.

(4) Name of business operating at the Site (location can change over time)

(5) Page Numbers are shown on the bottom right-hand side of each pdf Sandborn Map within the Appendices.

(6) Slabs are assumed to be slabs of wood.

Table 2
Sanborn Fire Map Review[1] - Summary of Potential Burning Sources in Area of Wauleco
Wausau, Wisconsin

SITE NO. [2]	MAP YEAR	STREET/ADDRESS/LOCATION DESCRIPTION [3]	POTENTIAL FUEL SOURCE		FACILITY NAME [4]	FACILITY USES	SANBORN FIRE INSURANCE MAP INCLUDED IN APPENDIX	PDF FILE	PDF PAGE NO. [5]
			RECORDED FUEL SOURCE SHOWN ON SANBORN MAP	POTENTIAL ADDITIONAL FUEL SOURCE					
14	1912, 1923	East of Edwards St, North of Adrian St, South of Thomas St, West of River	Spent Tan Bark and Coal, Waste fed to boilers through dutch ovens		Union Tanning Co.	Engines, Dry Loft, Blacksmith shop	14	5633330.3_43.pdf	11, 10
15	1904	East of intersection of S. 3rd Ave and Bopf St. North and West of railroad tracks	Refuse		Wausau Planing Mill	Planing Mill, Boiler Room	15	5633330.3_50.pdf	13
	1912		Waste		Lumber Company	Planing Mill, Boiler Room, Blacksmith shop, Engines		5633330.3_50.pdf	12
	1950	East of intersection of S. 3rd Ave and Bopf St	Unknown			Black Smith shop		5633330.3_49.pdf	9
16	1898, 1904	East of intersection of S. 3rd Ave and Bopf St. South of railroad tracks	Wood, Slabs[6]		Wisconsin Quartz Co. Mfr Quartz Sand	Boiler Room, Crushing & Screening	16	5633330.3_50.pdf	14, 13
17	1912, 1923, 1950, 1954, 1961, 1963, 1967	Southeast corner of intersection of Edwards St and Mc Cleary St	1912 & 1923: Spent Tan Bark and Coal, Waste fed to boilers through dutch ovens 1950: Coal	Oils	Murley - Murphy Co. Whol. Hardware Electrical & Plumbing Supplies	Coal Room, Boiler Room, Oil Room	17	5633330.3_52.pdf	11, 10, 9, 8, 7, 6, 5
18	1954	South of Myron St and Adrian St., East of Emter and Mc Cleary St, West of river, and North of Chellis St. and river.	Unknown		Sewage Treatment Plant & Incinerator	Sewage Treatment Plant & Incinerator	18	09731_1954-0000a.pdf	1

Footnotes:
(1) Based on TRC's review of 159 pages of Sanborn Fire Insurance Maps of a one square mile area that included the Wauleco site, from 1884 to 1967.
(2) Site Numbers are TRC's arbitrary numbering system based on TRC's understanding of location
(3) Location Description sometimes varies for the same Site due to changes in road names or visible reference points on each map.
(4) Name of business operating at the Site (location can change over time)
(5) Page Numbers are shown on the bottom right-hand side of each pdf Sandborn Map within the Appendices.
(6) Slabs are assumed to be slabs of wood.

Prepared by: C. Olson
Checked by: B. Iverson

Table 3
Historical Aerial Photograph Review - Summary of Potential Stacks in Area of Wauleco
Wausau, Wisconsin

MAP ID NO.	INTERPRETED POINT TYPE	OBSERVATION NOTES	YEAR OR DATE	AERIAL IMAGE SOURCE
1	Small Stack	Small rooftop stack	10/28/1980	1VEPA00010093_1980.tif
2	Stack	Large square stack	5/1/1978	R595E229_1978.jpg
3	Small Stack	Square rooftop stack	2000	County 2000
4	Small Stack	Rooftop stack on school	2000	County 2000
5	Small Stack	Possible small rooftop stack	5/1/1978	R595E229_1978.jpg
6	Small Stack	Square school stack, building gone	8/10/1965	R77E077_1965.jpg
7	Small Stack	Square school stack, building gone	8/10/1965	R77E077_1965.jpg
8	Stack	Stack from 68, gone by 74	8/10/1965	R77E077_1965.jpg
9	Small Stack	Possible rooftop stack, turbine ventilation	8/10/1965	R77E077_1965.jpg
10	Small Stack	Possible rooftop stack, turbine ventilation	8/10/1965	R77E077_1965.jpg
11	Small Stack	Rooftop stacks/vent pipes	2000	County 2000
12	Small Stack	Rooftop stacks/vent pipes	2000	County 2000
13	Small Stack	Small roof chimney, not major	1974	County 1974
14	Small Stack	Rooftop stacks/vent pipes	2000	County 2000
15	Small Stack	Rooftop stacks/vent pipes	2000	County 2000
16	Small Stack	Rooftop stacks/vent pipes	2000	County 2000
17	Small Stack	Rooftop stacks/vent pipes	2000	County 2000
18	Small Stack	Rooftop stacks/vent pipes	2000	County 2000
19	Small Stack	Square stack on school	8/10/1965	R77E077_1965.jpg
20	Small Stack	Rooftop stacks/vent pipes	2000	County 2000
21	Small Stack	Rooftop stacks/vent pipes	2000	County 2000
22	Small Stack	Rooftop stacks/vent pipes	2000	County 2000
23	Stack	Tall stack	5/1/1978	R595E229_1978.jpg
24	Small Stack	Just poi	8/10/1965	R77E077_1965.jpg
25	Small Stack	Square school stack	1974	County 1974
26	Stack	Clear stack, very tall	8/10/1965	R77E077_1965.jpg
27	Small Stack	Small stack on school	1974	County 1974
28	Small Stack	Small stack on school	1974	County 1974

Table 3
Historical Aerial Photograph Review - Summary of Potential Stacks in Area of Wauleco
Wausau, Wisconsin

MAP ID NO.	INTERPRETED POINT TYPE	OBSERVATION NOTES	YEAR OR DATE	AERIAL IMAGE SOURCE
29	Stack	Possible stack	8/10/1965	R77E087_1965.jpg/R77E077_1965.jpg
30	Stack		1974	County 1974
31	Stack		1974	County 1974
32	Stack		1974	County 1974
33	Stack		1974	County 1974
34	Stack	Wauleco stack	8/10/1965	R77E087_1965.jpg
35	Stack		1974	County 1974
36	Stack		1974	County 1974
37	Stack		1974	County 1974
38	Stack	Clear tall stacks	8/10/1965	R77E087_1965.jpg
39	Stack	Clear tall stacks	8/10/1965	R77E087_1965.jpg
40	Stack	Appears to be reconfigured from 3 to 1 stack by 74	1974	County 1974
41	Stack		1974	County 1974
42	Stack	Clear tall stacks	8/10/1965	R77E087_1965.jpg
43	Stack		1974	County 1974
44	Small Stack	Church	1974	County 1974
45	Stack	Stack	8/10/1965	R77E087_1965.jpg
46	Small Stack	Rooftop stack	1974	County 1974
47	Stack	Rooftop stack	8/10/1965	R77E087_1965.jpg
48	Stack	Stack	8/10/1965	R77E087_1965.jpg
49	Small Stack	Pilgrim Church	1974	County 1974
50	Small Stack	Square school stack	1974	County 1974
51	Stack	Not present by 1979	2000	County 1974
52	Small Stack	Rooftop stack	1974	County 1974
53	Stack	Large stack at Kraft Foods	1974	County 1974
54	Stack	Apparent tall stack, replaced by 1962 at N end of plant	1938	WISCO 1938
55	Small Stack	Apparent small square rooftop stack	1974	County 1974
56	Stack	Apparent large stack	1962	USGS 1962

Table 4
Coordinates of 36 Soil Sample Locations
Wausau, Wisconsin

NO.	TRC POINT ID	SP EASTING	SP NORTHING	DD LONGITUDE	DD LATITUDE
1	N1-1	2064328.44	406274.7662	-89.62987	44.947151
2	N1-2	2065083.187	405729.2732	-89.626965	44.945645
3	N1-3	2064081.478	406271.252	-89.630824	44.947144
4	N1-4	2064027.924	406544.2333	-89.631026	44.947893
5	N1-5	2064391.557	406602.7073	-89.629621	44.948049
6	N2-1	2060465.674	405904.7328	-89.644796	44.946183
7	N2-2	2060464.282	405684.7985	-89.644805	44.94558
8	N2-3	2059836.685	407253.141	-89.647203	44.949889
9	N2-4	2059837.11	407040.4213	-89.647205	44.949305
10	N2-5	2060138.041	407086.5801	-89.646041	44.949428
11	N3-1	2061262.496	408075.8954	-89.641681	44.952129
12	N3-2	2061267.959	408137.3966	-89.641659	44.952297
13	N3-3	2061229.534	408326.5669	-89.641804	44.952816
14	N3-4	2061040.822	408323.1613	-89.642533	44.952809
15	N4-1	2063989.627	407018.464	-89.631166	44.949195
16	N4-2	2063833.032	407099.1421	-89.631769	44.949418
17	N4-3	2063720.601	407164.0167	-89.632202	44.949597
18	N5-1A	2061896.213	408514.0994	-89.639226	44.953323
19	N5-2A	2061893.21	408627.9669	-89.639236	44.953635
20	N5-3	2061848.986	408812.2042	-89.639403	44.954141
21	N5-4	2061848.705	408897.3644	-89.639403	44.954375
22	N6-1	2058961.39	405524.192	-89.650612	44.945157
23	N6-2	2059698.427	407869.409	-89.647726	44.951581
24	N6-3	2066471.319	404319.002	-89.621629	44.941759
25	N6-4	2066721.362	409469.6866	-89.62057	44.955883
26	N7-1	2063219.106	407190.4673	-89.634139	44.949676
27	O-01	2063481.219	406264.4134	-89.633143	44.947133
28	O-02	2063195.26	406577.1632	-89.634242	44.947994
29	O-03	2063299.31	406539.554	-89.63384	44.94789
30	O-04	2062984.469	406448.4239	-89.635058	44.947644
31	O-05	2063331.762	406727.0356	-89.633712	44.948403
32	O-06	2062157.638	407462.2094	-89.638234	44.950434
33	O-07	2062157.394	407681.4674	-89.638231	44.951036
34	O-08	2061894	407974.4576	-89.639244	44.951843
35	O-09	2062023.164	407026.7369	-89.638761	44.949242
36	O-10	2063005.338	407900.0363	-89.634952	44.951625

Notes:

1. SP coordinates are in NAD83 State Plane Wisconsin Central (US Feet)
2. SP = State Plane
3. DD = Decimal degrees

Table 5
Summary of 36 Surface Soil Sample Dioxin and Furan Results
Wausau, Wisconsin

ANALYTE	UNITS	NR 720 SOIL RCLs		SAMPLE AREA/TYPE, SAMPLE ID, DEPTH (inches)[1], SAMPLE DATE											
				CITY INCINERATOR					YARD WASTE BURNING AND BURN BARRELS						MARATHON RUBBER
		NON-INDUSTRIAL DIRECT CONTACT	INDUSTRIAL DIRECT CONTACT	N1-1	N1-2	N1-3	N1-4	N1-5	N2-1	N2-2	N2-3	N2-4	N2-5	N3-1
				0-6	0-6	0-6	0-6	0-6	0-6	0-5[2]	0-6	0-6	0-6	0-6
				8/13/2019	8/13/2019	8/13/2019	8/13/2019	8/13/2019	8/13/2019	8/13/2019	8/13/2019	8/13/2019	8/13/2019	8/13/2019
DIOXIN CONGENERS														
2,3,7,8-TCDD	ng/Kg	4.82	21.8	< 0.22	0.26 J	< 0.12	< 0.21	< 0.22	< 0.24	< 0.36	16	< 0.32	< 0.37	< 0.13
1,2,3,7,8-PeCDD	ng/Kg	4.93	22.3	0.51 J	1 IJ EMPC	0.23 J	0.24 J	0.62 IJ EMPC	0.82 J	3 J	0.79 J	2.5 J	0.7 J	0.83 J
1,2,3,4,7,8-HxCDD	ng/Kg	49.3	223	0.77 J	1.4 J	0.43 J	0.41 J	1.3 J	0.92 BJ	7.2	1.8 J	3.4 J	1.4 J	1.2 IJ EMPC
1,2,3,6,7,8-HxCDD	ng/Kg	49.3	223	2.2 J	6.6	0.9 J	0.96 J	2.5 J	2 J	22	3.8 J	11	4.2 J	4.4 J
1,2,3,7,8,9-HxCDD	ng/Kg	49.3	223	1.5 J	2.8 J	0.71 J	0.86 J	2.3 J	1.6 J	13	3.3 J	4.1 J	0.91 IJ EMPC	3 J
1,2,3,4,6,7,8-HpCDD	ng/Kg	484	2190	54	180	20	16	71	34	400	72	210	100	58
OCDD	ng/Kg	16400	74400	600	1800	190	120	640	250	3000	520	1600	610	320
Total HpCDD	ng/Kg	-	-	100	340	42	32	140	63	670	130	350	230	120
Total HxCDD	ng/Kg	-	-	19	61	9.2	13	31	20	130	36	71	44	77
Total PeCDD	ng/Kg	-	-	4.4 J	15	1.4 J	5	6.7	7.5	23	9	11	5.1	38
Total TCDD	ng/Kg	-	-	3.9	7.8	0.9 J	2.8	2.3	3.3	3.5	19	2.7	1.2	15
FURAN CONGENERS														
2,3,7,8-TCDF	ng/Kg	48.4	219	< 0.47	1.9 C	0.13 IJ EMPC	0.25 J	< 0.31	0.55 J	0.97 J	0.79 J	1.8 C	0.67 J	0.45 J
1,2,3,7,8-PeCDF	ng/Kg	164	744	0.35 J	0.95 J	0.1 J	< 0.31	< 0.41	0.6 J	2 J	1 J	1.9 J	0.88 J	1.2 J
2,3,4,7,8-PeCDF	ng/Kg	16.4	74.4	0.8 J	12	0.38 J	0.72 J	1.4 IJ EMPC	1.6 IJ EMPC	6.8	5.7	13	1.5 J	2.2 J
1,2,3,4,7,8-HxCDF	ng/Kg	48.5	220	0.85 J	4 J	0.32 J	0.71 IJ EMPC	1.1 J	0.91 IJ EMPC	12	1.9 J	6.1	1.2 IJ EMPC	5.3
1,2,3,6,7,8-HxCDF	ng/Kg	48.5	220	0.94 J	5.5	0.26 J	0.79 J	0.8 IJ EMPC	1.2 J	9.1 P EMPC	3 J	6	1.5 J	4.3 J
2,3,4,6,7,8-HxCDF	ng/Kg	49.3	223	0.77 J	2.6 J	0.34 J	1.3 J	0.58 IJ EMPC	1 J	5.6	3 J	6.1	1.5 J	6.1
1,2,3,7,8,9-HxCDF	ng/Kg	49.3	223	0.31 J	1.5 J	< 0.041	0.32 IJ EMPC	< 0.12	0.49 IJ EMPC	4.8 J	0.83 J	1.9 J	< 0.47	1.9 J
1,2,3,4,6,7,8-HpCDF	ng/Kg	490	2220	8.8	60	6.5	8.1	11	13	160	32	94	20	44
1,2,3,4,7,8,9-HpCDF	ng/Kg	490	2220	0.59 J	2 J	0.33 IJ EMPC	0.66 J	0.56 IJ EMPC	0.54 IJ EMPC	11	1.8 J	3.5 IJ EMPC	0.88 IJ EMPC	3.8 J
OCDF	ng/Kg	16400	74400	27	85	18	17	28	18	310	59	130	34	50
Total HpCDF	ng/Kg	-	-	27	140	14	16	26	27	420	71	210	43	76
Total HxCDF	ng/Kg	-	-	15	110	7.9	10	20	23	230	77	150	26	59
Total PeCDF	ng/Kg	-	-	14	180	6.2	11	24	33	140	110	160	23	36
Total TCDF	ng/Kg	-	-	5.3	58	1.3	4.2	7.2	16	46	39	56	10	15
Calculated TEQ	ng/Kg	-	-	2.32	10.5	0.99	1.3	2.92	2.74	19.3	21.6	14.1	3.72	5.36

Analyte Abbreviations:

DIOXIN CONGENERS:

2,3,7,8-TCDD = 2,3,7,8-Tetrachlorodibenzo-p-dioxin
1,2,3,7,8-PeCDD = 1,2,3,7,8-Pentachlorodibenzo-p-dioxin
1,2,3,4,7,8-HxCDD = 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
1,2,3,6,7,8-HxCDD = 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
1,2,3,7,8,9-HxCDD = 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
1,2,3,4,6,7,8-HpCDD = 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
OCDD = Octachlorodibenzo-p-dioxin
Total HpCDD = Total heptachlorodibenzo-p-dioxin
Total HxCDD = Total hexachlorodibenzo-p-dioxin
Total PeCDD = Total pentachlorodibenzo-p-dioxin
Total TCDD = Total tetrachlorodibenzo-p-dioxin

FURAN CONGENERS:

2,3,7,8-TCDF = 2,3,7,8-Tetrachlorodibenzofuran
1,2,3,7,8-PeCDF = 1,2,3,7,8-Pentachlorodibenzofuran
2,3,4,7,8-PeCDF = 2,3,4,7,8-Pentachlorodibenzofuran
1,2,3,4,7,8-HxCDF = 1,2,3,4,7,8-Hexachlorodibenzofuran
1,2,3,6,7,8-HxCDF = 1,2,3,6,7,8-Hexachlorodibenzofuran
2,3,4,6,7,8-HxCDF = 2,3,4,6,7,8-Hexachlorodibenzofuran
1,2,3,7,8,9-HxCDF = 1,2,3,7,8,9-Hexachlorodibenzofuran
1,2,3,4,6,7,8-HpCDF = 1,2,3,4,6,7,8-Heptachlorodibenzofuran
1,2,3,4,7,8,9-HpCDF = 1,2,3,4,7,8,9-Heptachlorodibenzofuran
OCDF = Octachlorodibenzofuran
Total HpCDF = Total heptachlorodibenzofuran
Total HxCDF = Total hexachlorodibenzofuran
Total PeCDF = Total pentachlorodibenzofuran
Total TCDF = Total tetrachlorodibenzofuran

Notes:

1. ng/kg = nanograms/kilogram on a dry weight basis
2. TEQ = Toxicity Equivalent Calculation
3. TEQ values calculated using the U.S. EPA 2007 values: https://www.govinfo.gov/content/pkg/FR-2007-05-10/pdf/E7-9015.pdf
4. - = standard not established/not applicable
5. RCLs = NR 720 Residual Contaminant Levels. Values are generic RCLs for exposure by direct contact.
6. **Blue** = exceedance of Non-Industrial Direct Contact RCL

Qualifiers:

EMPC = Estimated Maximum Possible Concentration
J = Estimated value
I = Interference present
C = Result obtained from confirmation analysis
B = Less than 10x higher than method blank level
DN2 = Result obtained from analysis of diluted sample
E = Exceeds calibration range
P = PCDE Interference

Footnotes:

1. Samples were collected to the depth noted in inches below ground surface (bgs), not including the vegetative layer at the surface.
2. Sample N2-2 collected to 5 inches bgs due to refusal from roots.
3. Sample N6-3 collected to 5.5 inches bgs due to refusal from stones.

Prepared by: P. Popp
Checked by: L. Auner, 9/20/2019

Table 5
Summary of 36 Surface Soil Sample Dioxin and Furan Results
Wausau, Wisconsin

ANALYTE	UNITS	NR 720 SOIL RCLs		SAMPLE AREA/TYPE, SAMPLE ID, DEPTH (inches)[1], SAMPLE DATE											
				MARATHON RUBBER (CONT.)			RAILROAD			VEHICLE TRAFFIC				URBAN CONDITIONS	
		NON-INDUSTRIAL DIRECT CONTACT	INDUSTRIAL DIRECT CONTACT	N3-2	N3-3	N3-4	N4-1	N4-2	N4-3	N5-1A	N5-2A	N5-3	N5-4	N6-1	N6-2
				0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6
				8/13/2019	8/13/2019	8/13/2019	8/14/2019	8/14/2019	8/14/2019	8/13/2019	8/13/2019	8/13/2019	8/13/2019	8/13/2019	8/13/2019
DIOXIN CONGENERS															
2,3,7,8-TCDD	ng/Kg	4.82	21.8	< 0.13	< 0.098	< 0.14	0.8 J	0.85 J	1	< 0.52	< 0.5	< 0.97	< 0.42	< 0.54	< 0.77
1,2,3,7,8-PeCDD	ng/Kg	4.93	22.3	0.46 J	0.16 J	< 0.26	2.5 J	**5.2**	**5.9**	0.46 IJ EMPC	0.94 J	2.4 J	2.2 J	0.6 J	1.2 J
1,2,3,4,7,8-HxCDD	ng/Kg	49.3	223	0.85 J	0.19 J	< 0.29	6.3	7.8 JDN2	9 JDN2	0.77 BJDN2	1.9 J	2.5 JDN2	3.6 J	0.77 BJDN2	1.7 JDN2
1,2,3,6,7,8-HxCDD	ng/Kg	49.3	223	2.9 J	0.73 J	0.44 IJ EMPC	24	39 DN2	44 DN2	1.7 IJDN2 EMPC	3.6 IJ EMPC	5.1 JDN2	38	1.5 JDN2	5.1 JDN2
1,2,3,7,8,9-HxCDD	ng/Kg	49.3	223	1.6 IJ EMPC	0.4 J	< 0.32	12	15 JDN2	15 JDN2	1.3 IJDN2 EMPC	3 J	5 JDN2	5.1	1.3 IJDN2 EMPC	1.9 JDN2
1,2,3,4,6,7,8-HpCDD	ng/Kg	484	2190	39	14	11	**530**	**820 DN2**	**930 DN2**	37 DN2	76	100 DN2	**580**	19 JDN2	96 DN2
OCDD	ng/Kg	16400	74400	220	110	90	5100	7300 DN2	9200 DN2	340 DN2	660	1200 DN2	4200 E	160 DN2	860 DN2
Total HpCDD	ng/Kg	-	-	79	28	21	1000	1600 DN2	1900 DN2	81 DN2	140	230 DN2	960	39 DN2	200 DN2
Total HxCDD	ng/Kg	-	-	47	6.1	3 J	170	260 DN2	310 DN2	8.3 JDN2	31	35 DN2	140	6.8 JDN2	39 DN2
Total PeCDD	ng/Kg	-	-	21	0.96 J	0.5 J	22	25	33	< 0.3	6.3	10	11	1.3 J	3.9 J
Total TCDD	ng/Kg	-	-	8.7	0.36 J	0.55 J	11	18	12	1.2	0.67 J	< 0.97	0.61 J	< 0.54	1.7
FURAN CONGENERS															
2,3,7,8-TCDF	ng/Kg	48.4	219	0.3 IJ EMPC	0.15 J	< 0.15	2.1 0	4.4 C	2.4 0	< 0.54	< 0.76	< 0.99	0.3 J	< 0.35	< 0.68
1,2,3,7,8-PeCDF	ng/Kg	164	744	0.77 J	0.14 J	< 0.14	2.1 J	270 P EMPC	3.4 J	< 0.46	1.2 IJ EMPC	< 0.48	1.2 J	< 0.45	< 0.53
2,3,4,7,8-PeCDF	ng/Kg	16.4	74.4	1.2 J	0.35 J	< 0.12	11	14	**61**	1.6 J	1.8 J	1.1 J	2.7 J	0.8 J	5
1,2,3,4,7,8-HxCDF	ng/Kg	48.5	220	3.2 J	0.29 J	0.22 J	8.2	16 JDN2	75 PDN2 EMPC	1.1 JDN2	2.8 J	2 JDN2	3.5 J	0.57 JDN2	2.8 JDN2
1,2,3,6,7,8-HxCDF	ng/Kg	48.5	220	2.4 J	0.33 IJ EMPC	0.21 IJ EMPC	8	20 JDN2	28 PDN2 EMPC	1.1 JDN2	1.7 IJ EMPC	1.2 JDN2	2.4 J	0.79 JDN2	2.2 JDN2
2,3,4,6,7,8-HxCDF	ng/Kg	49.3	223	3.6 J	0.23 IJ EMPC	0.22 J	6.5	16 JDN2	30 DN2	0.62 JDN2	0.98 IJ EMPC	0.78 IJDN2 EMPC	3.3 J	0.31 IJDN2 EMPC	2.5 JDN2
1,2,3,7,8,9-HxCDF	ng/Kg	49.3	223	0.98 IJ EMPC	< 0.075	< 0.15	3 J	6.7 JDN2	6.1 JDN2	0.43 JDN2	0.72 IJ EMPC	< 0.22 DN2	2.5 J	0.41 JDN2	0.57 IJDN2 EMPC
1,2,3,4,6,7,8-HpCDF	ng/Kg	490	2220	26	6.1	2.7 J	150	250 DN2	380 DN2	11 JDN2	27	23 JDN2	55	7 JDN2	34 DN2
1,2,3,4,7,8,9-HpCDF	ng/Kg	490	2220	2.4 J	0.29 J	< 0.36	9.4	14 JDN2	20 JDN2	0.8 IJDN2 EMPC	1.5 IJ EMPC	1.2 IJDN2 EMPC	2.8 J	< 0.35 DN2	1.5 JDN2
OCDF	ng/Kg	16400	74400	34	9.6 J	6.6 J	320	490 DN2	620 DN2	25 JDN2	65	47 JDN2	230	11 JDN2	73 DN2
Total HpCDF	ng/Kg	-	-	47	13	7	380	610 DN2	1100 DN2	11 JDN2	68	58 DN2	170	15 JDN2	90 DN2
Total HxCDF	ng/Kg	-	-	34	6.4	1.9 J	200	430 DN2	1200 DN2	23 JDN2	49	35 DN2	110	13 JDN2	69 DN2
Total PeCDF	ng/Kg	-	-	23	6.4	1.5 J	180	480	760	21	24	12	31	9.8	58
Total TCDF	ng/Kg	-	-	11	3.1	0.61 J	58	99	140 E	2.7	3.9	1.4	7	1.9	19
Calculated TEQ	ng/Kg	-	-	3.18	0.74	0.27	22.2	44.0	62.5	2.24	4.25	6.1	16.6	1.72	5.97

Analyte Abbreviations:

DIOXIN CONGENERS:

2,3,7,8-TCDD = 2,3,7,8-Tetrachlorodibenzo-p-dioxin
1,2,3,7,8-PeCDD = 1,2,3,7,8-Pentachlorodibenzo-p-dioxin
1,2,3,4,7,8-HxCDD = 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
1,2,3,6,7,8-HxCDD = 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
1,2,3,7,8,9-HxCDD = 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
1,2,3,4,6,7,8-HpCDD = 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
OCDD = Octachlorodibenzo-p-dioxin
Total HpCDD = Total heptachlorodibenzo-p-dioxin
Total HxCDD = Total hexachlorodibenzo-p-dioxin
Total PeCDD = Total pentachlorodibenzo-p-dioxin
Total TCDD = Total tetrachlorodibenzo-p-dioxin

FURAN CONGENERS:

2,3,7,8-TCDF = 2,3,7,8-Tetrachlorodibenzofuran
1,2,3,7,8-PeCDF = 1,2,3,7,8-Pentachlorodibenzofuran
2,3,4,7,8-PeCDF = 2,3,4,7,8-Pentachlorodibenzofuran
1,2,3,4,7,8-HxCDF = 1,2,3,4,7,8-Hexachlorodibenzofuran
1,2,3,6,7,8-HxCDF = 1,2,3,6,7,8-Hexachlorodibenzofuran
2,3,4,6,7,8-HxCDF = 2,3,4,6,7,8-Hexachlorodibenzofuran
1,2,3,7,8,9-HxCDF = 1,2,3,7,8,9-Hexachlorodibenzofuran
1,2,3,4,6,7,8-HpCDF = 1,2,3,4,6,7,8-Heptachlorodibenzofuran
1,2,3,4,7,8,9-HpCDF = 1,2,3,4,7,8,9-Heptachlorodibenzofuran
OCDF = Octachlorodibenzofuran
Total HpCDF = Total heptachlorodibenzofuran
Total HxCDF = Total hexachlorodibenzofuran
Total PeCDF = Total pentachlorodibenzofuran
Total TCDF = Total tetrachlorodibenzofuran

Notes:

1. ng/kg = nanograms/kilogram on a dry weight basis
2. TEQ = Toxicity Equivalent Calculation
3. TEQ values calculated using the U.S. EPA 2007 values: https://www.govinfo.gov/content/pkg/FR-2007-05-10/pdf/E7-9015.pdf
4. - = standard not established/not applicable
5. RCLs = NR 720 Residual Contaminant Levels. Values are generic RCLs for exposure by direct contact.
6. **Blue** = exceedance of Non-Industrial Direct Contact RCL

Qualifiers:

EMPC = Estimated Maximum Possible Concentration
J = Estimated value
I = Interference present
C = Result obtained from confirmation analysis
B = Less than 10x higher than method blank level
DN2 = Result obtained from analysis of diluted sample
E = Exceeds calibration range
P = PCDE Interference

Footnotes:

1. Samples were collected to the depth noted below ground surface (bgs), not including the vegetative layer at the surface.
2. Sample N2-2 collected to 5 inches bgs due to refusal from roots.
3. Sample N6-3 collected to 5.5 inches bgs due to refusal from stones.

Prepared by: P. Popp
Checked by: L. Auner, 9/20/2019

Table 5
Summary of 36 Surface Soil Sample Dioxin and Furan Results
Wausau, Wisconsin

ANALYTE	UNITS	NR 720 SOIL RCLs		SAMPLE AREA/TYPE, SAMPLE ID, DEPTH (inches)[1], SAMPLE DATE												
				URBAN CONDITIONS (CONT.)		WDNR REQUEST	DATA GAP SAMPLES									
		NON-INDUSTRIAL DIRECT CONTACT	INDUSTRIAL DIRECT CONTACT	N6-3	N6-4	N7-1	O-01	O-02	O-03	O-04	O-05	O-06	O-07	O-08	O-09	O-10
				0-5.5[3]	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6
				8/13/2019	8/13/2019	8/14/2019	8/13/2019	8/14/2019	8/14/2019	8/13/2019	8/13/2019	8/14/2019	8/14/2019	8/14/2019	8/13/2019	8/13/2019
DIOXIN CONGENERS																
2,3,7,8-TCDD	ng/Kg	4.82	21.8	< 0.39	< 0.44	0.26 J	< 0.18	< 0.19	< 0.22	< 0.21	< 0.26	< 0.22	< 0.14	< 0.2	0.24 J	< 0.27
1,2,3,7,8-PeCDD	ng/Kg	4.93	22.3	0.51 J	0.47 IJ EMPC	0.91 J	0.27 IJ EMPC	< 0.26	0.38 J	0.34 IJ EMPC	1.1 J	0.38 IJ EMPC	< 0.16	0.5 J	2.3 J	0.61 J
1,2,3,4,7,8-HxCDD	ng/Kg	49.3	223	0.8 BJ	0.73 BJDN2	2.2 J	< 0.38	0.45 J	0.49 IJ EMPC	2 J	1.9 J	0.95 J	< 0.31	0.78 IJ EMPC	5.6	1.1 IJ EMPC
1,2,3,6,7,8-HxCDD	ng/Kg	49.3	223	2 IJ EMPC	2.4 JDN2	6.1	0.67 J	1.2 J	1.7 J	3 J	7.7	3.7 J	0.65 J	1.3 IJ EMPC	14	3 J
1,2,3,7,8,9-HxCDD	ng/Kg	49.3	223	1.6 IJ EMPC	1.6 JDN2	3.4 J	0.68 IJ EMPC	1.2 J	1.1 J	2.4 J	4.7 J	2.3 J	< 0.36	1.4 J	10	1.9 J
1,2,3,4,6,7,8-HpCDD	ng/Kg	484	2190	51	39 DN2	150	13	22	33	99	180	83	14	32	330	70
OCDD	ng/Kg	16400	74400	460	310 DN2	1300	110	160	260	580	1400	680	100	270	4000	570
Total HpCDD	ng/Kg	-	-	91	78 DN2	330	30	50	79	410	400	160	25	75	710	140
Total HxCDD	ng/Kg	-	-	14	21 JDN2	56	5.2	12	24	74	92	29	2.5 J	14	140	26
Total PeCDD	ng/Kg	-	-	2.1 J	2.6 J	7.6	0.27 J	0.69 J	6.6	5.3	11	3 J	< 0.16	1.8 J	14	4.4 J
Total TCDD	ng/Kg	-	-	0.73 J	3.1	2.3	0.79 J	< 0.19	3.2	0.63 J	1.7	0.82 J	0.36 J	0.81 J	4.4	2.9
FURAN CONGENERS																
2,3,7,8-TCDF	ng/Kg	48.4	219	< 0.53	0.56 J	0.55 IJ EMPC	< 0.26	< 0.27	< 0.32	< 0.38	0.5 J	< 0.5	< 0.28	< 0.31	1.6 C	0.8 J
1,2,3,7,8-PeCDF	ng/Kg	164	744	< 0.6	0.65 J	0.69 J	< 0.28	< 0.35	< 0.72	< 0.46	< 0.87	< 0.77	< 0.38	< 0.42	1.8 J	0.92 J
2,3,4,7,8-PeCDF	ng/Kg	16.4	74.4	0.46 IJ EMPC	1.9 J	4.1 J	0.39 J	0.89 J	2.9 J	0.78 J	1.7 J	1 J	< 0.19	0.42 IJ EMPC	12	1.7 J
1,2,3,4,7,8-HxCDF	ng/Kg	48.5	220	0.71 IJ EMPC	1.4 JDN2	3.6 PJ EMPC	0.53 J	0.97 J	1 IJ EMPC	1.1 J	2.8 J	2.3 J	0.35 J	0.63 IJ EMPC	7.3	2.1 J
1,2,3,6,7,8-HxCDF	ng/Kg	48.5	220	0.82 IJ EMPC	2 JDN2	2.7 J	0.5 J	0.89 IJ EMPC	0.7 J	1.2 J	2.5 J	2.3 PJ EMPC	0.31 IJ EMPC	0.97 PJ EMPC	5	2 J
2,3,4,6,7,8-HxCDF	ng/Kg	49.3	223	0.53 IJ EMPC	1.7 JDN2	2.4 J	0.61 J	1.5 J	2.7 J	1.1 IJ EMPC	3 J	1.9 IJ EMPC	0.28 IJ EMPC	0.62 J	7	1.2 J
1,2,3,7,8,9-HxCDF	ng/Kg	49.3	223	< 0.38	0.69 JDN2	0.8 J	0.28 J	< 0.23	< 0.15	< 0.28	< 0.45	< 0.4	< 0.31	< 0.14	1.8 J	0.43 J
1,2,3,4,6,7,8-HpCDF	ng/Kg	490	2220	12	17 JDN2	46	4.6 J	9.6	15	19	43	37	4.2 J	10	140	25
1,2,3,4,7,8,9-HpCDF	ng/Kg	490	2220	0.81 IJ EMPC	0.98 IJDN2 EMPC	2.3 J	0.47 J	0.48 IJ EMPC	0.56 IJ EMPC	0.96 J	2.2 J	1.7 IJ EMPC	< 0.22	0.67 J	6.4	1.4 J
OCDF	ng/Kg	16400	74400	43	40 JDN2	71	13	17	25	57	95	58	8.4 J	22	220	45
Total HpCDF	ng/Kg	-	-	33	43 DN2	100	11	19	31	53	92	80	9.6	27	250	56
Total HxCDF	ng/Kg	-	-	15	43 DN2	87	6.5	12	27	21	66	40	2.2 J	14	250	37
Total PeCDF	ng/Kg	-	-	7.3	51	50	3.8 J	20	72	19	46	27	2.1 J	9.2	310	37
Total TCDF	ng/Kg	-	-	2.5	26	21	1.2	2.9	16	3	11	6.3	0.61 J	1.7	53	13
Calculated TEQ	ng/Kg	-	-	2.08	2.84	6.99	0.93	1.26	2.59	3.03	6.62	3.46	0.37	1.71	17.45	3.55

Analyte Abbreviations:

DIOXIN CONGENERS:

2,3,7,8-TCDD = 2,3,7,8-Tetrachlorodibenzo-p-dioxin
1,2,3,7,8-PeCDD = 1,2,3,7,8-Pentachlorodibenzo-p-dioxin
1,2,3,4,7,8-HxCDD = 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
1,2,3,6,7,8-HxCDD = 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
1,2,3,7,8,9-HxCDD = 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
1,2,3,4,6,7,8-HpCDD = 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
OCDD = Octachlorodibenzo-p-dioxin
Total HpCDD = Total heptachlorodibenzo-p-dioxin
Total HxCDD = Total hexachlorodibenzo-p-dioxin
Total PeCDD = Total pentachlorodibenzo-p-dioxin
Total TCDD = Total tetrachlorodibenzo-p-dioxin

FURAN CONGENERS:

2,3,7,8-TCDF = 2,3,7,8-Tetrachlorodibenzofuran
1,2,3,7,8-PeCDF = 1,2,3,7,8-Pentachlorodibenzofuran
2,3,4,7,8-PeCDF = 2,3,4,7,8-Pentachlorodibenzofuran
1,2,3,4,7,8-HxCDF = 1,2,3,4,7,8-Hexachlorodibenzofuran
1,2,3,6,7,8-HxCDF = 1,2,3,6,7,8-Hexachlorodibenzofuran
2,3,4,6,7,8-HxCDF = 2,3,4,6,7,8-Hexachlorodibenzofuran
1,2,3,7,8,9-HxCDF = 1,2,3,7,8,9-Hexachlorodibenzofuran
1,2,3,4,6,7,8-HpCDF = 1,2,3,4,6,7,8-Heptachlorodibenzofuran
1,2,3,4,7,8,9-HpCDF = 1,2,3,4,7,8,9-Heptachlorodibenzofuran
OCDF = Octachlorodibenzofuran
Total HpCDF = Total heptachlorodibenzofuran
Total HxCDF = Total hexachlorodibenzofuran
Total PeCDF = Total pentachlorodibenzofuran
Total TCDF = Total tetrachlorodibenzofuran

Notes:

1. ng/kg = nanograms/kilogram on a dry weight basis
2. TEQ = Toxicity Equivalent Calculation
3. TEQ values calculated using the U.S. EPA 2007 values: https://www.govinfo.gov/content/pkg/FR-2007-05-10/pdf/E7-9015.pdf
4. - = standard not established/not applicable
5. RCLs = NR 720 Residual Contaminant Levels. Values are generic RCLs for exposure by direct contact.
6. **Blue** = exceedance of Non-Industrial Direct Contact RCL

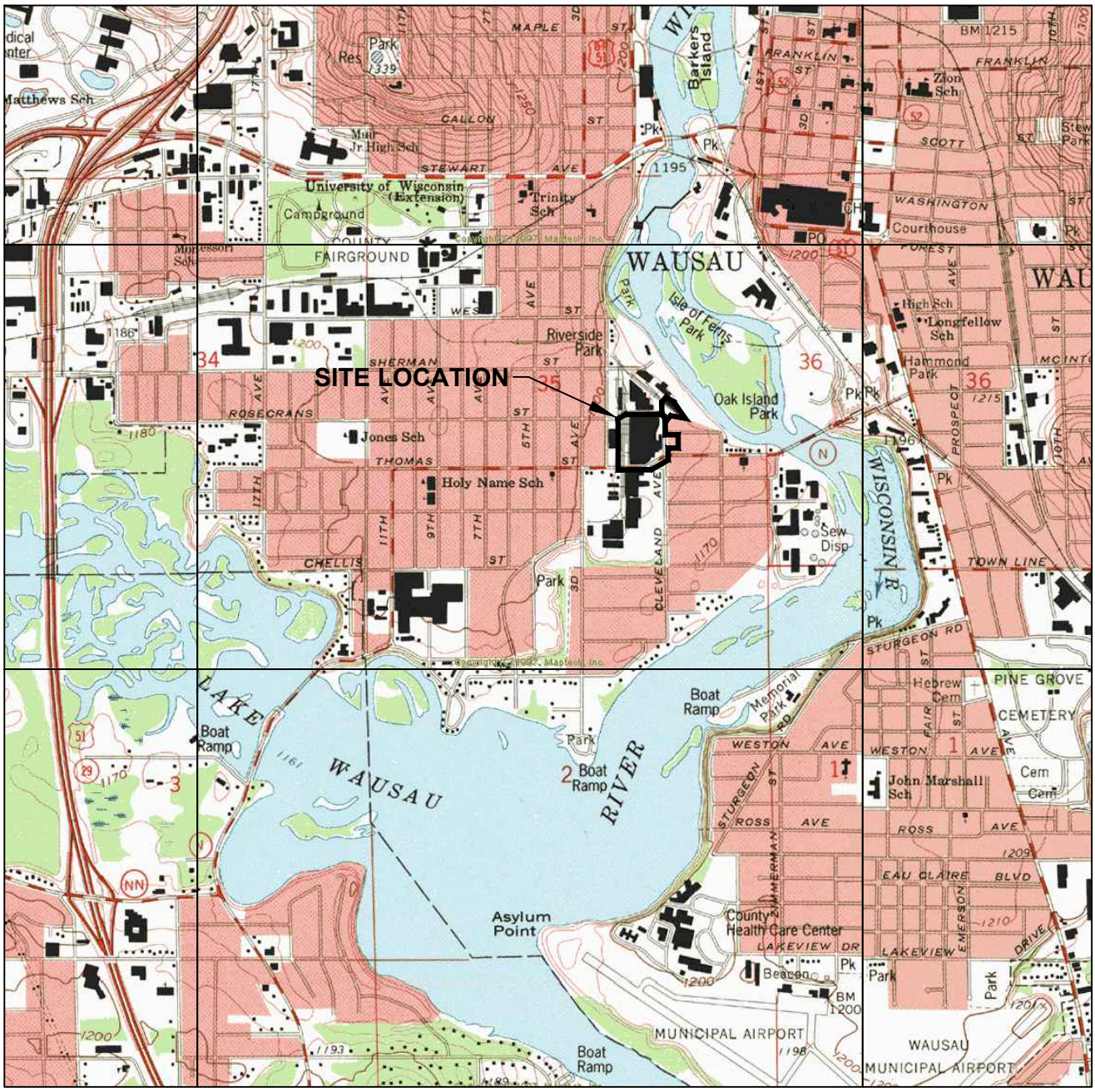
Qualifiers:

EMPC = Estimated Maximum Possible Concentration
J = Estimated value
I = Interference present
C = Result obtained from confirmation analysis
B = Less than 10x higher than method blank level
DN2 = Result obtained from analysis of diluted sample
E = Exceeds calibration range
P = PCDE Interference

Footnotes:

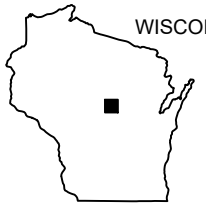
1. Samples were collected to the depth noted below ground surface (bgs), not including the vegetative layer at the surface.
2. Sample N2-2 collected to 5 inches bgs due to refusal from roots.
3. Sample N6-3 collected to 5.5 inches bgs due to refusal from stones.

Prepared by: P. Popp
Checked by: L. Auner, 9/20/2019



NOTE

BASE MAP DEVELOPED FROM THE WAUSAU WEST AND WAUSAU EAST, WISCONSIN 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAPS, DATED 1993. PART OF SECTION 35, T29N, R8E



QUADRANGLE LOCATION

TRC
708 Heartland Trail
Suite 3000
Madison, WI 53717
Phone: 608.826.3600

PROJECT:

WAULECO, INC.
125 ROSECRANS STREET
WAUSAU, WISCONSIN

TITLE:

SITE LOCATION MAP

DRAWN BY:	B. YUNUSOV
CHECKED BY:	K. QUINN
APPROVED BY:	B. IVERSON
DATE:	MARCH 2019
PROJ. NO.:	189597
FILE:	189597.0008.01.FIG1.dwg

FIGURE 1

LEGEND

- PARCEL BOUNDARY
- APPROXIMATE WAULECO PROPERTY BOUNDARY

NOTES

1. BASE MAP IMAGERY FROM MARATHON COUNTY, 1974.
2. PARCELS ARE FROM WISCONSIN STATE CARTOGRAPHE RS OFFICE, STATE PARCEL DOWNLOAD ON MARCH 20, 2018 .

0 200 400 Feet

1 " = 200 '
1:2,400

PROJECT:
WAULECO, INC.
125 ROSENCRANS STREET
WAUSAU, WISCONSIN

TITLE:
1974 SITE LAYOUT

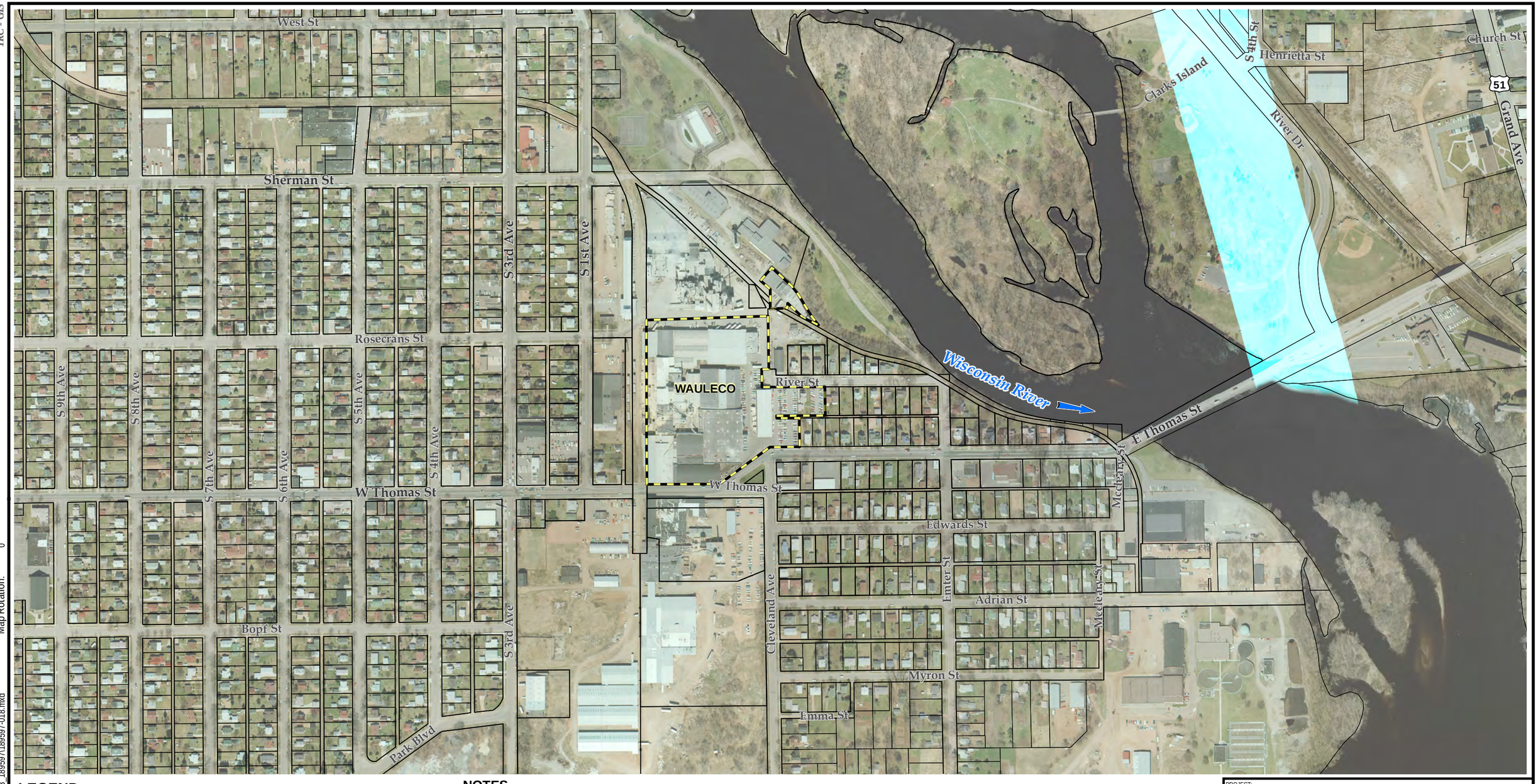
DRAWN BY:	J. PAPEZ	PROJ NO.:	189597.0003-T1
CHECKED BY:	K. QUINN		
APPROVED BY:	B. IVERSON		**FIGURE 2**
DATE:	MARCH 2019		

TRC
708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com

FILE NO.: 189597-019.mxd

Plot Date: 3/15/2019, 10:07:03 AM by SMAJOR -- LAYOUT: ANSI B(11"x17")
Path: S:\1-PROJECTS\Wauleco\MadisonArchive\2013_189597\189597-019.mxd
Coordinate System: NAD 1983 StatePlane Wisconsin Central FIPS 4802 Feet (Foot US)
Map Rotation: 0

TRC - GIS



LEGEND

- PARCEL BOUNDARY
- APPROXIMATE WAULECO PROPERTY BOUNDARY

NOTES

1. BASE MAP IMAGERY FROM MARATHON COUNTY, 1974.
2. PARCELS ARE FROM WISCONSIN STATE CARTOGRAPHE RS OFFICE, STATE PARCEL DOWNLOAD ON MARCH 20, 2018 .

0 400 800 Feet

1 " = 400 '

1:4,800

PROJECT:

WAULECO, INC.
125 ROSENCRANS STREET
WAUSAU, WISCONSIN

TITLE:

1974 SURROUNDING AREA SITE LAYOUT

DRAWN BY:	J. PAPEZ	PROJ NO.:	189597.0003-T1
CHECKED BY:	K. QUINN		
APPROVED BY:	B. IVERSON		**FIGURE 3**
DATE:	OCTOBER 2019		

TRC

708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com

FILE NO.: 189597-018.mxd

TRC - GIS
Coordinate System: NAD 1983 StatePlane Wisconsin Central FIPS 4802 Feet (Foot US)
Map Rotation: 0
Plot Date: 10/14/2019, 08:50:23 AM by SMAJOR -- LAYOUT: ANSI B(11"x17")
Path: S:\1-PROJECTS\Wauleco\MadisonArchive\2013_189597\189597-018.mxd

LEGEND

- AECOM SOIL SAMPLE LOCATION (2017)
- CWE SOIL SAMPLE LOCATION (2006)
- CWE SOIL SAMPLE LOCATION (2008)
- SCC SOIL SAMPLE LOCATION (2018)
- PARCEL BOUNDARY
- APPROXIMATE WAULECO PROPERTY BOUNDARY

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 9/01/2016.
2. PARCELS ARE FROM WISCONSIN STATE CARTOGRAPHE RS OFFICE, STATE PARCEL DOWNLOAD ON MARCH 20, 2018.
3. SAMPLING LOCATIONS ARE APPROXIMATE BASED ON GEOREFERENCED FIGURES FROM AECOM, CWE, AND SCC.
4. SAMPLE LOCATION FOR CWE (2008) SAMPLE WESTON NOT SHOWN ON FIGURE, LOCATED APPROXIMATELY 5 MILES SOUTHEAST OF AREA SHOWN ON FIGURE.

N

0 250 500 Feet

1 " = 250 '
1:3,000

PROJECT:

WAULECO, INC.
125 ROSENCRANS STREET
WAUSAU, WISCONSIN

TITLE:

SUMMARY OF PREVIOUS SAMPLE LOCATIONS

DRAWN BY:	S. MAJOR	PROJ NO.:	189597.0003-T1
CHECKED BY:	L. AUNER		
APPROVED BY:	B. IVERSON		**FIGURE 4**
DATE:	MARCH 2019		

TRC

708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
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FILE NO.: 189597-017.mxd

Plot Date: 3/15/2019, 12:08:33 PM by SMAJOR -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\Wauleco\MadisonArchive2013_189597\189597-017.mxd
Coordinate System: NAD 1983 StatePlane Wisconsin Central FIPS 4802 Feet (Foot US)
Map Rotation: 0
TRC - GIS

TRC - GIS

Coordinate System: NAD 1983 StatePlane Wisconsin Central FIPS 4802 Feet (Foot US)
Map Rotation: 0

Plot Date: 10/23/2019, 11:44:13 AM by SMAJOR -- LAYOUT: ANSI B(11"x17")
Path: S:\1-PROJECTS\Wauleco\189597-General\GIS\189597-013.mxd

LEGEND

- PRIMARY RESEARCH AREA
- RESEARCH REFERENCE GRID (1000'x1000')

AERIAL INTERPRETED STACK LOCATIONS (1938 - PRESENT)

- SMALL/ROOFTOP STACK
- LARGE STACK

SANBORN FIRE MAP REVIEW (1884 - 1967)

- LOCATION OF POTENTIAL BURNING SOURCE

NOTES

1. BASE MAP IMAGERY FROM ESRI/DIGITAL GLOBE, "WORLD IMAGERY", 2018.

0 1,000 2,000 Feet
1 " = 1,000 '
1:12,000

PROJECT:

WAULECO, INC.
125 ROSENCRANS STREET
WAUSAU, WISCONSIN

TITLE:

HISTORICAL BURNING SOURCES AND STACK LOCATIONS

DRAWN BY:	J. PAPEZ	PROJ NO.:	189597.0003-T1
CHECKED BY:	C. OLSEN		
APPROVED BY:	B. IVERSON		**FIGURE 5**
DATE:	OCTOBER 2019		

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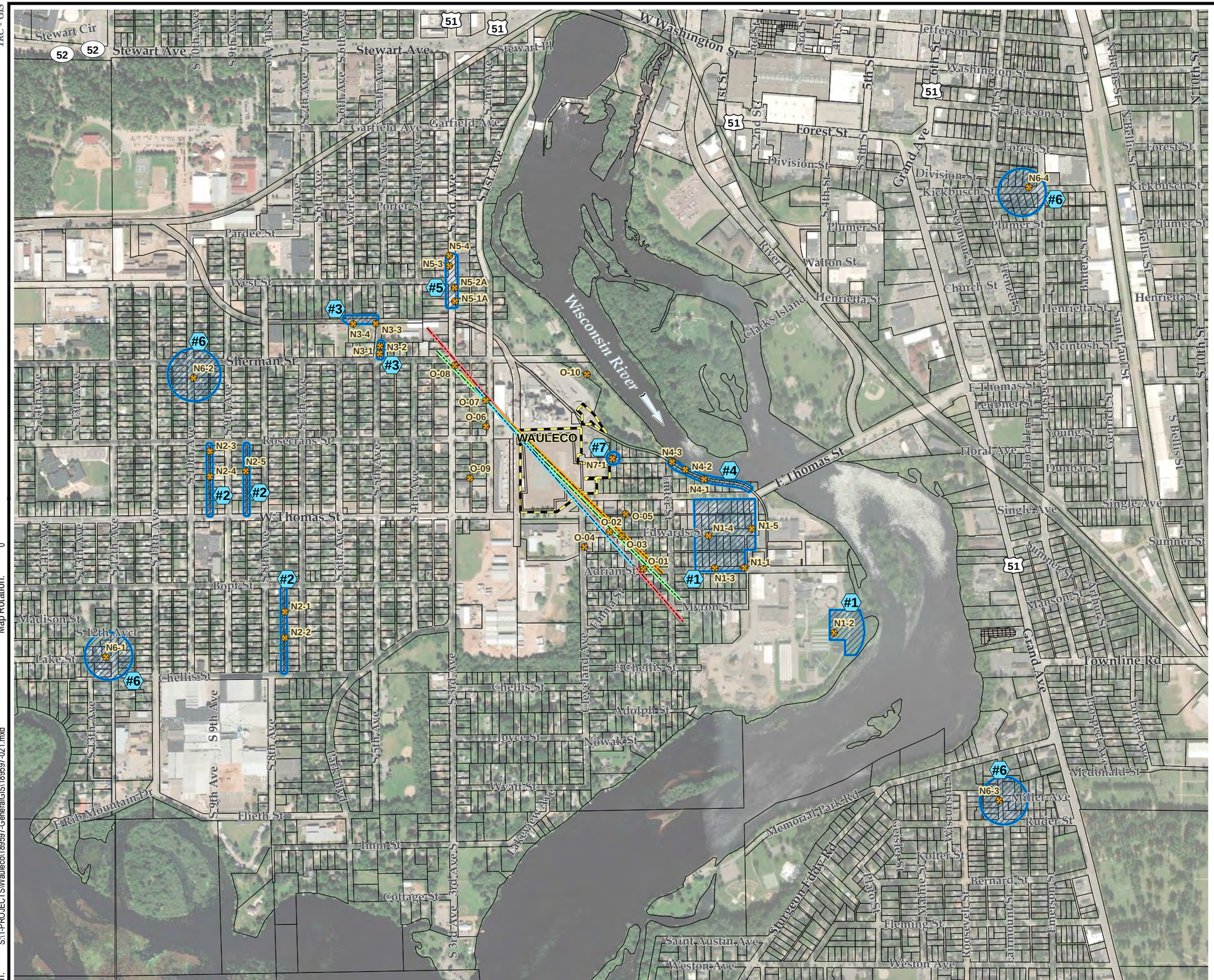
FILE NO.: 189597-013.mxd

TRC - GIS

Coordinate System: NAD 1983 StatePlane Wisconsin Central FIPS 4802 Feet (Foot US)
Map Rotation: 0

Plot Date: 10/23/2019, 11:48:06 AM by SMAJOR -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\Wauleco\189597-General\GIS\189597-021.mxd



LEGEND

- APPROXIMATE WAULECO PROPERTY BOUNDARY
- FORMER HISTORICAL BUILDING FOOTPRINT

PRIMARY AXES

- SCENARIO #1
- SCENARIO #2
- SCENARIO #3
- SCENARIO #4

- APPROXIMATE BACKGROUND SAMPLING AREAS
  - #1 - City Incinerator
  - #2 - Yard Waste Burning and Burn Barrels
  - #3 - Marathon Rubber
  - #4 - Railroad
  - #5 - Vehicle Traffic
  - #6 - Urban Conditions
  - #7 - WDNR Request Sample
- SURFACE SOIL SAMPLE LOCATION

NOTES

1. BASE MAP IMAGERY FROM ESRI, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER, 2018.
2. THE AXES SHOWN ON THIS MAP ARE THE PRIMARY AXES OF POTENTIAL MAXIMUM AERIAL DEPOSITION BASED ON AIR MODELING DESCRIBED IN THE MAY 16, 2019 SITE INVESTIGATION WORK PLAN ADDENDUM 2.

N

0 800 1,600 Feet

1 " = 800 '
1:9,600

PROJECT:
WAULECO, INC.
125 ROSENCRANS STREET
WAUSAU, WISCONSIN

TITLE:
LOCATION OF 36 SOIL SAMPLES AND RCL EXCEEDANCES

DRAWN BY:	J. PAPEZ	PROJ NO.:	189597.0003-T1
CHECKED BY:	K. QUINN		
APPROVED BY:	B. IVERSON		**FIGURE 6**
DATE:	OCTOBER 2019		

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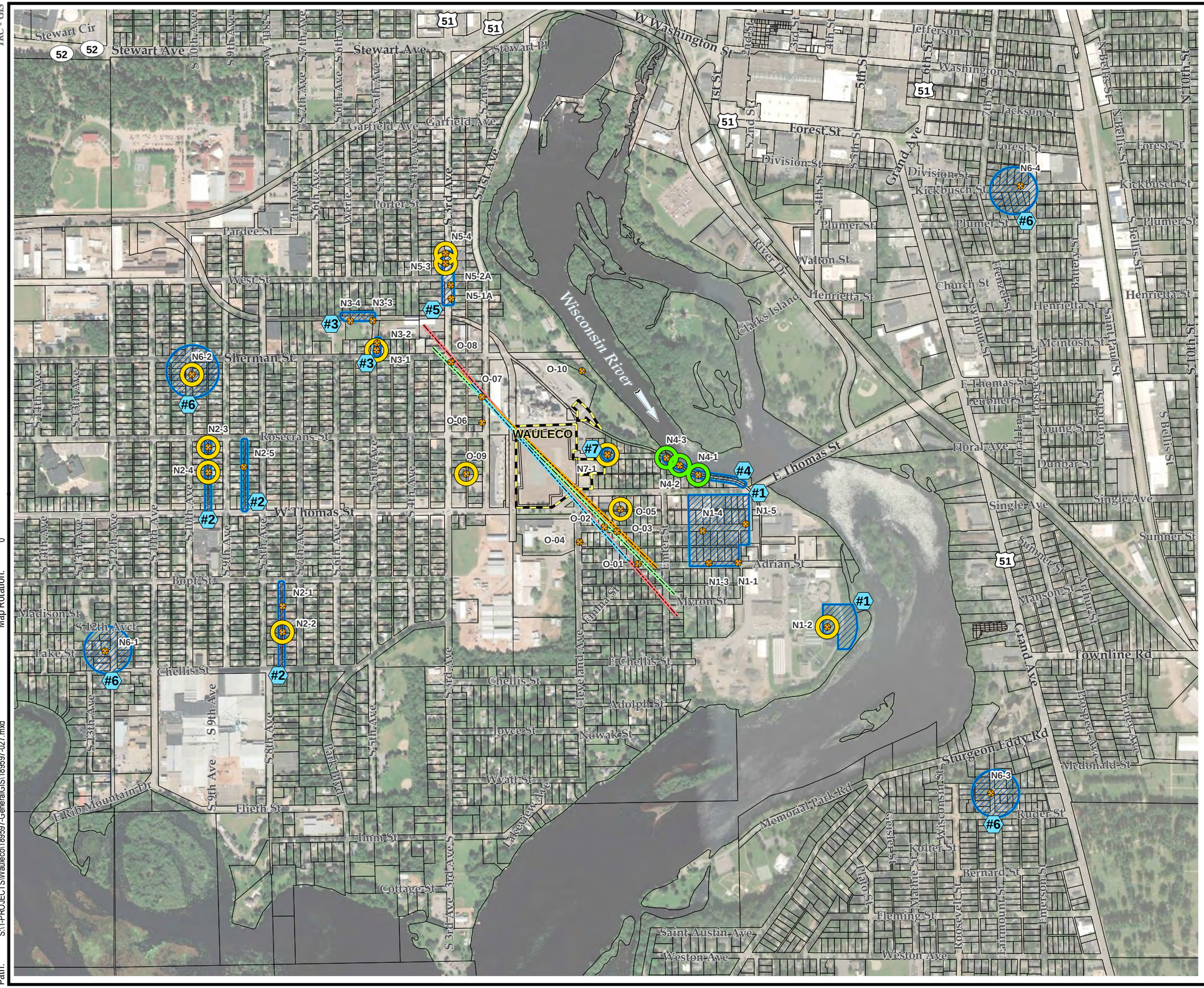
FILE NO.: 189597-021.mxd

TRC - GIS

Coordinate System: NAD 1983 StatePlane Wisconsin Central FIPS 4802 Feet (Foot US)
Map Rotation: 0

Plot Date: 10/23/2019, 14:06:50 PM by SMAJOR -- LAYOUT: ANSI B(11"x17")
Path: S:\1-PROJECTS\Wauleco\189597-General\GIS\189597-027.mxd



LEGEND

- APPROXIMATE WAULECO PROPERTY BOUNDARY
- FORMER HISTORICAL BUILDING FOOTPRINT

PRIMARY AXES

- SCENARIO #1
- SCENARIO #2
- SCENARIO #3
- SCENARIO #4

- APPROXIMATE BACKGROUND SAMPLING AREAS
  - #1 - City Incinerator
  - #2 - Yard Waste Burning and Burn Barrels
  - #3 - Marathon Rubber
  - #4 - Railroad
  - #5 - Vehicle Traffic
  - #6 - Urban Conditions
  - #7 - WDNR Request Sample
- WOOD BURNING SAMPLE LOCATION

TOXIC EQUIVALENCY

- 4.8-22 (SEE NOTE 3)
- >22

NOTES

1. BASE MAP IMAGERY FROM ESRI, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER, 2018.
2. THE AXES SHOWN ON THIS MAP ARE THE PRIMARY AXES OF POTENTIAL MAXIMUM AERIAL DEPOSITION BASED ON AIR MODELING DESCRIBED IN THE MAY 16, 2019 SITE INVESTIGATION WORK PLAN ADDENDUM 2.
3. U.S. EPA REGIONAL SCREENING LEVEL FOR DIOXIN IN RESIDENTIAL SOILS IS 4.8 ng/kg.

0 800 1,600 Feet

1 " = 800 '
1:9,600

PROJECT:
WAULECO, INC.
125 ROSENCRANS STREET
WAUSAU, WISCONSIN

TITLE:
LOCATION OF 36 SOIL SAMPLES AND TEQ EXCEEDANCES

DRAWN BY:	S. MAJOR	PROJ NO.:	189597.0003-T1
CHECKED BY:	K. QUINN		
APPROVED BY:	B. IVERSON		**FIGURE 7**
DATE:	OCTOBER 2019		

TRC
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FILE NO.: 189597-027.mxd

Appendix G
Photograph Log

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
1	8/13/2019

Description
N1-1 sample collection.

Photo No.	Date
2	8/13/2019

Description
N1-1 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
3	8/13/2019

Description
N1-2 sample collection.

Photo No.	Date
4	8/13/2019

Description
N1-2 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
5	8/13/2019

Description
N1-3 sample collection.

Photo No.	Date
6	8/13/2019

Description
N1-3 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
7	8/13/2019

Description
N1-4 sample collection.

Photo No.	Date
8	8/13/2019

Description
N1-4 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
9	8/13/2019

Description
N1-5 sample collection.

Photo No.	Date
10	8/13/2019

Description
N1-5 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
11	8/13/2019

Description
N2-1 sample collection.

Photo No.	Date
12	8/13/2019

Description
N2-1 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
13	8/13/2019

Description
N2-2 sample collection.

Photo No.	Date
14	8/13/2019

Description
N2-2 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
15	8/13/2019

Description
N2-3 sample collection.

Photo No.	Date
16	8/13/2019

Description
N2-3 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
17	8/13/2019

Description
N2-4 sample collection.

Photo No.	Date
18	8/13/2019

Description
N2-4 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
19	8/13/2019

Description
N2-5 sample collection.

Photo No.	Date
20	8/13/2019

Description
N2-5 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
21	8/13/2019

Description
N3-1 sample collection.

Photo No.	Date
22	8/13/2019

Description
N3-1 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
23	8/13/2019

Description
N3-2 sample collection.

Photo No.	Date
24	8/13/2019

Description
N3-2 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
25	8/13/2019

Description
N3-3 sample collection.

Photo No.	Date
26	8/13/2019

Description
N3-3 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
27	8/13/2019

Description
N3-4 sample collection.

Photo No.	Date
28	8/13/2019

Description
N3-4 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
29	8/14/2019

Description
N4-1 sample collection.

Photo No.	Date
30	8/14/2019

Description
N4-1 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
31	8/14/2019

Description
N4-2 sample collection.

Photo No.	Date
32	8/14/2019

Description
N4-2 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
33	8/14/2019

Description
N4-3 sample collection.

Photo No.	Date
34	8/14/2019

Description
N4-3 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
35	8/13/2019

Description
N5-1A sample collection.

Photo No.	Date
36	8/13/2019

Description
N5-1A sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
37	8/13/2019

Description
N5-2A sample collection.

Photo No.	Date
38	8/13/2019

Description
N5-2A sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
39	8/13/2019

Description
N5-3 sample collection.

Photo No.	Date
40	8/13/2019

Description
N5-3 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
41	8/13/2019

Description
N5-4 sample collection. Accidentally used N5-3 sample label for photo, and sample hole was backfilled already when mistake was noticed.

Photo No.	Date
42	8/13/2019

Description
N5-4 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
43	8/13/2019

Description
N6-1 sample collection.

Photo No.	Date
44	8/13/2019

Description
N6-1 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
45	8/13/2019

Description
N6-2 sample collection.

Photo No.	Date
46	8/13/2019

Description
N6-2 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
47	8/13/2019

Description
N6-3 sample collection.

Photo No.	Date
48	8/13/2019

Description
N6-3 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
49	8/13/2019

Description
N6-4 sample collection.

Photo No.	Date
50	8/13/2019

Description
N6-4 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
51	8/14/2019

Description
N7-1 sample collection.

Photo No.	Date
52	8/14/2019

Description
N7-1 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
53	8/13/2019

Description
O-01 sample collection.

Photo No.	Date
54	8/13/2019

Description
O-01 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
55	8/14/2019

Description
O-02 sample collection.

Photo No.	Date
56	8/14/2019

Description
O-02 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
57	8/14/2019

Description
O-03 sample collection.

Photo No.	Date
58	8/14/2019

Description
O-03 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
59	8/13/2019

Description
O-04 sample collection.

Photo No.	Date
60	8/13/2019

Description
O-04 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
61	8/13/2019

Description
O-05 sample collection.

Photo No.	Date
62	8/13/2019

Description
O-05 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
63	8/14/2019

Description
O-06 sample collection.

Photo No.	Date
64	8/14/2019

Description
O-06 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
65	8/14/2019

Description
O-07 sample collection.

Photo No.	Date
66	8/14/2019

Description
O-07 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
67	8/14/2019

Description
O-08 sample collection.

Photo No.	Date
68	8/14/2019

Description
O-08 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
69	8/13/2019

Description
O-09 sample collection.

Photo No.	Date
70	8/13/2019

Description
O-09 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
71	8/13/2019

Description
O-10 sample collection.

Photo No.	Date
72	8/13/2019

Description
O-10 sample location.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
73	8/13/2019

Description
Typical soil horizon for surface soil sampling. This photograph shows sample location N6-1.

Photo No.	Date
74	8/13/2019

Description
Typical surface cover appearance following surface soil sampling—surface disturbance not apparent. This photograph shows sample location N6-1.

Photographic Log

Client Name:	Site Location:	Project No.:
Wauleco, Inc.	Wausau, Marathon County, Wisconsin	189597.0008.0000 Phase 00003

Photo No.	Date
75	8/13/2019

Description
Typical soil horizon for surface soil sampling. This photograph shows sample location N5-2A.

Photo No.	Date
76	8/13/2019

Description
Decontamination procedure following each sampling location.

Appendix H
Field Log

SUMMARY OF SOIL SAMPLING - FIELD LOG
WAULECO WOOD WASTE BURNING INVESTIGATION

DATE	TIME	SAMPLE ID	DEPTH OF COLLECTION	USCS SOIL DESCRIPTION (AEE 8/14/19)	SURFACE COVER	VEGETATION REMOVED	SAMPLE COLLECTION METHOD	SAMPLE LOCATION PHOTO TAKEN	SAMPLE COLLECTION PHOTO TAKEN
8/13/19	8:00	N6-1	0-6"	highly organic ~~silty sand~~ sandy silt, mostly ~~sand~~ silt, some ~~silt~~ sand, 7.5 YR 3/2, organic odor, moist, medium dense	grass	grass + roots (~1" thick)	shovel	✓	✓
8/13/19	8:16	N6-2	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 3/2, organic odor, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓
8/13/19	8:40	N6-4	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 2.5/1, organic odor, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓
8/13/19	9:00	N6-3	0-5.5" (stones at 5.5")	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 4/3, organic odor, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓
8/13/19	9:35	N2-1	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 3/2, organic odor, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓
8/13/19	9:45	N2-2	0-5" (roots at 5")	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 4/1, organic odor, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓
8/13/19	10:05	N2-4	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 3/1, organic odor, moist, medium density	grass	grass + roots (~2")	shovel	✓	✓
8/13/19	10:15	N2-3	0-6"	highly organic sandy silt, mostly silt some well graded sand, few ~~small~~ gravel, 7.5YR 4/2, organic odor, moist, medium density	grass	grass + roots (~1")	shovel	✓	✓
8/13/19	10:30	N2-5	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 4/1, organic odor, moist, medium dense	mulch	none	shovel	✓	✓
8/13/19	11:05	N5-2A	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 3/2, organic odor, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓

page 1 of 4

Recorded by: Alia Enright

SUMMARY OF SOIL SAMPLING - FIELD LOG
WAULECO WOOD WASTE BURNING INVESTIGATION

DATE	TIME	SAMPLE ID	DEPTH OF COLLECTION	USCS SOIL DESCRIPTION	SURFACE COVER	VEGETATION REMOVED	SAMPLE COLLECTION METHOD	SAMPLE LOCATION PHOTO TAKEN	SAMPLE COLLECTION PHOTO TAKEN	
8/13/19	11:15	NS-1A	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 3/2, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓	
8/13/19	11:25	NS-3	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 4/2, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓	
8/13/19	11:35	NS-4	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 3/1, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓	accidentally took close-up photo of NS-3 card (realized after backfilled)
8/13/19	12:50	N3-4	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 4/2, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓	
8/13/19	13:00	N3-3	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 4/2, organic oder, moist, medium dense	grass + exposed soil	grass + roots (~½")	shovel	✓	✓	
8/13/19	13:10	N3-2	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 3/2, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓	
8/13/19	13:20	N3-1	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 4/1, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓	
8/13/19	13:40	N1-2	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5 YR 4/2, organic oder, moist, medium dense, some glass/ceramic fragments	grass	grass + roots (~1")	shovel	✓	✓	
8/13/19	14:25	N1-3	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 4/1, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓	
8/13/19	14:40	N1-1	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5 YR 3/3, organic oder, moist, medium density	grass	grass + roots (~1")	shovel	✓	✓	

Recorded by: Alia Enright

SUMMARY OF SOIL SAMPLING - FIELD LOG
WAULECO WOOD WASTE BURNING INVESTIGATION

DATE	TIME	SAMPLE ID	DEPTH OF COLLECTION	USCS SOIL DESCRIPTION	SURFACE COVER	VEGETATION REMOVED	SAMPLE COLLECTION METHOD	SAMPLE LOCATION PHOTO TAKEN	SAMPLE COLLECTION PHOTO TAKEN
8/13/19	14:45	N1-5	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5 YR 3/2, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓
8/13/19	15:00	N1-4	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5 YR 4/3, organic oder, moist, medium dense	grass	grass + roots (~1/2")	shovel	✓	✓
8/13/19	15:30	O-10	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5 YR 2.5/1, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓
8/13/19	15:45	O-09	0-6"	highly organic sandy silt, mostly silt, some well graded sand, some alleyway surface gravel, 7.5 YR 3/1, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓
8/13/19	16:00	O-01	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5 YR 3/1, organic oder, moist, medium dense	grass	grass + roots (~1/2")	shovel	✓	✓
8/13/19	16:15	O-04	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5 YR 4/1, organic oder, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓
8/13/19	16:25	O-05	0-6"	highly organic sandy silt, mostly silt, some well graded sand, little gravel, 7.5 YR 4/2, organic oder, moist, medium dense, some trash (paper, grass)	grass	grass + roots (~1/2")	shovel	✓	✓
8/17/19	7:30	O-06	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5 YR 3/2, organic oder, moist, medium dense	grass	grass + roots (~1/2")	shovel	✓	✓
8/17/19	7:45	O-08	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5 YR 3/2, organic oder, moist, medium dense	grass	grass + roots (~1/2")	shovel	✓	✓
8/17/19	8:00	O-07	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5 YR 3/2, organic oder, moist, medium dense	grass	grass + roots (~1/2")	shovel	✓	✓

Recorded by: Alia Enright

SUMMARY OF SOIL SAMPLING - FIELD LOG
WAULECO WOOD WASTE BURNING INVESTIGATION

DATE	TIME	SAMPLE ID	DEPTH OF COLLECTION	USCS SOIL DESCRIPTION	SURFACE COVER	VEGETATION REMOVED	SAMPLE COLLECTION METHOD	SAMPLE LOCATION PHOTO TAKEN	SAMPLE COLLECTION PHOTO TAKEN
8/14/19	8:15	O-B	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 3/2, organic odor, moist, medium dense	grass	grass + roots (~1/2")	shovel	✓	✓
8/14/19	8:25	O-02	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 3/2, organic odor, moist, medium dense	grass	grass + roots (~1/2")	shovel	✓	✓
8/14/19	~~8:45~~ 9:06	N4-3	0-6"	highly organic sandy silt, mostly silt some well graded sand, 7.5 YR 4/1, organic odor, moist, little gravel, medium dense, some glass	exposed soil, twigs, minimal leaves	minimal dead leaves	shovel	✓	✓
8/14/19	9:15	N4-2	0-6"	highly organic sandy silt, mostly silt, some well graded sand, little gravel, 7.5YR 4/1, organic odor, moist, medium dense	dead vegetation, minimal clover-type plants	minimal (deep rt.)	shovel	✓	✓
8/14/19	9:25	N4-1	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 4/3, organic odor, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓
8/14/19	8:45	N7-1	0-6"	highly organic sandy silt, mostly silt, some well graded sand, 7.5YR 4/2, organic odor, moist, medium dense	grass	grass + roots (~1")	shovel	✓	✓

Recorded by: Alia Enright

Appendix I
Laboratory Analytical Report – 36 Soil Samples

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, LLC.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

Report Prepared for:

Bruce Iverson
TRC-WI
708 Heartland Trail
Suite 3000
Madison WI 53717

REPORT OF LABORATORY ANALYSIS FOR PCDD/PCDF

Report Information:

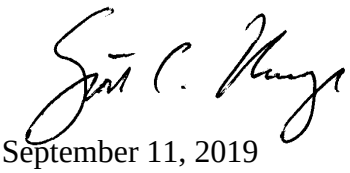
Pace Project #: 10487441
Sample Receipt Date: 08/15/2019
Client Project #: 189597.0008 Phase 3
Client Sub PO #: 140882
State Cert #: 999407970

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 Carolynne Trout, your Pace Project Manager.

This report has been reviewed by:



September 11, 2019
Scott Unze, Project Manager
(612) 607-6383
(612) 607-6444 (fax)
scott.unze@pacelabs.com

Report Prepared Date:
September 11, 2019

Report of Laboratory Analysis

Pace Analytical Services, LLC.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

DISCUSSION

This report presents the results from the analyses performed on thirty-six samples submitted by a representative of TRC. 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 Concentration (EMPC) values were treated as positives in the toxic equivalence calculations. 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. The quantitation limits, adjusted for sample extraction amount, may be somewhat higher or lower than the reporting limits provided in Appendix A. This report was revised to provide WHO 2005 TEQ results.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 28-137%. 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" and "N2". The values reported for 2,3,7,8-TCDF were obtained from (flagged "C") or verified by (flagged "V") second column confirmation analyses.

A laboratory method blank was prepared and analyzed with each sample batch as part of our routine quality control procedures. The results show the blanks to contain trace levels of selected congeners. These levels were below the calibration range of 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 reference matrix that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 76-120% with relative percent differences of 0.0-12.0%. The background-subtracted recovery value obtained for OCDD in the primary matrix spike sample was below the target range, possibly due to sample inhomogeneity. Matrix spikes were prepared with the 08/27/2019 extraction batch using sample material from a separate project; results from these analyses will be provided upon request. Matrix spikes were not prepared with the remaining extraction batch.

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

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

Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Minnesota - Pet	1240
Alabama	40770	Mississippi	MN00064
Alaska - DW	MN00064	Missouri - DW	10100
Alaska - UST	17-009	Montana	CERT0092
Arizona	AZ0014	Nebraska	NE-OS-18-06
Arkansas - DW	MN00064	Nevada	MN00064
Arkansas - WW	88-0680	New Hampshire	2081
CNMI Saipan	MP0003	New Jersey (NE	MN002
California	2929	New York	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Carolina -	27700
EPA Region 8+	via MN 027-053	North Carolina -	530
Florida (NELAP	E87605	North Dakota	R-036
Georgia	959	Ohio - DW	41244
Guam	17-001r	Ohio - VAP	CL101
Hawaii	MN00064	Oklahoma	9507
Idaho	MN00064	Oregon - Primar	MN300001
Illinois	200011	Oregon - Secon	MN200001
Indiana	C-MN-01	Pennsylvania	68-00563
Iowa	368	Puerto Rico	MN00064
Kansas	E-10167	South Carolina	74003
Kentucky - DW	90062	South Dakota	NA
Kentucky - WW	90062	Tennessee	TN02818
Louisiana - DE	03086	Texas	T104704192
Louisiana - DW	MN00064	Utah (NELAP)	MN00064
Maine	MN00064	Virginia	460163
Maryland	322	Washington	C486
Massachusetts	M-MN064	West Virginia -	382
Michigan	9909	West Virginia -	9952C
Minnesota	027-053-137	Wisconsin	999407970
Minnesota - De	via MN 027-053	Wyoming - UST	2926.01

REPORT OF LABORATORY ANALYSIS

Appendix A

Sample Management

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

2296847

Section A Required Client Information:

Company: TRC
Address: 708 Heartland Trl. Suite 3000, Madison, WI 53717
Email To: biverson@trcompanies.com
Phone: 608-826-3441 Fax: 608-826-3941
Requested Due Date/TAT: Standard 7-10

Section B Required Project Information:

Report To: biverson@trcompanies.com
Copy To: kquinn@trcompanies.com, aenright@trcompanies.com
Purchase Order No.: 140882
Project Name: Dioxin Sampling
Project Number: 189597.0008 Phase 3

Section C Invoice Information:

Attention: apinvoiceapproval@trcompanies.com
Company Name: TRC
Address: —
Pace Quote Reference: —
Pace Project Manager: Carolynne Trout
Pace Profile #: 46324

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER ____
Site Location STATE: WI

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

WO#: 10487441

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: Dioxins (1613B)	Res	Pace Project No./ Lab I.D.
1	N6-1	SL	G	—	—	8/13/19	8:00	Ambient	1	X								X		001
2	N6-2						8:16													002
3	N6-4						8:40													003
4	N6-3						9:00													004
5	N2-1						9:35													005
6	N2-2						9:45													006
7	N2-4						10:05													007
8	N2-3						10:15													008
9	N2-5						10:30													009
10	N5-2A						11:05													010
11	N5-1A						11:15													011
12	N5-3						11:25													012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*Run undiluted to avoid elevated detection limits. If dilution is necessary, run the sample a second time at dilution to correct QA/QC problems.	Alia Enright / TRC	8/13/19	11:35	Waulece cooler	8/13/19	11:35				
	Waulece cooler / TRC	8/14/19	15:30	Pace shipment cooler	8/14/19	15:30				
	S. J. Dumb	8/14/19	1530	Anna Mg Pace	8/15/19	840	3.6°	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER:
SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-C-010-rev.00, 09Nov2017

Report No....10487441_1613FC_R1_DFR

Page 6 of 96

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 2 of 3

2296848

Section A Required Client Information:
Company: TRC
Address: 708 Heartland Trail, #3000
Madison, WI 53717
Email To: biverson@trcompanies.com
Phone: 608-826-3644 Fax: 608-826-3941
Requested Due Date/TAT: Standard 7-10

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Report To: biverson@trcompanies.com
Copy To: kquinn@trcompanies.com, aenright@trcompanies.com
Purchase Order No.: 140882
Project Name: Dioxin Sampling
Project Number: 189597.0008 Phase 3

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Attention: apinvoiceapproval@trcompanies.com
Company Name: TRC
Address: —
Pace Quote Reference: —
Pace Project Manager: Carolynne Trout
Pace Profile #: 49324

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER
Site Location STATE: WI

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N)	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	N5-4	SL	G			8/13/19	11:35	4°C	1	X								Dioxins (1613B)	N		013
2	N3-4						12:50											X			014
3	N3-3						13:00														015
4	N3-2						13:10														016
5	N3-1						13:20														017
6	N1-2						13:40														018
7	N1-3						14:25														019
8	N1-1						14:40														020
9	N1-5						14:45														021
10	N1-4						15:00														022
11	0-10						15:30														023
12	0-09						15:45														024

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*see comment on p.1	Alia Enright/TRC	8/13/19	14:00	Waulecs cooler	8/13/19	14:00				
	Waulecs cooler	8/14/19	1530	Pace Shipment cooler	8/14/19	1530				
	J. Dumke	8/14/19	1530	Pace	8-8-19	8403	3.6	Y	Y	Y

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER:
SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-C-010-rev.00, 09Nov2017

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Pace Quote Reference: —
Pace Project Manager: Carolynne Trout
Pace Profile #: 40324

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER
Site Location STATE: WI

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SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test ↓ (Dioxins (1613B))	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	O-01	SL	G			8/13/19	16:00	4.2°C	1	X								X		025
2	O-04	"	"			"	16:15	"	"	"								"		026
3	O-05	"	"			"	16:25	"	"	"								"		027
4	O-06	"	"			8/14/19	7:30	"	"	"								"		028
5	O-08	"	"			"	7:45	"	"	"								"		029
6	O-07	"	"			"	8:00	"	"	"								"		030
7	O-03	"	"			"	8:15	"	"	"								"		031
8	O-02	"	"			"	8:25	"	"	"								"		032
9	N4-3	"	"			"	9:00	"	"	"								"		033
10	N4-2	"	"			"	9:15	"	"	"								"		034
11	N4-1	"	"			"	9:25	"	"	"								"		035
12	N7-1	↓	↓			↓	8:45	↓	↓	↓								↓		036

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*See comment on p. 1	Alia Enright / TRC	8/13/19	16:40	Wanlera cooler	8/13/19	16:40	
	Wanlera cooler	8/14/19	15:30	Pace shipment cooler	8/14/19	15:30	
	J.J. Dunkle	8/14/19	15:30	Pace	8/15/19	8:40	3.6°C Y Y Y

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER:
SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-C-010-rev.00, 09Nov2017

Pace Analytical	Document Name: Sample Condition Upon Receipt Form	Document Revised: 09May2019 Page 1 of 1
	Document No.: F-MN-L-213-rev.28	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt **Client Name:** TRC **Project #:** WO#: 10487441

PM: CT1 Due Date: 08/29/19
CLIENT: TRC-WI

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☐ Commercial See Exception ☐

Tracking Number: 4638 0199 1562

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☑ Yes ☐ No

Thermometer: ☐ T1(0461) ☐ T2(1336) ☑ T3(0459) ☐ T4(0254) ☐ T5(0489) **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Dry ☐ Melted

Note: Each West Virginia Sample must have temp taken (no temp blanks)

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 3.5 °C **Average Corrected Temp (no temp blank only):** _____ °C See Exceptions ☐

Correction Factor: +0.1 **Cooler Temp Corrected w/temp blank:** 3.6 °C

USDA Regulated Soil: (☐ N/A, water sample/Other: _____) **Date/Initials of Person Examining Contents:** AUM 08.15.19

Did samples originate in a quarantine zone within the United States: AL, AR, 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 and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☐ Yes	☐ No	☑ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No		4.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E coli ☐ BOD/cBOD ☐ Hex Chrome ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other
Rush Turn Around Time Requested?	☐ Yes	☑ No		6.
Sufficient Volume?	☑ Yes	☐ No		7.
Correct Containers Used? -Pace Containers Used?	☑ Yes ☑ Yes	☐ No ☐ No		8.
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC? Matrix: ☐ Water ☑ Soil ☐ Oil ☐ Other	☑ Yes	☐ No		11. If no, write ID/ Date/Time on Container Below: See Exception ☐
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☑ Yes	☐ No	☐ N/A	Positive for Res. Chlorine? ☐ Yes ☐ No pH Paper Lot# See Exception ☐
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	13. See Exception ☐
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ 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: Carolynne Trout **Date:** 8/15/19

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).

Labeled by: SJ (2)

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

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

Method 1613B Blank Analysis Results

Lab Sample Name	DFBLKWU		
Lab Sample ID	BLANK-72962	Matrix	Solid
Filename	F190829A_12	Dilution	NA
Total Amount Extracted	10.7 g	Extracted	08/27/2019 15:05
ICAL ID	F190827	Analyzed	08/29/2019 16:25
CCal Filename(s)	F190829A_01	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	84
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	82
Total TCDD	ND	-----	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	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	87
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	86
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	68
1,2,3,7,8-PeCDD	ND	-----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	76
Total PeCDD	ND	-----	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	72
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	57
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			
OCDD	ND	-----	10			

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

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

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

Method 1613B Blank Analysis Results

Lab Sample Name	DFBLKWZ			
Lab Sample ID	BLANK-72988	Matrix	Solid	
Filename	F190830A_06	Dilution	NA	
Total Amount Extracted	10.1 g	Extracted	08/28/2019	15:05
ICAL ID	F190827	Analyzed	08/30/2019	13:45
CCal Filename(s)	F190830A_03	Injected By	ZMS	

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	91
Total TCDF	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	88
				1,2,3,7,8-PeCDF-13C	2.00	89
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	87
Total TCDD	ND	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	89
				1,2,3,4,7,8-HxCDF-13C	2.00	92
1,2,3,7,8-PeCDF	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	105
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	102
Total PeCDF	ND	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	100
				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	84
Total PeCDD	ND	-----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	100
				1,2,3,4,7,8,9-HpCDF-13C	2.00	96
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	98
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	84
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: 0.00 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			
OCDD	ND	-----	10			

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

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

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

Method 1613B Blank Analysis Results

Lab Sample Name	DFBLKXD		
Lab Sample ID	BLANK-73004	Matrix	Solid
Filename	F190830B_07	Dilution	NA
Total Amount Extracted	20.7 g	Extracted	08/28/2019 15:05
ICAL ID	F190827	Analyzed	08/30/2019 21:33
CCal Filename(s)	F190830A_09	Injected By	JRH

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	75
				1,2,3,7,8-PeCDF-13C	2.00	71
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	75
Total TCDD	ND	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	82
				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	77
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	70
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	82
				1,2,3,4,7,8,9-HpCDF-13C	2.00	85
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	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	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: 0.00 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			
OCDD	ND	-----	10			

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

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

REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N6-1		
Lab Sample ID	10487441001		
Filename	U190830B_03		
Injected By	SMT		
Total Amount Extracted	12.8 g	Matrix	Solid
% Moisture	9.3	Dilution	NA
Dry Weight Extracted	11.6 g	Collected	08/13/2019 08:00
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 11:41

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	91	
Total TCDF	1.3	-----	1.0		2,3,7,8-TCDD-13C	2.00	91	
					1,2,3,7,8-PeCDF-13C	2.00	94	
2,3,7,8-TCDD	ND	-----	1.0		2,3,4,7,8-PeCDF-13C	2.00	92	
Total TCDD	ND	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	102	
					1,2,3,4,7,8-HxCDF-13C	2.00	80	DN2
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	74	DN2
2,3,4,7,8-PeCDF	ND	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	71	DN2
Total PeCDF	7.9	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	57	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	84	DN2
1,2,3,7,8-PeCDD	ND	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	67	DN2
Total PeCDD	ND	-----	5.0		1,2,3,4,6,7,8-HpCDF-13C	2.00	63	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	64	DN2
1,2,3,4,7,8-HxCDF	ND	-----	5.0	DN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	68	DN2
1,2,3,6,7,8-HxCDF	ND	-----	5.0	DN2	OCDD-13C	4.00	48	DN2
2,3,4,6,7,8-HxCDF	ND	-----	5.0	DN2				
1,2,3,7,8,9-HxCDF	ND	-----	5.0	DN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	5.2	-----	5.0	JDN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	ND	-----	5.0	DN2	2,3,7,8-TCDD-37Cl4	0.20	87	
1,2,3,6,7,8-HxCDD	ND	-----	5.0	DN2				
1,2,3,7,8,9-HxCDD	ND	-----	5.0	DN2				
Total HxCDD	ND	-----	5.0	DN2				
1,2,3,4,6,7,8-HpCDF	7.0	-----	5.0	JDN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	DN2	Equivalence: 0.43 ng/Kg			
Total HpCDF	15	-----	5.0	JDN2	(Lower-bound - Using ITE Factors)			
1,2,3,4,6,7,8-HpCDD	19	-----	5.0	JDN2				
Total HpCDD	39	-----	5.0	DN2				
OCDF	11	-----	10	JDN2				
OCDD	160	-----	10	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
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N6-2		
Lab Sample ID	10487441002		
Filename	U190830B_04		
Injected By	SMT		
Total Amount Extracted	11.8 g	Matrix	Solid
% Moisture	11.4	Dilution	NA
Dry Weight Extracted	10.5 g	Collected	08/13/2019 08:16
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 12:24

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	81	
Total TCDF	19	-----	1.0		2,3,7,8-TCDD-13C	2.00	83	
					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	85	
Total TCDD	1.7	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	92	
					1,2,3,4,7,8-HxCDF-13C	2.00	90	DN2
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	84	DN2
2,3,4,7,8-PeCDF	5.0	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	82	DN2
Total PeCDF	57	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	42	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	98	DN2
1,2,3,7,8-PeCDD	ND	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	77	DN2
Total PeCDD	ND	-----	5.0		1,2,3,4,6,7,8-HpCDF-13C	2.00	75	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	77	DN2
1,2,3,4,7,8-HxCDF	ND	-----	5.0	DN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	79	DN2
1,2,3,6,7,8-HxCDF	ND	-----	5.0	DN2	OCDD-13C	4.00	68	DN2
2,3,4,6,7,8-HxCDF	ND	-----	5.0	DN2				
1,2,3,7,8,9-HxCDF	ND	-----	5.0	DN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	60	-----	5.0	DN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	ND	-----	5.0	DN2	2,3,7,8-TCDD-37Cl4	0.20	78	
1,2,3,6,7,8-HxCDD	5.1	-----	5.0	JDN2				
1,2,3,7,8,9-HxCDD	ND	-----	5.0	DN2				
Total HxCDD	33	-----	5.0	DN2				
1,2,3,4,6,7,8-HpCDF	34	-----	5.0	DN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	DN2	Equivalence: 5.3 ng/Kg			
Total HpCDF	89	-----	5.0	DN2	(Lower-bound - Using ITE Factors)			
1,2,3,4,6,7,8-HpCDD	96	-----	5.0	DN2				
Total HpCDD	200	-----	5.0	DN2				
OCDF	73	-----	10	DN2				
OCDD	860	-----	10	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
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

Report No.....10487441

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N6-4		
Lab Sample ID	10487441003		
Filename	U190830B_05		
Injected By	SMT		
Total Amount Extracted	11.4 g	Matrix	Solid
% Moisture	11.9	Dilution	NA
Dry Weight Extracted	10.0 g	Collected	08/13/2019 08:40
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 13:08

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	83	
Total TCDF	23	-----	1.0		2,3,7,8-TCDD-13C	2.00	84	
					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	84	
Total TCDD	3.1	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	92	
					1,2,3,4,7,8-HxCDF-13C	2.00	74	DN2
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	66	DN2
2,3,4,7,8-PeCDF	ND	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	66	DN2
Total PeCDF	39	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	52	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	79	DN2
1,2,3,7,8-PeCDD	ND	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	61	DN2
Total PeCDD	ND	-----	5.0		1,2,3,4,6,7,8-HpCDF-13C	2.00	61	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	64	DN2
1,2,3,4,7,8-HxCDF	ND	-----	5.0	DN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	67	DN2
1,2,3,6,7,8-HxCDF	ND	-----	5.0	DN2	OCDD-13C	4.00	51	DN2
2,3,4,6,7,8-HxCDF	ND	-----	5.0	DN2				
1,2,3,7,8,9-HxCDF	ND	-----	5.0	DN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	37	-----	5.0	DN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	ND	-----	5.0	DN2	2,3,7,8-TCDD-37Cl4	0.20	76	
1,2,3,6,7,8-HxCDD	ND	-----	5.0	DN2				
1,2,3,7,8,9-HxCDD	ND	-----	5.0	DN2				
Total HxCDD	14	-----	5.0	JDN2				
1,2,3,4,6,7,8-HpCDF	17	-----	5.0	JDN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	DN2	Equivalence: 0.91 ng/Kg			
Total HpCDF	43	-----	5.0	DN2	(Lower-bound - Using ITE Factors)			
1,2,3,4,6,7,8-HpCDD	39	-----	5.0	DN2				
Total HpCDD	78	-----	5.0	DN2				
OCDF	40	-----	10	JDN2				
OCDD	310	-----	10	DN2				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
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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
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

Report No.....10487441

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N6-3		
Lab Sample ID	10487441004		
Filename	U190830B_06		
Injected By	SMT		
Total Amount Extracted	11.6 g	Matrix	Solid
% Moisture	10.2	Dilution	NA
Dry Weight Extracted	10.4 g	Collected	08/13/2019 09:00
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 13:51

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	1.7	-----	1.0	2,3,7,8-TCDD-13C	2.00	78
				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	79
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	81
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	75
Total PeCDF	7.3	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	45
				1,2,3,4,7,8-HxCDD-13C	2.00	79
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	64
				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	71
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	58
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	13	-----	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	80
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	7.4	-----	5.0			
1,2,3,4,6,7,8-HpCDF	12	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 1.1 ng/Kg		
Total HpCDF	33	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	51	-----	5.0			
Total HpCDD	91	-----	5.0			
OCDF	43	-----	10			
OCDD	460	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N2-1		
Lab Sample ID	10487441005		
Filename	U190830B_07		
Injected By	SMT		
Total Amount Extracted	12.1 g	Matrix	Solid
% Moisture	17.6	Dilution	NA
Dry Weight Extracted	10.0 g	Collected	08/13/2019 09:35
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 14:35

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	87
Total TCDF	14	-----	1.0	2,3,7,8-TCDD-13C	2.00	87
				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	91
Total TCDD	2.3	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	92
				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	77
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	79
Total PeCDF	28	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	57
				1,2,3,4,7,8-HxCDD-13C	2.00	87
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	70
				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	83
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	18	-----	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	79
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	12	-----	5.0			
1,2,3,4,6,7,8-HpCDF	13	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 0.74 ng/Kg		
Total HpCDF	27	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	34	-----	5.0			
Total HpCDD	63	-----	5.0			
OCDF	18	-----	10			
OCDD	250	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N2-2		
Lab Sample ID	10487441006		
Filename	U190830B_08		
Injected By	SMT		
Total Amount Extracted	11.7 g	Matrix	Solid
% Moisture	14.4	Dilution	NA
Dry Weight Extracted	10.00 g	Collected	08/13/2019 09:45
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 15:18

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	44	-----	1.0		2,3,7,8-TCDD-13C	2.00	67
					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	72
Total TCDD	2.2	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	74
					1,2,3,4,7,8-HxCDF-13C	2.00	66
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	56
2,3,4,7,8-PeCDF	6.8	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	60
Total PeCDF	130	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	48
					1,2,3,4,7,8-HxCDD-13C	2.00	71
1,2,3,7,8-PeCDD	ND	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	45
Total PeCDD	12	-----	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	67
1,2,3,4,7,8-HxCDF	12	-----	5.0		1,2,3,4,6,7,8-HpCDD-13C	2.00	68
1,2,3,6,7,8-HxCDF	-----	9.1	5.0	P	OCDD-13C	4.00	63
2,3,4,6,7,8-HxCDF	5.6	-----	5.0				
1,2,3,7,8,9-HxCDF	ND	-----	5.0		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	230	-----	5.0		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	7.2	-----	5.0		2,3,7,8-TCDD-37Cl4	0.20	63
1,2,3,6,7,8-HxCDD	22	-----	5.0				
1,2,3,7,8,9-HxCDD	13	-----	5.0				
Total HxCDD	130	-----	5.0				
1,2,3,4,6,7,8-HpCDF	160	-----	5.0		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	11	-----	5.0		Equivalence: 19 ng/Kg		
Total HpCDF	420	-----	5.0		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	400	-----	5.0				
Total HpCDD	670	-----	5.0				
OCDF	310	-----	10				
OCDD	3000	-----	10				

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

REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N2-4		
Lab Sample ID	10487441007		
Filename	U190830B_09		
Injected By	SMT		
Total Amount Extracted	12.0 g	Matrix	Solid
% Moisture	14.9	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/13/2019 10:05
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 16:01

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.8	-----	1.0	C	2,3,7,8-TCDF-13C	2.00	83
Total TCDF	55	-----	1.0		2,3,7,8-TCDD-13C	2.00	84
					1,2,3,7,8-PeCDF-13C	2.00	89
2,3,7,8-TCDD	ND	-----	1.0		2,3,4,7,8-PeCDF-13C	2.00	76
Total TCDD	2.0	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	84
					1,2,3,4,7,8-HxCDF-13C	2.00	128
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	113
2,3,4,7,8-PeCDF	13	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	119
Total PeCDF	160	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	120
					1,2,3,4,7,8-HxCDD-13C	2.00	137
1,2,3,7,8-PeCDD	ND	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	102
Total PeCDD	ND	-----	5.0		1,2,3,4,6,7,8-HpCDF-13C	2.00	111
					1,2,3,4,7,8,9-HpCDF-13C	2.00	126
1,2,3,4,7,8-HxCDF	6.1	-----	5.0		1,2,3,4,6,7,8-HpCDD-13C	2.00	137
1,2,3,6,7,8-HxCDF	6.0	-----	5.0		OCDD-13C	4.00	129
2,3,4,6,7,8-HxCDF	6.1	-----	5.0				
1,2,3,7,8,9-HxCDF	ND	-----	5.0		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	150	-----	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	75
1,2,3,6,7,8-HxCDD	11	-----	5.0				
1,2,3,7,8,9-HxCDD	ND	-----	5.0				
Total HxCDD	61	-----	5.0				
1,2,3,4,6,7,8-HpCDF	94	-----	5.0		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0		Equivalence: 15 ng/Kg		
Total HpCDF	210	-----	5.0		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	210	-----	5.0				
Total HpCDD	350	-----	5.0				
OCDF	130	-----	10				
OCDD	1600	-----	10				

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.
C = Result obtained from confirmation analysis

REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N2-3		
Lab Sample ID	10487441008		
Filename	U190830B_10		
Injected By	SMT		
Total Amount Extracted	11.6 g	Matrix	Solid
% Moisture	13.2	Dilution	NA
Dry Weight Extracted	10.0 g	Collected	08/13/2019 10:15
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 16:44

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	82
Total TCDF	39	-----	1.0	2,3,7,8-TCDD-13C	2.00	82
				1,2,3,7,8-PeCDF-13C	2.00	83
2,3,7,8-TCDD	16	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	84
Total TCDD	19	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	87
				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	66
2,3,4,7,8-PeCDF	5.7	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	68
Total PeCDF	110	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	49
				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	59
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	78
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	74
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	68
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	69	-----	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	25	-----	5.0			
1,2,3,4,6,7,8-HpCDF	32	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 20 ng/Kg		
Total HpCDF	69	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	72	-----	5.0			
Total HpCDD	130	-----	5.0			
OCDF	59	-----	10			
OCDD	520	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N2-5		
Lab Sample ID	10487441009		
Filename	U190830B_11		
Injected By	SMT		
Total Amount Extracted	12.0 g	Matrix	Solid
% Moisture	14.6	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/13/2019 10:30
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 17:28

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	85
Total TCDF	8.1	-----	1.0	2,3,7,8-TCDD-13C	2.00	84
				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	85
Total TCDD	1.2	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	91
				1,2,3,4,7,8-HxCDF-13C	2.00	129
1,2,3,7,8-PeCDF	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	114
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	124
Total PeCDF	13	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	59
				1,2,3,4,7,8-HxCDD-13C	2.00	132
1,2,3,7,8-PeCDD	ND	-----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	104
Total PeCDD	ND	-----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	117
				1,2,3,4,7,8,9-HpCDF-13C	2.00	131
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	134
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	124
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	20	-----	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	75
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	35	-----	5.0			
1,2,3,4,6,7,8-HpCDF	20	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 1.8 ng/Kg		
Total HpCDF	43	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	100	-----	5.0			
Total HpCDD	230	-----	5.0			
OCDF	34	-----	10			
OCDD	610	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N5-2A		
Lab Sample ID	10487441010		
Filename	U190830B_12		
Injected By	SMT		
Total Amount Extracted	12.4 g	Matrix	Solid
% Moisture	16.9	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	08/13/2019 11:05
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 18:11

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	79
Total TCDF	3.9	-----	1.0	2,3,7,8-TCDD-13C	2.00	79
				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	82
				1,2,3,4,7,8-HxCDF-13C	2.00	113
1,2,3,7,8-PeCDF	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	99
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	106
Total PeCDF	16	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	50
				1,2,3,4,7,8-HxCDD-13C	2.00	115
1,2,3,7,8-PeCDD	ND	-----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	86
Total PeCDD	ND	-----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	93
				1,2,3,4,7,8,9-HpCDF-13C	2.00	107
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	109
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	90
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	46	-----	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	75
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	24	-----	5.0			
1,2,3,4,6,7,8-HpCDF	27	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 1.8 ng/Kg		
Total HpCDF	68	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	76	-----	5.0			
Total HpCDD	140	-----	5.0			
OCDF	65	-----	10			
OCDD	660	-----	10			

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

Report No.....10487441

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N5-1A		
Lab Sample ID	10487441011		
Filename	U190830B_13		
Injected By	SMT		
Total Amount Extracted	11.5 g	Matrix	Solid
% Moisture	12.7	Dilution	NA
Dry Weight Extracted	10.0 g	Collected	08/13/2019 11:15
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 18:54

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	100	
Total TCDF	1.9	-----	1.0		2,3,7,8-TCDD-13C	2.00	100	
					1,2,3,7,8-PeCDF-13C	2.00	96	
2,3,7,8-TCDD	ND	-----	1.0		2,3,4,7,8-PeCDF-13C	2.00	98	
Total TCDD	ND	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	106	
					1,2,3,4,7,8-HxCDF-13C	2.00	80	DN2
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	78	DN2
2,3,4,7,8-PeCDF	ND	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	74	DN2
Total PeCDF	13	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	76	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	86	DN2
1,2,3,7,8-PeCDD	ND	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	73	DN2
Total PeCDD	ND	-----	5.0		1,2,3,4,6,7,8-HpCDF-13C	2.00	67	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	68	DN2
1,2,3,4,7,8-HxCDF	ND	-----	5.0	DN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	75	DN2
1,2,3,6,7,8-HxCDF	ND	-----	5.0	DN2	OCDD-13C	4.00	51	DN2
2,3,4,6,7,8-HxCDF	ND	-----	5.0	DN2				
1,2,3,7,8,9-HxCDF	ND	-----	5.0	DN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	17	-----	5.0	JDN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	ND	-----	5.0	DN2	2,3,7,8-TCDD-37Cl4	0.20	95	
1,2,3,6,7,8-HxCDD	ND	-----	5.0	DN2				
1,2,3,7,8,9-HxCDD	ND	-----	5.0	DN2				
Total HxCDD	6.1	-----	5.0	JDN2				
1,2,3,4,6,7,8-HpCDF	11	-----	5.0	JDN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	DN2	Equivalence: 0.84 ng/Kg			
Total HpCDF	11	-----	5.0	JDN2	(Lower-bound - Using ITE Factors)			
1,2,3,4,6,7,8-HpCDD	37	-----	5.0	DN2				
Total HpCDD	81	-----	5.0	DN2				
OCDF	25	-----	10	JDN2				
OCDD	340	-----	10	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
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

Report No.....10487441

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N5-3		
Lab Sample ID	10487441012		
Filename	U190830B_14		
Injected By	SMT		
Total Amount Extracted	11.8 g	Matrix	Solid
% Moisture	13.6	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/13/2019 11:25
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 19:38

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	80	
Total TCDF	1.4	-----	1.0		2,3,7,8-TCDD-13C	2.00	82	
					1,2,3,7,8-PeCDF-13C	2.00	75	
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	80	
					1,2,3,4,7,8-HxCDF-13C	2.00	95	DN2
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	85	DN2
2,3,4,7,8-PeCDF	ND	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	79	DN2
Total PeCDF	7.7	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	43	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	94	DN2
1,2,3,7,8-PeCDD	ND	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	79	DN2
Total PeCDD	ND	-----	5.0		1,2,3,4,6,7,8-HpCDF-13C	2.00	65	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	66	DN2
1,2,3,4,7,8-HxCDF	ND	-----	5.0	DN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	67	DN2
1,2,3,6,7,8-HxCDF	ND	-----	5.0	DN2	OCDD-13C	4.00	48	DN2
2,3,4,6,7,8-HxCDF	ND	-----	5.0	DN2				
1,2,3,7,8,9-HxCDF	ND	-----	5.0	DN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	32	-----	5.0	DN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	ND	-----	5.0	DN2	2,3,7,8-TCDD-37Cl4	0.20	75	
1,2,3,6,7,8-HxCDD	5.1	-----	5.0	JDN2				
1,2,3,7,8,9-HxCDD	ND	-----	5.0	DN2				
Total HxCDD	25	-----	5.0	DN2				
1,2,3,4,6,7,8-HpCDF	23	-----	5.0	JDN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	DN2	Equivalence: 3.1 ng/Kg			
Total HpCDF	58	-----	5.0	DN2	(Lower-bound - Using ITE Factors)			
1,2,3,4,6,7,8-HpCDD	100	-----	5.0	DN2				
Total HpCDD	230	-----	5.0	DN2				
OCDF	47	-----	10	JDN2				
OCDD	1200	-----	10	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
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

Report No.....10487441

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N5-4		
Lab Sample ID	10487441013		
Filename	U190830B_15		
Injected By	SMT		
Total Amount Extracted	12.1 g	Matrix	Solid
% Moisture	16.6	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 11:35
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 20:21

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	89
Total TCDF	4.8	-----	1.0		2,3,7,8-TCDD-13C	2.00	89
					1,2,3,7,8-PeCDF-13C	2.00	86
2,3,7,8-TCDD	ND	-----	1.0		2,3,4,7,8-PeCDF-13C	2.00	89
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	125
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	108
2,3,4,7,8-PeCDF	ND	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	114
Total PeCDF	21	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	66
					1,2,3,4,7,8-HxCDD-13C	2.00	120
1,2,3,7,8-PeCDD	ND	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	96
Total PeCDD	ND	-----	5.0		1,2,3,4,6,7,8-HpCDF-13C	2.00	106
					1,2,3,4,7,8,9-HpCDF-13C	2.00	116
1,2,3,4,7,8-HxCDF	ND	-----	5.0		1,2,3,4,6,7,8-HpCDD-13C	2.00	120
1,2,3,6,7,8-HxCDF	ND	-----	5.0		OCDD-13C	4.00	105
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	95	-----	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	79
1,2,3,6,7,8-HxCDD	38	-----	5.0				
1,2,3,7,8,9-HxCDD	5.1	-----	5.0				
Total HxCDD	130	-----	5.0				
1,2,3,4,6,7,8-HpCDF	55	-----	5.0		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0		Equivalence: 15 ng/Kg		
Total HpCDF	170	-----	5.0		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	580	-----	5.0				
Total HpCDD	960	-----	5.0				
OCDF	230	-----	10				
OCDD	4200	-----	10	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

Report No.....10487441

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N3-4		
Lab Sample ID	10487441014		
Filename	Y190830A_10		
Injected By	ZMS		
Total Amount Extracted	11.8 g	Matrix	Solid
% Moisture	14.5	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 12:50
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 15:46

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	82
Total TCDF	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	77
				1,2,3,7,8-PeCDF-13C	2.00	70
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	69
				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	82
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	84
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	79
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	70
				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	69
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	57
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	82
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: 0.20 ng/Kg		
Total HpCDF	ND	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	11	-----	5.0			
Total HpCDD	21	-----	5.0			
OCDF	ND	-----	10			
OCDD	90	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N3-3		
Lab Sample ID	10487441015		
Filename	Y190830A_11		
Injected By	ZMS		
Total Amount Extracted	11.9 g	Matrix	Solid
% Moisture	12.9	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	08/13/2019 13:00
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 16:31

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	84
Total TCDF	ND	-----	1.0	2,3,7,8-TCDD-13C	2.00	80
				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	85
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	81
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	64
				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	67
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	69
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	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	82
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	6.1	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 0.31 ng/Kg		
Total HpCDF	13	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	14	-----	5.0			
Total HpCDD	28	-----	5.0			
OCDF	ND	-----	10			
OCDD	110	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N3-2		
Lab Sample ID	10487441016		
Filename	Y190830A_12		
Injected By	ZMS		
Total Amount Extracted	11.3 g	Matrix	Solid
% Moisture	9.6	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/13/2019 13:10
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 17:17

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	3.9	-----	1.0	2,3,7,8-TCDD-13C	2.00	72
				1,2,3,7,8-PeCDF-13C	2.00	75
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	76
Total TCDD	8.1	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	77
				1,2,3,4,7,8-HxCDF-13C	2.00	77
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	6.4	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	76
				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	16	-----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	67
				1,2,3,4,7,8,9-HpCDF-13C	2.00	68
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	17	-----	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	43	-----	5.0			
1,2,3,4,6,7,8-HpCDF	26	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 0.90 ng/Kg		
Total HpCDF	42	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	39	-----	5.0			
Total HpCDD	79	-----	5.0			
OCDF	34	-----	10			
OCDD	220	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N3-1		
Lab Sample ID	10487441017		
Filename	Y190830A_13		
Injected By	ZMS		
Total Amount Extracted	10.9 g	Matrix	Solid
% Moisture	8.0	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 13:20
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 18:03

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	10	-----	1.0	2,3,7,8-TCDD-13C	2.00	77
				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	80
Total TCDD	14	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	82
				1,2,3,4,7,8-HxCDF-13C	2.00	74
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	76
Total PeCDF	21	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	66
				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	65
Total PeCDD	34	-----	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	66
1,2,3,4,7,8-HxCDF	5.3	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	64
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	73
2,3,4,6,7,8-HxCDF	6.1	-----	5.0			
1,2,3,7,8,9-HxCDF	ND	-----	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	46	-----	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	79
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	70	-----	5.0			
1,2,3,4,6,7,8-HpCDF	44	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 2.5 ng/Kg		
Total HpCDF	72	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	58	-----	5.0			
Total HpCDD	120	-----	5.0			
OCDF	50	-----	10			
OCDD	320	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N1-2		
Lab Sample ID	10487441018		
Filename	Y190830A_14		
Injected By	ZMS		
Total Amount Extracted	11.8 g	Matrix	Solid
% Moisture	12.8	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	08/13/2019 13:40
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 18:48

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.9	-----	1.0	C	2,3,7,8-TCDF-13C	2.00	74
Total TCDF	57	-----	1.0		2,3,7,8-TCDD-13C	2.00	71
					1,2,3,7,8-PeCDF-13C	2.00	75
2,3,7,8-TCDD	ND	-----	1.0		2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	4.6	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	79
					1,2,3,4,7,8-HxCDF-13C	2.00	74
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	12	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	76
Total PeCDF	170	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	69
					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	64
Total PeCDD	6.7	-----	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	68
1,2,3,4,7,8-HxCDF	ND	-----	5.0		1,2,3,4,6,7,8-HpCDD-13C	2.00	65
1,2,3,6,7,8-HxCDF	5.5	-----	5.0		OCDD-13C	4.00	61
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	91	-----	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	75
1,2,3,6,7,8-HxCDD	6.6	-----	5.0				
1,2,3,7,8,9-HxCDD	ND	-----	5.0				
Total HxCDD	55	-----	5.0				
1,2,3,4,6,7,8-HpCDF	60	-----	5.0		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0		Equivalence: 11 ng/Kg		
Total HpCDF	130	-----	5.0		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	180	-----	5.0				
Total HpCDD	340	-----	5.0				
OCDF	85	-----	10				
OCDD	1800	-----	10				

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.
C = Result obtained from confirmation analysis

REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N1-3		
Lab Sample ID	10487441019		
Filename	Y190830A_15		
Injected By	ZMS		
Total Amount Extracted	11.6 g	Matrix	Solid
% Moisture	9.7	Dilution	NA
Dry Weight Extracted	10.4 g	Collected	08/13/2019 14:25
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 19:34

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	65
				1,2,3,7,8-PeCDF-13C	2.00	69
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	72
				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	63
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	64
Total PeCDF	ND	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	54
				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	54
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	56
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	56
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	44
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	68
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	6.5	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 0.47 ng/Kg		
Total HpCDF	14	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	20	-----	5.0			
Total HpCDD	42	-----	5.0			
OCDF	18	-----	10			
OCDD	190	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N1-1		
Lab Sample ID	10487441020		
Filename	F190831A_03		
Injected By	JRH		
Total Amount Extracted	12.0 g	Matrix	Solid
% Moisture	11.0	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	08/13/2019 14:40
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 06:00

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	69
Total TCDF	2.5	-----	1.0	2,3,7,8-TCDD-13C	2.00	78
				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	72
Total TCDD	1.4	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	83
				1,2,3,4,7,8-HxCDF-13C	2.00	66
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	69
Total PeCDF	10	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	72
				1,2,3,4,7,8-HxCDD-13C	2.00	65
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	77
				1,2,3,4,7,8,9-HpCDF-13C	2.00	84
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	93
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	74
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	5.9	-----	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	7.8	-----	5.0			
1,2,3,4,6,7,8-HpCDF	8.8	-----	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	27	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	54	-----	5.0			
Total HpCDD	100	-----	5.0			
OCDF	27	-----	10			
OCDD	600	-----	10			

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

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

REPORT OF LABORATORY ANALYSIS

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

Tel: 612-607-1700
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N1-5		
Lab Sample ID	10487441021		
Filename	F190831A_04		
Injected By	JRH		
Total Amount Extracted	11.4 g	Matrix	Solid
% Moisture	11.3	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 14:45
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 06:46

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	6.4	-----	1.0	2,3,7,8-TCDD-13C	2.00	87
				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	79
Total TCDD	1.3	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	92
				1,2,3,4,7,8-HxCDF-13C	2.00	84
1,2,3,7,8-PeCDF	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	83
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	18	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	72
				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	78
Total PeCDD	ND	-----	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	74
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	88
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	53
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	83
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	20	-----	5.0			
1,2,3,4,6,7,8-HpCDF	11	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 1.5 ng/Kg		
Total HpCDF	26	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	71	-----	5.0			
Total HpCDD	140	-----	5.0			
OCDF	28	-----	10			
OCDD	640	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N1-4		
Lab Sample ID	10487441022		
Filename	F190831A_05		
Injected By	JRH		
Total Amount Extracted	11.5 g	Matrix	Solid
% Moisture	10.5	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	08/13/2019 15:00
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 07:32

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	61
Total TCDF	1.4	-----	1.0	2,3,7,8-TCDD-13C	2.00	71
				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	66
Total TCDD	2.8	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	78
				1,2,3,4,7,8-HxCDF-13C	2.00	66
1,2,3,7,8-PeCDF	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	66
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	68
Total PeCDF	5.2	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	65
				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	63
Total PeCDD	ND	-----	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	74
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	61
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	66
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	8.1	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 0.37 ng/Kg		
Total HpCDF	16	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	16	-----	5.0			
Total HpCDD	32	-----	5.0			
OCDF	17	-----	10			
OCDD	120	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-10		
Lab Sample ID	10487441023		
Filename	F190831A_06		
Injected By	JRH		
Total Amount Extracted	13.1 g	Matrix	Solid
% Moisture	21.7	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	08/13/2019 15:30
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 08:18

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	54
Total TCDF	7.8	-----	1.0	2,3,7,8-TCDD-13C	2.00	63
				1,2,3,7,8-PeCDF-13C	2.00	56
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	58
Total TCDD	1.7	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	67
				1,2,3,4,7,8-HxCDF-13C	2.00	56
1,2,3,7,8-PeCDF	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	57
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	57
Total PeCDF	31	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	55
				1,2,3,4,7,8-HxCDD-13C	2.00	59
1,2,3,7,8-PeCDD	ND	-----	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	53
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	64
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	74
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	54
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	24	-----	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	58
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	21	-----	5.0			
1,2,3,4,6,7,8-HpCDF	25	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 1.6 ng/Kg		
Total HpCDF	55	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	70	-----	5.0			
Total HpCDD	140	-----	5.0			
OCDF	45	-----	10			
OCDD	570	-----	10			

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

Report No.....10487441

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-09		
Lab Sample ID	10487441024		
Filename	F190831A_07		
Injected By	JRH		
Total Amount Extracted	11.8 g	Matrix	Solid
% Moisture	11.3	Dilution	NA
Dry Weight Extracted	10.5 g	Collected	08/13/2019 15:45
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 09:04

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.6	------	1.0	C	2,3,7,8-TCDF-13C	2.00	67
Total TCDF	52	------	1.0		2,3,7,8-TCDD-13C	2.00	78
					1,2,3,7,8-PeCDF-13C	2.00	71
2,3,7,8-TCDD	ND	-----	1.0		2,3,4,7,8-PeCDF-13C	2.00	69
Total TCDD	2.0	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	82
					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	72
2,3,4,7,8-PeCDF	12	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	300	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	70
					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	68
					1,2,3,4,7,8,9-HpCDF-13C	2.00	66
1,2,3,4,7,8-HxCDF	7.3	-----	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	49
2,3,4,6,7,8-HxCDF	7.0	-----	5.0				
1,2,3,7,8,9-HxCDF	ND	-----	5.0		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	240	-----	5.0		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	5.6	------	5.0		2,3,7,8-TCDD-37Cl4	0.20	74
1,2,3,6,7,8-HxCDD	14	-----	5.0				
1,2,3,7,8,9-HxCDD	10	-----	5.0				
Total HxCDD	140	-----	5.0				
1,2,3,4,6,7,8-HpCDF	140	-----	5.0		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	6.4	-----	5.0		Equivalence: 20 ng/Kg		
Total HpCDF	250	-----	5.0		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	330	------	5.0				
Total HpCDD	710	------	5.0				
OCDF	220	-----	10				
OCDD	4000	-----	10				

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.
C = Result obtained from confirmation analysis

REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-01		
Lab Sample ID	10487441025		
Filename	F190831A_08		
Injected By	JRH		
Total Amount Extracted	11.0 g	Matrix	Solid
% Moisture	8.7	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 16:00
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 09:50

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	76
				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	70
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	70
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	ND	------	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	59
				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	68
Total PeCDD	ND	------	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	72
				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	84
1,2,3,6,7,8-HxCDF	ND	------	5.0	OCDD-13C	4.00	59
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	75
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	5.7	------	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	13	------	5.0			
Total HpCDD	30	------	5.0			
OCDF	13	------	10			
OCDD	110	------	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-04		
Lab Sample ID	10487441026		
Filename	F190831A_09		
Injected By	JRH		
Total Amount Extracted	11.2 g	Matrix	Solid
% Moisture	10.0	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 16:15
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 10:36

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	60
Total TCDF	1.5	-----	1.0	2,3,7,8-TCDD-13C	2.00	69
				1,2,3,7,8-PeCDF-13C	2.00	61
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	61
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	61
1,2,3,7,8-PeCDF	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	64
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	62
Total PeCDF	14	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	58
				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	62
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	66
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	53
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	16	-----	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	64
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	67	-----	5.0			
1,2,3,4,6,7,8-HpCDF	19	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 1.8 ng/Kg		
Total HpCDF	52	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	99	-----	5.0			
Total HpCDD	410	-----	5.0			
OCDF	57	-----	10			
OCDD	580	-----	10			

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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-05		
Lab Sample ID	10487441027		
Filename	F190831A_10		
Injected By	JRH		
Total Amount Extracted	12.1 g	Matrix	Solid
% Moisture	13.2	Dilution	NA
Dry Weight Extracted	10.5 g	Collected	08/13/2019 16:25
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 11:22

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	60
Total TCDF	7.8	-----	1.0	2,3,7,8-TCDD-13C	2.00	71
				1,2,3,7,8-PeCDF-13C	2.00	60
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	59
Total TCDD	1.2	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	73
				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	72
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	41	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	59
				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	57
Total PeCDD	ND	-----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	53
				1,2,3,4,7,8,9-HpCDF-13C	2.00	47
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	59
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	31
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	57	-----	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	64
1,2,3,6,7,8-HxCDD	7.7	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	84	-----	5.0			
1,2,3,4,6,7,8-HpCDF	43	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 4.5 ng/Kg		
Total HpCDF	90	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	180	-----	5.0			
Total HpCDD	400	-----	5.0			
OCDF	95	-----	10			
OCDD	1400	-----	10			

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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

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-06		
Lab Sample ID	10487441028		
Filename	F190831A_11		
Injected By	JRH		
Total Amount Extracted	11.5 g	Matrix	Solid
% Moisture	11.8	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/14/2019 07:30
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 12:08

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	70
Total TCDF	3.5	-----	1.0	2,3,7,8-TCDD-13C	2.00	82
				1,2,3,7,8-PeCDF-13C	2.00	70
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	79
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	80
Total PeCDF	24	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	67
				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	75
Total PeCDD	ND	-----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	72
				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	86
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	54
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	38	-----	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	20	-----	5.0			
1,2,3,4,6,7,8-HpCDF	37	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 1.9 ng/Kg		
Total HpCDF	80	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	83	-----	5.0			
Total HpCDD	160	-----	5.0			
OCDF	58	-----	10			
OCDD	680	-----	10			

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REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-08		
Lab Sample ID	10487441029		
Filename	F190831A_12		
Injected By	JRH		
Total Amount Extracted	11.3 g	Matrix	Solid
% Moisture	11.2	Dilution	NA
Dry Weight Extracted	10.0 g	Collected	08/14/2019 07:45
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 12:54

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	1.1	-----	1.0	2,3,7,8-TCDD-13C	2.00	78
				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	67
Total TCDD	ND	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	79
				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	69
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	67
Total PeCDF	6.8	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	55
				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	66
Total PeCDD	ND	-----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	73
				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	86
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	54
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	7.3	-----	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	12	-----	5.0			
1,2,3,4,6,7,8-HpCDF	10	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 0.71 ng/Kg		
Total HpCDF	26	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	32	-----	5.0			
Total HpCDD	75	-----	5.0			
OCDF	22	-----	10			
OCDD	270	-----	10			

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REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-07		
Lab Sample ID	10487441030		
Filename	F190831A_13		
Injected By	JRH		
Total Amount Extracted	11.3 g	Matrix	Solid
% Moisture	9.8	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/14/2019 08:00
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 13:40

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	76
				1,2,3,7,8-PeCDF-13C	2.00	65
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	65
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	69
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	69
				1,2,3,4,7,8-HxCDD-13C	2.00	73
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	75
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	88
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	58
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	71
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: 0.24 ng/Kg		
Total HpCDF	5.3	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	14	-----	5.0			
Total HpCDD	25	-----	5.0			
OCDF	ND	-----	10			
OCDD	100	-----	10			

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REPORT OF LABORATORY ANALYSIS

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

Tel: 612-607-1700
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-03		
Lab Sample ID	10487441031		
Filename	F190831A_14		
Injected By	JRH		
Total Amount Extracted	11.1 g	Matrix	Solid
% Moisture	8.8	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/14/2019 08:15
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 14:26

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	14	-----	1.0	2,3,7,8-TCDD-13C	2.00	84
				1,2,3,7,8-PeCDF-13C	2.00	70
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	70
Total TCDD	3.0	-----	1.0	1,2,3,7,8-PeCDD-13C	2.00	83
				1,2,3,4,7,8-HxCDF-13C	2.00	71
1,2,3,7,8-PeCDF	ND	-----	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	78
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	64	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	75
				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	71
Total PeCDD	ND	-----	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	82
				1,2,3,4,7,8,9-HpCDF-13C	2.00	80
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	100
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	63
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	23	-----	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	78
1,2,3,6,7,8-HxCDD	ND	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	21	-----	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: 0.77 ng/Kg		
Total HpCDF	31	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	33	-----	5.0			
Total HpCDD	79	-----	5.0			
OCDF	25	-----	10			
OCDD	260	-----	10			

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

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REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-02		
Lab Sample ID	10487441032		
Filename	F190831A_15		
Injected By	JRH		
Total Amount Extracted	12.0 g	Matrix	Solid
% Moisture	11.1	Dilution	NA
Dry Weight Extracted	10.7 g	Collected	08/14/2019 08:25
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 15:12

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	1.0	-----	1.0	2,3,7,8-TCDD-13C	2.00	79
				1,2,3,7,8-PeCDF-13C	2.00	65
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	76
				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	76
2,3,4,7,8-PeCDF	ND	-----	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	71
Total PeCDF	12	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	69
				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	74
Total PeCDD	ND	-----	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	78
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	93
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	61
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	5.8	-----	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	9.6	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 0.49 ng/Kg		
Total HpCDF	19	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	22	-----	5.0			
Total HpCDD	50	-----	5.0			
OCDF	17	-----	10			
OCDD	160	-----	10			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
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REPORT OF LABORATORY ANALYSIS

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

Tel: 612-607-1700
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N4-3		
Lab Sample ID	10487441033		
Filename	Y190830B_11		
Injected By	JRH		
Total Amount Extracted	11.2 g	Matrix	Solid
% Moisture	8.9	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/14/2019 09:00
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_18	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 06:12

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery	
2,3,7,8-TCDF	2.4	-----	1.0	V	2,3,7,8-TCDF-13C	2.00	63	
Total TCDF	140	-----	1.0		2,3,7,8-TCDD-13C	2.00	66	
					1,2,3,7,8-PeCDF-13C	2.00	70	
2,3,7,8-TCDD	1.0	-----	1.0		2,3,4,7,8-PeCDF-13C	2.00	70	
Total TCDD	12	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	76	
					1,2,3,4,7,8-HxCDF-13C	2.00	88	DN2
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	83	DN2
2,3,4,7,8-PeCDF	61	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	81	DN2
Total PeCDF	750	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	41	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	90	DN2
1,2,3,7,8-PeCDD	5.9	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	74	DN2
Total PeCDD	18	-----	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	79	DN2
1,2,3,4,7,8-HxCDF	-----	75	5.0	PDN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	81	DN2
1,2,3,6,7,8-HxCDF	-----	28	5.0	PDN2	OCDD-13C	4.00	84	DN2
2,3,4,6,7,8-HxCDF	30	-----	5.0	DN2				
1,2,3,7,8,9-HxCDF	6.1	-----	5.0	JDN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	1200	-----	5.0	DN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	9.0	-----	5.0	JDN2	2,3,7,8-TCDD-37Cl4	0.20	77	
1,2,3,6,7,8-HxCDD	44	-----	5.0	DN2				
1,2,3,7,8,9-HxCDD	15	-----	5.0	JDN2				
Total HxCDD	310	-----	5.0	DN2				
1,2,3,4,6,7,8-HpCDF	380	-----	5.0	DN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	20	-----	5.0	JDN2	Equivalence: 78 ng/Kg			
Total HpCDF	1100	-----	5.0	DN2	(Lower-bound - Using ITE Factors)			
1,2,3,4,6,7,8-HpCDD	930	-----	5.0	DN2				
Total HpCDD	1900	-----	5.0	DN2				
OCDF	620	-----	10	DN2				
OCDD	9200	-----	10	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
P = PCDE Interference
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis
V = Result verified by confirmation analysis

REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N4-2		
Lab Sample ID	10487441034		
Filename	Y190830B_12		
Injected By	JRH		
Total Amount Extracted	11.5 g	Matrix	Solid
% Moisture	12.0	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/14/2019 09:15
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_18	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 06:58

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery	
2,3,7,8-TCDF	4.4	------	1.0	C	2,3,7,8-TCDF-13C	2.00	81	
Total TCDF	98	------	1.0		2,3,7,8-TCDD-13C	2.00	87	
					1,2,3,7,8-PeCDF-13C	2.00	89	
2,3,7,8-TCDD	ND	-----	1.0		2,3,4,7,8-PeCDF-13C	2.00	99	
Total TCDD	17	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	104	
					1,2,3,4,7,8-HxCDF-13C	2.00	89	DN2
1,2,3,7,8-PeCDF	-----	270	5.0	P	1,2,3,6,7,8-HxCDF-13C	2.00	80	DN2
2,3,4,7,8-PeCDF	14	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	84	DN2
Total PeCDF	480	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	46	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	86	DN2
1,2,3,7,8-PeCDD	5.2	-----	5.0		1,2,3,6,7,8-HxCDD-13C	2.00	68	DN2
Total PeCDD	11	-----	5.0		1,2,3,4,6,7,8-HpCDF-13C	2.00	64	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	70	DN2
1,2,3,4,7,8-HxCDF	16	------	5.0	JDN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	70	DN2
1,2,3,6,7,8-HxCDF	20	-----	5.0	JDN2	OCDD-13C	4.00	74	DN2
2,3,4,6,7,8-HxCDF	16	-----	5.0	JDN2				
1,2,3,7,8,9-HxCDF	6.7	-----	5.0	JDN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	430	-----	5.0	DN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	7.8	-----	5.0	JDN2	2,3,7,8-TCDD-37Cl4	0.20	101	
1,2,3,6,7,8-HxCDD	39	-----	5.0	DN2				
1,2,3,7,8,9-HxCDD	15	-----	5.0	JDN2				
Total HxCDD	260	-----	5.0	DN2				
1,2,3,4,6,7,8-HpCDF	250	-----	5.0	DN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	14	-----	5.0	JDN2	Equivalence: 54 ng/Kg			
Total HpCDF	610	------	5.0	DN2	(Lower-bound - Using ITE Factors)			
1,2,3,4,6,7,8-HpCDD	820	-----	5.0	DN2				
Total HpCDD	1600	-----	5.0	DN2				
OCDF	490	------	10	DN2				
OCDD	7300	-----	10	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
P = PCDE Interference
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis
C = Result obtained from confirmation analysis

REPORT OF LABORATORY ANALYSIS

Report No.....10487441

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N4-1		
Lab Sample ID	10487441035		
Filename	Y190830B_13		
Injected By	JRH		
Total Amount Extracted	11.5 g	Matrix	Solid
% Moisture	8.7	Dilution	NA
Dry Weight Extracted	10.5 g	Collected	08/14/2019 09:25
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_18	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 07:43

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	2.1	-----	1.0	V	2,3,7,8-TCDF-13C	2.00	84
Total TCDF	58	-----	1.0		2,3,7,8-TCDD-13C	2.00	82
					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	85
Total TCDD	7.4	-----	1.0		1,2,3,7,8-PeCDD-13C	2.00	92
					1,2,3,4,7,8-HxCDF-13C	2.00	97
1,2,3,7,8-PeCDF	ND	-----	5.0		1,2,3,6,7,8-HxCDF-13C	2.00	93
2,3,4,7,8-PeCDF	11	-----	5.0		2,3,4,6,7,8-HxCDF-13C	2.00	90
Total PeCDF	170	-----	5.0		1,2,3,7,8,9-HxCDF-13C	2.00	61
					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	71
Total PeCDD	12	-----	5.0		1,2,3,4,6,7,8-HpCDF-13C	2.00	52
					1,2,3,4,7,8,9-HpCDF-13C	2.00	43
1,2,3,4,7,8-HxCDF	8.2	-----	5.0		1,2,3,4,6,7,8-HpCDD-13C	2.00	48
1,2,3,6,7,8-HxCDF	8.0	-----	5.0		OCDD-13C	4.00	28
2,3,4,6,7,8-HxCDF	6.5	-----	5.0				
1,2,3,7,8,9-HxCDF	ND	-----	5.0		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	190	-----	5.0		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	6.3	-----	5.0		2,3,7,8-TCDD-37Cl4	0.20	80
1,2,3,6,7,8-HxCDD	24	-----	5.0				
1,2,3,7,8,9-HxCDD	12	-----	5.0				
Total HxCDD	170	-----	5.0				
1,2,3,4,6,7,8-HpCDF	150	-----	5.0		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	9.4	-----	5.0		Equivalence: 25 ng/Kg		
Total HpCDF	380	-----	5.0		(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	530	-----	5.0				
Total HpCDD	1000	-----	5.0				
OCDF	320	-----	10				
OCDD	5100	-----	10				

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.
V = Result verified by confirmation analysis

REPORT OF LABORATORY ANALYSIS

Report No.....10487441

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N7-1		
Lab Sample ID	10487441036		
Filename	Y190830B_14		
Injected By	JRH		
Total Amount Extracted	11.1 g	Matrix	Solid
% Moisture	8.2	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/14/2019 08:45
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_18	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 08:29

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	83
Total TCDF	17	-----	1.0	2,3,7,8-TCDD-13C	2.00	81
				1,2,3,7,8-PeCDF-13C	2.00	83
2,3,7,8-TCDD	ND	-----	1.0	2,3,4,7,8-PeCDF-13C	2.00	85
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	84
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	80
Total PeCDF	38	-----	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	50
				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	68
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	59
1,2,3,4,7,8-HxCDF	ND	-----	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	58
1,2,3,6,7,8-HxCDF	ND	-----	5.0	OCDD-13C	4.00	36
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	75	-----	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	82
1,2,3,6,7,8-HxCDD	6.1	-----	5.0			
1,2,3,7,8,9-HxCDD	ND	-----	5.0			
Total HxCDD	40	-----	5.0			
1,2,3,4,6,7,8-HpCDF	46	-----	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	5.0	Equivalence: 4.0 ng/Kg		
Total HpCDF	100	-----	5.0	(Lower-bound - Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	150	-----	5.0			
Total HpCDD	330	-----	5.0			
OCDF	71	-----	10			
OCDD	1300	-----	10			

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

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

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

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 = Interferencepresent

J = Estimated value

L = Suppressive interference, analyte may be biased low

Nn = Value obtained from additional analysis

P = PCDEInterference

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

* = SeeDiscussion

Appendix B

Sample Analysis Summary

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N6-1		
Lab Sample ID	10487441001		
Filename	U190830B_03		
Injected By	SMT		
Total Amount Extracted	12.8 g	Matrix	Solid
% Moisture	9.3	Dilution	NA
Dry Weight Extracted	11.6 g	Collected	08/13/2019 08:00
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 11:41

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery	
2,3,7,8-TCDF	ND	-----	0.35		2,3,7,8-TCDF-13C	2.00	91	
Total TCDF	1.9	-----	0.35		2,3,7,8-TCDD-13C	2.00	91	
					1,2,3,7,8-PeCDF-13C	2.00	94	
2,3,7,8-TCDD	ND	-----	0.54		2,3,4,7,8-PeCDF-13C	2.00	92	
Total TCDD	ND	-----	0.54		1,2,3,7,8-PeCDD-13C	2.00	102	
					1,2,3,4,7,8-HxCDF-13C	2.00	80	DN2
1,2,3,7,8-PeCDF	ND	-----	0.45		1,2,3,6,7,8-HxCDF-13C	2.00	74	DN2
2,3,4,7,8-PeCDF	0.80	-----	0.34	J	2,3,4,6,7,8-HxCDF-13C	2.00	71	DN2
Total PeCDF	9.8	-----	0.34		1,2,3,7,8,9-HxCDF-13C	2.00	57	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	84	DN2
1,2,3,7,8-PeCDD	0.60	-----	0.42	J	1,2,3,6,7,8-HxCDD-13C	2.00	67	DN2
Total PeCDD	1.3	-----	0.42	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	63	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	64	DN2
1,2,3,4,7,8-HxCDF	0.57	-----	0.30	JDN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	68	DN2
1,2,3,6,7,8-HxCDF	0.79	-----	0.32	JDN2	OCDD-13C	4.00	48	DN2
2,3,4,6,7,8-HxCDF	-----	0.31	0.27	IJDN2				
1,2,3,7,8,9-HxCDF	0.41	-----	0.13	JDN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	13	-----	0.13	JDN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	0.77	-----	0.29	BJDN2	2,3,7,8-TCDD-37Cl4	0.20	87	
1,2,3,6,7,8-HxCDD	1.5	-----	0.31	JDN2				
1,2,3,7,8,9-HxCDD	-----	1.3	0.38	IJDN2				
Total HxCDD	6.8	-----	0.29	JDN2				
1,2,3,4,6,7,8-HpCDF	7.0	-----	0.40	JDN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	ND	-----	0.35	DN2	Equivalence: 1.7 ng/Kg			
Total HpCDF	15	-----	0.35	JDN2	(Lower-bound - Using 2005 WHO Factors)			
1,2,3,4,6,7,8-HpCDD	19	-----	0.43	JDN2				
Total HpCDD	39	-----	0.43	DN2				
OCDF	11	-----	0.73	JDN2				
OCDD	160	-----	0.85	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
B = Less than 10x higher than method blank level
I = Interference present
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N6-2		
Lab Sample ID	10487441002		
Filename	U190830B_04		
Injected By	SMT		
Total Amount Extracted	11.8 g	Matrix	Solid
% Moisture	11.4	Dilution	NA
Dry Weight Extracted	10.5 g	Collected	08/13/2019 08:16
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 12:24

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery	
2,3,7,8-TCDF	ND	-----	0.68		2,3,7,8-TCDF-13C	2.00	81	
Total TCDF	19	-----	0.68		2,3,7,8-TCDD-13C	2.00	83	
					1,2,3,7,8-PeCDF-13C	2.00	85	
2,3,7,8-TCDD	ND	-----	0.77		2,3,4,7,8-PeCDF-13C	2.00	85	
Total TCDD	1.7	-----	0.77		1,2,3,7,8-PeCDD-13C	2.00	92	
					1,2,3,4,7,8-HxCDF-13C	2.00	90	DN2
1,2,3,7,8-PeCDF	ND	-----	0.53		1,2,3,6,7,8-HxCDF-13C	2.00	84	DN2
2,3,4,7,8-PeCDF	5.0	-----	0.42		2,3,4,6,7,8-HxCDF-13C	2.00	82	DN2
Total PeCDF	58	-----	0.42		1,2,3,7,8,9-HxCDF-13C	2.00	42	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	98	DN2
1,2,3,7,8-PeCDD	1.2	-----	0.60	J	1,2,3,6,7,8-HxCDD-13C	2.00	77	DN2
Total PeCDD	3.9	-----	0.60	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	75	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	77	DN2
1,2,3,4,7,8-HxCDF	2.8	-----	0.32	JDN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	79	DN2
1,2,3,6,7,8-HxCDF	2.2	-----	0.34	JDN2	OCDD-13C	4.00	68	DN2
2,3,4,6,7,8-HxCDF	2.5	-----	0.35	JDN2				
1,2,3,7,8,9-HxCDF	-----	0.57	0.15	IJDN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	69	-----	0.15	DN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	1.7	-----	0.57	JDN2	2,3,7,8-TCDD-37Cl4	0.20	78	
1,2,3,6,7,8-HxCDD	5.1	-----	0.66	JDN2				
1,2,3,7,8,9-HxCDD	1.9	-----	0.52	JDN2				
Total HxCDD	39	-----	0.52	DN2				
1,2,3,4,6,7,8-HpCDF	34	-----	0.41	DN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	1.5	-----	0.40	JDN2	Equivalence: 6.0 ng/Kg			
Total HpCDF	90	-----	0.40	DN2	(Lower-bound - Using 2005 WHO Factors)			
1,2,3,4,6,7,8-HpCDD	96	-----	0.41	DN2				
Total HpCDD	200	-----	0.41	DN2				
OCDF	73	-----	1.0	DN2				
OCDD	860	-----	0.84	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
I = Interference present
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414

Tel: 612-607-1700
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N6-4		
Lab Sample ID	10487441003		
Filename	U190830B_05		
Injected By	SMT		
Total Amount Extracted	11.4 g	Matrix	Solid
% Moisture	11.9	Dilution	NA
Dry Weight Extracted	10.0 g	Collected	08/13/2019 08:40
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 13:08

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery	
2,3,7,8-TCDF	0.56	-----	0.36	J	2,3,7,8-TCDF-13C	2.00	83	
Total TCDF	26	-----	0.36		2,3,7,8-TCDD-13C	2.00	84	
					1,2,3,7,8-PeCDF-13C	2.00	84	
2,3,7,8-TCDD	ND	-----	0.44		2,3,4,7,8-PeCDF-13C	2.00	84	
Total TCDD	3.1	-----	0.44		1,2,3,7,8-PeCDD-13C	2.00	92	
					1,2,3,4,7,8-HxCDF-13C	2.00	74	DN2
1,2,3,7,8-PeCDF	0.65	-----	0.42	J	1,2,3,6,7,8-HxCDF-13C	2.00	66	DN2
2,3,4,7,8-PeCDF	1.9	-----	0.48	J	2,3,4,6,7,8-HxCDF-13C	2.00	66	DN2
Total PeCDF	51	-----	0.42		1,2,3,7,8,9-HxCDF-13C	2.00	52	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	79	DN2
1,2,3,7,8-PeCDD	-----	0.47	0.40	IJ	1,2,3,6,7,8-HxCDD-13C	2.00	61	DN2
Total PeCDD	2.6	-----	0.40	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	61	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	64	DN2
1,2,3,4,7,8-HxCDF	1.4	-----	0.44	JDN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	67	DN2
1,2,3,6,7,8-HxCDF	2.0	-----	0.31	JDN2	OCDD-13C	4.00	51	DN2
2,3,4,6,7,8-HxCDF	1.7	-----	0.16	JDN2				
1,2,3,7,8,9-HxCDF	0.69	-----	0.16	JDN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	43	-----	0.16	DN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	0.73	-----	0.50	BJDN2	2,3,7,8-TCDD-37Cl4	0.20	76	
1,2,3,6,7,8-HxCDD	2.4	-----	0.51	JDN2				
1,2,3,7,8,9-HxCDD	1.6	-----	0.25	JDN2				
Total HxCDD	21	-----	0.25	JDN2				
1,2,3,4,6,7,8-HpCDF	17	-----	0.37	JDN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	-----	0.98	0.39	IJDN2	Equivalence: 2.8 ng/Kg			
Total HpCDF	43	-----	0.37	DN2	(Lower-bound - Using 2005 WHO Factors)			
1,2,3,4,6,7,8-HpCDD	39	-----	0.90	DN2				
Total HpCDD	78	-----	0.90	DN2				
OCDF	40	-----	0.76	JDN2				
OCDD	310	-----	0.46	DN2				

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

ND = Not Detected
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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
I = Interference present
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N6-3		
Lab Sample ID	10487441004		
Filename	U190830B_06		
Injected By	SMT		
Total Amount Extracted	11.6 g	Matrix	Solid
% Moisture	10.2	Dilution	NA
Dry Weight Extracted	10.4 g	Collected	08/13/2019 09:00
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 13:51

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.53		2,3,7,8-TCDF-13C	2.00	79
Total TCDF	2.5	-----	0.53		2,3,7,8-TCDD-13C	2.00	78
					1,2,3,7,8-PeCDF-13C	2.00	76
2,3,7,8-TCDD	ND	-----	0.39		2,3,4,7,8-PeCDF-13C	2.00	79
Total TCDD	0.73	-----	0.39	J	1,2,3,7,8-PeCDD-13C	2.00	83
					1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	ND	-----	0.60		1,2,3,6,7,8-HxCDF-13C	2.00	70
2,3,4,7,8-PeCDF	-----	0.46	0.43	IJ	2,3,4,6,7,8-HxCDF-13C	2.00	75
Total PeCDF	7.3	-----	0.43		1,2,3,7,8,9-HxCDF-13C	2.00	45
					1,2,3,4,7,8-HxCDD-13C	2.00	79
1,2,3,7,8-PeCDD	0.51	-----	0.37	J	1,2,3,6,7,8-HxCDD-13C	2.00	61
Total PeCDD	2.1	-----	0.37	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	64
					1,2,3,4,7,8,9-HpCDF-13C	2.00	71
1,2,3,4,7,8-HxCDF	-----	0.71	0.39	IJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	71
1,2,3,6,7,8-HxCDF	-----	0.82	0.33	IJ	OCDD-13C	4.00	58
2,3,4,6,7,8-HxCDF	-----	0.53	0.27	IJ			
1,2,3,7,8,9-HxCDF	ND	-----	0.38		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	15	-----	0.27		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.80	-----	0.27	BJ	2,3,7,8-TCDD-37Cl4	0.20	80
1,2,3,6,7,8-HxCDD	-----	2.0	0.36	IJ			
1,2,3,7,8,9-HxCDD	-----	1.6	0.29	IJ			
Total HxCDD	14	-----	0.27				
1,2,3,4,6,7,8-HpCDF	12	-----	0.27		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	0.81	0.34	IJ	Equivalence: 2.1 ng/Kg		
Total HpCDF	33	-----	0.27		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	51	-----	0.48				
Total HpCDD	91	-----	0.48				
OCDF	43	-----	0.41				
OCDD	460	-----	0.45				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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Results reported on a dry weight basis and are valid to no more than 2 significant figures.
J = Estimated value
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I = Interference present

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N2-1		
Lab Sample ID	10487441005		
Filename	U190830B_07		
Injected By	SMT		
Total Amount Extracted	12.1 g	Matrix	Solid
% Moisture	17.6	Dilution	NA
Dry Weight Extracted	10.0 g	Collected	08/13/2019 09:35
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 14:35

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.55	-----	0.21	J	2,3,7,8-TCDF-13C	2.00	87
Total TCDF	16	-----	0.21		2,3,7,8-TCDD-13C	2.00	87
					1,2,3,7,8-PeCDF-13C	2.00	88
2,3,7,8-TCDD	ND	-----	0.24		2,3,4,7,8-PeCDF-13C	2.00	91
Total TCDD	3.3	-----	0.24		1,2,3,7,8-PeCDD-13C	2.00	92
					1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	0.60	-----	0.37	J	1,2,3,6,7,8-HxCDF-13C	2.00	77
2,3,4,7,8-PeCDF	-----	1.6	0.39	IJ	2,3,4,6,7,8-HxCDF-13C	2.00	79
Total PeCDF	33	-----	0.37		1,2,3,7,8,9-HxCDF-13C	2.00	57
					1,2,3,4,7,8-HxCDD-13C	2.00	87
1,2,3,7,8-PeCDD	0.82	-----	0.35	J	1,2,3,6,7,8-HxCDD-13C	2.00	65
Total PeCDD	7.5	-----	0.35		1,2,3,4,6,7,8-HpCDF-13C	2.00	70
					1,2,3,4,7,8,9-HpCDF-13C	2.00	79
1,2,3,4,7,8-HxCDF	-----	0.91	0.51	IJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	83
1,2,3,6,7,8-HxCDF	1.2	-----	0.48	J	OCDD-13C	4.00	64
2,3,4,6,7,8-HxCDF	1.0	-----	0.44	J			
1,2,3,7,8,9-HxCDF	-----	0.49	0.28	IJ	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	23	-----	0.28		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.92	-----	0.34	BJ	2,3,7,8-TCDD-37Cl4	0.20	79
1,2,3,6,7,8-HxCDD	2.0	-----	0.23	J			
1,2,3,7,8,9-HxCDD	1.6	-----	0.21	J			
Total HxCDD	20	-----	0.21				
1,2,3,4,6,7,8-HpCDF	13	-----	0.21		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	0.54	0.18	IJ	Equivalence: 2.7 ng/Kg		
Total HpCDF	27	-----	0.18		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	34	-----	0.31				
Total HpCDD	63	-----	0.31				
OCDF	18	-----	0.49				
OCDD	250	-----	0.59				

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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
I = Interference present

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N2-2		
Lab Sample ID	10487441006		
Filename	U190830B_08		
Injected By	SMT		
Total Amount Extracted	11.7 g	Matrix	Solid
% Moisture	14.4	Dilution	NA
Dry Weight Extracted	10.00 g	Collected	08/13/2019 09:45
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 15:18

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.97	-----	0.34	J	2,3,7,8-TCDF-13C	2.00	67
Total TCDF	46	-----	0.34		2,3,7,8-TCDD-13C	2.00	67
					1,2,3,7,8-PeCDF-13C	2.00	68
2,3,7,8-TCDD	ND	-----	0.36		2,3,4,7,8-PeCDF-13C	2.00	72
Total TCDD	3.5	-----	0.36		1,2,3,7,8-PeCDD-13C	2.00	74
					1,2,3,4,7,8-HxCDF-13C	2.00	66
1,2,3,7,8-PeCDF	2.0	-----	0.44	J	1,2,3,6,7,8-HxCDF-13C	2.00	56
2,3,4,7,8-PeCDF	6.8	-----	0.30		2,3,4,6,7,8-HxCDF-13C	2.00	60
Total PeCDF	140	-----	0.30		1,2,3,7,8,9-HxCDF-13C	2.00	48
					1,2,3,4,7,8-HxCDD-13C	2.00	71
1,2,3,7,8-PeCDD	3.0	-----	0.52	J	1,2,3,6,7,8-HxCDD-13C	2.00	45
Total PeCDD	23	-----	0.52		1,2,3,4,6,7,8-HpCDF-13C	2.00	55
					1,2,3,4,7,8,9-HpCDF-13C	2.00	67
1,2,3,4,7,8-HxCDF	12	-----	0.41		1,2,3,4,6,7,8-HpCDD-13C	2.00	68
1,2,3,6,7,8-HxCDF	-----	9.1	0.40	P	OCDD-13C	4.00	63
2,3,4,6,7,8-HxCDF	5.6	-----	0.53				
1,2,3,7,8,9-HxCDF	4.8	-----	0.35	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	230	-----	0.35		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	7.2	-----	0.41		2,3,7,8-TCDD-37Cl4	0.20	63
1,2,3,6,7,8-HxCDD	22	-----	0.53				
1,2,3,7,8,9-HxCDD	13	-----	0.55				
Total HxCDD	130	-----	0.41				
1,2,3,4,6,7,8-HpCDF	160	-----	0.98		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	11	-----	0.35		Equivalence: 19 ng/Kg		
Total HpCDF	420	-----	0.35		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	400	-----	0.46				
Total HpCDD	670	-----	0.46				
OCDF	310	-----	0.40				
OCDD	3000	-----	0.36				

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
P = PCDE Interference

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N2-4		
Lab Sample ID	10487441007		
Filename	U190830B_09		
Injected By	SMT		
Total Amount Extracted	12.0 g	Matrix	Solid
% Moisture	14.9	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/13/2019 10:05
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 16:01

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.8	-----	0.43	C	2,3,7,8-TCDF-13C	2.00	83
Total TCDF	56	-----	0.53		2,3,7,8-TCDD-13C	2.00	84
					1,2,3,7,8-PeCDF-13C	2.00	89
2,3,7,8-TCDD	ND	-----	0.32		2,3,4,7,8-PeCDF-13C	2.00	76
Total TCDD	2.7	-----	0.32		1,2,3,7,8-PeCDD-13C	2.00	84
					1,2,3,4,7,8-HxCDF-13C	2.00	128
1,2,3,7,8-PeCDF	1.9	-----	1.0	J	1,2,3,6,7,8-HxCDF-13C	2.00	113
2,3,4,7,8-PeCDF	13	-----	0.48		2,3,4,6,7,8-HxCDF-13C	2.00	119
Total PeCDF	160	-----	0.48		1,2,3,7,8,9-HxCDF-13C	2.00	120
					1,2,3,4,7,8-HxCDD-13C	2.00	137
1,2,3,7,8-PeCDD	2.5	-----	0.32	J	1,2,3,6,7,8-HxCDD-13C	2.00	102
Total PeCDD	11	-----	0.32		1,2,3,4,6,7,8-HpCDF-13C	2.00	111
					1,2,3,4,7,8,9-HpCDF-13C	2.00	126
1,2,3,4,7,8-HxCDF	6.1	-----	0.24		1,2,3,4,6,7,8-HpCDD-13C	2.00	137
1,2,3,6,7,8-HxCDF	6.0	-----	0.21		OCDD-13C	4.00	129
2,3,4,6,7,8-HxCDF	6.1	-----	0.25				
1,2,3,7,8,9-HxCDF	1.9	-----	0.30	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	150	-----	0.21		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	3.4	-----	0.31	J	2,3,7,8-TCDD-37Cl4	0.20	75
1,2,3,6,7,8-HxCDD	11	-----	0.16				
1,2,3,7,8,9-HxCDD	4.1	-----	0.17	J			
Total HxCDD	71	-----	0.16				
1,2,3,4,6,7,8-HpCDF	94	-----	0.17		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	3.5	0.29	IJ	Equivalence: 14 ng/Kg		
Total HpCDF	210	-----	0.17		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	210	-----	0.33				
Total HpCDD	350	-----	0.33				
OCDF	130	-----	0.25				
OCDD	1600	-----	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
C = Result obtained from confirmation analysis

REPORT OF LABORATORY ANALYSIS

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

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

Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N2-3		
Lab Sample ID	10487441008		
Filename	U190830B_10		
Injected By	SMT		
Total Amount Extracted	11.6 g	Matrix	Solid
% Moisture	13.2	Dilution	NA
Dry Weight Extracted	10.0 g	Collected	08/13/2019 10:15
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 16:44

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.79	-----	0.43	J	2,3,7,8-TCDF-13C	2.00	82
Total TCDF	39	-----	0.43		2,3,7,8-TCDD-13C	2.00	82
					1,2,3,7,8-PeCDF-13C	2.00	83
2,3,7,8-TCDD	16	-----	0.66		2,3,4,7,8-PeCDF-13C	2.00	84
Total TCDD	19	-----	0.66		1,2,3,7,8-PeCDD-13C	2.00	87
					1,2,3,4,7,8-HxCDF-13C	2.00	79
1,2,3,7,8-PeCDF	1.0	-----	0.51	J	1,2,3,6,7,8-HxCDF-13C	2.00	66
2,3,4,7,8-PeCDF	5.7	-----	0.40		2,3,4,6,7,8-HxCDF-13C	2.00	68
Total PeCDF	110	-----	0.40		1,2,3,7,8,9-HxCDF-13C	2.00	49
					1,2,3,4,7,8-HxCDD-13C	2.00	76
1,2,3,7,8-PeCDD	0.79	-----	0.33	J	1,2,3,6,7,8-HxCDD-13C	2.00	59
Total PeCDD	9.0	-----	0.33		1,2,3,4,6,7,8-HpCDF-13C	2.00	64
					1,2,3,4,7,8,9-HpCDF-13C	2.00	78
1,2,3,4,7,8-HxCDF	1.9	-----	0.41	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	74
1,2,3,6,7,8-HxCDF	3.0	-----	0.46	J	OCDD-13C	4.00	68
2,3,4,6,7,8-HxCDF	3.0	-----	0.44	J			
1,2,3,7,8,9-HxCDF	0.83	-----	0.54	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	77	-----	0.41		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.8	-----	0.38	J	2,3,7,8-TCDD-37Cl4	0.20	74
1,2,3,6,7,8-HxCDD	3.8	-----	0.38	J			
1,2,3,7,8,9-HxCDD	3.3	-----	0.41	J			
Total HxCDD	36	-----	0.38				
1,2,3,4,6,7,8-HpCDF	32	-----	0.43		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	1.8	-----	0.40	J	Equivalence: 21 ng/Kg		
Total HpCDF	71	-----	0.40		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	72	-----	0.27				
Total HpCDD	130	-----	0.27				
OCDF	59	-----	0.28				
OCDD	520	-----	0.40				

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 - TRC-WI

Client's Sample ID	N2-5		
Lab Sample ID	10487441009		
Filename	U190830B_11		
Injected By	SMT		
Total Amount Extracted	12.0 g	Matrix	Solid
% Moisture	14.6	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/13/2019 10:30
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 17:28

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.67	-----	0.48	J	2,3,7,8-TCDF-13C	2.00	85
Total TCDF	10	-----	0.48		2,3,7,8-TCDD-13C	2.00	84
					1,2,3,7,8-PeCDF-13C	2.00	87
2,3,7,8-TCDD	ND	-----	0.37		2,3,4,7,8-PeCDF-13C	2.00	85
Total TCDD	1.2	-----	0.37		1,2,3,7,8-PeCDD-13C	2.00	91
					1,2,3,4,7,8-HxCDF-13C	2.00	129
1,2,3,7,8-PeCDF	0.88	-----	0.86	J	1,2,3,6,7,8-HxCDF-13C	2.00	114
2,3,4,7,8-PeCDF	1.5	-----	0.55	J	2,3,4,6,7,8-HxCDF-13C	2.00	124
Total PeCDF	23	-----	0.55		1,2,3,7,8,9-HxCDF-13C	2.00	59
					1,2,3,4,7,8-HxCDD-13C	2.00	132
1,2,3,7,8-PeCDD	0.70	-----	0.49	J	1,2,3,6,7,8-HxCDD-13C	2.00	104
Total PeCDD	5.1	-----	0.49		1,2,3,4,6,7,8-HpCDF-13C	2.00	117
					1,2,3,4,7,8,9-HpCDF-13C	2.00	131
1,2,3,4,7,8-HxCDF	-----	1.2	0.76	IJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	134
1,2,3,6,7,8-HxCDF	1.5	-----	0.43	J	OCDD-13C	4.00	124
2,3,4,6,7,8-HxCDF	1.5	-----	0.47	J			
1,2,3,7,8,9-HxCDF	ND	-----	0.47		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	26	-----	0.43		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.4	-----	0.44	J	2,3,7,8-TCDD-37Cl4	0.20	75
1,2,3,6,7,8-HxCDD	4.2	-----	0.37	J			
1,2,3,7,8,9-HxCDD	-----	0.91	0.41	IJ			
Total HxCDD	44	-----	0.37				
1,2,3,4,6,7,8-HpCDF	20	-----	0.43		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	0.88	0.22	IJ	Equivalence: 3.7 ng/Kg		
Total HpCDF	43	-----	0.22		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	100	-----	0.26				
Total HpCDD	230	-----	0.26				
OCDF	34	-----	0.45				
OCDD	610	-----	0.47				

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

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N5-2A		
Lab Sample ID	10487441010		
Filename	U190830B_12		
Injected By	SMT		
Total Amount Extracted	12.4 g	Matrix	Solid
% Moisture	16.9	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	08/13/2019 11:05
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 18:11

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.76		2,3,7,8-TCDF-13C	2.00	79
Total TCDF	3.9	-----	0.76		2,3,7,8-TCDD-13C	2.00	79
					1,2,3,7,8-PeCDF-13C	2.00	77
2,3,7,8-TCDD	ND	-----	0.50		2,3,4,7,8-PeCDF-13C	2.00	78
Total TCDD	0.67	-----	0.50	J	1,2,3,7,8-PeCDD-13C	2.00	82
					1,2,3,4,7,8-HxCDF-13C	2.00	113
1,2,3,7,8-PeCDF	-----	1.2	0.68	IJ	1,2,3,6,7,8-HxCDF-13C	2.00	99
2,3,4,7,8-PeCDF	1.8	-----	0.58	J	2,3,4,6,7,8-HxCDF-13C	2.00	106
Total PeCDF	24	-----	0.58		1,2,3,7,8,9-HxCDF-13C	2.00	50
					1,2,3,4,7,8-HxCDD-13C	2.00	115
1,2,3,7,8-PeCDD	0.94	-----	0.43	J	1,2,3,6,7,8-HxCDD-13C	2.00	86
Total PeCDD	6.3	-----	0.43		1,2,3,4,6,7,8-HpCDF-13C	2.00	93
					1,2,3,4,7,8,9-HpCDF-13C	2.00	107
1,2,3,4,7,8-HxCDF	2.8	-----	0.73	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	109
1,2,3,6,7,8-HxCDF	-----	1.7	0.61	IJ	OCDD-13C	4.00	90
2,3,4,6,7,8-HxCDF	-----	0.98	0.77	IJ			
1,2,3,7,8,9-HxCDF	-----	0.72	0.37	IJ	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	49	-----	0.37		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.9	-----	0.31	J	2,3,7,8-TCDD-37Cl4	0.20	75
1,2,3,6,7,8-HxCDD	-----	3.6	0.24	IJ			
1,2,3,7,8,9-HxCDD	3.0	-----	0.44	J			
Total HxCDD	31	-----	0.24				
1,2,3,4,6,7,8-HpCDF	27	-----	0.44		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	1.5	0.54	IJ	Equivalence: 4.3 ng/Kg		
Total HpCDF	68	-----	0.44		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	76	-----	0.46				
Total HpCDD	140	-----	0.46				
OCDF	65	-----	0.32				
OCDD	660	-----	0.61				

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 Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N5-1A		
Lab Sample ID	10487441011		
Filename	U190830B_13		
Injected By	SMT		
Total Amount Extracted	11.5 g	Matrix	Solid
% Moisture	12.7	Dilution	NA
Dry Weight Extracted	10.0 g	Collected	08/13/2019 11:15
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 18:54

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery	
2,3,7,8-TCDF	ND	-----	0.54		2,3,7,8-TCDF-13C	2.00	100	
Total TCDF	2.7	-----	0.54		2,3,7,8-TCDD-13C	2.00	100	
					1,2,3,7,8-PeCDF-13C	2.00	96	
2,3,7,8-TCDD	ND	-----	0.52		2,3,4,7,8-PeCDF-13C	2.00	98	
Total TCDD	1.2	-----	0.52		1,2,3,7,8-PeCDD-13C	2.00	106	
					1,2,3,4,7,8-HxCDF-13C	2.00	80	DN2
1,2,3,7,8-PeCDF	ND	-----	0.46		1,2,3,6,7,8-HxCDF-13C	2.00	78	DN2
2,3,4,7,8-PeCDF	1.6	-----	0.29	J	2,3,4,6,7,8-HxCDF-13C	2.00	74	DN2
Total PeCDF	21	-----	0.29		1,2,3,7,8,9-HxCDF-13C	2.00	76	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	86	DN2
1,2,3,7,8-PeCDD	-----	0.46	0.30	IJ	1,2,3,6,7,8-HxCDD-13C	2.00	73	DN2
Total PeCDD	ND	-----	0.30		1,2,3,4,6,7,8-HpCDF-13C	2.00	67	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	68	DN2
1,2,3,4,7,8-HxCDF	1.1	-----	0.28	JDN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	75	DN2
1,2,3,6,7,8-HxCDF	1.1	-----	0.27	JDN2	OCDD-13C	4.00	51	DN2
2,3,4,6,7,8-HxCDF	0.62	-----	0.33	JDN2				
1,2,3,7,8,9-HxCDF	0.43	-----	0.30	JDN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	23	-----	0.27	JDN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	0.77	-----	0.24	BJDN2	2,3,7,8-TCDD-37Cl4	0.20	95	
1,2,3,6,7,8-HxCDD	-----	1.7	0.30	IJDN2				
1,2,3,7,8,9-HxCDD	-----	1.3	0.29	IJDN2				
Total HxCDD	8.3	-----	0.24	JDN2				
1,2,3,4,6,7,8-HpCDF	11	-----	0.49	JDN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	-----	0.80	0.50	IJDN2	Equivalence: 2.2 ng/Kg			
Total HpCDF	11	-----	0.49	JDN2	(Lower-bound - Using 2005 WHO Factors)			
1,2,3,4,6,7,8-HpCDD	37	-----	0.24	DN2				
Total HpCDD	81	-----	0.24	DN2				
OCDF	25	-----	0.54	JDN2				
OCDD	340	-----	0.93	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
B = Less than 10x higher than method blank level
I = Interference present
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N5-3		
Lab Sample ID	10487441012		
Filename	U190830B_14		
Injected By	SMT		
Total Amount Extracted	11.8 g	Matrix	Solid
% Moisture	13.6	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/13/2019 11:25
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 19:38

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery	
2,3,7,8-TCDF	ND	-----	0.99		2,3,7,8-TCDF-13C	2.00	80	
Total TCDF	1.4	-----	0.99		2,3,7,8-TCDD-13C	2.00	82	
					1,2,3,7,8-PeCDF-13C	2.00	75	
2,3,7,8-TCDD	ND	-----	0.97		2,3,4,7,8-PeCDF-13C	2.00	74	
Total TCDD	ND	-----	0.97		1,2,3,7,8-PeCDD-13C	2.00	80	
					1,2,3,4,7,8-HxCDF-13C	2.00	95	DN2
1,2,3,7,8-PeCDF	ND	-----	0.48		1,2,3,6,7,8-HxCDF-13C	2.00	85	DN2
2,3,4,7,8-PeCDF	1.1	-----	0.86	J	2,3,4,6,7,8-HxCDF-13C	2.00	79	DN2
Total PeCDF	12	-----	0.48		1,2,3,7,8,9-HxCDF-13C	2.00	43	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	94	DN2
1,2,3,7,8-PeCDD	2.4	-----	0.88	J	1,2,3,6,7,8-HxCDD-13C	2.00	79	DN2
Total PeCDD	10	-----	0.88		1,2,3,4,6,7,8-HpCDF-13C	2.00	65	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	66	DN2
1,2,3,4,7,8-HxCDF	2.0	-----	0.42	JDN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	67	DN2
1,2,3,6,7,8-HxCDF	1.2	-----	0.41	JDN2	OCDD-13C	4.00	48	DN2
2,3,4,6,7,8-HxCDF	-----	0.78	0.40	IJDN2				
1,2,3,7,8,9-HxCDF	ND	-----	0.22	DN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	35	-----	0.22	DN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	2.5	-----	0.88	JDN2	2,3,7,8-TCDD-37Cl4	0.20	75	
1,2,3,6,7,8-HxCDD	5.1	-----	1.3	JDN2				
1,2,3,7,8,9-HxCDD	5.0	-----	0.89	JDN2				
Total HxCDD	35	-----	0.88	DN2				
1,2,3,4,6,7,8-HpCDF	23	-----	0.53	JDN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	-----	1.2	0.56	IJDN2	Equivalence: 6.1 ng/Kg			
Total HpCDF	58	-----	0.53	DN2	(Lower-bound - Using 2005 WHO Factors)			
1,2,3,4,6,7,8-HpCDD	100	-----	1.1	DN2				
Total HpCDD	230	-----	1.1	DN2				
OCDF	47	-----	1.2	JDN2				
OCDD	1200	-----	0.88	DN2				

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

ND = Not Detected
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Results reported on a dry weight basis and are valid to no more than 2 significant figures.
J = Estimated value
I = Interference present
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N5-4		
Lab Sample ID	10487441013		
Filename	U190830B_15		
Injected By	SMT		
Total Amount Extracted	12.1 g	Matrix	Solid
% Moisture	16.6	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 11:35
ICAL ID	U190730	Received	08/15/2019 08:40
CCal Filename(s)	U190830B_01	Extracted	08/27/2019 15:05
Method Blank ID	BLANK-72962	Analyzed	08/30/2019 20:21

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.30	-----	0.24	J	2,3,7,8-TCDF-13C	2.00	89
Total TCDF	7.0	-----	0.24		2,3,7,8-TCDD-13C	2.00	89
					1,2,3,7,8-PeCDF-13C	2.00	86
2,3,7,8-TCDD	ND	-----	0.42		2,3,4,7,8-PeCDF-13C	2.00	89
Total TCDD	0.61	-----	0.42	J	1,2,3,7,8-PeCDD-13C	2.00	94
					1,2,3,4,7,8-HxCDF-13C	2.00	125
1,2,3,7,8-PeCDF	1.2	-----	0.32	J	1,2,3,6,7,8-HxCDF-13C	2.00	108
2,3,4,7,8-PeCDF	2.7	-----	0.53	J	2,3,4,6,7,8-HxCDF-13C	2.00	114
Total PeCDF	31	-----	0.32		1,2,3,7,8,9-HxCDF-13C	2.00	66
					1,2,3,4,7,8-HxCDD-13C	2.00	120
1,2,3,7,8-PeCDD	2.2	-----	0.34	J	1,2,3,6,7,8-HxCDD-13C	2.00	96
Total PeCDD	11	-----	0.34		1,2,3,4,6,7,8-HpCDF-13C	2.00	106
					1,2,3,4,7,8,9-HpCDF-13C	2.00	116
1,2,3,4,7,8-HxCDF	3.5	-----	0.19	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	120
1,2,3,6,7,8-HxCDF	2.4	-----	0.33	J	OCDD-13C	4.00	105
2,3,4,6,7,8-HxCDF	3.3	-----	0.12	J			
1,2,3,7,8,9-HxCDF	2.5	-----	0.16	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	110	-----	0.12		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	3.6	-----	0.34	J	2,3,7,8-TCDD-37Cl4	0.20	79
1,2,3,6,7,8-HxCDD	38	-----	0.32				
1,2,3,7,8,9-HxCDD	5.1	-----	0.17				
Total HxCDD	140	-----	0.17				
1,2,3,4,6,7,8-HpCDF	55	-----	0.31		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	2.8	-----	0.27	J	Equivalence: 17 ng/Kg		
Total HpCDF	170	-----	0.27		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	580	-----	0.37				
Total HpCDD	960	-----	0.37				
OCDF	230	-----	0.30				
OCDD	4200	-----	0.23	E			

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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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N3-4		
Lab Sample ID	10487441014		
Filename	Y190830A_10		
Injected By	ZMS		
Total Amount Extracted	11.8 g	Matrix	Solid
% Moisture	14.5	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 12:50
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 15:46

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.15		2,3,7,8-TCDF-13C	2.00	82
Total TCDF	0.61	-----	0.15	J	2,3,7,8-TCDD-13C	2.00	77
					1,2,3,7,8-PeCDF-13C	2.00	70
2,3,7,8-TCDD	ND	-----	0.14		2,3,4,7,8-PeCDF-13C	2.00	68
Total TCDD	0.55	-----	0.14	J	1,2,3,7,8-PeCDD-13C	2.00	69
					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	82
2,3,4,7,8-PeCDF	ND	-----	0.12		2,3,4,6,7,8-HxCDF-13C	2.00	84
Total PeCDF	1.5	-----	0.12	J	1,2,3,7,8,9-HxCDF-13C	2.00	78
					1,2,3,4,7,8-HxCDD-13C	2.00	79
1,2,3,7,8-PeCDD	ND	-----	0.26		1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD	0.50	-----	0.26	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	70
					1,2,3,4,7,8,9-HpCDF-13C	2.00	70
1,2,3,4,7,8-HxCDF	0.22	-----	0.18	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	69
1,2,3,6,7,8-HxCDF	-----	0.21	0.16	IJ	OCDD-13C	4.00	57
2,3,4,6,7,8-HxCDF	0.22	-----	0.13	J			
1,2,3,7,8,9-HxCDF	ND	-----	0.15		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	1.9	-----	0.13	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.29		2,3,7,8-TCDD-37Cl4	0.20	82
1,2,3,6,7,8-HxCDD	-----	0.44	0.30	IJ			
1,2,3,7,8,9-HxCDD	ND	-----	0.32				
Total HxCDD	3.0	-----	0.29	J			
1,2,3,4,6,7,8-HpCDF	2.7	-----	0.43	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.36		Equivalence: 0.27 ng/Kg		
Total HpCDF	7.0	-----	0.36		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	11	-----	0.14				
Total HpCDD	21	-----	0.14				
OCDF	6.6	-----	0.44	J			
OCDD	90	-----	0.32				

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I = Interference present

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N3-3		
Lab Sample ID	10487441015		
Filename	Y190830A_11		
Injected By	ZMS		
Total Amount Extracted	11.9 g	Matrix	Solid
% Moisture	12.9	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	08/13/2019 13:00
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 16:31

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.15	-----	0.10	J	2,3,7,8-TCDF-13C	2.00	84
Total TCDF	3.1	-----	0.10		2,3,7,8-TCDD-13C	2.00	80
					1,2,3,7,8-PeCDF-13C	2.00	80
2,3,7,8-TCDD	ND	-----	0.098		2,3,4,7,8-PeCDF-13C	2.00	85
Total TCDD	0.36	-----	0.098	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	0.14	-----	0.080	J	1,2,3,6,7,8-HxCDF-13C	2.00	81
2,3,4,7,8-PeCDF	0.35	-----	0.094	J	2,3,4,6,7,8-HxCDF-13C	2.00	82
Total PeCDF	6.4	-----	0.080		1,2,3,7,8,9-HxCDF-13C	2.00	64
					1,2,3,4,7,8-HxCDD-13C	2.00	83
1,2,3,7,8-PeCDD	0.16	-----	0.16	J	1,2,3,6,7,8-HxCDD-13C	2.00	67
Total PeCDD	0.96	-----	0.16	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	68
					1,2,3,4,7,8,9-HpCDF-13C	2.00	69
1,2,3,4,7,8-HxCDF	0.29	-----	0.16	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	67
1,2,3,6,7,8-HxCDF	-----	0.33	0.11	IJ	OCDD-13C	4.00	62
2,3,4,6,7,8-HxCDF	-----	0.23	0.15	IJ			
1,2,3,7,8,9-HxCDF	ND	-----	0.075		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	6.4	-----	0.075		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.19	-----	0.091	J	2,3,7,8-TCDD-37Cl4	0.20	82
1,2,3,6,7,8-HxCDD	0.73	-----	0.077	J			
1,2,3,7,8,9-HxCDD	0.40	-----	0.075	J			
Total HxCDD	6.1	-----	0.075				
1,2,3,4,6,7,8-HpCDF	6.1	-----	0.12		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	0.29	-----	0.10	J	Equivalence: 0.74 ng/Kg		
Total HpCDF	13	-----	0.10		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	14	-----	0.076				
Total HpCDD	28	-----	0.076				
OCDF	9.6	-----	0.24	J			
OCDD	110	-----	0.39				

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REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N3-2		
Lab Sample ID	10487441016		
Filename	Y190830A_12		
Injected By	ZMS		
Total Amount Extracted	11.3 g	Matrix	Solid
% Moisture	9.6	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/13/2019 13:10
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 17:17

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	-----	0.30	0.075	IJ	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	11	-----	0.075		2,3,7,8-TCDD-13C	2.00	72
					1,2,3,7,8-PeCDF-13C	2.00	75
2,3,7,8-TCDD	ND	-----	0.13		2,3,4,7,8-PeCDF-13C	2.00	76
Total TCDD	8.7	-----	0.13		1,2,3,7,8-PeCDD-13C	2.00	77
					1,2,3,4,7,8-HxCDF-13C	2.00	77
1,2,3,7,8-PeCDF	0.77	-----	0.25	J	1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	1.2	-----	0.18	J	2,3,4,6,7,8-HxCDF-13C	2.00	76
Total PeCDF	23	-----	0.18		1,2,3,7,8,9-HxCDF-13C	2.00	76
					1,2,3,4,7,8-HxCDD-13C	2.00	72
1,2,3,7,8-PeCDD	0.46	-----	0.34	J	1,2,3,6,7,8-HxCDD-13C	2.00	67
Total PeCDD	21	-----	0.34		1,2,3,4,6,7,8-HpCDF-13C	2.00	67
					1,2,3,4,7,8,9-HpCDF-13C	2.00	68
1,2,3,4,7,8-HxCDF	3.2	-----	0.15	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	67
1,2,3,6,7,8-HxCDF	2.4	-----	0.11	J	OCDD-13C	4.00	64
2,3,4,6,7,8-HxCDF	3.6	-----	0.14	J			
1,2,3,7,8,9-HxCDF	-----	0.98	0.095	IJ	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	34	-----	0.095		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.85	-----	0.26	J	2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	2.9	-----	0.32	J			
1,2,3,7,8,9-HxCDD	-----	1.6	0.39	IJ			
Total HxCDD	47	-----	0.26				
1,2,3,4,6,7,8-HpCDF	26	-----	0.17		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	2.4	-----	0.37	J	Equivalence: 3.2 ng/Kg		
Total HpCDF	47	-----	0.17		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	39	-----	0.43				
Total HpCDD	79	-----	0.43				
OCDF	34	-----	0.56				
OCDD	220	-----	0.94				

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N3-1		
Lab Sample ID	10487441017		
Filename	Y190830A_13		
Injected By	ZMS		
Total Amount Extracted	10.9 g	Matrix	Solid
% Moisture	8.0	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 13:20
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 18:03

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.45	-----	0.054	J	2,3,7,8-TCDF-13C	2.00	80
Total TCDF	15	-----	0.054		2,3,7,8-TCDD-13C	2.00	77
					1,2,3,7,8-PeCDF-13C	2.00	79
2,3,7,8-TCDD	ND	-----	0.13		2,3,4,7,8-PeCDF-13C	2.00	80
Total TCDD	15	-----	0.13		1,2,3,7,8-PeCDD-13C	2.00	82
					1,2,3,4,7,8-HxCDF-13C	2.00	74
1,2,3,7,8-PeCDF	1.2	-----	0.14	J	1,2,3,6,7,8-HxCDF-13C	2.00	77
2,3,4,7,8-PeCDF	2.2	-----	0.18	J	2,3,4,6,7,8-HxCDF-13C	2.00	76
Total PeCDF	36	-----	0.14		1,2,3,7,8,9-HxCDF-13C	2.00	66
					1,2,3,4,7,8-HxCDD-13C	2.00	76
1,2,3,7,8-PeCDD	0.83	-----	0.20	J	1,2,3,6,7,8-HxCDD-13C	2.00	65
Total PeCDD	38	-----	0.20		1,2,3,4,6,7,8-HpCDF-13C	2.00	65
					1,2,3,4,7,8,9-HpCDF-13C	2.00	66
1,2,3,4,7,8-HxCDF	5.3	-----	0.23		1,2,3,4,6,7,8-HpCDD-13C	2.00	64
1,2,3,6,7,8-HxCDF	4.3	-----	0.23	J	OCDD-13C	4.00	73
2,3,4,6,7,8-HxCDF	6.1	-----	0.18				
1,2,3,7,8,9-HxCDF	1.9	-----	0.096	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	59	-----	0.096		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	-----	1.2	0.51	IJ	2,3,7,8-TCDD-37Cl4	0.20	79
1,2,3,6,7,8-HxCDD	4.4	-----	0.34	J			
1,2,3,7,8,9-HxCDD	3.0	-----	0.091	J			
Total HxCDD	77	-----	0.091				
1,2,3,4,6,7,8-HpCDF	44	-----	0.12		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	3.8	-----	0.51	J	Equivalence: 5.4 ng/Kg		
Total HpCDF	76	-----	0.12		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	58	-----	0.10				
Total HpCDD	120	-----	0.10				
OCDF	50	-----	0.21				
OCDD	320	-----	0.44				

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N1-2		
Lab Sample ID	10487441018		
Filename	Y190830A_14		
Injected By	ZMS		
Total Amount Extracted	11.8 g	Matrix	Solid
% Moisture	12.8	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	08/13/2019 13:40
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 18:48

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.9	-----	0.46	C	2,3,7,8-TCDF-13C	2.00	74
Total TCDF	58	-----	0.12		2,3,7,8-TCDD-13C	2.00	71
					1,2,3,7,8-PeCDF-13C	2.00	75
2,3,7,8-TCDD	0.26	-----	0.13	J	2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	7.8	-----	0.13		1,2,3,7,8-PeCDD-13C	2.00	79
					1,2,3,4,7,8-HxCDF-13C	2.00	74
1,2,3,7,8-PeCDF	0.95	-----	0.15	J	1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	12	-----	0.18		2,3,4,6,7,8-HxCDF-13C	2.00	76
Total PeCDF	180	-----	0.15		1,2,3,7,8,9-HxCDF-13C	2.00	69
					1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	-----	1.0	0.30	IJ	1,2,3,6,7,8-HxCDD-13C	2.00	64
Total PeCDD	15	-----	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	68
1,2,3,4,7,8-HxCDF	4.0	-----	0.19	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	65
1,2,3,6,7,8-HxCDF	5.5	-----	0.16		OCDD-13C	4.00	61
2,3,4,6,7,8-HxCDF	2.6	-----	0.12	J			
1,2,3,7,8,9-HxCDF	1.5	-----	0.11	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	110	-----	0.11		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.4	-----	0.32	J	2,3,7,8-TCDD-37Cl4	0.20	75
1,2,3,6,7,8-HxCDD	6.6	-----	0.13				
1,2,3,7,8,9-HxCDD	2.8	-----	0.098	J			
Total HxCDD	61	-----	0.098				
1,2,3,4,6,7,8-HpCDF	60	-----	0.071		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	2.0	-----	0.12	J	Equivalence: 10 ng/Kg		
Total HpCDF	140	-----	0.071		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	180	-----	0.11				
Total HpCDD	340	-----	0.11				
OCDF	85	-----	0.24				
OCDD	1800	-----	0.12				

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
C = Result obtained from confirmation analysis

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N1-3		
Lab Sample ID	10487441019		
Filename	Y190830A_15		
Injected By	ZMS		
Total Amount Extracted	11.6 g	Matrix	Solid
% Moisture	9.7	Dilution	NA
Dry Weight Extracted	10.4 g	Collected	08/13/2019 14:25
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_02	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/30/2019 19:34

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	0.093	IJ	2,3,7,8-TCDF-13C	2.00	67
Total TCDF	1.3	-----	0.093		2,3,7,8-TCDD-13C	2.00	65
					1,2,3,7,8-PeCDF-13C	2.00	69
2,3,7,8-TCDD	ND	-----	0.12		2,3,4,7,8-PeCDF-13C	2.00	68
Total TCDD	0.90	-----	0.12	J	1,2,3,7,8-PeCDD-13C	2.00	72
					1,2,3,4,7,8-HxCDF-13C	2.00	72
1,2,3,7,8-PeCDF	0.10	-----	0.077	J	1,2,3,6,7,8-HxCDF-13C	2.00	63
2,3,4,7,8-PeCDF	0.38	-----	0.091	J	2,3,4,6,7,8-HxCDF-13C	2.00	64
Total PeCDF	6.2	-----	0.077		1,2,3,7,8,9-HxCDF-13C	2.00	54
					1,2,3,4,7,8-HxCDD-13C	2.00	67
1,2,3,7,8-PeCDD	0.23	-----	0.19	J	1,2,3,6,7,8-HxCDD-13C	2.00	54
Total PeCDD	1.4	-----	0.19	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	57
					1,2,3,4,7,8,9-HpCDF-13C	2.00	56
1,2,3,4,7,8-HxCDF	0.32	-----	0.11	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	56
1,2,3,6,7,8-HxCDF	0.26	-----	0.11	J	OCDD-13C	4.00	44
2,3,4,6,7,8-HxCDF	0.34	-----	0.063	J			
1,2,3,7,8,9-HxCDF	ND	-----	0.041		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	7.9	-----	0.041		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.43	-----	0.11	J	2,3,7,8-TCDD-37Cl4	0.20	68
1,2,3,6,7,8-HxCDD	0.90	-----	0.12	J			
1,2,3,7,8,9-HxCDD	0.71	-----	0.066	J			
Total HxCDD	9.2	-----	0.066				
1,2,3,4,6,7,8-HpCDF	6.5	-----	0.14		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	0.33	0.082	IJ	Equivalence: 0.99 ng/Kg		
Total HpCDF	14	-----	0.082		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	20	-----	0.15				
Total HpCDD	42	-----	0.15				
OCDF	18	-----	0.20				
OCDD	190	-----	0.15				

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

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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 Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N1-1		
Lab Sample ID	10487441020		
Filename	F190831A_03		
Injected By	JRH		
Total Amount Extracted	12.0 g	Matrix	Solid
% Moisture	11.0	Dilution	NA
Dry Weight Extracted	10.6 g	Collected	08/13/2019 14:40
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 06:00

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.47		2,3,7,8-TCDF-13C	2.00	69
Total TCDF	5.3	-----	0.47		2,3,7,8-TCDD-13C	2.00	78
					1,2,3,7,8-PeCDF-13C	2.00	74
2,3,7,8-TCDD	ND	-----	0.22		2,3,4,7,8-PeCDF-13C	2.00	72
Total TCDD	3.9	-----	0.22		1,2,3,7,8-PeCDD-13C	2.00	83
					1,2,3,4,7,8-HxCDF-13C	2.00	66
1,2,3,7,8-PeCDF	0.35	-----	0.33	J	1,2,3,6,7,8-HxCDF-13C	2.00	71
2,3,4,7,8-PeCDF	0.80	-----	0.25	J	2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	14	-----	0.25		1,2,3,7,8,9-HxCDF-13C	2.00	72
					1,2,3,4,7,8-HxCDD-13C	2.00	65
1,2,3,7,8-PeCDD	0.51	-----	0.19	J	1,2,3,6,7,8-HxCDD-13C	2.00	69
Total PeCDD	4.4	-----	0.19	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	77
					1,2,3,4,7,8,9-HpCDF-13C	2.00	84
1,2,3,4,7,8-HxCDF	0.85	-----	0.22	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	93
1,2,3,6,7,8-HxCDF	0.94	-----	0.16	J	OCDD-13C	4.00	74
2,3,4,6,7,8-HxCDF	0.77	-----	0.17	J			
1,2,3,7,8,9-HxCDF	0.31	-----	0.14	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	15	-----	0.14		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.77	-----	0.43	J	2,3,7,8-TCDD-37Cl4	0.20	72
1,2,3,6,7,8-HxCDD	2.2	-----	0.29	J			
1,2,3,7,8,9-HxCDD	1.5	-----	0.21	J			
Total HxCDD	19	-----	0.21				
1,2,3,4,6,7,8-HpCDF	8.8	-----	0.41		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	0.59	-----	0.37	J	Equivalence: 2.3 ng/Kg		
Total HpCDF	27	-----	0.37		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	54	-----	0.11				
Total HpCDD	100	-----	0.11				
OCDF	27	-----	0.74				
OCDD	600	-----	0.30				

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

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N1-5		
Lab Sample ID	10487441021		
Filename	F190831A_04		
Injected By	JRH		
Total Amount Extracted	11.4 g	Matrix	Solid
% Moisture	11.3	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 14:45
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 06:46

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.31		2,3,7,8-TCDF-13C	2.00	75
Total TCDF	7.2	-----	0.31		2,3,7,8-TCDD-13C	2.00	87
					1,2,3,7,8-PeCDF-13C	2.00	79
2,3,7,8-TCDD	ND	-----	0.22		2,3,4,7,8-PeCDF-13C	2.00	79
Total TCDD	2.3	-----	0.22		1,2,3,7,8-PeCDD-13C	2.00	92
					1,2,3,4,7,8-HxCDF-13C	2.00	84
1,2,3,7,8-PeCDF	ND	-----	0.41		1,2,3,6,7,8-HxCDF-13C	2.00	83
2,3,4,7,8-PeCDF	-----	1.4	0.24	IJ	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	24	-----	0.24		1,2,3,7,8,9-HxCDF-13C	2.00	72
					1,2,3,4,7,8-HxCDD-13C	2.00	84
1,2,3,7,8-PeCDD	-----	0.62	0.28	IJ	1,2,3,6,7,8-HxCDD-13C	2.00	78
Total PeCDD	6.7	-----	0.28		1,2,3,4,6,7,8-HpCDF-13C	2.00	76
					1,2,3,4,7,8,9-HpCDF-13C	2.00	74
1,2,3,4,7,8-HxCDF	1.1	-----	0.20	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	88
1,2,3,6,7,8-HxCDF	-----	0.80	0.14	IJ	OCDD-13C	4.00	53
2,3,4,6,7,8-HxCDF	-----	0.58	0.15	IJ			
1,2,3,7,8,9-HxCDF	ND	-----	0.12		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	20	-----	0.12		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.3	-----	0.39	J	2,3,7,8-TCDD-37Cl4	0.20	83
1,2,3,6,7,8-HxCDD	2.5	-----	0.43	J			
1,2,3,7,8,9-HxCDD	2.3	-----	0.20	J			
Total HxCDD	31	-----	0.20				
1,2,3,4,6,7,8-HpCDF	11	-----	0.26		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	0.56	0.34	IJ	Equivalence: 2.9 ng/Kg		
Total HpCDF	26	-----	0.26		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	71	-----	0.66				
Total HpCDD	140	-----	0.66				
OCDF	28	-----	1.7				
OCDD	640	-----	0.41				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
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I = Interference present

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N1-4		
Lab Sample ID	10487441022		
Filename	F190831A_05		
Injected By	JRH		
Total Amount Extracted	11.5 g	Matrix	Solid
% Moisture	10.5	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	08/13/2019 15:00
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 07:32

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	-----	0.18	J	2,3,7,8-TCDF-13C	2.00	61
Total TCDF	4.2	-----	0.18		2,3,7,8-TCDD-13C	2.00	71
					1,2,3,7,8-PeCDF-13C	2.00	68
2,3,7,8-TCDD	ND	-----	0.21		2,3,4,7,8-PeCDF-13C	2.00	66
Total TCDD	2.8	-----	0.21		1,2,3,7,8-PeCDD-13C	2.00	78
					1,2,3,4,7,8-HxCDF-13C	2.00	66
1,2,3,7,8-PeCDF	ND	-----	0.31		1,2,3,6,7,8-HxCDF-13C	2.00	66
2,3,4,7,8-PeCDF	0.72	-----	0.20	J	2,3,4,6,7,8-HxCDF-13C	2.00	68
Total PeCDF	11	-----	0.20		1,2,3,7,8,9-HxCDF-13C	2.00	65
					1,2,3,4,7,8-HxCDD-13C	2.00	69
1,2,3,7,8-PeCDD	0.24	-----	0.24	J	1,2,3,6,7,8-HxCDD-13C	2.00	63
Total PeCDD	5.0	-----	0.24		1,2,3,4,6,7,8-HpCDF-13C	2.00	71
					1,2,3,4,7,8,9-HpCDF-13C	2.00	74
1,2,3,4,7,8-HxCDF	-----	0.71	0.33	IJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	85
1,2,3,6,7,8-HxCDF	0.79	-----	0.29	J	OCDD-13C	4.00	61
2,3,4,6,7,8-HxCDF	1.3	-----	0.26	J			
1,2,3,7,8,9-HxCDF	-----	0.32	0.26	IJ	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	10	-----	0.26		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.41	-----	0.25	J	2,3,7,8-TCDD-37Cl4	0.20	66
1,2,3,6,7,8-HxCDD	0.96	-----	0.42	J			
1,2,3,7,8,9-HxCDD	0.86	-----	0.42	J			
Total HxCDD	13	-----	0.25				
1,2,3,4,6,7,8-HpCDF	8.1	-----	0.23		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	0.66	-----	0.20	J	Equivalence: 1.3 ng/Kg		
Total HpCDF	16	-----	0.20		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	16	-----	0.23				
Total HpCDD	32	-----	0.23				
OCDF	17	-----	0.34				
OCDD	120	-----	0.60				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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J = Estimated value
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-10		
Lab Sample ID	10487441023		
Filename	F190831A_06		
Injected By	JRH		
Total Amount Extracted	13.1 g	Matrix	Solid
% Moisture	21.7	Dilution	NA
Dry Weight Extracted	10.3 g	Collected	08/13/2019 15:30
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 08:18

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.80	-----	0.39	J	2,3,7,8-TCDF-13C	2.00	54
Total TCDF	13	-----	0.39		2,3,7,8-TCDD-13C	2.00	63
					1,2,3,7,8-PeCDF-13C	2.00	56
2,3,7,8-TCDD	ND	-----	0.27		2,3,4,7,8-PeCDF-13C	2.00	58
Total TCDD	2.9	-----	0.27		1,2,3,7,8-PeCDD-13C	2.00	67
					1,2,3,4,7,8-HxCDF-13C	2.00	56
1,2,3,7,8-PeCDF	0.92	-----	0.62	J	1,2,3,6,7,8-HxCDF-13C	2.00	57
2,3,4,7,8-PeCDF	1.7	-----	0.27	J	2,3,4,6,7,8-HxCDF-13C	2.00	57
Total PeCDF	37	-----	0.27		1,2,3,7,8,9-HxCDF-13C	2.00	55
					1,2,3,4,7,8-HxCDD-13C	2.00	59
1,2,3,7,8-PeCDD	0.61	-----	0.31	J	1,2,3,6,7,8-HxCDD-13C	2.00	53
Total PeCDD	4.4	-----	0.31	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	61
					1,2,3,4,7,8,9-HpCDF-13C	2.00	64
1,2,3,4,7,8-HxCDF	2.1	-----	0.35	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	74
1,2,3,6,7,8-HxCDF	2.0	-----	0.21	J	OCDD-13C	4.00	54
2,3,4,6,7,8-HxCDF	1.2	-----	0.31	J			
1,2,3,7,8,9-HxCDF	0.43	-----	0.22	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	37	-----	0.21		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	-----	1.1	0.32	IJ	2,3,7,8-TCDD-37Cl4	0.20	58
1,2,3,6,7,8-HxCDD	3.0	-----	0.32	J			
1,2,3,7,8,9-HxCDD	1.9	-----	0.33	J			
Total HxCDD	26	-----	0.32				
1,2,3,4,6,7,8-HpCDF	25	-----	0.38		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	1.4	-----	0.43	J	Equivalence: 3.6 ng/Kg		
Total HpCDF	56	-----	0.38		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	70	-----	0.20				
Total HpCDD	140	-----	0.20				
OCDF	45	-----	0.26				
OCDD	570	-----	0.35				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-09		
Lab Sample ID	10487441024		
Filename	F190831A_07		
Injected By	JRH		
Total Amount Extracted	11.8 g	Matrix	Solid
% Moisture	11.3	Dilution	NA
Dry Weight Extracted	10.5 g	Collected	08/13/2019 15:45
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 09:04

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	1.6	-----	0.88	C	2,3,7,8-TCDF-13C	2.00	67
Total TCDF	53	-----	0.11		2,3,7,8-TCDD-13C	2.00	78
					1,2,3,7,8-PeCDF-13C	2.00	71
2,3,7,8-TCDD	0.24	-----	0.16	J	2,3,4,7,8-PeCDF-13C	2.00	69
Total TCDD	4.4	-----	0.16		1,2,3,7,8-PeCDD-13C	2.00	82
					1,2,3,4,7,8-HxCDF-13C	2.00	69
1,2,3,7,8-PeCDF	1.8	-----	0.22	J	1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	12	-----	0.28		2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	310	-----	0.22		1,2,3,7,8,9-HxCDF-13C	2.00	70
					1,2,3,4,7,8-HxCDD-13C	2.00	72
1,2,3,7,8-PeCDD	2.3	-----	0.50	J	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	14	-----	0.50		1,2,3,4,6,7,8-HpCDF-13C	2.00	68
					1,2,3,4,7,8,9-HpCDF-13C	2.00	66
1,2,3,4,7,8-HxCDF	7.3	-----	0.40		1,2,3,4,6,7,8-HpCDD-13C	2.00	81
1,2,3,6,7,8-HxCDF	5.0	-----	0.46		OCDD-13C	4.00	49
2,3,4,6,7,8-HxCDF	7.0	-----	0.32				
1,2,3,7,8,9-HxCDF	1.8	-----	0.34	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	250	-----	0.32		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	5.6	-----	0.43		2,3,7,8-TCDD-37Cl4	0.20	74
1,2,3,6,7,8-HxCDD	14	-----	0.23				
1,2,3,7,8,9-HxCDD	10	-----	0.23				
Total HxCDD	140	-----	0.23				
1,2,3,4,6,7,8-HpCDF	140	-----	0.89		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	6.4	-----	1.7		Equivalence: 18 ng/Kg		
Total HpCDF	250	-----	0.89		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	330	-----	0.16				
Total HpCDD	710	-----	0.16				
OCDF	220	-----	0.32				
OCDD	4000	-----	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
C = Result obtained from confirmation analysis

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-01		
Lab Sample ID	10487441025		
Filename	F190831A_08		
Injected By	JRH		
Total Amount Extracted	11.0 g	Matrix	Solid
% Moisture	8.7	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 16:00
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 09:50

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.26		2,3,7,8-TCDF-13C	2.00	66
Total TCDF	1.2	-----	0.26		2,3,7,8-TCDD-13C	2.00	76
					1,2,3,7,8-PeCDF-13C	2.00	72
2,3,7,8-TCDD	ND	-----	0.18		2,3,4,7,8-PeCDF-13C	2.00	70
Total TCDD	0.79	-----	0.18	J	1,2,3,7,8-PeCDD-13C	2.00	85
					1,2,3,4,7,8-HxCDF-13C	2.00	70
1,2,3,7,8-PeCDF	ND	-----	0.28		1,2,3,6,7,8-HxCDF-13C	2.00	68
2,3,4,7,8-PeCDF	0.39	-----	0.18	J	2,3,4,6,7,8-HxCDF-13C	2.00	68
Total PeCDF	3.8	-----	0.18	J	1,2,3,7,8,9-HxCDF-13C	2.00	59
					1,2,3,4,7,8-HxCDD-13C	2.00	77
1,2,3,7,8-PeCDD	-----	0.27	0.20	IJ	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	0.27	-----	0.20	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	72
					1,2,3,4,7,8,9-HpCDF-13C	2.00	73
1,2,3,4,7,8-HxCDF	0.53	-----	0.31	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	84
1,2,3,6,7,8-HxCDF	0.50	-----	0.31	J	OCDD-13C	4.00	59
2,3,4,6,7,8-HxCDF	0.61	-----	0.26	J			
1,2,3,7,8,9-HxCDF	0.28	-----	0.17	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	6.5	-----	0.17		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.38		2,3,7,8-TCDD-37Cl4	0.20	75
1,2,3,6,7,8-HxCDD	0.67	-----	0.41	J			
1,2,3,7,8,9-HxCDD	-----	0.68	0.38	IJ			
Total HxCDD	5.2	-----	0.38				
1,2,3,4,6,7,8-HpCDF	4.6	-----	0.32	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	0.47	-----	0.34	J	Equivalence: 0.93 ng/Kg		
Total HpCDF	11	-----	0.32		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	13	-----	0.21				
Total HpCDD	30	-----	0.21				
OCDF	13	-----	0.38				
OCDD	110	-----	0.29				

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

Pace Analytical Services, LLC
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-04		
Lab Sample ID	10487441026		
Filename	F190831A_09		
Injected By	JRH		
Total Amount Extracted	11.2 g	Matrix	Solid
% Moisture	10.0	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/13/2019 16:15
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 10:36

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.38		2,3,7,8-TCDF-13C	2.00	60
Total TCDF	3.0	-----	0.38		2,3,7,8-TCDD-13C	2.00	69
					1,2,3,7,8-PeCDF-13C	2.00	61
2,3,7,8-TCDD	ND	-----	0.21		2,3,4,7,8-PeCDF-13C	2.00	61
Total TCDD	0.63	-----	0.21	J	1,2,3,7,8-PeCDD-13C	2.00	72
					1,2,3,4,7,8-HxCDF-13C	2.00	61
1,2,3,7,8-PeCDF	ND	-----	0.46		1,2,3,6,7,8-HxCDF-13C	2.00	64
2,3,4,7,8-PeCDF	0.78	-----	0.27	J	2,3,4,6,7,8-HxCDF-13C	2.00	62
Total PeCDF	19	-----	0.27		1,2,3,7,8,9-HxCDF-13C	2.00	58
					1,2,3,4,7,8-HxCDD-13C	2.00	66
1,2,3,7,8-PeCDD	-----	0.34	0.23	IJ	1,2,3,6,7,8-HxCDD-13C	2.00	62
Total PeCDD	5.3	-----	0.23		1,2,3,4,6,7,8-HpCDF-13C	2.00	65
					1,2,3,4,7,8,9-HpCDF-13C	2.00	66
1,2,3,4,7,8-HxCDF	1.1	-----	0.60	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	78
1,2,3,6,7,8-HxCDF	1.2	-----	0.73	J	OCDD-13C	4.00	53
2,3,4,6,7,8-HxCDF	-----	1.1	0.58	IJ			
1,2,3,7,8,9-HxCDF	ND	-----	0.28		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	21	-----	0.28		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	2.0	-----	0.57	J	2,3,7,8-TCDD-37Cl4	0.20	64
1,2,3,6,7,8-HxCDD	3.0	-----	0.61	J			
1,2,3,7,8,9-HxCDD	2.4	-----	0.61	J			
Total HxCDD	74	-----	0.57				
1,2,3,4,6,7,8-HpCDF	19	-----	0.63		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	0.96	-----	0.79	J	Equivalence: 3.0 ng/Kg		
Total HpCDF	53	-----	0.63		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	99	-----	0.21				
Total HpCDD	410	-----	0.21				
OCDF	57	-----	0.67				
OCDD	580	-----	0.62				

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I = Interference present

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-05		
Lab Sample ID	10487441027		
Filename	F190831A_10		
Injected By	JRH		
Total Amount Extracted	12.1 g	Matrix	Solid
% Moisture	13.2	Dilution	NA
Dry Weight Extracted	10.5 g	Collected	08/13/2019 16:25
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 11:22

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.50	-----	0.21	J	2,3,7,8-TCDF-13C	2.00	60
Total TCDF	11	-----	0.21		2,3,7,8-TCDD-13C	2.00	71
					1,2,3,7,8-PeCDF-13C	2.00	60
2,3,7,8-TCDD	ND	-----	0.26		2,3,4,7,8-PeCDF-13C	2.00	59
Total TCDD	1.7	-----	0.26		1,2,3,7,8-PeCDD-13C	2.00	73
					1,2,3,4,7,8-HxCDF-13C	2.00	79
1,2,3,7,8-PeCDF	ND	-----	0.87		1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	1.7	-----	0.45	J	2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	46	-----	0.45		1,2,3,7,8,9-HxCDF-13C	2.00	59
					1,2,3,4,7,8-HxCDD-13C	2.00	76
1,2,3,7,8-PeCDD	1.1	-----	0.50	J	1,2,3,6,7,8-HxCDD-13C	2.00	57
Total PeCDD	11	-----	0.50		1,2,3,4,6,7,8-HpCDF-13C	2.00	53
					1,2,3,4,7,8,9-HpCDF-13C	2.00	47
1,2,3,4,7,8-HxCDF	2.8	-----	0.37	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	59
1,2,3,6,7,8-HxCDF	2.5	-----	0.32	J	OCDD-13C	4.00	31
2,3,4,6,7,8-HxCDF	3.0	-----	0.31	J			
1,2,3,7,8,9-HxCDF	ND	-----	0.45		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	66	-----	0.31		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.9	-----	0.68	J	2,3,7,8-TCDD-37Cl4	0.20	64
1,2,3,6,7,8-HxCDD	7.7	-----	0.52				
1,2,3,7,8,9-HxCDD	4.7	-----	0.67	J			
Total HxCDD	92	-----	0.52				
1,2,3,4,6,7,8-HpCDF	43	-----	0.90		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	2.2	-----	0.67	J	Equivalence: 6.6 ng/Kg		
Total HpCDF	92	-----	0.67		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	180	-----	0.30				
Total HpCDD	400	-----	0.30				
OCDF	95	-----	0.83				
OCDD	1400	-----	0.73				

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

Client's Sample ID	O-06		
Lab Sample ID	10487441028		
Filename	F190831A_11		
Injected By	JRH		
Total Amount Extracted	11.5 g	Matrix	Solid
% Moisture	11.8	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/14/2019 07:30
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 12:08

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.50		2,3,7,8-TCDF-13C	2.00	70
Total TCDF	6.3	-----	0.50		2,3,7,8-TCDD-13C	2.00	82
					1,2,3,7,8-PeCDF-13C	2.00	70
2,3,7,8-TCDD	ND	-----	0.22		2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	0.82	-----	0.22	J	1,2,3,7,8-PeCDD-13C	2.00	83
					1,2,3,4,7,8-HxCDF-13C	2.00	79
1,2,3,7,8-PeCDF	ND	-----	0.77		1,2,3,6,7,8-HxCDF-13C	2.00	82
2,3,4,7,8-PeCDF	1.0	-----	0.51	J	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	27	-----	0.51		1,2,3,7,8,9-HxCDF-13C	2.00	67
					1,2,3,4,7,8-HxCDD-13C	2.00	86
1,2,3,7,8-PeCDD	-----	0.38	0.31	IJ	1,2,3,6,7,8-HxCDD-13C	2.00	75
Total PeCDD	3.0	-----	0.31	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	72
					1,2,3,4,7,8,9-HpCDF-13C	2.00	70
1,2,3,4,7,8-HxCDF	2.3	-----	0.54	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	86
1,2,3,6,7,8-HxCDF	-----	2.3	0.52	PJ	OCDD-13C	4.00	54
2,3,4,6,7,8-HxCDF	-----	1.9	0.34	IJ			
1,2,3,7,8,9-HxCDF	ND	-----	0.40		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	40	-----	0.34		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.95	-----	0.66	J	2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	3.7	-----	0.68	J			
1,2,3,7,8,9-HxCDD	2.3	-----	0.32	J			
Total HxCDD	29	-----	0.32				
1,2,3,4,6,7,8-HpCDF	37	-----	0.38		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	1.7	0.33	IJ	Equivalence: 3.5 ng/Kg		
Total HpCDF	80	-----	0.33		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	83	-----	0.39				
Total HpCDD	160	-----	0.39				
OCDF	58	-----	0.99				
OCDD	680	-----	0.86				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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J = Estimated value
P = PCDE Interference
I = Interference present

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-08		
Lab Sample ID	10487441029		
Filename	F190831A_12		
Injected By	JRH		
Total Amount Extracted	11.3 g	Matrix	Solid
% Moisture	11.2	Dilution	NA
Dry Weight Extracted	10.0 g	Collected	08/14/2019 07:45
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-72988	Analyzed	08/31/2019 12:54

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.31		2,3,7,8-TCDF-13C	2.00	65
Total TCDF	1.7	-----	0.31		2,3,7,8-TCDD-13C	2.00	78
					1,2,3,7,8-PeCDF-13C	2.00	67
2,3,7,8-TCDD	ND	-----	0.20		2,3,4,7,8-PeCDF-13C	2.00	67
Total TCDD	0.81	-----	0.20	J	1,2,3,7,8-PeCDD-13C	2.00	79
					1,2,3,4,7,8-HxCDF-13C	2.00	75
1,2,3,7,8-PeCDF	ND	-----	0.42		1,2,3,6,7,8-HxCDF-13C	2.00	69
2,3,4,7,8-PeCDF	-----	0.42	0.26	IJ	2,3,4,6,7,8-HxCDF-13C	2.00	67
Total PeCDF	9.2	-----	0.26		1,2,3,7,8,9-HxCDF-13C	2.00	55
					1,2,3,4,7,8-HxCDD-13C	2.00	78
1,2,3,7,8-PeCDD	0.50	-----	0.21	J	1,2,3,6,7,8-HxCDD-13C	2.00	66
Total PeCDD	1.8	-----	0.21	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	73
					1,2,3,4,7,8,9-HpCDF-13C	2.00	70
1,2,3,4,7,8-HxCDF	-----	0.63	0.37	IJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	86
1,2,3,6,7,8-HxCDF	-----	0.97	0.33	PJ	OCDD-13C	4.00	54
2,3,4,6,7,8-HxCDF	0.62	-----	0.40	J			
1,2,3,7,8,9-HxCDF	ND	-----	0.14		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	14	-----	0.14		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	-----	0.78	0.26	IJ	2,3,7,8-TCDD-37Cl4	0.20	72
1,2,3,6,7,8-HxCDD	-----	1.3	0.24	IJ			
1,2,3,7,8,9-HxCDD	1.4	-----	0.40	J			
Total HxCDD	14	-----	0.24				
1,2,3,4,6,7,8-HpCDF	10	-----	0.21		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	0.67	-----	0.38	J	Equivalence: 1.7 ng/Kg		
Total HpCDF	27	-----	0.21		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	32	-----	0.15				
Total HpCDD	75	-----	0.15				
OCDF	22	-----	0.57				
OCDD	270	-----	0.50				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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P = PCDE Interference
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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-07		
Lab Sample ID	10487441030		
Filename	F190831A_13		
Injected By	JRH		
Total Amount Extracted	11.3 g	Matrix	Solid
% Moisture	9.8	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/14/2019 08:00
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 13:40

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.28		2,3,7,8-TCDF-13C	2.00	65
Total TCDF	0.61	-----	0.28	J	2,3,7,8-TCDD-13C	2.00	76
					1,2,3,7,8-PeCDF-13C	2.00	65
2,3,7,8-TCDD	ND	-----	0.14		2,3,4,7,8-PeCDF-13C	2.00	65
Total TCDD	0.36	-----	0.14	J	1,2,3,7,8-PeCDD-13C	2.00	78
					1,2,3,4,7,8-HxCDF-13C	2.00	69
1,2,3,7,8-PeCDF	ND	-----	0.38		1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	ND	-----	0.19		2,3,4,6,7,8-HxCDF-13C	2.00	72
Total PeCDF	2.1	-----	0.19	J	1,2,3,7,8,9-HxCDF-13C	2.00	69
					1,2,3,4,7,8-HxCDD-13C	2.00	73
1,2,3,7,8-PeCDD	ND	-----	0.16		1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD	ND	-----	0.16		1,2,3,4,6,7,8-HpCDF-13C	2.00	75
					1,2,3,4,7,8,9-HpCDF-13C	2.00	75
1,2,3,4,7,8-HxCDF	0.35	-----	0.29	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	88
1,2,3,6,7,8-HxCDF	-----	0.31	0.29	IJ	OCDD-13C	4.00	58
2,3,4,6,7,8-HxCDF	-----	0.28	0.25	IJ			
1,2,3,7,8,9-HxCDF	ND	-----	0.31		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	2.2	-----	0.25	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.31		2,3,7,8-TCDD-37Cl4	0.20	71
1,2,3,6,7,8-HxCDD	0.65	-----	0.42	J			
1,2,3,7,8,9-HxCDD	ND	-----	0.36				
Total HxCDD	2.5	-----	0.31	J			
1,2,3,4,6,7,8-HpCDF	4.2	-----	0.25	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.22		Equivalence: 0.37 ng/Kg		
Total HpCDF	9.6	-----	0.22		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	14	-----	0.19				
Total HpCDD	25	-----	0.19				
OCDF	8.4	-----	0.53	J			
OCDD	100	-----	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

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-03		
Lab Sample ID	10487441031		
Filename	F190831A_14		
Injected By	JRH		
Total Amount Extracted	11.1 g	Matrix	Solid
% Moisture	8.8	Dilution	NA
Dry Weight Extracted	10.1 g	Collected	08/14/2019 08:15
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 14:26

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.32		2,3,7,8-TCDF-13C	2.00	68
Total TCDF	16	-----	0.32		2,3,7,8-TCDD-13C	2.00	84
					1,2,3,7,8-PeCDF-13C	2.00	70
2,3,7,8-TCDD	ND	-----	0.22		2,3,4,7,8-PeCDF-13C	2.00	70
Total TCDD	3.2	-----	0.22		1,2,3,7,8-PeCDD-13C	2.00	83
					1,2,3,4,7,8-HxCDF-13C	2.00	71
1,2,3,7,8-PeCDF	ND	-----	0.72		1,2,3,6,7,8-HxCDF-13C	2.00	78
2,3,4,7,8-PeCDF	2.9	-----	0.25	J	2,3,4,6,7,8-HxCDF-13C	2.00	69
Total PeCDF	72	-----	0.25		1,2,3,7,8,9-HxCDF-13C	2.00	75
					1,2,3,4,7,8-HxCDD-13C	2.00	80
1,2,3,7,8-PeCDD	0.38	-----	0.23	J	1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	6.6	-----	0.23		1,2,3,4,6,7,8-HpCDF-13C	2.00	82
					1,2,3,4,7,8,9-HpCDF-13C	2.00	80
1,2,3,4,7,8-HxCDF	-----	1.0	0.27	IJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	100
1,2,3,6,7,8-HxCDF	0.70	-----	0.18	J	OCDD-13C	4.00	63
2,3,4,6,7,8-HxCDF	2.7	-----	0.17	J			
1,2,3,7,8,9-HxCDF	ND	-----	0.15		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	27	-----	0.15		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	-----	0.49	0.25	IJ	2,3,7,8-TCDD-37Cl4	0.20	78
1,2,3,6,7,8-HxCDD	1.7	-----	0.21	J			
1,2,3,7,8,9-HxCDD	1.1	-----	0.28	J			
Total HxCDD	24	-----	0.21				
1,2,3,4,6,7,8-HpCDF	15	-----	0.091		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	0.56	0.26	IJ	Equivalence: 2.6 ng/Kg		
Total HpCDF	31	-----	0.091		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	33	-----	0.053				
Total HpCDD	79	-----	0.053				
OCDF	25	-----	0.31				
OCDD	260	-----	0.30				

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

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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 Sample Analysis Results

Client - TRC-WI

Client's Sample ID	O-02		
Lab Sample ID	10487441032		
Filename	F190831A_15		
Injected By	JRH		
Total Amount Extracted	12.0 g	Matrix	Solid
% Moisture	11.1	Dilution	NA
Dry Weight Extracted	10.7 g	Collected	08/14/2019 08:25
ICAL ID	F190827	Received	08/15/2019 08:40
CCal Filename(s)	F190831A_01	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 15:12

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.27		2,3,7,8-TCDF-13C	2.00	66
Total TCDF	2.9	-----	0.27		2,3,7,8-TCDD-13C	2.00	79
					1,2,3,7,8-PeCDF-13C	2.00	65
2,3,7,8-TCDD	ND	-----	0.19		2,3,4,7,8-PeCDF-13C	2.00	64
Total TCDD	ND	-----	0.19		1,2,3,7,8-PeCDD-13C	2.00	76
					1,2,3,4,7,8-HxCDF-13C	2.00	72
1,2,3,7,8-PeCDF	ND	-----	0.35		1,2,3,6,7,8-HxCDF-13C	2.00	76
2,3,4,7,8-PeCDF	0.89	-----	0.16	J	2,3,4,6,7,8-HxCDF-13C	2.00	71
Total PeCDF	20	-----	0.16		1,2,3,7,8,9-HxCDF-13C	2.00	69
					1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	ND	-----	0.26		1,2,3,6,7,8-HxCDD-13C	2.00	74
Total PeCDD	0.69	-----	0.26	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	76
					1,2,3,4,7,8,9-HpCDF-13C	2.00	78
1,2,3,4,7,8-HxCDF	0.97	-----	0.28	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	93
1,2,3,6,7,8-HxCDF	-----	0.89	0.37	IJ	OCDD-13C	4.00	61
2,3,4,6,7,8-HxCDF	1.5	-----	0.31	J			
1,2,3,7,8,9-HxCDF	ND	-----	0.23		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	12	-----	0.23		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.45	-----	0.40	J	2,3,7,8-TCDD-37Cl4	0.20	72
1,2,3,6,7,8-HxCDD	1.2	-----	0.34	J			
1,2,3,7,8,9-HxCDD	1.2	-----	0.42	J			
Total HxCDD	12	-----	0.34				
1,2,3,4,6,7,8-HpCDF	9.6	-----	0.21		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	0.48	0.26	IJ	Equivalence: 1.3 ng/Kg		
Total HpCDF	19	-----	0.21		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	22	-----	0.100				
Total HpCDD	50	-----	0.100				
OCDF	17	-----	0.41				
OCDD	160	-----	0.23				

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 Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N4-3		
Lab Sample ID	10487441033		
Filename	Y190830B_11		
Injected By	JRH		
Total Amount Extracted	11.2 g	Matrix	Solid
% Moisture	8.9	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/14/2019 09:00
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_18	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 06:12

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery	
2,3,7,8-TCDF	2.4	-----	0.13		2,3,7,8-TCDF-13C	2.00	63	
Total TCDF	140	-----	0.13	E	2,3,7,8-TCDD-13C	2.00	66	
					1,2,3,7,8-PeCDF-13C	2.00	70	
2,3,7,8-TCDD	1.0	-----	0.15		2,3,4,7,8-PeCDF-13C	2.00	70	
Total TCDD	12	-----	0.15		1,2,3,7,8-PeCDD-13C	2.00	76	
					1,2,3,4,7,8-HxCDF-13C	2.00	88	DN2
1,2,3,7,8-PeCDF	3.4	-----	0.32	J	1,2,3,6,7,8-HxCDF-13C	2.00	83	DN2
2,3,4,7,8-PeCDF	61	-----	1.0		2,3,4,6,7,8-HxCDF-13C	2.00	81	DN2
Total PeCDF	760	-----	0.32		1,2,3,7,8,9-HxCDF-13C	2.00	41	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	90	DN2
1,2,3,7,8-PeCDD	5.9	-----	0.13		1,2,3,6,7,8-HxCDD-13C	2.00	74	DN2
Total PeCDD	33	-----	0.13		1,2,3,4,6,7,8-HpCDF-13C	2.00	70	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	79	DN2
1,2,3,4,7,8-HxCDF	-----	75	0.73	PDN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	81	DN2
1,2,3,6,7,8-HxCDF	-----	28	0.91	PDN2	OCDD-13C	4.00	84	DN2
2,3,4,6,7,8-HxCDF	30	-----	0.77	DN2				
1,2,3,7,8,9-HxCDF	6.1	-----	0.65	JDN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	1200	-----	0.65	DN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	9.0	-----	1.1	JDN2	2,3,7,8-TCDD-37Cl4	0.20	77	
1,2,3,6,7,8-HxCDD	44	-----	1.2	DN2				
1,2,3,7,8,9-HxCDD	15	-----	1.1	JDN2				
Total HxCDD	310	-----	1.1	DN2				
1,2,3,4,6,7,8-HpCDF	380	-----	0.72	DN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	20	-----	0.55	JDN2	Equivalence: 62 ng/Kg			
Total HpCDF	1100	-----	0.55	DN2	(Lower-bound - Using 2005 WHO Factors)			
1,2,3,4,6,7,8-HpCDD	930	-----	1.7	DN2				
Total HpCDD	1900	-----	1.7	DN2				
OCDF	620	-----	0.40	DN2				
OCDD	9200	-----	0.48	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
P = PCDE Interference
E = Exceeds calibration range
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N4-2				
Lab Sample ID	10487441034				
Filename	Y190830B_12				
Injected By	JRH				
Total Amount Extracted	11.5 g		Matrix	Solid	
% Moisture	12.0		Dilution	NA	
Dry Weight Extracted	10.1 g		Collected	08/14/2019	09:15
ICAL ID	Y190827		Received	08/15/2019	08:40
CCal Filename(s)	Y190830A_18		Extracted	08/28/2019	15:05
Method Blank ID	BLANK-73004		Analyzed	08/31/2019	06:58

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery	
2,3,7,8-TCDF	4.4	-----	0.98	C	2,3,7,8-TCDF-13C	2.00	81	
Total TCDF	99	-----	0.66		2,3,7,8-TCDD-13C	2.00	87	
					1,2,3,7,8-PeCDF-13C	2.00	89	
2,3,7,8-TCDD	0.85	-----	0.59	J	2,3,4,7,8-PeCDF-13C	2.00	99	
Total TCDD	18	-----	0.59		1,2,3,7,8-PeCDD-13C	2.00	104	
					1,2,3,4,7,8-HxCDF-13C	2.00	89	DN2
1,2,3,7,8-PeCDF	-----	270	0.85	P	1,2,3,6,7,8-HxCDF-13C	2.00	80	DN2
2,3,4,7,8-PeCDF	14	-----	0.56		2,3,4,6,7,8-HxCDF-13C	2.00	84	DN2
Total PeCDF	480	-----	0.56		1,2,3,7,8,9-HxCDF-13C	2.00	46	DN2
					1,2,3,4,7,8-HxCDD-13C	2.00	86	DN2
1,2,3,7,8-PeCDD	5.2	-----	0.51		1,2,3,6,7,8-HxCDD-13C	2.00	68	DN2
Total PeCDD	25	-----	0.51		1,2,3,4,6,7,8-HpCDF-13C	2.00	64	DN2
					1,2,3,4,7,8,9-HpCDF-13C	2.00	70	DN2
1,2,3,4,7,8-HxCDF	16	-----	0.68	JDN2	1,2,3,4,6,7,8-HpCDD-13C	2.00	70	DN2
1,2,3,6,7,8-HxCDF	20	-----	0.49	JDN2	OCDD-13C	4.00	74	DN2
2,3,4,6,7,8-HxCDF	16	-----	0.45	JDN2				
1,2,3,7,8,9-HxCDF	6.7	-----	0.91	JDN2	1,2,3,4-TCDD-13C	2.00	NA	
Total HxCDF	430	-----	0.45	DN2	1,2,3,7,8,9-HxCDD-13C	2.00	NA	
1,2,3,4,7,8-HxCDD	7.8	-----	0.71	JDN2	2,3,7,8-TCDD-37Cl4	0.20	101	
1,2,3,6,7,8-HxCDD	39	-----	0.61	DN2				
1,2,3,7,8,9-HxCDD	15	-----	0.70	JDN2				
Total HxCDD	260	-----	0.61	DN2				
1,2,3,4,6,7,8-HpCDF	250	-----	0.57	DN2	Total 2,3,7,8-TCDD			
1,2,3,4,7,8,9-HpCDF	14	-----	0.67	JDN2	Equivalence: 44 ng/Kg			
Total HpCDF	610	-----	0.57	DN2	(Lower-bound - Using 2005 WHO Factors)			
1,2,3,4,6,7,8-HpCDD	820	-----	1.3	DN2				
Total HpCDD	1600	-----	1.3	DN2				
OCDF	490	-----	0.53	DN2				
OCDD	7300	-----	0.57	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
P = PCDE Interference
D = Result obtained from analysis of diluted sample
Nn = Value obtained from additional analysis
C = Result obtained from confirmation analysis

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - TRC-WI

Client's Sample ID	N4-1		
Lab Sample ID	10487441035		
Filename	Y190830B_13		
Injected By	JRH		
Total Amount Extracted	11.5 g	Matrix	Solid
% Moisture	8.7	Dilution	NA
Dry Weight Extracted	10.5 g	Collected	08/14/2019 09:25
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_18	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 07:43

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	2.1	-----	0.31		2,3,7,8-TCDF-13C	2.00	84
Total TCDF	58	-----	0.31		2,3,7,8-TCDD-13C	2.00	82
					1,2,3,7,8-PeCDF-13C	2.00	84
2,3,7,8-TCDD	0.80	-----	0.37	J	2,3,4,7,8-PeCDF-13C	2.00	85
Total TCDD	11	-----	0.37		1,2,3,7,8-PeCDD-13C	2.00	92
					1,2,3,4,7,8-HxCDF-13C	2.00	97
1,2,3,7,8-PeCDF	2.1	-----	0.26	J	1,2,3,6,7,8-HxCDF-13C	2.00	93
2,3,4,7,8-PeCDF	11	-----	0.34		2,3,4,6,7,8-HxCDF-13C	2.00	90
Total PeCDF	180	-----	0.26		1,2,3,7,8,9-HxCDF-13C	2.00	61
					1,2,3,4,7,8-HxCDD-13C	2.00	86
1,2,3,7,8-PeCDD	2.5	-----	0.34	J	1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	22	-----	0.34		1,2,3,4,6,7,8-HpCDF-13C	2.00	52
					1,2,3,4,7,8,9-HpCDF-13C	2.00	43
1,2,3,4,7,8-HxCDF	8.2	-----	0.16		1,2,3,4,6,7,8-HpCDD-13C	2.00	48
1,2,3,6,7,8-HxCDF	8.0	-----	0.21		OCDD-13C	4.00	28
2,3,4,6,7,8-HxCDF	6.5	-----	0.13				
1,2,3,7,8,9-HxCDF	3.0	-----	0.11	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	200	-----	0.11		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	6.3	-----	0.38		2,3,7,8-TCDD-37Cl4	0.20	80
1,2,3,6,7,8-HxCDD	24	-----	0.14				
1,2,3,7,8,9-HxCDD	12	-----	0.12				
Total HxCDD	170	-----	0.12				
1,2,3,4,6,7,8-HpCDF	150	-----	0.39		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	9.4	-----	0.38		Equivalence: 22 ng/Kg		
Total HpCDF	380	-----	0.38		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	530	-----	0.31				
Total HpCDD	1000	-----	0.31				
OCDF	320	-----	0.68				
OCDD	5100	-----	0.91				

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 - TRC-WI

Client's Sample ID	N7-1		
Lab Sample ID	10487441036		
Filename	Y190830B_14		
Injected By	JRH		
Total Amount Extracted	11.1 g	Matrix	Solid
% Moisture	8.2	Dilution	NA
Dry Weight Extracted	10.2 g	Collected	08/14/2019 08:45
ICAL ID	Y190827	Received	08/15/2019 08:40
CCal Filename(s)	Y190830A_18	Extracted	08/28/2019 15:05
Method Blank ID	BLANK-73004	Analyzed	08/31/2019 08:29

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	-----	0.55	0.16	IJ	2,3,7,8-TCDF-13C	2.00	83
Total TCDF	21	-----	0.16		2,3,7,8-TCDD-13C	2.00	81
					1,2,3,7,8-PeCDF-13C	2.00	83
2,3,7,8-TCDD	0.26	-----	0.23	J	2,3,4,7,8-PeCDF-13C	2.00	85
Total TCDD	2.3	-----	0.23		1,2,3,7,8-PeCDD-13C	2.00	88
					1,2,3,4,7,8-HxCDF-13C	2.00	84
1,2,3,7,8-PeCDF	0.69	-----	0.11	J	1,2,3,6,7,8-HxCDF-13C	2.00	77
2,3,4,7,8-PeCDF	4.1	-----	0.15	J	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	50	-----	0.11		1,2,3,7,8,9-HxCDF-13C	2.00	50
					1,2,3,4,7,8-HxCDD-13C	2.00	82
1,2,3,7,8-PeCDD	0.91	-----	0.25	J	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	7.6	-----	0.25		1,2,3,4,6,7,8-HpCDF-13C	2.00	63
					1,2,3,4,7,8,9-HpCDF-13C	2.00	59
1,2,3,4,7,8-HxCDF	-----	3.6	0.12	PJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	58
1,2,3,6,7,8-HxCDF	2.7	-----	0.14	J	OCDD-13C	4.00	36
2,3,4,6,7,8-HxCDF	2.4	-----	0.12	J			
1,2,3,7,8,9-HxCDF	0.80	-----	0.100	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	87	-----	0.100		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	2.2	-----	0.077	J	2,3,7,8-TCDD-37Cl4	0.20	82
1,2,3,6,7,8-HxCDD	6.1	-----	0.078				
1,2,3,7,8,9-HxCDD	3.4	-----	0.077	J			
Total HxCDD	56	-----	0.077				
1,2,3,4,6,7,8-HpCDF	46	-----	0.14		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	2.3	-----	0.23	J	Equivalence: 7.0 ng/Kg		
Total HpCDF	100	-----	0.14		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	150	-----	0.10				
Total HpCDD	330	-----	0.10				
OCDF	71	-----	0.36				
OCDD	1300	-----	0.22				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
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P = PCDE Interference
I = Interference present

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Method 1613B Blank Analysis Results

Lab Sample Name	DFBLKWU		
Lab Sample ID	BLANK-72962	Matrix	Solid
Filename	F190829A_12	Dilution	NA
Total Amount Extracted	10.7 g	Extracted	08/27/2019 15:05
ICAL ID	F190827	Analyzed	08/29/2019 16:25
CCal Filename(s)	F190829A_01	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	-----	0.072		2,3,7,8-TCDF-13C	2.00	84
Total TCDF	ND	-----	0.072		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	-----	0.079		2,3,4,7,8-PeCDF-13C	2.00	82
Total TCDD	ND	-----	0.079		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	ND	-----	0.10		1,2,3,6,7,8-HxCDF-13C	2.00	87
2,3,4,7,8-PeCDF	ND	-----	0.061		2,3,4,6,7,8-HxCDF-13C	2.00	86
Total PeCDF	ND	-----	0.061		1,2,3,7,8,9-HxCDF-13C	2.00	86
					1,2,3,4,7,8-HxCDD-13C	2.00	68
1,2,3,7,8-PeCDD	ND	-----	0.10		1,2,3,6,7,8-HxCDD-13C	2.00	76
Total PeCDD	ND	-----	0.10		1,2,3,4,6,7,8-HpCDF-13C	2.00	76
					1,2,3,4,7,8,9-HpCDF-13C	2.00	72
1,2,3,4,7,8-HxCDF	ND	-----	0.079		1,2,3,4,6,7,8-HpCDD-13C	2.00	76
1,2,3,6,7,8-HxCDF	ND	-----	0.070		OCDD-13C	4.00	57
2,3,4,6,7,8-HxCDF	ND	-----	0.065				
1,2,3,7,8,9-HxCDF	ND	-----	0.060		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	0.060		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	0.093	-----	0.076	J	2,3,7,8-TCDD-37Cl4	0.20	76
1,2,3,6,7,8-HxCDD	ND	-----	0.086				
1,2,3,7,8,9-HxCDD	ND	-----	0.096				
Total HxCDD	0.093	-----	0.076	J			
1,2,3,4,6,7,8-HpCDF	ND	-----	0.084		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.097		Equivalence: 0.010 ng/Kg		
Total HpCDF	ND	-----	0.084		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	ND	-----	0.13				
Total HpCDD	0.28	-----	0.13	J			
OCDF	-----	0.27	0.15	IJ			
OCDD	2.3	-----	0.11	J			

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

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J = Estimated value
I = Interference present

REPORT OF LABORATORY ANALYSIS

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Method 1613B Blank Analysis Results

Lab Sample Name	DFBLKWZ		
Lab Sample ID	BLANK-72988	Matrix	Solid
Filename	F190830A_06	Dilution	NA
Total Amount Extracted	10.1 g	Extracted	08/28/2019 15:05
ICAL ID	F190827	Analyzed	08/30/2019 13:45
CCal Filename(s)	F190830A_03	Injected By	ZMS

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.065		2,3,7,8-TCDF-13C	2.00	91
Total TCDF	ND	-----	0.065		2,3,7,8-TCDD-13C	2.00	88
					1,2,3,7,8-PeCDF-13C	2.00	89
2,3,7,8-TCDD	ND	-----	0.10		2,3,4,7,8-PeCDF-13C	2.00	87
Total TCDD	0.13	-----	0.10	J	1,2,3,7,8-PeCDD-13C	2.00	89
					1,2,3,4,7,8-HxCDF-13C	2.00	92
1,2,3,7,8-PeCDF	ND	-----	0.14		1,2,3,6,7,8-HxCDF-13C	2.00	105
2,3,4,7,8-PeCDF	0.11	-----	0.089	J	2,3,4,6,7,8-HxCDF-13C	2.00	102
Total PeCDF	0.11	-----	0.089	J	1,2,3,7,8,9-HxCDF-13C	2.00	100
					1,2,3,4,7,8-HxCDD-13C	2.00	83
1,2,3,7,8-PeCDD	ND	-----	0.079		1,2,3,6,7,8-HxCDD-13C	2.00	84
Total PeCDD	ND	-----	0.079		1,2,3,4,6,7,8-HpCDF-13C	2.00	100
					1,2,3,4,7,8,9-HpCDF-13C	2.00	96
1,2,3,4,7,8-HxCDF	0.077	-----	0.066	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	98
1,2,3,6,7,8-HxCDF	0.076	-----	0.057	J	OCDD-13C	4.00	84
2,3,4,6,7,8-HxCDF	-----	0.059	0.054	IJ			
1,2,3,7,8,9-HxCDF	0.10	-----	0.076	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	0.25	-----	0.054	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	ND	-----	0.12				
1,2,3,7,8,9-HxCDD	ND	-----	0.15				
Total HxCDD	ND	-----	0.11				
1,2,3,4,6,7,8-HpCDF	-----	0.069	0.054	IJ	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	0.095	-----	0.067	J	Equivalence: 0.070 ng/Kg		
Total HpCDF	0.095	-----	0.054	J	(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	0.25	-----	0.12	J			
Total HpCDD	0.53	-----	0.12	J			
OCDF	0.20	-----	0.10	J			
OCDD	1.3	-----	0.17	J			

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J = Estimated value
I = Interference present

REPORT OF LABORATORY ANALYSIS

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Method 1613B Blank Analysis Results

Lab Sample Name	DFBLKXD		
Lab Sample ID	BLANK-73004	Matrix	Solid
Filename	F190830B_07	Dilution	NA
Total Amount Extracted	20.7 g	Extracted	08/28/2019 15:05
ICAL ID	F190827	Analyzed	08/30/2019 21:33
CCal Filename(s)	F190830A_09	Injected By	JRH

Native Isomers	Conc ng/Kg	EMPC ng/Kg	EDL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.048		2,3,7,8-TCDF-13C	2.00	65
Total TCDF	ND	-----	0.048		2,3,7,8-TCDD-13C	2.00	75
					1,2,3,7,8-PeCDF-13C	2.00	71
2,3,7,8-TCDD	ND	-----	0.054		2,3,4,7,8-PeCDF-13C	2.00	75
Total TCDD	ND	-----	0.054		1,2,3,7,8-PeCDD-13C	2.00	82
					1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	-----	0.079		1,2,3,6,7,8-HxCDF-13C	2.00	79
2,3,4,7,8-PeCDF	ND	-----	0.049		2,3,4,6,7,8-HxCDF-13C	2.00	77
Total PeCDF	ND	-----	0.049		1,2,3,7,8,9-HxCDF-13C	2.00	78
					1,2,3,4,7,8-HxCDD-13C	2.00	70
1,2,3,7,8-PeCDD	ND	-----	0.060		1,2,3,6,7,8-HxCDD-13C	2.00	69
Total PeCDD	ND	-----	0.060		1,2,3,4,6,7,8-HpCDF-13C	2.00	82
					1,2,3,4,7,8,9-HpCDF-13C	2.00	85
1,2,3,4,7,8-HxCDF	ND	-----	0.036		1,2,3,4,6,7,8-HpCDD-13C	2.00	90
1,2,3,6,7,8-HxCDF	ND	-----	0.033		OCDD-13C	4.00	79
2,3,4,6,7,8-HxCDF	ND	-----	0.039				
1,2,3,7,8,9-HxCDF	ND	-----	0.047		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	0.033		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.069		2,3,7,8-TCDD-37Cl4	0.20	72
1,2,3,6,7,8-HxCDD	ND	-----	0.074				
1,2,3,7,8,9-HxCDD	ND	-----	0.063				
Total HxCDD	ND	-----	0.063				
1,2,3,4,6,7,8-HpCDF	-----	0.026	0.026	IJ	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.029		Equivalence: 0.0015 ng/Kg		
Total HpCDF	0.052	-----	0.026	J	(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	0.098	-----	0.043	J			
Total HpCDD	0.098	-----	0.043	J			
OCDF	-----	0.098	0.063	IJ			
OCDD	0.62	-----	0.095	J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-72963		
Filename	F190829A_10	Matrix	Solid
Total Amount Extracted	10.8 g	Dilution	NA
ICAL ID	F190827	Extracted	08/27/2019 15:05
CCal Filename	F190829A_01	Analyzed	08/29/2019 14:53
Method Blank ID	BLANK-72962	Injected By	SMT

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	106
2,3,7,8-TCDD	10	11	6.7	15.8	106
1,2,3,7,8-PeCDF	50	52	40.0	67.0	104
2,3,4,7,8-PeCDF	50	52	34.0	80.0	105
1,2,3,7,8-PeCDD	50	46	35.0	71.0	92
1,2,3,4,7,8-HxCDF	50	55	36.0	67.0	110
1,2,3,6,7,8-HxCDF	50	52	42.0	65.0	104
2,3,4,6,7,8-HxCDF	50	52	35.0	78.0	105
1,2,3,7,8,9-HxCDF	50	50	39.0	65.0	100
1,2,3,4,7,8-HxCDD	50	54	35.0	82.0	108
1,2,3,6,7,8-HxCDD	50	54	38.0	67.0	109
1,2,3,7,8,9-HxCDD	50	57	32.0	81.0	113
1,2,3,4,6,7,8-HpCDF	50	53	41.0	61.0	106
1,2,3,4,7,8,9-HpCDF	50	47	39.0	69.0	94
1,2,3,4,6,7,8-HpCDD	50	48	35.0	70.0	97
OCDF	100	120	63.0	170.0	116
OCDD	100	110	78.0	144.0	107
2,3,7,8-TCDD-37Cl4	10	8.9	3.1	19.1	89
2,3,7,8-TCDF-13C	100	96	22.0	152.0	96
2,3,7,8-TCDD-13C	100	92	20.0	175.0	92
1,2,3,7,8-PeCDF-13C	100	90	21.0	192.0	90
2,3,4,7,8-PeCDF-13C	100	94	13.0	328.0	94
1,2,3,7,8-PeCDD-13C	100	93	21.0	227.0	93
1,2,3,4,7,8-HxCDF-13C	100	91	19.0	202.0	91
1,2,3,6,7,8-HxCDF-13C	100	110	21.0	159.0	105
2,3,4,6,7,8-HxCDF-13C	100	92	22.0	176.0	92
1,2,3,7,8,9-HxCDF-13C	100	94	17.0	205.0	94
1,2,3,4,7,8-HxCDD-13C	100	76	21.0	193.0	76
1,2,3,6,7,8-HxCDD-13C	100	84	25.0	163.0	84
1,2,3,4,6,7,8-HpCDF-13C	100	85	21.0	158.0	85
1,2,3,4,7,8,9-HpCDF-13C	100	86	20.0	186.0	86
1,2,3,4,6,7,8-HpCDD-13C	100	88	26.0	166.0	88
OCDD-13C	200	150	26.0	397.0	73

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	LCS-72989		
Filename	F190830A_04	Matrix	Solid
Total Amount Extracted	10.4 g	Dilution	NA
ICAL ID	F190827	Extracted	08/28/2019 15:05
CCal Filename	F190830A_03	Analyzed	08/30/2019 12:14
Method Blank ID	BLANK-72988	Injected By	ZMS

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	10	6.7	15.8	101
1,2,3,7,8-PeCDF	50	48	40.0	67.0	96
2,3,4,7,8-PeCDF	50	49	34.0	80.0	98
1,2,3,7,8-PeCDD	50	43	35.0	71.0	86
1,2,3,4,7,8-HxCDF	50	51	36.0	67.0	102
1,2,3,6,7,8-HxCDF	50	49	42.0	65.0	99
2,3,4,6,7,8-HxCDF	50	49	35.0	78.0	98
1,2,3,7,8,9-HxCDF	50	48	39.0	65.0	96
1,2,3,4,7,8-HxCDD	50	50	35.0	82.0	99
1,2,3,6,7,8-HxCDD	50	52	38.0	67.0	103
1,2,3,7,8,9-HxCDD	50	51	32.0	81.0	103
1,2,3,4,6,7,8-HpCDF	50	47	41.0	61.0	93
1,2,3,4,7,8,9-HpCDF	50	44	39.0	69.0	89
1,2,3,4,6,7,8-HpCDD	50	43	35.0	70.0	86
OCDF	100	100	63.0	170.0	102
OCDD	100	97	78.0	144.0	97
2,3,7,8-TCDD-37Cl4	10	7.9	3.1	19.1	79
2,3,7,8-TCDF-13C	100	90	22.0	152.0	90
2,3,7,8-TCDD-13C	100	90	20.0	175.0	90
1,2,3,7,8-PeCDF-13C	100	86	21.0	192.0	86
2,3,4,7,8-PeCDF-13C	100	87	13.0	328.0	87
1,2,3,7,8-PeCDD-13C	100	88	21.0	227.0	88
1,2,3,4,7,8-HxCDF-13C	100	92	19.0	202.0	92
1,2,3,6,7,8-HxCDF-13C	100	99	21.0	159.0	99
2,3,4,6,7,8-HxCDF-13C	100	96	22.0	176.0	96
1,2,3,7,8,9-HxCDF-13C	100	92	17.0	205.0	92
1,2,3,4,7,8-HxCDD-13C	100	83	21.0	193.0	83
1,2,3,6,7,8-HxCDD-13C	100	84	25.0	163.0	84
1,2,3,4,6,7,8-HpCDF-13C	100	95	21.0	158.0	95
1,2,3,4,7,8,9-HpCDF-13C	100	96	20.0	186.0	96
1,2,3,4,6,7,8-HpCDD-13C	100	97	26.0	166.0	97
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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Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-73005		
Filename	F190830B_03	Matrix	Solid
Total Amount Extracted	20.4 g	Dilution	NA
ICAL ID	F190827	Extracted	08/28/2019 15:05
CCal Filename	F190830A_09	Analyzed	08/30/2019 18:29
Method Blank ID	BLANK-73004	Injected By	JRH

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	10	7.5	15.8	103
2,3,7,8-TCDD	10	11	6.7	15.8	110
1,2,3,7,8-PeCDF	50	53	40.0	67.0	107
2,3,4,7,8-PeCDF	50	56	34.0	80.0	112
1,2,3,7,8-PeCDD	50	50	35.0	71.0	100
1,2,3,4,7,8-HxCDF	50	59	36.0	67.0	119
1,2,3,6,7,8-HxCDF	50	54	42.0	65.0	108
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	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	60	32.0	81.0	120
1,2,3,4,6,7,8-HpCDF	50	54	41.0	61.0	109
1,2,3,4,7,8,9-HpCDF	50	51	39.0	69.0	103
1,2,3,4,6,7,8-HpCDD	50	52	35.0	70.0	104
OCDF	100	110	63.0	170.0	115
OCDD	100	110	78.0	144.0	113
2,3,7,8-TCDD-37Cl4	10	8.7	3.1	19.1	87
2,3,7,8-TCDF-13C	100	83	22.0	152.0	83
2,3,7,8-TCDD-13C	100	84	20.0	175.0	84
1,2,3,7,8-PeCDF-13C	100	83	21.0	192.0	83
2,3,4,7,8-PeCDF-13C	100	82	13.0	328.0	82
1,2,3,7,8-PeCDD-13C	100	85	21.0	227.0	85
1,2,3,4,7,8-HxCDF-13C	100	82	19.0	202.0	82
1,2,3,6,7,8-HxCDF-13C	100	90	21.0	159.0	90
2,3,4,6,7,8-HxCDF-13C	100	87	22.0	176.0	87
1,2,3,7,8,9-HxCDF-13C	100	89	17.0	205.0	89
1,2,3,4,7,8-HxCDD-13C	100	75	21.0	193.0	75
1,2,3,6,7,8-HxCDD-13C	100	77	25.0	163.0	77
1,2,3,4,6,7,8-HpCDF-13C	100	88	21.0	158.0	88
1,2,3,4,7,8,9-HpCDF-13C	100	91	20.0	186.0	91
1,2,3,4,6,7,8-HpCDD-13C	100	94	26.0	166.0	94
OCDD-13C	200	170	26.0	397.0	86

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-73008		
Filename	F190830B_04	Matrix	Solid
Total Amount Extracted	20.1 g	Dilution	NA
ICAL ID	F190827	Extracted	08/28/2019 15:05
CCal Filename	F190830A_09	Analyzed	08/30/2019 19:15
Method Blank ID	BLANK-73004	Injected By	JRH

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	11	6.7	15.8	109
1,2,3,7,8-PeCDF	50	52	40.0	67.0	104
2,3,4,7,8-PeCDF	50	55	34.0	80.0	109
1,2,3,7,8-PeCDD	50	48	35.0	71.0	96
1,2,3,4,7,8-HxCDF	50	60	36.0	67.0	119
1,2,3,6,7,8-HxCDF	50	53	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	52	39.0	65.0	103
1,2,3,4,7,8-HxCDD	50	57	35.0	82.0	113
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	119
1,2,3,4,6,7,8-HpCDF	50	55	41.0	61.0	110
1,2,3,4,7,8,9-HpCDF	50	50	39.0	69.0	101
1,2,3,4,6,7,8-HpCDD	50	51	35.0	70.0	102
OCDF	100	120	63.0	170.0	117
OCDD	100	120	78.0	144.0	119
2,3,7,8-TCDD-37Cl4	10	7.7	3.1	19.1	77
2,3,7,8-TCDF-13C	100	74	22.0	152.0	74
2,3,7,8-TCDD-13C	100	80	20.0	175.0	80
1,2,3,7,8-PeCDF-13C	100	75	21.0	192.0	75
2,3,4,7,8-PeCDF-13C	100	77	13.0	328.0	77
1,2,3,7,8-PeCDD-13C	100	83	21.0	227.0	83
1,2,3,4,7,8-HxCDF-13C	100	78	19.0	202.0	78
1,2,3,6,7,8-HxCDF-13C	100	84	21.0	159.0	84
2,3,4,6,7,8-HxCDF-13C	100	80	22.0	176.0	80
1,2,3,7,8,9-HxCDF-13C	100	79	17.0	205.0	79
1,2,3,4,7,8-HxCDD-13C	100	73	21.0	193.0	73
1,2,3,6,7,8-HxCDD-13C	100	71	25.0	163.0	71
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	89	20.0	186.0	89
1,2,3,4,6,7,8-HpCDD-13C	100	92	26.0	166.0	92
OCDD-13C	200	150	26.0	397.0	77

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	TRC-WI		
Spike 1 ID	LCS-73005	Spike 2 ID	LCSD-73008
Spike 1 Filename	F190830B_03	Spike 2 Filename	F190830B_04

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	103	109	5.7
2,3,7,8-TCDD	110	109	0.9
1,2,3,7,8-PeCDF	107	104	2.8
2,3,4,7,8-PeCDF	112	109	2.7
1,2,3,7,8-PeCDD	100	96	4.1
1,2,3,4,7,8-HxCDF	119	119	0.0
1,2,3,6,7,8-HxCDF	108	107	0.9
2,3,4,6,7,8-HxCDF	106	104	1.9
1,2,3,7,8,9-HxCDF	104	103	1.0
1,2,3,4,7,8-HxCDD	115	113	1.8
1,2,3,6,7,8-HxCDD	117	116	0.9
1,2,3,7,8,9-HxCDD	120	119	0.8
1,2,3,4,6,7,8-HpCDF	109	110	0.9
1,2,3,4,7,8,9-HpCDF	103	101	2.0
1,2,3,4,6,7,8-HpCDD	104	102	1.9
OCDF	115	117	1.7
OCDD	113	119	5.2

%REC = Percent Recovered
RPD = The difference between the two values divided by the mean value

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Method 1613B Spiked Sample Report

Client - TRC-WI

Client's Sample ID	N3-1-MS		
Lab Sample ID	10487441017-MS		
Filename	Y190830A_16	Matrix	Solid
Total Amount Extracted	11.0 g	Dilution	NA
ICAL ID	Y190827	Extracted	08/28/2019 15:05
CCal Filename(s)	Y190830A_02	Analyzed	08/30/2019 20:19
Method Blank ID	BLANK-72988	Injected By	ZMS

Native Isomers	**Qs** (ng)	**Qm** (ng)	% Rec.	**Internal Standards**	**ng's Added**	**Percent Recovery**
2,3,7,8-TCDF	0.20	0.21	104	2,3,7,8-TCDF-13C	2.00	83
Total TCDF				2,3,7,8-TCDD-13C	2.00	82
				1,2,3,7,8-PeCDF-13C	2.00	86
2,3,7,8-TCDD	0.20	0.22	108	2,3,4,7,8-PeCDF-13C	2.00	86
Total TCDD				1,2,3,7,8-PeCDD-13C	2.00	91
				1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	1.00	0.96	96	1,2,3,6,7,8-HxCDF-13C	2.00	82
2,3,4,7,8-PeCDF	1.00	1.01	101	2,3,4,6,7,8-HxCDF-13C	2.00	81
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.00	85
				1,2,3,4,7,8-HxCDD-13C	2.00	80
1,2,3,7,8-PeCDD	1.00	0.93	93	1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.00	73
				1,2,3,4,7,8,9-HpCDF-13C	2.00	71
1,2,3,4,7,8-HxCDF	1.00	1.08	108	1,2,3,4,6,7,8-HpCDD-13C	2.00	71
1,2,3,6,7,8-HxCDF	1.00	1.03	103	OCDD-13C	4.00	63
2,3,4,6,7,8-HxCDF	1.00	1.04	104			
1,2,3,7,8,9-HxCDF	1.00	0.97	97	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	1.09	109	2,3,7,8-TCDD-37Cl4	0.20	75 R
1,2,3,6,7,8-HxCDD	1.00	1.12	112			
1,2,3,7,8,9-HxCDD	1.00	1.04	104			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.00	1.43	143			
1,2,3,4,7,8,9-HpCDF	1.00	1.04	104			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.00	1.51	151			
Total HpCDD						
OCDF	2.00	2.43	122			
OCDD	2.00	4.73	237			

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

Pace Analytical Services, LLC
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Method 1613B Spiked Sample Report

Client - TRC-WI

Client's Sample ID	N3-1-MSD		
Lab Sample ID	10487441017-MSD		
Filename	Y190830A_17	Matrix	Solid
Total Amount Extracted	11.0 g	Dilution	NA
ICAL ID	Y190827	Extracted	08/28/2019 15:05
CCal Filename(s)	Y190830A_02	Analyzed	08/30/2019 21:05
Method Blank ID	BLANK-72988	Injected By	ZMS

Native Isomers	**Qs** (ng)	**Qm** (ng)	% Rec.	**Internal Standards**	**ng's Added**	**Percent Recovery**
2,3,7,8-TCDF	0.20	0.19	93	2,3,7,8-TCDF-13C	2.00	85
Total TCDF				2,3,7,8-TCDD-13C	2.00	81
				1,2,3,7,8-PeCDF-13C	2.00	91
2,3,7,8-TCDD	0.20	0.21	105	2,3,4,7,8-PeCDF-13C	2.00	87
Total TCDD				1,2,3,7,8-PeCDD-13C	2.00	93
				1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	1.00	0.96	96	1,2,3,6,7,8-HxCDF-13C	2.00	81
2,3,4,7,8-PeCDF	1.00	1.01	101	2,3,4,6,7,8-HxCDF-13C	2.00	81
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.00	83
				1,2,3,4,7,8-HxCDD-13C	2.00	78
1,2,3,7,8-PeCDD	1.00	0.93	93	1,2,3,6,7,8-HxCDD-13C	2.00	74
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.00	73
				1,2,3,4,7,8,9-HpCDF-13C	2.00	69
1,2,3,4,7,8-HxCDF	1.00	1.08	108	1,2,3,4,6,7,8-HpCDD-13C	2.00	71
1,2,3,6,7,8-HxCDF	1.00	1.04	104	OCDD-13C	4.00	59
2,3,4,6,7,8-HxCDF	1.00	1.02	102			
1,2,3,7,8,9-HxCDF	1.00	0.99	99	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	1.08	108	2,3,7,8-TCDD-37Cl4	0.20	75 R
1,2,3,6,7,8-HxCDD	1.00	1.15	115			
1,2,3,7,8,9-HxCDD	1.00	1.06	106			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.00	1.43	143			
1,2,3,4,7,8,9-HpCDF	1.00	1.02	102			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.00	1.54	154			
Total HpCDD						
OCDF	2.00	2.66	133			
OCDD	2.00	5.01	250			

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 - TRC-WI

Client Sample ID	N3-1			Dry Weights	
Lab Sample ID	10487441017	Sample Filename	Y190830A_13	Sample Amount	10.1 g
MS ID	10487441017-MS	MS Filename	Y190830A_16	MS Amount	10.1 g
MSD ID	10487441017-MSD	MSD Filename	Y190830A_17	MSD Amount	10.1 g

Analyte	Sample Conc. ng/Kg	MS/MSD Qs (ng)	MS Qm (ng)	MSD Qm (ng)	RPD	Background Subtracted MS % Rec.	Background Subtracted MSD % Rec.	Background Subtracted RPD
2,3,7,8-TCDF	0.446	0.20	0.21	0.19	12.0	102	90	12.2
2,3,7,8-TCDD	0.000	0.20	0.22	0.21	2.8	108	105	2.8
1,2,3,7,8-PeCDF	1.183	1.00	0.96	0.96	0.5	95	95	0.5
2,3,4,7,8-PeCDF	2.182	1.00	1.01	1.01	0.7	99	99	0.7
1,2,3,7,8-PeCDD	0.827	1.00	0.93	0.93	0.3	93	92	0.3
1,2,3,4,7,8-HxCDF	5.293	1.00	1.08	1.08	0.6	103	102	0.7
1,2,3,6,7,8-HxCDF	4.252	1.00	1.03	1.04	1.7	98	100	1.8
2,3,4,6,7,8-HxCDF	6.105	1.00	1.04	1.02	1.8	97	96	1.9
1,2,3,7,8,9-HxCDF	1.925	1.00	0.97	0.99	1.8	95	97	1.9
1,2,3,4,7,8-HxCDD	0.000	1.00	1.09	1.08	0.5	107	107	0.5
1,2,3,6,7,8-HxCDD	4.433	1.00	1.12	1.15	2.5	108	110	2.6
1,2,3,7,8,9-HxCDD	3.041	1.00	1.04	1.06	1.8	101	103	1.9
1,2,3,4,6,7,8-HpCDF	43.724	1.00	1.43	1.43	0.2	99	99	0.2
1,2,3,4,7,8,9-HpCDF	3.838	1.00	1.04	1.02	1.9	100	99	1.9
1,2,3,4,6,7,8-HpCDD	57.861	1.00	1.51	1.54	2.4	92	96	3.9
OCDF	49.814	2.00	2.43	2.66	9.0	96	108	11.3
OCDD	316.107	2.00	4.73	5.01	5.7	76	90	16.9

Definitions

MS = Matrix Spike
MSD = Matrix Spike Duplicate
Qm = Quantity Measured
Qs = Quantity Spiked
% Rec. = Percent Recovery
RPD = Relative Percent Difference
NA = Not Applicable
NC = Not Calculated

CDD = Chlorinated dibenzo-p-dioxin
CDF = Chlorinated dibenzo-p-furan
T = Tetra
Pe = Penta
Hx = Hexa
Hp = Hepta
O = Octa

Appendix J
Data Usability Review

36 Surface Soil Samples for Dioxins/Furans
Wauleco
Wausau, Wisconsin

Data Usability Assessment
Prepared: September 20, 2019

A. Overall Summary

The data associated with the 36 surface soil samples collected on August 13 and 14, 2019 for dioxin/furan analysis were reviewed. In general, data are usable for project decisions based on a review of accuracy, precision, and sensitivity of the data. The data are valid as reported and may be used for decision-making purposes with no cautions or limitations.

Samples Included in the Data Usability Assessment

N1-1, N1-2, N1-3, N1-4, N1-5, N2-1, N2-2, N2-3, N2-4, N2-5, N3-1, N3-2, N3-3, N3-4, N4-1, N4-2, N4-3, N5-1A, N5-2A, N5-3, N5-4, N6-1, N6-2, N6-3, N6-4, N7-1, O-01, O-02, O-03, O-04, O-05, O-06, O-07, O-08, O-09, O-10

MS/MSDs

N3-1

Soil Analyses Performed

Dioxins/furans

Laboratory Data Package

10487441 (Pace Analytical, Minneapolis, MN)

Criteria Reviewed

Holding times/sample preparation, blanks, internal standards, cleanup standard, laboratory control sample (LCS), LCS duplicates (LCSDs), matrix spikes (MS), MS duplicates, estimated detection limits (EDLs)

B. Sensitivity Evaluation

Sensitivity was acceptable for the dioxin/furan analyses of soil samples (i.e., the EDLs for nondetect results were below the Wisconsin Industrial and Non-industrial Direct Contact soil standards).

C. Evaluation of Accuracy and Precision

Biases associated with the dioxin/furan analyses of soil samples are discussed below.

C-1. High-Biased Results

Potential high bias exists for select results due to various QC nonconformances. In general, the overall data usability and decision-making process were not affected by the QC nonconformances, as shown in the table below.

SAMPLE AFFECTED	ANALYTES AFFECTED	REASON FOR HIGH BIAS	REASON DATA USABILITY OR DECISION-MAKING PROCESS NOT AFFECTED
N2-1, N2-2, N2-3, N2-4, N2-5, N5-1A, N5-2A, N5-3, N5-4, N6-1, N6-2, N6-3, N6-4	123478-HxCDD, Total HxCDD, Total HpCDD, OCDD, OCDF	Low-level method blank contamination	Potential high bias for affected analytes would not cause significant difference in toxicity equivalents (TEQs) as these analytes have low toxicity equivalence factors (TEFs).
N1-1, N1-2, N1-3, N1-4, N1-5, N3-1, N3-2, N3-3, N3-4, O-01, O-04, O-05, O-06, O-08, O-09, O-10	Total TCDD, 23478-PeCDF, Total PeCDF, 123478-HxCDF, 123678-HxCDF, 234678-HxCDF, 123789-HxCDF, Total HxCDF, 1234678-HpCDF, 1234789-HpCDF, Total HpCDF, 1234678-HpCDD, Total HpCDD, OCDF, OCDD	Low-level method blank contamination	Potential high bias for affected analytes would not cause significant difference in TEQs as these analytes have low TEFs.
N4-1, N4-2, N4-3, N7-1, O-02, O-03, O-07	1234678-HpCDF, Total HpCDF, 1234678-HpCDD, Total HpCDD, OCDF, OCDD	Low-level method blank contamination	Potential high bias for affected analytes would not cause significant difference in TEQs as these analytes have low TEFs.
N6-1, N6-2, N6-4, N6-3, N2-1, N2-4, N2-5, N5-2A, N5-1A, N5-3, N3-4, N3-3, N3-2, N3-1, N1-2, N1-3, N1-5, N1-4, O-10, O-01, O-04, O-06, O-08, O-07, O-03, O-02, N7-1	Select analytes	Interference present; flagged as estimated maximum possible concentration (EMPC)	Potential high bias for affected analytes would not cause significant difference in TEQs as the affected analytes have low TEFs and concentrations detected were below the reporting limit.
N2-2, O-06, O-08, N4-3	123678-HxCDF	Polychlorinated diphenyl ether interference; flagged as an EMPC	Potential high bias for affected analytes would not cause significant difference in TEQs as the affected analytes have low TEFs.
N4-3, N7-1	123478-HxCDF		
N4-2	12378-PeCDF		

C-2. Potential Uncertainty

Potential uncertainty exists for select results due to various QC nonconformances. In general, the overall data usability and decision-making process were not affected by the QC nonconformances, as shown in the table below.

SAMPLE AFFECTED	ANALYTES AFFECTED	REASON FOR UNCERTAINTY	REASON DATA USABILITY OR DECISION-MAKING PROCESS NOT AFFECTED
N5-4	OCDD	Calibration range exceedance	Potential uncertainty for OCDD would not cause significant difference in TEQ as OCDD has a low TEF.