Final

Quarterly Report

April through June 2017

Penta Wood Products Superfund Site

Wisconsin Department of Natural Resources

GHD | 1801 Old Highway 8 Northwest Suite 114 St. Paul Minnesota 55112 USA

086165| Report No 15 | July 14, 2017

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1. Introduction

GHD Services Inc. (GHD) prepared this Quarterly Report (Report) for the Penta Woods Products Superfund Site (Site) in Siren, Wisconsin on behalf of Wisconsin Department of Natural Resources (WDNR). The Site location is shown on Figure 1.1, and the Site plan is shown on Figure 1.2. This Report presents the results of the activities conducted at the Site during April through June 2017 including:

- Groundwater monitoring and sampling (Section 2)
- Residential well and on-site supply well sampling (Section 3)
- Microcosm and bio-trap study (Section 4)
- Waste management and disposal (Section 5)
- Continuing obligations and inspections (Section 6)
- Conclusions and recommendations (Section 7)
- Certification (Section 8)

2. Groundwater Monitoring and Sampling

Groundwater monitoring and sampling was conducted at the Site in April 2017 based on the modified scope of work provided in a GHD letter to EPA dated June 30, 2016. Sampling was completed in general accordance with the Field Sampling Plan (FSP) (CH2M HILL, November 1999 and November 2010) and Quality Assurance Project Plan (QAPP) (CH2M HILL, February 2005) with subsequent addendums (most recent is Addendum No. 6 dated July 2014). The objectives of the groundwater monitoring at the Site included:

- To monitor flow direction and hydraulic gradient through the measurement and assessment of groundwater levels
- To monitor the natural attenuation of the plume through collection and chemical analysis of groundwater samples from monitoring wells
- To monitor long term improvement in groundwater quality through the collection and chemical analysis of groundwater samples from monitoring wells
- To monitor compliance with groundwater cleanup standards for the Site (State of Wisconsin ch. NR 140 Enforcement Standards)
- To monitor potential impact to residential wells through collection and chemical analysis of water samples from targeted residential wells

2.1 Groundwater and LNAPL Level Monitoring

Groundwater and Light Non-Aqueous Phase Liquid (LNAPL) levels were measured in thirty-three (33) monitoring wells and twenty-two (22) extraction well casings at the Site on April 17,

2017. The groundwater and LNAPL elevation data along with well survey data are summarized in Table 2.1. Historical LNAPL thickness data are included in Appendix A.

Groundwater elevation contours were inferred from the April 2017 measurement data. Unconfined aquifer (upper portion) contours are shown on Figure 2.1. Semiconfined aquifer (lower portion) groundwater contours are shown on Figure 2.2. The contours indicate that the groundwater gradient is relatively flat at less than 0.0005 ft/ft (as calculated between wells MW2 and MW26) and represent non-pumping conditions following shutdown of the remediation system and groundwater extraction pumps (November 2015).

Historically, LNAPL has been present in measurable quantities in four monitoring wells (MW10S, MW18, MW19, and MW20). During the April 2017 event, LNAPL was present in monitoring wells MW18, MW19, MW20 and MW29 at measurable thicknesses, and LNAPL was not present in well MW10S. LNAPL was present in six extraction wells (EW05S, EW06S, EW07S, EW10S, EW12S, and EW14S) with casings screened in the unconfined (upper) aquifer during the January 2017 monitoring event. This is consistent with previous monitoring, with the exception of MW29, in which LNAPL was observed at a measurable thickness for the first time in April 2017. During drilling and installation of well MW29 in November 2015, GHD observed LNAPL in the soil cuttings and expected LNAPL to eventually be present in the well. GHD believes that MW29 was installed within the LNAPL source area and the presence of LNAPL in the well for the first time in April 2017 does not represent LNAPL migration. LNAPL was not observed in any monitoring wells with casings screened in the semiconfined (lower) aquifer during January 2017. LNAPL thickness measurements are shown on Figure 2.3.

2.1.1 Vertical Gradients

Vertical hydraulic gradients were calculated between the semiconfined and unconfined aquifers to evaluate vertical flow between the two aquifers. The vertical gradient was calculated at monitoring wells MW10/MW10S, MW12/MW16, and MW23/MW9 (see Figures 2.1 and 2.2). The vertical gradient was determined by taking the difference in groundwater elevations divided by the difference in mid screen elevations of the wells listed above.

Groundwater at the Site flows from the unconfined aquifer downward to the semiconfined aquifer. The vertical gradients at the site range from 0.004 ft/ft (MW10/MW10S) to 0.025 ft/ft (MW9/MW23). As expected, these values are less than historical values since groundwater elevations are not influenced by groundwater extraction from the semiconfined aquifer.

2.2 Groundwater Sampling

This groundwater sampling event was conducted from April 18 through 24, 2017 and consisted of collecting groundwater samples from eighteen (18) monitoring wells (MW1, MW3, MW4, MW6S, MW10, MW10S, MW12, MW13, MW14, MW16, MW17, MW21, MW22, MW23, MW25, MW28, MW30, and MW31) and three (3) extraction wells (EW11D, EW11S, and EW13S). Wells MW20 and MW29 were not sampled due to the presence of LNAPL in the wells. Groundwater samples were collected using low flow purge and sample protocol. As part of the well stabilization process, the groundwater was measured in the field for the following parameters: pH, temperature, specific conductance, dissolved oxygen (DO), oxidation-reduction potential (ORP), iron, and sulfide. The

parameters DO, ORP, iron and sulfide are used to help evaluate the groundwater geochemical conditions at the well. The groundwater purging and sampling data are summarized in Table 2.2.

The groundwater samples were collected and analyzed for the following compounds: pentachlorophenol (PCP); naphthalene; benzene, toluene, ethylbenzene, and xylene (BTEX); natural attenuation parameters; and select dissolved metals. The natural attenuation parameters included alkalinity, chloride, hardness, nitrate, sulfate, total organic carbon, and methane. The results of the natural attenuation parameters were evaluated to confirm the groundwater reduction-oxidation conditions at the Site and if the groundwater conditions are favorable for biodegradation. The select dissolved metals included arsenic, copper, iron, manganese, and zinc. The metals samples were filtered in the field through a 0.54 micron filter. The groundwater sample analytical data are summarized in Table 2.3.

All groundwater samples were shipped via commercial courier under standard chain of custody procedures to TestAmerica Laboratories (TestAmerica) in North Canton, Ohio for analysis. Copies of laboratory reports are included in Appendix B.

The following sections present a discussion of the groundwater sample analytical data and the Wisconsin Chapter NR140 preventative action limits (PAL) and enforcement standards (ES). Historical data are included in Appendix A.

2.2.1 Naphthalene and BTEX Analytical Data

The April 2017 naphthalene and BTEX analytical data are summarized in Table 2.3. Naphthalene was detected in three (3) wells (MW10, MW10S, EW13S) at concentrations that exceeded the PAL of 10 micrograms per liter (µg/L) (Table 2.3). Naphthalene concentrations did not exceed the ES of 100 µg/L.

BTEX was not detected at concentrations that exceeded the ESs or PALs.

2.2.2 PCP Analytical Data

The April 2017 PCP analytical data are summarized in Table 2.3. PCP was detected in thirteen (13) wells (MW1, MW3, MW4, MW6S, MW10, MW10S, MW12, MW13, MW28, MW30, EW11D, EW11S, and EW13S) at concentrations exceeding the PAL of 0.1 µg/L. Of those thirteen wells, the PCP concentrations in six (6) wells (MW10, MW10S, MW12, MW28, MW30, and EW13S) exceeded the ES of 1.0 µg/L. Figure 2.4 shows the PCP concentrations in the unconfined (upper) aquifer wells. Figure 2.5 shows the PCP concentrations in the semiconfined (lower) aquifer wells.

Based on a review of the April 2017 analytical data, it appears that the elevated PCP concentrations (i.e., greater than 1,000 µg/L) are limited to the immediate vicinity of the LNAPL area in the unconfined and semiconfined aquifers, which is consistent with baseline sampling in April 2016.

Based on the PCP concentration distribution in the wells at the Site with significantly lower concentrations detected in wells located outside of the immediate LNAPL area, the current monitoring well network is sufficient to assess the plume.

2.2.3 Dissolved Arsenic Analytical Data

The April 2017 dissolved arsenic analytical data are summarized in Table 2.3. Arsenic was detected in two (2) wells (MW4 and EW13S) at concentrations exceeding the PAL (1 µg/L). Of those two wells, the PCP concentrations in one well (EW13S) exceeded the ES (10 µg/L). Figure 2.6 shows the arsenic concentrations in the unconfined (upper) aquifer wells. Figure 2.7 shows the arsenic concentrations in the semiconfined (lower) aquifer wells.

2.2.4 Other Dissolved Metals Analytical Data

The April 2017 dissolved metals analytical data are summarized in Table 2.3. Zinc and copper were not detected above the PALs or ESs in any of the eighteen (18) monitoring wells and three (3) extraction wells.

Iron was detected in five (5) wells at concentrations exceeding the PAL (150 µg/L) and the ES (300 µg/L). Manganese was detected in eight (8) wells at concentrations exceeding the PAL (25 µg/L) and six (6) wells at concentrations exceeding the ES (50 µg/L). The ES for iron and manganese are considered secondary health based standards that are based on aesthetics (i.e., odor and taste).

2.2.5 Natural Attenuation Parameters Analytical Data

The natural attenuation results are provided in Table 2.3. The results generally show elevated levels of nitrate and sulfate and low concentrations of TOC and methane. These results in combination with the field stabilization parameters of DO, ORP, iron, and sulfide (Table 2.2) show that the groundwater beneath the Site is aerobic to slightly anaerobic because DO values are greater than 1 mg/L and ORP values are positive at the majority of wells outside the immediate vicinity of the LNAPL area in both the unconfined and semiconfined aquifers. A more detailed assessment of natural attenuation is presented in Section 4.

3. Residential Well and Onsite Supply Well Sampling

On April 17 through 19, 2017, water samples were collected from six residential wells located near the Site and the onsite water supply well (DW01) in general accordance with the FSP and QAPP. The six residential wells included:

- 8713 Daniels 70 (RW1)
- 8627 Daniels 70 (RW2)
- 8454 Daniels 70 (RW3)
- 8526 Daniels 70 (RW4)
- 8783 Daniels 70 (RW5)
- 8542 West Doctor Lake Road (RW6)

The onsite water supply well serves the remediation equipment building. The water is used for sanitary facilities in the building and maintaining the remediation equipment but is not ingested by

workers. The residential well and onsite water supply well locations are shown on Figure 3.1. The samples were analyzed for PCP, BTEX, and naphthalene. The well purging and sampling data are summarized in Table 2.2. The residential well sample analytical data are summarized in Table 3.1. Copies of the laboratory reports and data validation are included in Appendix C. Historical residential and onsite water supply well PCP data are included in Appendix A.

3.1 Residential Well Sample Analytical Data

PCP was detected in residential well RW1 at a concentration of 0.015 µg/L and was detected in the onsite water supply well at a concentration of 0.020 µg/L (0.022 µg/L – duplicate) (Table 3.1), which are less than the PAL (0.1 µg/L) and ES (1 µg/L). PCP was not detected in the remaining residential wells. Naphthalene and BTEX were not detected in any of residential wells or the onsite water supply well (Table 3.1). These results are similar with historical data. Copies of the laboratory reports and the data validation memo are presented in Appendix C.

4. Microcosm and BioTrap Study

Microcosm and BioTrap studies were conducted in accordance with the Remediation System Shutdown Pilot Study Work Plan (GHD; November 13, 2015). The objectives of the microcosm study were to gather the data necessary to:

- Determine whether natural attenuation of PCP is occurring at the Site
- Determine whether natural attenuation is occurring under aerobic conditions, anaerobic conditions, or both
- Determine a Site-specific biodegradation rate for PCP

The objectives of the BioTrap study were to gather the data necessary to:

- Determine whether bacteria capable of degrading PCP are present at the Site
- Demonstrate in situ biodegradation of PCP using a BioTrap

A technical memorandum presenting the results of the studies is included in Appendix D.

The results from the microcosm tests indicate that PCP and diesel range petroleum hydrocarbons (TPH(C_9-C_{36})) are readily degradable under aerobic conditions and that PCP and TPH(C_9-C_{36}) are also degradable under anaerobic conditions; however, the anaerobic process is much slower. The addition of emulsified vegetable oil (EVO) to optimize anaerobic conditions appears to increase the biodegradation rate of PCP. Based on the half-lives measured in the microcosms, the cleanup time for the aerobic area under aerobic conditions would be 6.3 months. The cleanup time for the anaerobic area without EVO enhancement would be 66 months (5.5 years). These estimated cleanup times assume that LNAPL is not present and there is no ongoing source of contamination.

These conclusions are supported by the data from the BioTraps. In the BioTraps deployed in the downgradient area in wells MW9 and EW11S, the dominant class of organisms, the Proteobacteria degraded PCP and incorporated it into the biomass at a moderate rate. In the source area in wells MW20 and MW29, the BioTrap data appears to indicate that well MW20 may be in a

transitional zone where some aerobic and some anaerobic processes are occurring. Although the BioTrap from MW20 contained the anaerobic Fimicutes, which were the dominant class of organisms in MW29, Proteobacteria were the dominant class of organisms in MW20, and the rate of incorporation of PCP into biomass was similar to the aerobic wells. In MW29, which was likely highly anaerobic, the Fimicutes dominated, and slower incorporation of PCP into biomass was observed.

No mineralization of PCP (i.e., degradation into carbon dioxide) was observed in the BioTrap study; however, the BioTraps were deployed for only 32 days, which may not be long enough for mineralization of PCP to occur.

Overall, the data suggests that monitored natural attenuation (MNA) would be an effective treatment for the downgradient area, and biodegradation of PCP and TPH(C_9-C_{36}) is expected to occur at a moderate rate. MNA may be effective for the source area. The BioTrap and amended microcosm data show that PCP degradation does occur under anaerobic conditions; however, slower biodegradation rates are expected. Analysis of the unamended anaerobic microcosms after more time has elapsed would provide additional information about the rates that can be expected. Additional anaerobic microcosm testing may be performed after 24 and 36 months.

5. Waste Management and Disposal

Historical hazardous waste disposal is summarized in Appendix A. GHD continues to collect and containerize PPE and other waste produced during sampling events onsite.

5.1 Sodium Hydroxide

Sodium hydroxide remained stored in an above ground tank at the Site after remediation system decommissioning was completed in January 2016. On March 20, 2017, 5,000 gallons of sodium hydroxide were removed from the Site, as documented in the Quarterly Report – January through March 2017 (GHD; May 3, 2017). On April 7, 2017, the remaining 200 gallons of sodium hydroxide were removed from the Site and transported to the Advanced Waste Services of Wisconsin, ChemWorks Treatment Facility located in Milwaukee, Wisconsin under Profile CHE1000137125 for reclamation and reuse as part of the facility treatment operations. Waste disposal documentation including the bill of lading (BL2790504000) and waste profile is provided in Appendix E.

5.2 Ferric Sulfate

Ferric sulfate remained stored in an above ground tank at the Site after remediation system decommissioning was completed in January 2016. On April 7, 2017, 2,759 gallons of ferric sulfate were removed from the Site and transported to the EQ Illinois Facility located in Harvey, Illinois under Profile CHE1000137125 for disposal. Waste disposal documentation including the uniform waste profile, hazardous waste manifest (001251251VES), and certificate of disposal is provided in Appendix E.

6. Continuing Obligations and Inspections

The WDNR has implemented Institutional Controls (ICs) at the Site in the form of Continuing Obligations (COs). COs are legal requirements designed to protect public health and the environment in regard to contamination that remains on a property, and COs still apply after a property is sold. The Long-Term Response Action Operation and Maintenance Plan (O&M Plan) – Addendum No. 1 (GHD; November 9, 2015) effectively serves as an Institutional Control Implementation and Assurance Plan (ICIAP). This section documents the COs in addition to inspections required by the O&M Plan (GHD; July 22, 2015).

6.1 Continuing Obligations

On July 6, 2015 the WDNR provided a letter approving the Remedial Actions with Continuing Obligations (WDNR BRRTS Activity #02-07-000532, FID #: 807050310). That letter approved the remedies which have been implemented at the Site and specified the condition with which any current or future owner of the property must comply to ensure that the Site does not pose a threat. These conditions or COs meet the intent of the ICs required by the Record of Decision for the Site.

CO maintenance consists of periodic monitoring and reporting to confirm that Site security is in place and providing protection as intended and that use of the land is restricted to maintain the integrity and functional effectiveness of the Site remedy.

Maintenance activities consist of periodic review of the property and COs by WDNR, notifications to new land owners or lessees, and continuing education for land owners and property users through annual updates and information. There was no transfer of ownership during the current monitoring period.

To facilitate monitoring of the COs, roles and responsibilities, schedules, corrective actions, and reporting requirements were performed as follows:

1. Periodic monitoring was conducted whenever WDNR or its contractors or other representatives were present at the Site.
2. Prohibition of use of the Site real estate is evaluated and updated on an annual basis (minimum frequency). This evaluation determined:
   - The selected remedy (i.e. remediation system shutdown pilot study and associated monitoring) remains in place and remains effective
   - Site security remains effective and real estate use meets the stated objectives and performance goals and provides protection required by the response
3. Evidence was not observed of the following improper uses:
   - Removal of the existing barrier or cover
   - Replacement with another barrier or cover
   - Excavating or grading of the land surface
   - Filling on covered or paved areas

- Plowing for agricultural cultivation
- Construction or placement of a building or other structure
- Changing the use or occupancy of the property to a residential exposure setting, which may include certain uses, such as single or multiple family residences, a school, day care, senior center, hospital, or similar residential exposure setting

An inspection of continuing obligations items was completed on April 26, 2017 and a copy of the continuing obligations inspection form is included in Appendix F.

6.2 Inspections

Additional inspections required by the O&M Plan (GHD; July 22, 2015) were conducted during this monitoring period. The results of the inspections are as follows:

- The CAMU area fence is in satisfactory condition and does not require repairs; the CAMU fence gates remain closed and locked when GHD and/or WDNR are not at the Site
- The CAMU area surface soils/vegetation were in good condition during this monitoring period and did not require repairs; erosion, subsidence, and ponding water were not observed on the CAMU

A site well inspection was completed on April 26, 2017 and a copy of the well inspection form is included in Appendix F.

7. Conclusions and Recommendations

Based on the pilot study data obtained since April 2016, the following conclusions are made:

- LNAPL is stable and not migrating
- The dissolved PCP plume is stable and not migrating
- Dissolved PCP concentrations greater than 1,000 µg/L are limited to the immediate vicinity of the LNAPL area
- Dissolved PCP degrades naturally in the aerobic zone
- Dissolved PCP degrades in the anaerobic zone (LNAPL source area) at a slow rate
- The current monitoring well network is sufficient to monitor plume conditions

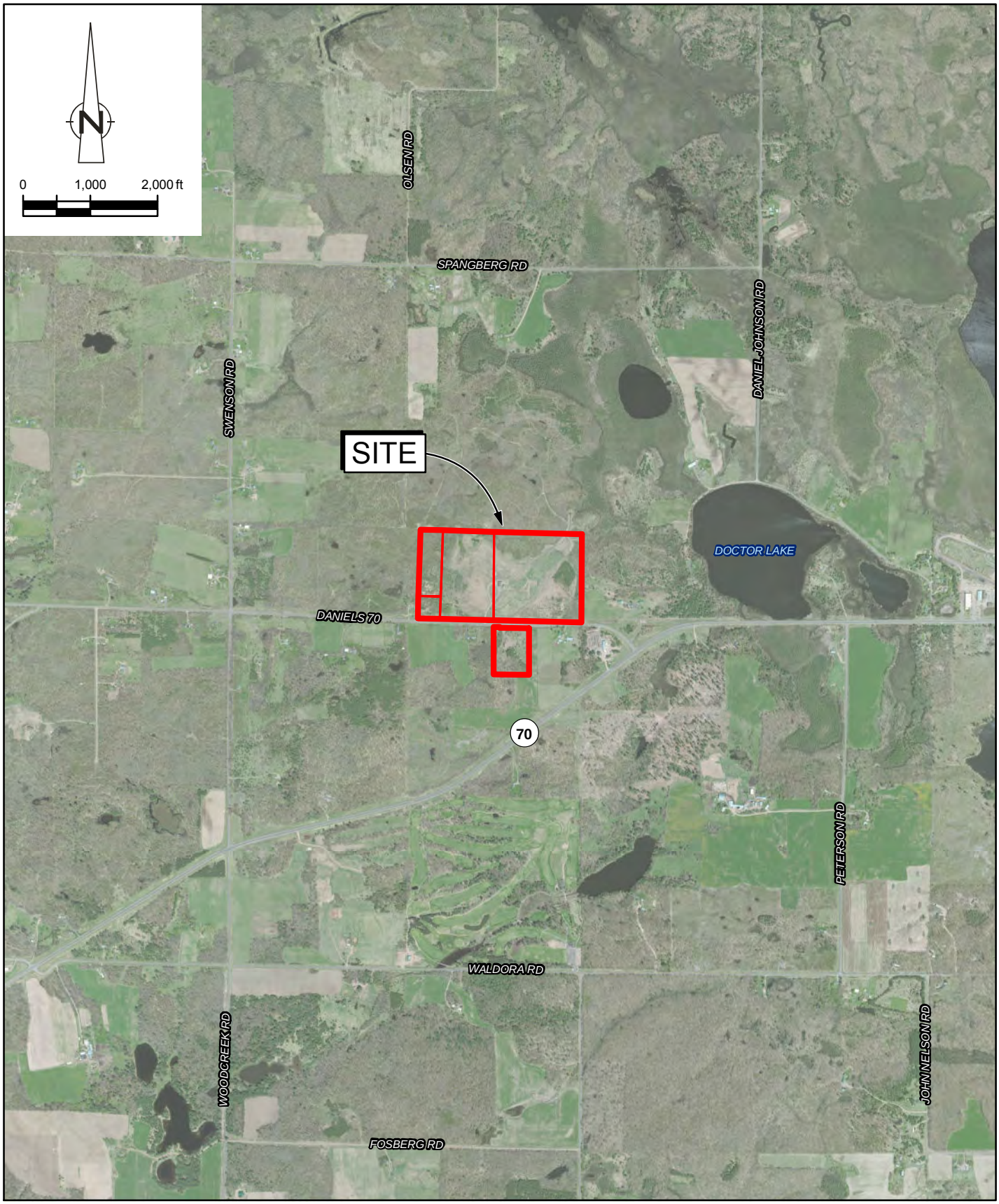
The following actions are recommended for the Site during the next reporting period:

- Keep the remediation system shut down and continue the pilot study monitoring and sampling at the Site based on the USEPA approved scope and schedule
- Consider extending the anaerobic microcosm study laboratory analyses and evaluation
- Conduct quarterly groundwater and LNAPL level monitoring during July and October 2017
- Conduct semiannual groundwater monitoring and sampling during October 2017

- Continue to include wells MW4 and MW14 in the semiannual groundwater sampling events to assess semi-confined aquifer (lower portion) groundwater quality southeast of the LNAPL source area
- Conduct semiannual residential well sampling during October 2017
- Assess future pilot study data to determine whether a change in the monitoring and sampling scope and schedule is appropriate and/or whether additional wells are needed to delineate the extent of PCP concentrations exceeding the ES
- Prepare and submit required monthly and semiannual reports; the next report will document Site work during July through December 2017 and will be submitted in January 2018.
- Conduct a groundwater statistical evaluation using USEPA and ITRC guidance when sufficient groundwater data is obtained after future sampling events

8. Certification

The current actions at the Site remain protective of human health and the environment based on an evaluation of the current data. Implementation of the pilot study contingency plan outlined in the Remediation System Pilot Study Work Plan (GHD; November 13, 2015) is not necessary at this time.



Source: DigitalGlobe 2011

PENTA WOOD PRODUCTS SUPERFUND SITE
SIREN, WISCONSIN
QUARTERLY REPORT

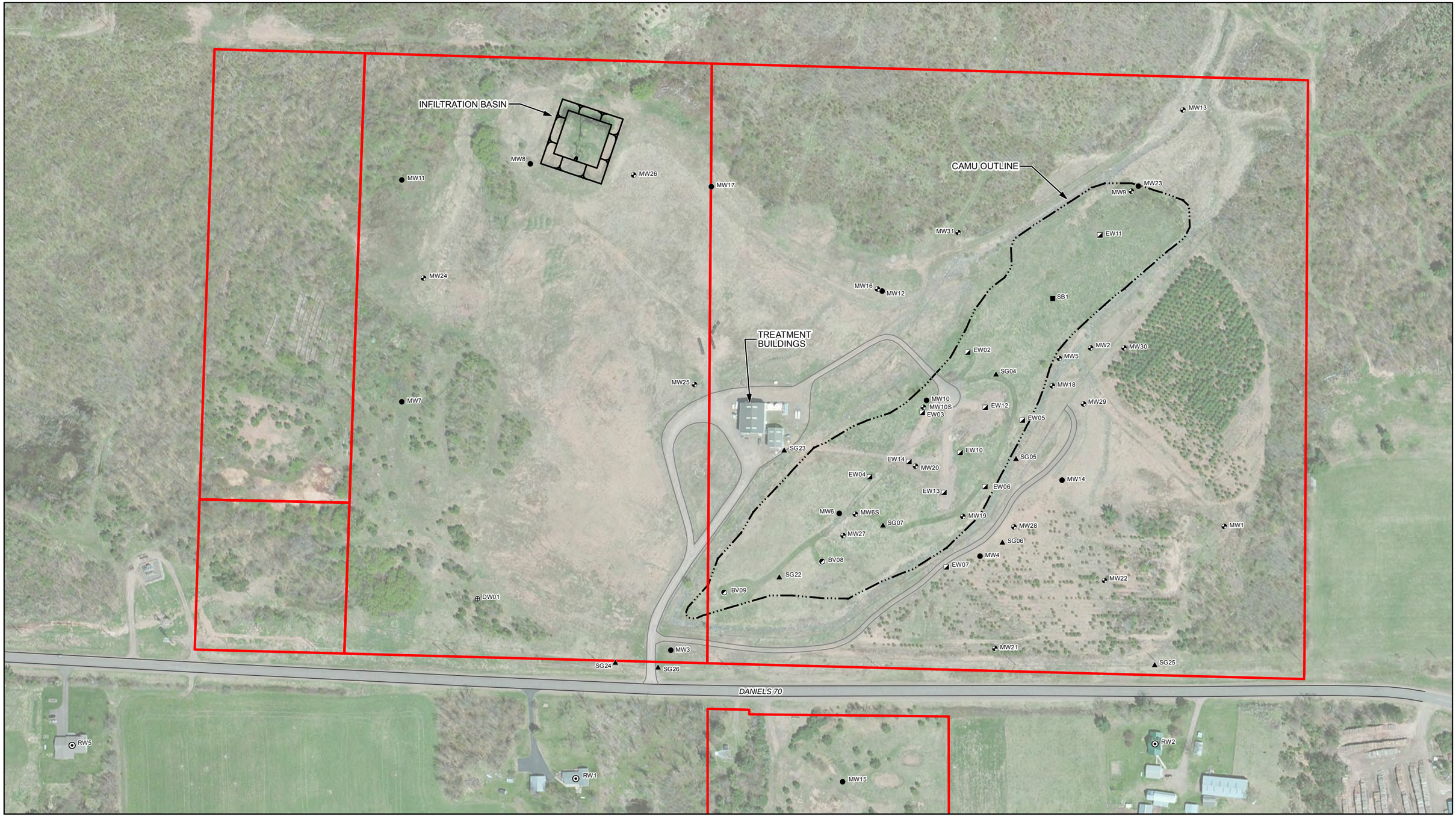
086165-04-07

Jul 6, 2017

SITE LOCATION

FIGURE 1.1

GIS File: I:\GIS\Projects\6-chars\08----\0861--\086165\086165-REPORTS\086165-04(015)\086165-04(015)GIS-SP001.mxd



0 100 200 ft

N

LEGEND

- EXTRACTION WELL NEST
- UNCONFINED MONITORING WELL
- SEMICONFINED MONITORING WELL
- BIOVENTING WELL
- SOIL GAS WELL NEST
- WATER SUPPLY WELL
- RESIDENTIAL WELL
- APPROXIMATE CAMU LIMIT
- SITE PARCEL BOUNDARY

GHD

PENTA WOOD PRODUCTS SUPERFUND SITE
SIREN, WISCONSIN
QUARTERLY REPORT

086165-04-07

Jul 6, 2017

SITE PLAN

FIGURE 1.2

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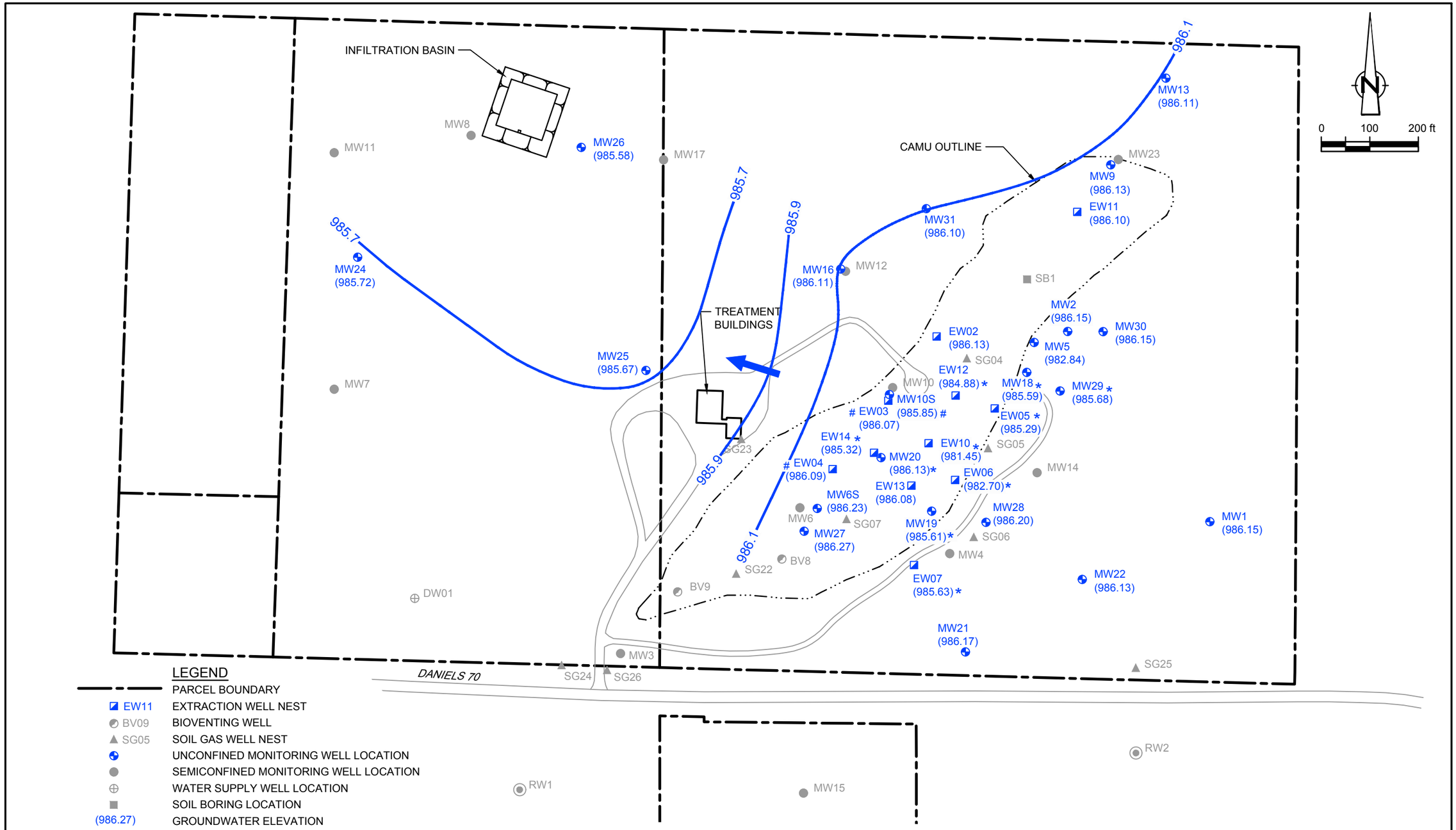


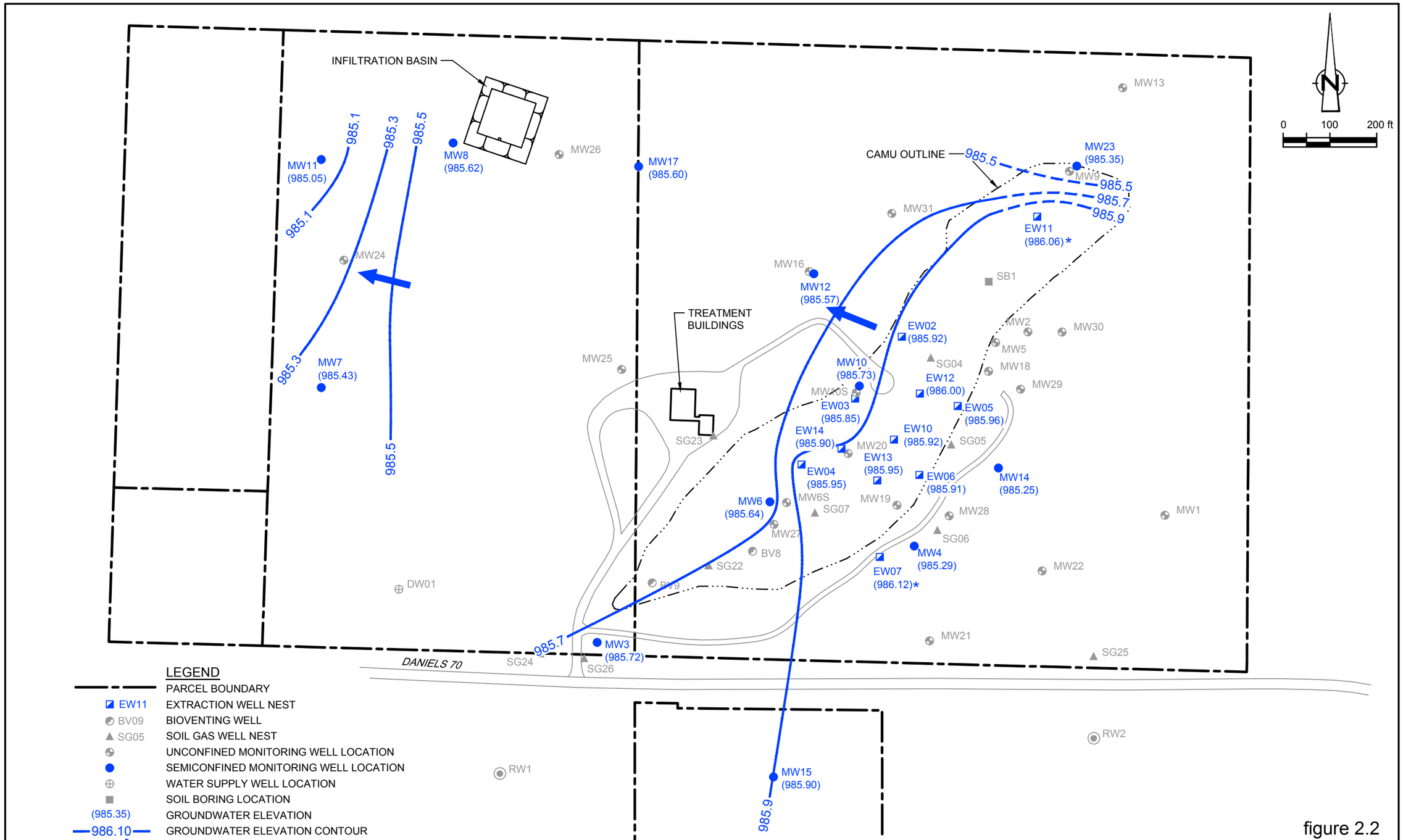
LEGEND

- PARCEL BOUNDARY
- EW11 — EXTRACTION WELL NEST
- BV09 — BIOVENTING WELL
- SG05 — SOIL GAS WELL NEST
- UNCONFINED MONITORING WELL LOCATION
- SEMICONFINED MONITORING WELL LOCATION
- WATER SUPPLY WELL LOCATION
- SOIL BORING LOCATION
- (986.27) — GROUNDWATER ELEVATION
- 985.7 — GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- * — LNAPL PRESENT IN WELL, WELL NOT UTILIZED TO INFER GROUNDWATER ELEVATION CONTOURS
- # — WELL NOT USED TO INFER GROUNDWATER ELEVATION CONTOURS
- RESIDENTIAL WELL

SOURCE: KEMPER AND ASSOCIATES, INC. SURVEY DATED MAY 2016 (WISCONSIN BURNETT COUNTY COORDINATE SYSTEM NAD83, 1996).

figure 2.1

UNCONFINED (UPPER) AQUIFER GROUNDWATER CONTOURS - APRIL 2017
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin



LEGEND

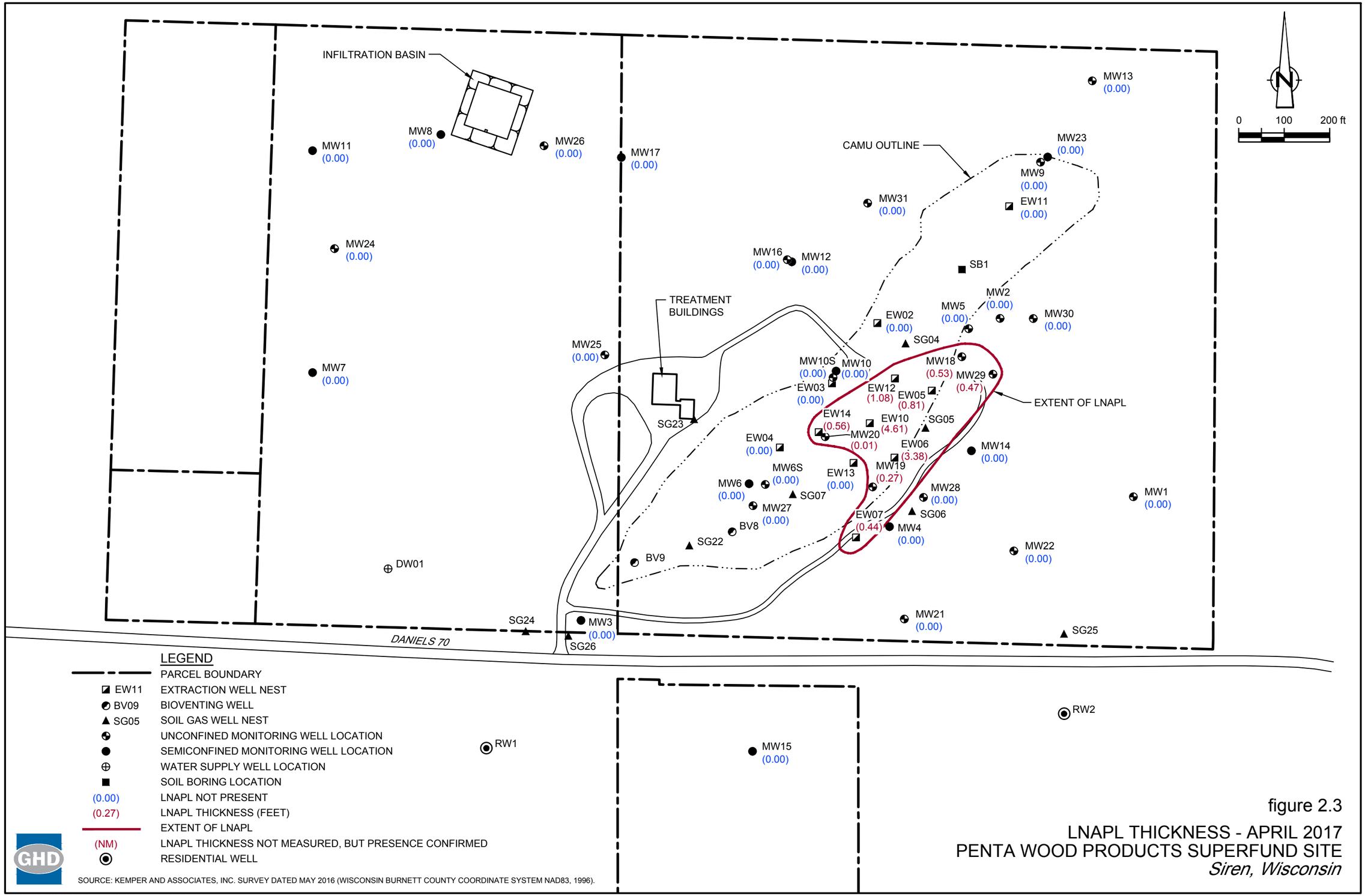
- PARCEL BOUNDARY
- EW11 EXTRACTION WELL NEST
- BV09 BIOVENTING WELL
- SG05 SOIL GAS WELL NEST
- UNCONFINED MONITORING WELL LOCATION
- SEMICONFINED MONITORING WELL LOCATION
- WATER SUPPLY WELL LOCATION
- SOIL BORING LOCATION
- (985.35) GROUNDWATER ELEVATION
- 986.10 GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- * WELL NOT UTILIZED TO INFER GROUNDWATER ELEVATION CONTOURS
- RESIDENTIAL WELL

SOURCE: KEMPER AND ASSOCIATES, INC. SURVEY DATED MAY 2016 (WISCONSIN BURNETT COUNTY COORDINATE SYSTEM NAD83, 1996).

figure 2.2

SEMICONFINED (LOWER) AQUIFER GROUNDWATER CONTOURS - APRIL 2017
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-03(015)GN-WA002 JUL 11, 2017



LEGEND

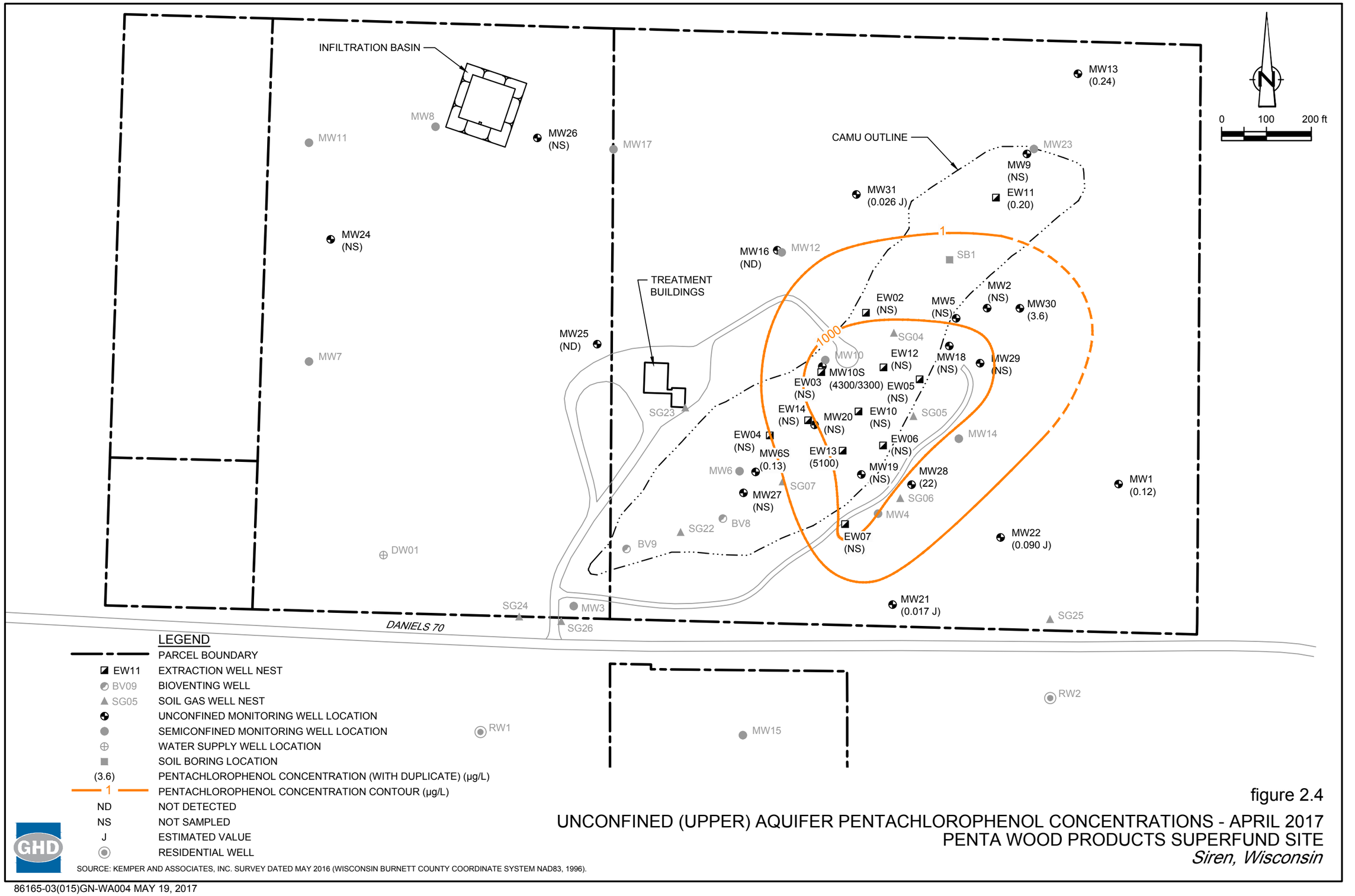
- PARCEL BOUNDARY
- EW11 EXTRACTION WELL NEST
- BV09 BIOVENTING WELL
- SG05 SOIL GAS WELL NEST
- UNCONFINED MONITORING WELL LOCATION
- SEMICONFINED MONITORING WELL LOCATION
- WATER SUPPLY WELL LOCATION
- SOIL BORING LOCATION
- (0.00) LNAPL NOT PRESENT
- (0.27) LNAPL THICKNESS (FEET)
- EXTENT OF LNAPL
- (NM) LNAPL THICKNESS NOT MEASURED, BUT PRESENCE CONFIRMED
- RESIDENTIAL WELL

SOURCE: KEMPER AND ASSOCIATES, INC. SURVEY DATED MAY 2016 (WISCONSIN BURNETT COUNTY COORDINATE SYSTEM NAD83, 1996).

figure 2.3

LNAPL THICKNESS - APRIL 2017
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-03(015)GN-WA003 MAY 19, 2017



LEGEND

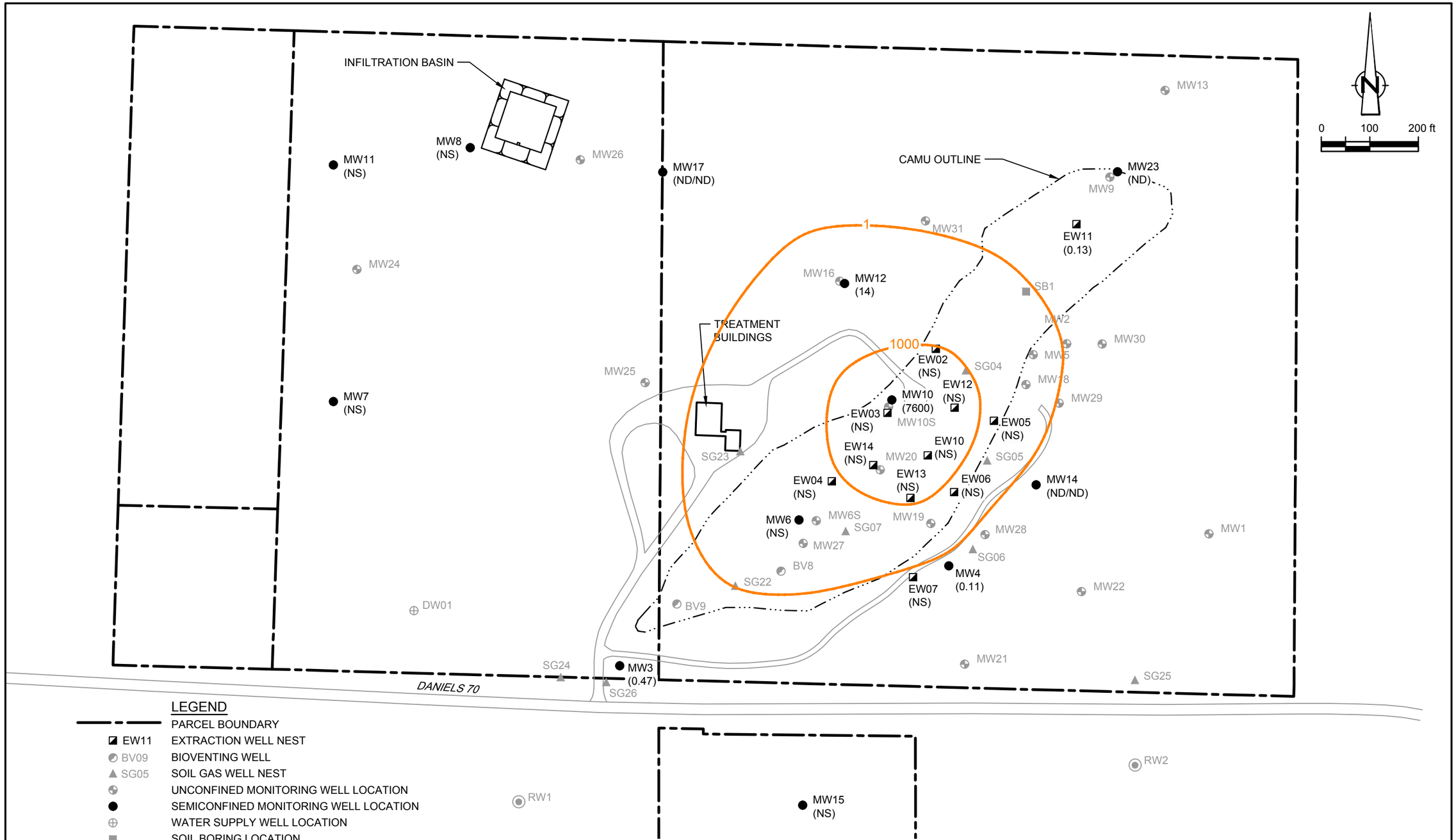
	PARCEL BOUNDARY
EW11	EXTRACTION WELL NEST
BV09	BIOVENTING WELL
SG05	SOIL GAS WELL NEST
	UNCONFINED MONITORING WELL LOCATION
	SEMICONFINED MONITORING WELL LOCATION
	WATER SUPPLY WELL LOCATION
	SOIL BORING LOCATION
(3.6)	PENTACHLOROPHENOL CONCENTRATION (WITH DUPLICATE) (µg/L)
1	PENTACHLOROPHENOL CONCENTRATION CONTOUR (µg/L)
ND	NOT DETECTED
NS	NOT SAMPLED
J	ESTIMATED VALUE
	RESIDENTIAL WELL

SOURCE: KEMPER AND ASSOCIATES, INC. SURVEY DATED MAY 2016 (WISCONSIN BURNETT COUNTY COORDINATE SYSTEM NAD83, 1996).

figure 2.4

UNCONFINED (UPPER) AQUIFER PENTACHLOROPHENOL CONCENTRATIONS - APRIL 2017
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-03(015)GN-WA004 MAY 19, 2017



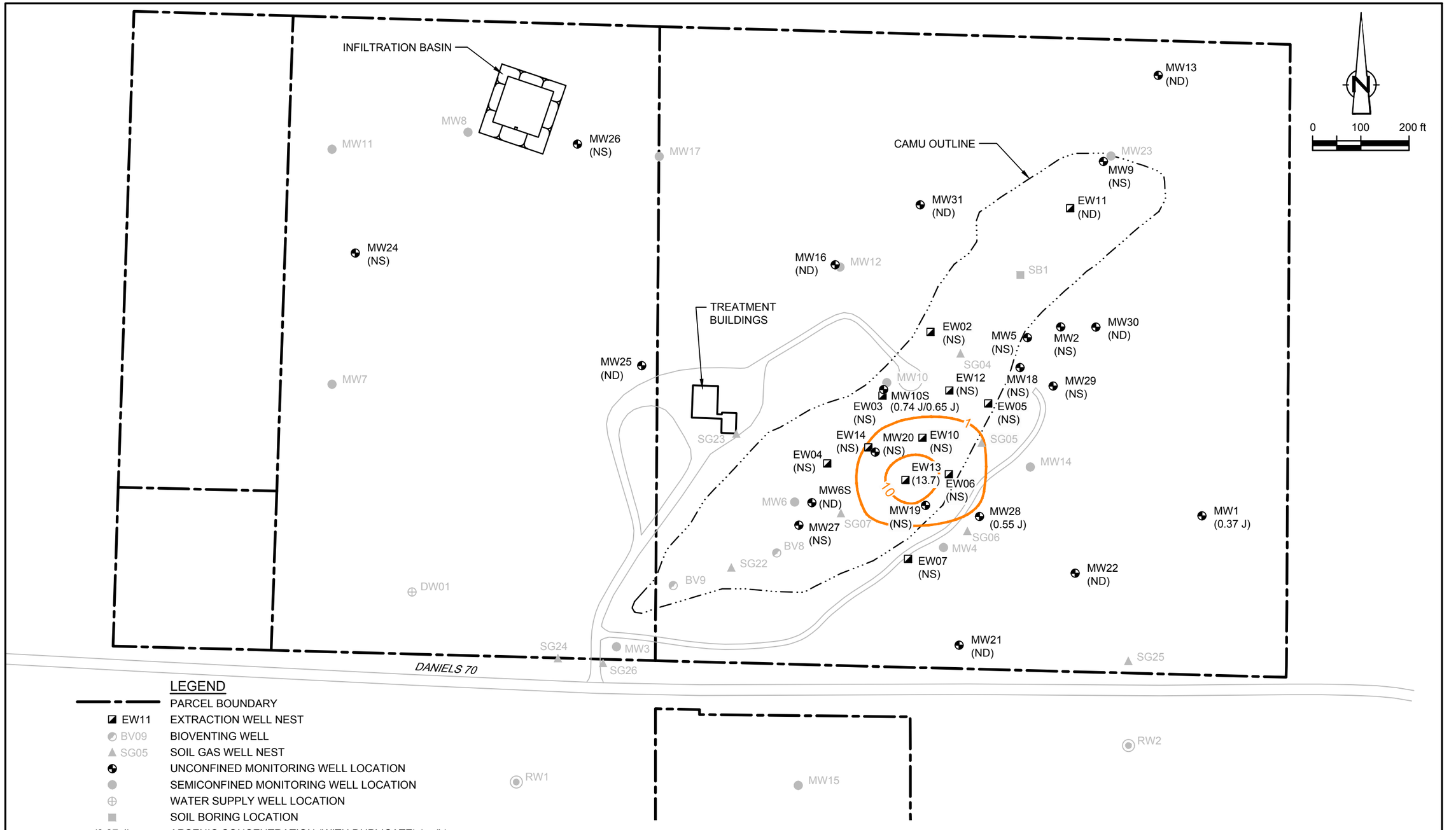
LEGEND

	PARCEL BOUNDARY
EW11	EXTRACTION WELL NEST
BV09	BIOVENTING WELL
SG05	SOIL GAS WELL NEST
	UNCONFINED MONITORING WELL LOCATION
	SEMICONFINED MONITORING WELL LOCATION
	WATER SUPPLY WELL LOCATION
	SOIL BORING LOCATION
(0.47)	PENTACHLOROPHENOL CONCENTRATION (WITH DUPLICATE) (µg/L)
1	PENTACHLOROPHENOL CONCENTRATION CONTOUR (µg/L)
ND	NOT DETECTED
NS	NOT SAMPLED
	RESIDENTIAL WELL

SOURCE: KEMPER AND ASSOCIATES, INC. SURVEY DATED MAY 2016 (WISCONSIN BURNETT COUNTY COORDINATE SYSTEM NAD83, 1996).

figure 2.5

SEMICONFINED (LOWER) AQUIFER PENTACHLOROPHENOL CONCENTRATIONS - APRIL 2017
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin



LEGEND

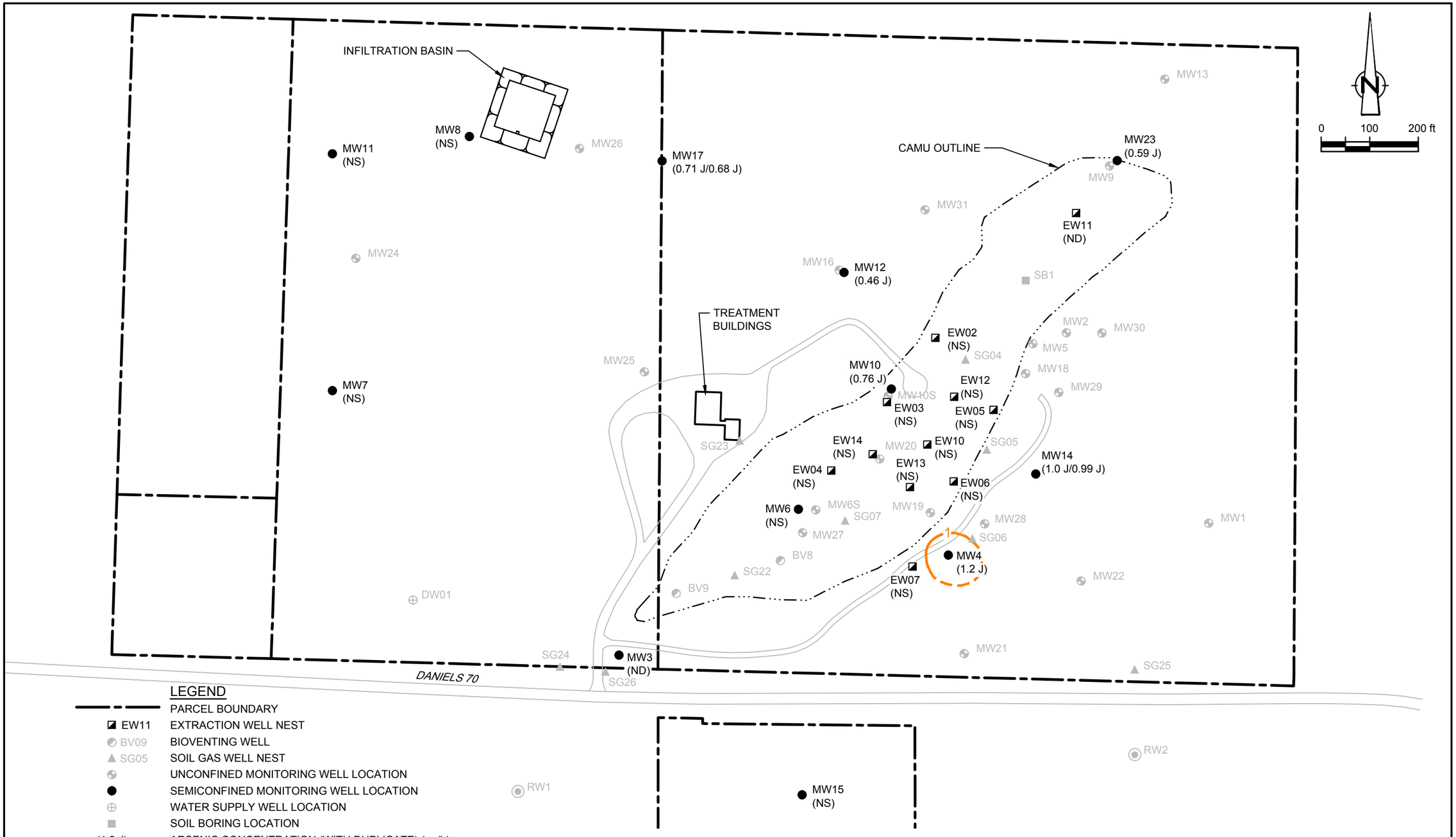
	PARCEL BOUNDARY
EW11	EXTRACTION WELL NEST
BV09	BIOVENTING WELL
SG05	SOIL GAS WELL NEST
	UNCONFINED MONITORING WELL LOCATION
	SEMICONFINED MONITORING WELL LOCATION
	WATER SUPPLY WELL LOCATION
	SOIL BORING LOCATION
(0.37 J)	ARSENIC CONCENTRATION (WITH DUPLICATE) (µg/L)
1	ARSENIC CONCENTRATION CONTOUR (µg/L)
ND	NOT DETECTED
NS	NOT SAMPLED
J	ESTIMATED VALUE
	RESIDENTIAL WELL

SOURCE: KEMPER AND ASSOCIATES, INC. SURVEY DATED MAY 2016 (WISCONSIN BURNETT COUNTY COORDINATE SYSTEM NAD83, 1996).

figure 2.6

UNCONFINED (UPPER) AQUIFER ARSENIC CONCENTRATIONS - APRIL 2017
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-03(015)GN-WA006 MAY 19, 2017



LEGEND

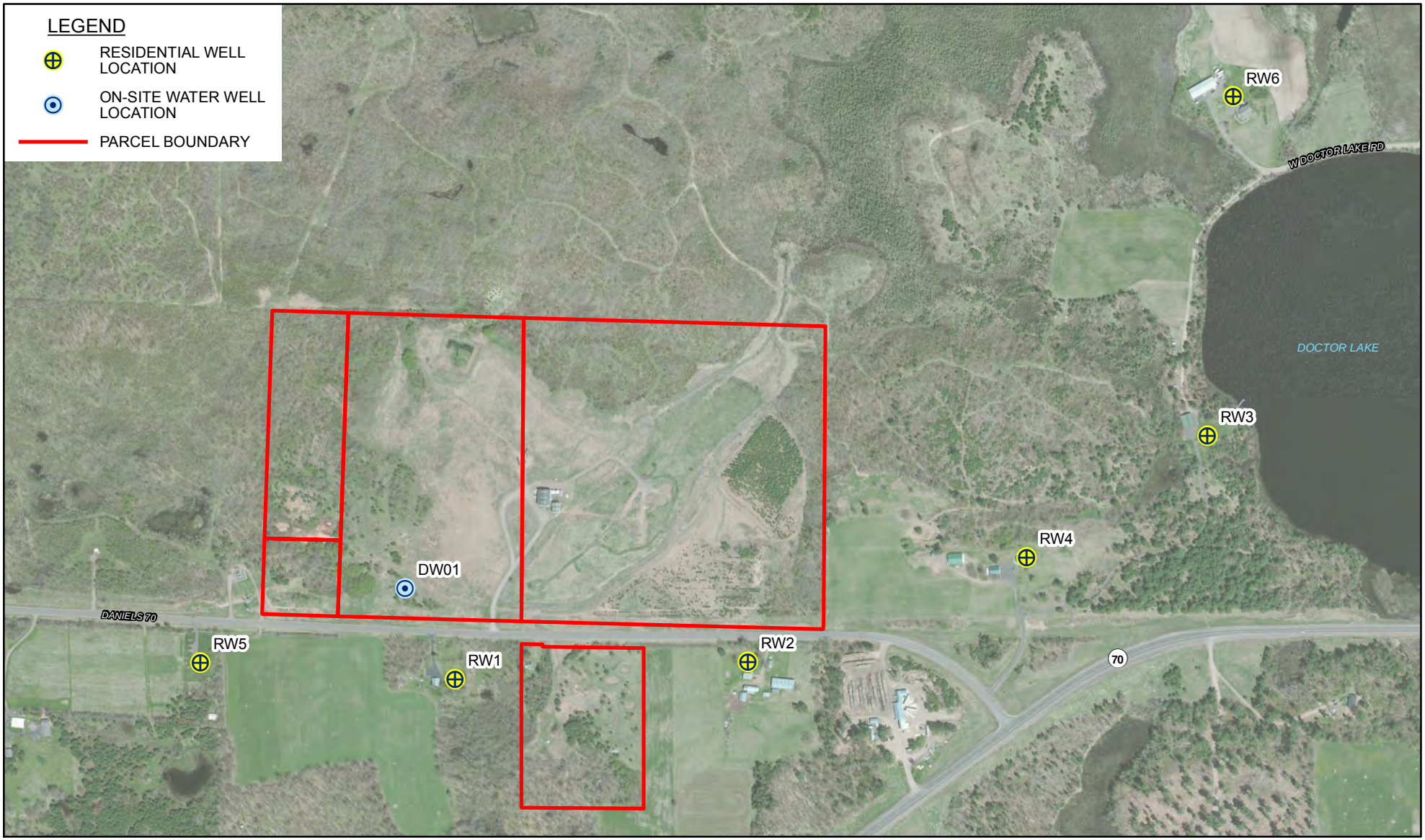
	PARCEL BOUNDARY
EW11	EXTRACTION WELL NEST
BV09	BIOVENTING WELL
SG05	SOIL GAS WELL NEST
	UNCONFINED MONITORING WELL LOCATION
	SEMICONFINED MONITORING WELL LOCATION
	WATER SUPPLY WELL LOCATION
	SOIL BORING LOCATION
(1.2 J)	ARSENIC CONCENTRATION (WITH DUPLICATE) (µg/L)
1	ARSENIC CONCENTRATION CONTOUR (µg/L)
ND	NOT DETECTED
NS	NOT SAMPLED
J	ESTIMATED VALUE
	RESIDENTIAL WELL

SOURCE: KEMPER AND ASSOCIATES, INC. SURVEY DATED MAY 2016 (WISCONSIN BURNETT COUNTY COORDINATE SYSTEM NAD83, 1996).

figure 2.7

SEMICONFINED (LOWER) AQUIFER ARSENIC CONCENTRATIONS - APRIL 2017
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-03(015)GN-WA007 MAY 19, 2017



0 200 400 600 ft

N

GHD

PENTA WOOD PRODUCTS SUPERFUND SITE
SIREN, WISCONSIN
QUARTERLY REPORT

086165-04-07
Jul 6, 2017

RESIDENTIAL WELL LOCATIONS

FIGURE 3.1

GIS File: I:\GIS\Projects\6-chars\08----\0861--\086165\086165-REPORTS\086165-04(015)\086165-04(015)GIS-SP003.mxd

Table 2.1

Groundwater and LNAPL Level Monitoring Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Well ID	Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet btoc)	Depth to LNAPL (feet btoc)	Groundwater Elevation (feet AMSL)	LNAPL Elevation (feet AMSL)	LNAPL Thickness (feet)
Semiconfined Aquifer (Lower)							
MW3	4/17/2017	1129.44	143.72	ND	985.72	NA	0.00
MW4	4/17/2017	1087.74	102.45	ND	985.29	NA	0.00
MW6	4/17/2017	1109.11	123.47	ND	985.64	NA	0.00
MW7	4/17/2017	1096.25	110.82	ND	985.43	NA	0.00
MW8	4/17/2017	1091.13	105.51	ND	985.62	NA	0.00
MW10	4/17/2017	1089.01	103.28	ND	985.73	NA	0.00
MW11	4/17/2017	1085.48	100.43	ND	985.05	NA	0.00
MW12	4/17/2017	1080.91	95.34	ND	985.57	NA	0.00
MW14	4/17/2017	1078.28	93.03	ND	985.25	NA	0.00
MW15	4/17/2017	1127.09	141.19	ND	985.90	NA	0.00
MW17	4/17/2017	1084.43	98.83	ND	985.60	NA	0.00
MW23	4/17/2017	1017.45	32.10	ND	985.35	NA	0.00
EW02D	4/17/2017	1083.00	97.08	ND	985.92	NA	0.00
EW03D	4/17/2017	1089.48	103.63	ND	985.85	NA	0.00
EW04D	4/17/2017	1101.09	115.14	ND	985.95	NA	0.00
EW05D	4/17/2017	1076.99	91.03	ND	985.96	NA	0.00
EW06D	4/17/2017	1083.39	97.48	ND	985.91	NA	0.00
EW07D	4/17/2017	1087.52	101.40	ND	986.12	NA	0.00
EW10D	4/17/2017	1088.55	102.63	ND	985.92	NA	0.00
EW11D	4/17/2017	1048.19	62.13	ND	986.06	NA	0.00
EW12D	4/17/2017	1086.41	100.41	ND	986.00	NA	0.00
EW13D	4/17/2017	1092.88	106.93	ND	985.95	NA	0.00
EW14D	4/17/2017	1098.28	112.38	ND	985.90	NA	0.00

Table 2.1

Groundwater and LNAPL Level Monitoring Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Well ID	Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet btoc)	Depth to LNAPL (feet btoc)	Groundwater Elevation (feet AMSL)	LNAPL Elevation (feet AMSL)	LNAPL Thickness (feet)
Unconfined Aquifer (Upper)							
MW1	4/17/2017	1072.27	86.12	ND	986.15	NA	0.00
MW2	4/17/2017	1065.03	78.88	ND	986.15	NA	0.00
MW5	4/17/2017	1071.39	88.55	ND	982.84	NA	0.00
MW6S	4/17/2017	1108.35	122.12	ND	986.23	NA	0.00
MW9	4/17/2017	1019.58	33.45	ND	986.13	NA	0.00
MW10S	4/17/2017	1090.12	104.27	ND	985.85	NA	0.00
MW13	4/17/2017	1005.81	19.70	ND	986.11	NA	0.00
MW16	4/17/2017	1081.95	95.84	ND	986.11	NA	0.00
MW18	4/17/2017	1071.96	86.37	85.84	985.59	986.12	0.53
MW19	4/17/2017	1087.96	102.35	102.08	985.61	985.88	0.27
MW20	4/17/2017	1098.16	112.03	112.02	986.13	986.14	0.01
MW21	4/17/2017	1095.82	109.65	ND	986.17	NA	0.00
MW22	4/17/2017	1084.65	98.52	ND	986.13	NA	0.00
MW24	4/17/2017	1084.04	98.32	ND	985.72	NA	0.00
MW25	4/17/2017	1095.25	109.58	ND	985.67	NA	0.00
MW26	4/17/2017	1086.87	101.29	ND	985.58	NA	0.00
MW27	4/17/2017	1110.96	124.69	ND	986.27	NA	0.00
MW28	4/17/2017	1083.52	97.32	ND	986.20	NA	0.00
MW29	4/17/2017	1070.24	84.56	84.09	985.68	986.15	0.47
MW30	4/17/2017	1048.98	62.83	ND	986.15	NA	0.00
MW31	4/17/2017	1076.34	90.24	ND	986.10	NA	0.00
EW02S	4/17/2017	1082.25	96.12	ND	986.13	NA	0.00
EW03S	4/17/2017	1088.66	102.59	ND	986.07	NA	0.00
EW04S	4/17/2017	1101.01	114.92	ND	986.09	NA	0.00
EW05S	4/17/2017	1077.04	91.75	90.94	985.29	986.10	0.81
EW06S	4/17/2017	1083.61	100.91	97.53	982.70	986.08	3.38
EW07S	4/17/2017	1087.49	101.86	101.42	985.63	986.07	0.44
EW10S	4/17/2017	1088.72	107.27	102.66	981.45	986.06	4.61
EW11S	4/17/2017	1047.23	61.13	ND	986.10	NA	0.00
EW12S	4/17/2017	1086.31	101.43	100.35	984.88	985.96	1.08
EW13S	4/17/2017	1092.88	106.80	ND	986.08	NA	0.00
EW14S	4/17/2017	1098.32	113.00	112.44	985.32	985.88	0.56

Notes:

btoc - Feet below top of casing
feet AMSL - Feet above mean sea level
NA - Not applicable
ND - LNAPL was not detected in a measurable quantity

Table 2.2

Groundwater Purging and Sampling Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Location	Date	Sample Identification	Time	Purge Volume (gallons)	Temperature (°C)	Specific Conductance (µS)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Total Iron (mg/L)	Total Sulfide (mg/L)
MW1	4/18/2017	W-170418-PS-01	12:35	2.0	9.60	157	10.4	12.32	7.85	214	-	-
		W-170418-PS-02	12:40	4.0	9.62	155	6.7	12.14	7.73	210	-	-
			12:45	5.9	9.64	154	5.8	12.08	7.68	210	-	-
			12:50	7.9	9.65	154	3.2	11.88	7.65	211	0.1	ND
MW3	4/20/2017	W-170420-PS-18	14:10	4.0	10.64	610	50	16.01	7.71	-48	-	-
			14:15	5.9	11.68	650	81	11.22	7.62	-25	-	-
			14:20	7.9	11.61	664	46.1	10.61	7.53	-2	-	-
			14:25	9.9	11.67	665	31.1	10.11	7.51	0	-	-
			14:30	11.9	11.68	666	30.3	9.82	7.51	1	ND	ND
MW4	4/21/2017	W-170421-PS-20	9:20	1.3	9.66	339	15.9	0	7.74	-197	-	-
			9:25	2.6	9.74	337	8.9	0	7.93	-206	-	-
			9:30	4.0	9.79	332	3.1	0	8.07	-215	-	-
			9:35	5.3	9.85	326	0.3	0	8.14	-218	1.0	ND
MW6S	4/24/2017	W-170424-PS-27	13:05	3.0	11.36	456	588.0	6.61	6.67	82	0.8	ND
MW10S	4/24/2017	W-170424-PS-25	11:25	1.3	12.18	584	10.3	29.00	6.82	-13	-	-
		W-170424-PS-26 (Duplicate)	11:30	2.6	13.30	568	3.0	0.00	6.57	2	-	-
			11:35	4.0	12.20	559	3.2	0.00	6.51	4	-	-
			11:40	5.3	12.19	557	3.1	0.00	6.51	5	0.8	ND
MW10	4/24/2017	W-170424-PS-24 (MS/MSD)	11:00	2.0	11.72	389	12.3	2.10	7.11	-56	-	-
			11:05	4.0	11.83	422	5.0	1.66	7.28	-104	-	-
			11:10	5.9	11.83	430	4.6	1.73	7.29	-111	-	-
			11:15	7.9	11.84	434	3.7	1.65	7.30	-113	1.0	ND

Table 2.2

Groundwater Purging and Sampling Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Location	Date	Sample Identification	Time	Purge Volume (gallons)	Temperature (°C)	Specific Conductance (µS)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Total Iron (mg/L)	Total Sulfide (mg/L)
MW12	4/19/2017	W-170419-PS-11	14:50	2.0	11.93	600	2.5	3.76	7.53	64	-	-
			14:55	4.0	11.91	638	0.0	2.19	7.43	64	-	-
			15:00	5.9	11.91	646	0.0	1.82	7.42	65	-	-
			15:05	7.9	11.90	649	0.0	1.53	7.41	67	ND	ND
MW13	4/18/2017	W-170418-PS-05	7:45	2.0	8.82	129	0.9	9.59	5.83	279	-	-
			7:50	4.0	8.82	130	0.5	9.06	5.83	281	-	-
			7:55	5.9	8.83	132	0.2	8.69	5.85	284	ND	ND
MW14	4/20/2017	W-170420-PS-15	11:40	2.0	9.61	306	16	4.75	8.10	52	-	-
		W-170420-PS-16 (Duplicate)	11:45	4.0	9.84	315	4	4.95	8.12	53	-	-
			11:50	5.9	9.80	317	0	5.20	8.12	53	-	-
			11:55	7.9	9.77	318	0.0	5.13	8.13	54	ND	ND
MW16	4/19/2017	W-170419-PS-10	15:15	3.0	10.02	129	31.2	5.23	7.51	95	0.8	ND
MW17	4/20/2017	W-170420-PS-12	8:30	2.0	11.00	762	0.0	10.48	7.45	-34	-	-
		W-170420-PS-13 (Duplicate)	9:35	27.7	11.63	758	0.0	9.03	7.54	-13	-	-
			9:40	29.7	11.67	759	0.0	9.06	7.58	-1	-	-
			9:45	31.7	11.68	759	0.0	8.99	7.60	-6	-	-
			9:50	33.7	11.69	759	0.0	8.81	7.62	0	-	-
			9:55	35.7	11.69	759	0.0	8.78	7.63	5	ND	ND
MW21	4/18/2017	W-170418-PS-02	13:25	2.0	9.78	362	2.7	12.13	7.52	201	-	-
			13:30	4.0	9.81	362	1.9	11.81	7.48	206	-	-
			13:35	5.9	9.85	362	1.5	11.85	7.41	212	ND	ND

Table 2.2

Groundwater Purging and Sampling Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Location	Date	Sample Identification	Time	Purge Volume (gallons)	Temperature (°C)	Specific Conductance (µS)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Total Iron (mg/L)	Total Sulfide (mg/L)
MW22	4/21/2017	W-170421-PS-22	11:25	3.0	11.31	124	206.0	8.76	6.89	98	2.0	ND
MW23	4/19/2017	W-170419-PS-06	8:20	2.0	8.83	528	2.4	5.48	7.41	237	-	-
			8:25	4.0	9.02	528	0.9	5.15	7.75	200	-	-
			8:30	5.9	9.07	528	0.9	5.20	7.86	168	-	-
			8:35	7.9	9.10	527	0.4	5.18	7.91	140	-	-
			8:40	9.9	9.12	527	0.1	5.19	7.93	134	-	-
			8:45	11.9	9.13	527	0.0	5.18	7.95	131	ND	ND
MW25	4/18/2017	W-170418-PS-03	14:15	2.6	10.53	303	27	12.52	7.30	212	-	-
			14:20	5.3	10.75	303	5.8	11.40	7.06	219	-	-
			14:25	7.9	10.77	300	2.0	11.45	7.01	221	-	-
			14:30	10.6	10.78	298	1.8	11.42	6.99	222	ND	ND
MW28	4/20/2017	W-170420-PS-14 (MS/MSD)	10:35	32.1	10.42	352	0.0	12.78	7.86	26	-	-
			10:40	34.1	11.50	349	0.0	11.47	7.84	23	-	-
			10:45	36.1	11.54	347	0.0	10.58	7.82	28	-	-
			10:50	38.0	11.53	347	0.0	10.41	7.82	29	-	-
			10:55	40.0	11.59	346	0.0	9.90	7.82	32	ND	ND
MW30	4/21/2017	W-170421-PS-21	10:10	2.0	9.61	125	3.2	0.70	7.53	-7	-	-
			10:15	2.8	9.63	123	1.3	0.11	7.25	20	-	-
			10:20	3.6	9.63	123	0	0	6.99	33	-	-
			10:25	4.4	9.65	123	0	0	6.83	45	-	-
			10:30	5.2	9.65	124	0	0	6.76	52	-	-
			10:35	5.9	9.64	124	0	0	6.70	61	ND	ND
MW31	4/18/2017	W-170418-PS-04	14:55	2.0	10.06	229	7.5	11.17	7.29	74	-	-
			15:00	4.0	10.15	228	4.5	11.08	7.32	112	-	-
			15:05	5.9	10.15	226	3.4	11.04	7.32	122	-	-
			15:10	7.9	10.15	224	2.2	10.98	7.34	132	ND	ND

Table 2.2

Groundwater Purging and Sampling Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Location	Date	Sample Identification	Time	Purge Volume (gallons)	Temperature (°C)	Specific Conductance (µS)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Total Iron (mg/L)	Total Sulfide (mg/L)
EW11S	4/19/2017	W-170419-PS-08	10:00	2.0	9.73	296	10	6.48	6.48	158	-	-
			10:05	4.0	9.86	295	0	5.12	6.33	161	-	-
			10:10	5.9	9.84	295	0	1.43	6.19	156	-	-
			10:15	7.9	9.83	296	0	0.00	6.11	136	0.5	ND
EW11D	4/19/2017	W-170419-PS-07	9:25	1.6	9.26	655	297	2.50	7.45	-86	-	-
			9:30	3.2	9.29	640	275	3.20	7.41	-111	-	-
			9:35	4.8	9.28	632	118	3.58	7.40	-115	-	-
			9:40	6.3	9.32	619	65.9	3.61	7.40	-119	9.0	ND
EW13S	4/20/2017	W-170420-PS-19	8:55	1.6	11.24	711	185	7.81	6.64	-96	-	-
		Purged dry on 4/20/17	9:00	3.2	11.61	687	185	6.63	6.65	-98	-	-
		Sampled on 4/20/17	15:30	3.2							6.9	ND

Notes:

°C - Degrees Celcius
µS - Micro-Siemens
mg/L - Milligrams per liter
MS/MSD - Matrix Spike Sample & Matrix Spike Duplicate Sample
mV - Millivolts
ND - Not Detected
NM - Not Measured
NTU - National Turbidity Units
ORP - Oxidation Reduction Potential (ORP) reported in millivolts (mV)
Wells MW20 and MW29 were not sampled due to the presence of LNAPL

Table 2.3

Groundwater Analytical Data - Monitoring and Extraction Wells
Penta Wood Products Superfund Site
Siren, Wisconsin

Sample Location	Sample Idendification	Sample Date	Alkalinity, total (as CaCO3)	Chloride[3]	Hardness, carbonate	Nitrate (as N)	Sulfate[3]	TOC averages	Methane (dissolved)	Arsenic (dissolved)	Copper (dissolved)	Iron (dissolved)	Manganese (dissolved)	Zinc (dissolved)	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)
		ES[1]	-	250	-	10	250	-	-	10	1300	300	50	5000	1	100	5	700	800	2000
		PAL[2]	-	125	-	2	125	-	-	1	130	150	25	2500	0.1	10	0.5	140	160	400
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Semiconfined Aquifer (Lower)																				
EW11D	W-170419-PS-07	4/19/2017	152	11.4	238	5.2	97.3	3.2	35	5.0 U	0.58 J	2930 B	129 B	19.0 J	0.13	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U
MW3	W-170420-PS-18	4/20/2017	232	45.5	358	1.8 H	15.0	1.4	1.3	5.0 U	1.7 JB	83.6 JB	23.0	20.0 U	0.47	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U
MW4	W-170421-PS-20	4/21/2017	82.8	32.9	170	0.15	13.2	0.60 J	10	1.2 J	2.0 U	85.4 JB	39.0	20.0 U	0.11	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U
MW10	W-170424-PS-24	4/24/2017	142	--	234	--	--	--	--	0.76 J	5.9 B	756 B	897 B	20.0 U	7600	20	--	--	--	--
MW12	W-170419-PS-11	4/19/2017	201	10.1	346	1.0	112	1.0	0.13 J	0.46 J	1.2 JB	10.8 JB	362	20.0 U	14	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U
MW14	W-170420-PS-15	4/20/2017	131	14.8	186	3.5	7.0	0.47 J	0.50 U	1.0 J	0.37 JB	100 U	0.33 J	20.0 U	0.10 U	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U
MW14 FD	W-170420-PS-16	4/20/2017	133	14.7	188	1.7	7.0	0.49 J	0.50 U	0.99 J	2.0 U	100 U	0.64 J	20.0 U	0.10 U	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U
MW17	W-170420-PS-12	4/20/2017	201	16.1	460	2.2	164	0.48 J	0.50 U	0.71 J	0.77 JB	100 U	0.45 J	20.0 U	0.10 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U
MW17 FD	W-170420-PS-13	4/20/2017	223	16.1	470	2.2	165	0.43 J	0.50 U	0.68 J	0.65 JB	100 U	0.58 J	20.0 U	0.10 U	0.24 U	0.50 U	1.0 U	1.0 U	2.0 U
MW23	W-170419-PS-06	4/19/2017	179	34.7	304	1.9	9.1	0.76 J	0.50 U	0.59 J	2.0 U	100 U	5.0 U	20.0 U	0.095 U	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U
Unconfined Aquifer (Upper)																				
EW11S	W-170419-PS-08	4/19/2017	45.9	9.2	122	8.6	36.8	3.5	0.26 J	5.0 U	1.8 J	445 B	185 B	20.0 U	0.20	0.23 U	0.50 U	1.0 U	1.0 U	2.0 U
EW13S	W-170420-PS-19	4/20/2017	240	29.1	294	0.10 UH	16.1	37.2	32	13.7	2.2 B	10600 B	2260	20.0 U	5100	20	0.50 U	0.96 J	0.90 J	13
MW1	W-170418-PS-01	4/18/2017	64.4	3.9	84.0	0.39	5.5	0.91 J	0.50 U	0.37 J	2.0 U	100 U	5.0 U	20.0 U	0.12	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U
MW6S	W-170424-PS-27	4/24/2017	198	--	268	--	--	--	--	5.0 U	3.3 B	8.3 JB	7.4 B	20.0 U	0.13	0.23 U	--	--	--	--
MW10S	W-170424-PS-25	4/24/2017	195	--	332	--	--	--	--	0.74 J	3.3 B	394 B	1340 B	20.0 U	4300	11	--	--	--	--
MW10S FD	W-170424-PS-26	4/24/2017	195	--	350	--	--	--	--	0.65 J	3.3 B	406 B	1380 B	20.0 U	3300	10	--	--	--	--
MW13	W-170419-PS-05	4/19/2017	53.7	0.76 J	60.0	0.50	4.4	2.2	0.50 U	5.0 U	1.1 J	100 U	0.28 JB	20.0 U	0.24	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U
MW16	W-170419-PS-10	4/19/2017	39.0	3.3	60.0	0.57	4.5	2.0	0.50 U	5.0 U	1.6 JB	7.7 JB	0.80 J	20.0 U	0.10 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U
MW21	W-170418-PS-02	4/18/2017	26.7	78.6	92.0	1.8	7.5	0.77 J	0.50 U	5.0 U	0.44 J	100 U	5.0 U	20.0 U	0.017 Jp	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U
MW22	W-170421-PS-22	4/21/2017	62.9	2.8	110	0.77	4.4	0.93 J	0.50 U	5.0 U	2.6 B	100 U	0.31 J	20.0 U	0.090 J	0.23 U	0.50 U	1.0 U	1.0 U	2.0 U
MW25	W-170418-PS-03	4/18/2017	81.3	29.0	108	2.9	7.3	0.82 J	0.50 U	5.0 U	1.4 J	100 U	5.0 U	20.0 U	0.094 U	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U
MW28	W-170420-PS-14	4/20/2017	123	22.5	186	3.3	7.1	1.6	0.50 U	0.55 J	1.0 JB	11.9 JB	4.0 J	20.0 U	22	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U
MW30	W-170421-PS-21	4/21/2017	46.2	0.57 J	250	1.1	5.4	0.93 J	0.50 U	5.0 U	0.95 JB	8.1 JB	37.7	20.0 U	3.6	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U
MW31	W-170418-PS-04	4/18/2017	111	0.68 J	136	0.73	2.8	0.72 J	0.21 J	5.0 U	0.58 J	100 U	0.63 JB	20.0 U	0.026 Jp	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U

Notes:

[1] - Enforcement Standard (ES) criteria adapted from Table 1 referred to and incorporated by NR 140.10 with except of Iron, Manganese, Zinc, Chloride, and Sulfate (see note 3 below)

[2] - Preventive Action Limit (PAL) criteria adapted from Table 1 referred to and incorporated by NR 140.10 with except of Iron, Manganese, Zinc, Chloride, and Sulfate (see note 3 below)

[3] - Enforcement Standard (ES) and Preventive Action Limit (PAL) criteria adapted from Table 2 referred to and incorporated by NR 140.12

mg/L - Concentrations listed with units of milligrams per liter

ug/L - Concentrations listed with units of micrograms per liter

J - Concentration was between the limit of detection and the limit of quantitation

U - Compound was not detected above the limit of detection

B - Compound was found in the blank and sample

F1 - MS and/or MSD recovery is outside acceptance limits

H - Analysis was performed beyond the specified holding time

^ - Instrument related quality control (QC) is outside of acceptance limits

NA - Not analyzed

- Concentration exceeds the ES

- Concentration exceeds the PAL

Wells MW20 and MW29 were not sampled due to the presence of LNAPL

Table 3.1

Groundwater Analytical Data - Residential Wells and Onsite Supply Well
Penta Wood Products Superfund Site
Siren, Wisconsin

Sample Location	Sample Identification	Date	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)
		ES[1]	1	100	5	700	800	2000
		PAL[2]	0.1	10	0.5	140	160	400
			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
DW01	W-170418-PS-07R	4/18/2017	0.020 J	0.063 U	0.50 U	0.26 U	0.23 U	0.24 U
DW01 (Dup)	W-170418-PS-08R	4/18/2017	0.022 J	0.063 U	0.28 U	0.26 U	0.23 U	0.24 U
RW1	W-170419-PS-01R	4/19/2017	0.015 J	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U
RW2	W-170417-PS-02R	4/17/2017	0.015 U	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U
RW3	W-170417-PS-03R	4/17/2017	0.015 U	0.061 U	0.28 U	0.26 U	0.23 U	0.24 U
RW4	W-170417-PS-04R	4/17/2017	0.015 U	0.060 U	0.50 U	0.26 U	0.23 U	0.24 U
RW5	W-170417-PS-05R	4/17/2017	0.015 U	0.060 U	0.50 U	0.26 U	0.23 U	0.24 U
RW6	W-170418-PS-06R	4/18/2017	0.015 U	0.060 U	0.50 U	0.26 U	0.23 U	0.24 U

Notes:

[1] - Enforcement Standard (ES) criteria adapted from Table 1 referred to and incorporated by NR 140.10

[2] - Preventive Action Limit (PAL) criteria adapted from Table 1 referred to and incorporated by NR 140.10

ug/L - Concentrations listed with units of micrograms per liter

J - Concentration was between the limit of detection and the limit of quantitation

U - Compound was not detected above the limit of detection

Dup - Duplicate sample

- Concentration exceeds the ES

- Concentration exceeds the PAL

Appendix A
Historical Site Data

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

	Compound [1]		Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
DW01	9/24/03	N2	0.5 U		1 U		1 U		50 UJ			5 U		40															
DW01	5/4/04	N	10.0 U		0.243 J		61.5 R		194 R	27300		108 R		2710 R	0.102 UB	5.00 U	0.109 J	5.00 U	0.153 J	5.00 U		292	49 =		309	1.8 J	7.9 R		1.54 J
DW01	5/4/04	N2			0.280 J		49.5 R		29.2 R			58.0 R		2590 R															
DW01	9/22/04	N														5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
DW01	9/28/04	N													1.08 =														
DW01	11/1/04	N													0.0962 U														
DW01	5/11/05	N	2.0 U												0.033 J	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U					260 J				
DW01	9/27/05	N													0.040 J	0.93 UJ	0.50 U	5.0 U	5.0 U	5.0 U									
DW01	5/31/06	N	2.0 U		1.0 UJ		140 J		50 UJ			4.0 UJ		1900 J	0.039 J	0.95 U	0.50 U	5.0 U	5.0 U	5.0 U		270 J	29 J		260 J	1.5 J	6.5		1.1 J
DW01	9/26/06	N	2.0 UJ		1.0 UJ		100		50 UJ			15 J		1500 J	0.11 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U		230 J	21 J		230 J	0.67 J	13 J		2.1
DW01	5/10/07	N	2.0 UJ		1.0 UJ		100		100 UJ			10 UB		620 J	0.074 J	0.95 R	1.0 UJ	1.0 UJ	1.0 UJ	2.0 UJ		400 =	29		320	1.8	17 J		1.0 UB
DW01	9/19/07	N	2.0 UJ		0.63 J		89		100 UJ			2.4 J		1100	0.093 UJ	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U		250 J	27		330 J	1.5 J	14 J		0.92 J
DW01	5/20/08	N													0.094 UJ	0.94 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ									
DW01	10/23/08	N	2.0 UJ		2 UJ		205 J		642 J	33000 J		4.6 J		81.2 J	0.1 U	1 U	0.5 U	2.0 U	2.0 U	5.0 U		297 J	29.6		423 J	1.79 J	9.07		44.4
DW01	6/3/09	N													0.1 U	1.0 UJ	0.5 U	2.0 U	2.0 U	5.0 U									
DW01	10/8/09	N													0.1 UJ	0.994 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ									
DW01	5/19/10	N													0.1 U	1.0 U	0.4 U	5 U	5 U	5 U									
DW01	10/7/10	N													0.1 UJ	0.995 UJ	0.1 U	0.4 U	0.4 U	1 U									
DW01	6/30/11	N													0.1 U	0.999 U	0.1 U	0.4 U	0.4 U	1 U									
DW01	10/18/11	N													0.032 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
DW01	5/23/12	N													0.028 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
DW01	10/18/12	N													0.032 J	0.19 UH	0.50 U	1.0 U	1.0 U	2.0 U									
DW01	5/21/13	N													0.029 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
DW01	10/8/13	N													0.027 J	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U									
DW01	5/13/14	N													0.057 J														
DW01	9/25/14	N													0.54 J	0.060 UJ	0.24 U	0.23 U	0.22 U	0.43 U									
DW01	4/21/15	N													0.023 J	0.061 U	0.35 U	0.25 U	0.23 U	0.52 U									
DW01	10/15/15	FD													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
DW01	10/15/15	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
DW01	4/5/16	N													0.095 Jp	0.14 J	0.35 U	0.25 U	0.23 U	0.52 U									
DW01	4/5/16	FD													0.097 Jp	0.062 U	0.35 U	0.25 U	0.23 U	0.52 U									
DW01	4/18/17	N													0.020 J	0.063 U	0.29 JB	0.26 U	0.23 U	0.24 U									
DW01	4/18/17	FD													0.022 J	0.063 U	0.28 U	0.26 U	0.23 U	0.24 U									
EW02D	4/14/16	N	0.15 J	0.49 J		3.8		299			384		46.7		1 U	1.7	0.35 U	0.25 U	0.23 U	0.52 U		55.0	12.1		70.6	0.70	8.7		4.8
EW02S	4/14/16	N	0.094 J	0.49 U		1.4 J		50.2 J			39.3		7.3 U		0.1 U	2.5	0.35 U	0.25 U	0.23 U	0.52 U		30.0	10.5		41.2	1.0	7.0		2.7
EW03D	4/18/16	N	1.3	2.7 J		9.8		12500 B			1780		398		0.071 J	2.4	0.35 U	0.33 J	0.23 U	3.6		184	13.4		169	0.035 UH	25.6		10
EW03S	4/18/16	N	0.15 J	0.53 J		10.8		1050 B			3530		7.3 U		0.1 U	12	0.70 U	0.50 U	0.46 U	5.2		88.0	73.8		220	0.29 H	39.1		59.1
EW04D	4/18/16	N	0.33 J	0.49 U		2.2		3060 B			316		172		0.05 U	0.16 J	0.35 U	0.25 U	0.23 U	0.52 U		129	16.5		131	1.9	6.0		5.3
EW04S	4/18/16	N	0.12 J	0.49 U		2.4		567 B			385		7.3 U		0.23	0.25	0.35 U	0.25 U	0.23 U	0.52 U		81.0	9.9		98.0	0.92	8.1		7.2
EW05D	4/20/16	N	0.44 J	2.7 J		8.6		8430			1980		372		0.04	19	0.35 U	0.79 J	0.95 J	6.7		145 B	14.4		171	0.035 U	17.0		36.7
EW07D	4/12/16	N	0.59	0.49 U		1.1 J		122			210		7.3 U		0.1 J	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		127	23.7		174	6.6 H	8.4		1.2
EW10D	4/20/16	N	1.1	6.5		10.3		3350			2200		81.0		0.28	19	0.35 U	1.4	1.8	12		135 B	25.7 F1		180	0.057 JF1	21.8 F1		41.8
EW10D	4/20/16	FD	1.3	7.6		12.1		3720			2170		114		0.24	19	0.35 U	1.3	1.9	12		136 B	23.9		184	0.060 J	20.3		41.0
EW10D	4/20/16	RB		0.49 U		0.89 J		16.0 U			1.1 U		7.3 U		0.134 UB	0.065 U	0.35 U	0.25 U	0.23 U	0.52 U									
EW11D	4/14/16	N	0.080 U	0.49 U		1.1 J		657			22.6		46.4		0.140 UB	0.063 U	0.35 U	0.25 U	0.23 U	0.52 U		187	12.7		282	2.0	155		1.0

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
	Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
EW11D	4/14/16	FD	0.080 J	0.49 U		0.75 U		825			27.4		55.9		1.51	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		190	12.8		276	2.0	198		1.2
EW11D	7/19/16	N	1.1	0.49 U		2.7 B		292			54.5		50		0.201	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		151	9.1	242		2.2	112 F1	1.9	
EW11D	10/10/16	N	3.2	0.35 U		0.67 JB		793 B			23.6 B		6.2 U		8.4	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		190	13.6	272		2.7	159	1.0 B	
EW11D	1/19/17	N	8.9	0.35 U		0.51 JB		897 B			40.4 B		10.8 J		0.15	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		168	12.2	70.0		3.3 H	129	1.9	
EW11D	4/19/17	N	35	5.0 U		0.58 J		2930 B			129 B		19.0 J		0.13	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U	152		11.4	238		5.2	97.3	3.2	
EW11S	4/14/16	N	0.080 U	0.49 U		3.4		451			63.5		7.3 U		0.0952 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		48.6	7.0		100	8.9	45.1		5.2
EW11S	7/19/16	N	0.080 U	0.49 U		2.3 B		84.2 J			37.3		7.3 U		0.053 J	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		65.7	7.9	106		6	36.5	2.7	
EW11S	10/10/16	N	0.080 U	0.40 J		3.0 B		114 B			97.9 B		6.2 U		0.70	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		64.7	7.9	118		7.9	39.1	4.7 B	
EW11S	1/19/17	N	0.20 J	0.40 J		2.2 B		211 B			157 B		6.2 U		0.96	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		50.5	9.8	108		7.7 H	36.3	4.3	
EW11S	4/19/17	N	0.26 J	5.0 U		1.8 J		445 B			185 B		20.0 U		0.2	0.23 U	0.50 U	1.0 U	1.0 U	2.0 U	45.9		9.2	122		8.6	36.8	3.5	
EW12D	4/20/16	N	4.0	2.2 J		1.3 J		3820			1620		7.3 U		0.068 J	12	0.35 U	0.58 J	0.50 J	7.2		90.0 B	5.4		80.4	0.035 U	6.4		15.7
EW13D	4/19/16	N	1100	1.6 J		0.75 U		7660 B			956		11.7 J		0.035 J	13	0.35 U	0.27 J	0.32 J	4.8		180	15.1		167	0.093 J	2.0		20.7
EW13S	4/19/16	N	4.9	23.2		37.7		14100 B			2340		13.8 J		0.043 J	2.0	0.35 U	0.26 J	0.23 U	4.2		370	20.7		229	0.035 U	9.6		36.6
EW13S	7/26/16	N	20	58.9		133		45600			2580		52.2		0.049 J	4	0.35 U	0.31 J	0.35 J	4.4		312	21.2	292		0.035 U	7.8	32.6 ^	
EW13S	10/14/16	N	40 B	18.5		30.6 B		15600 B			2360		8.4 J		4200	6.8	0.28 U	0.53 J	0.54 J	7.1		296	25.1	236		0.035 U	11.8	34.7	
EW13S	1/24/17	N	48	11.4		3.2		8700 B			2220 B		6.2 U		6400	11	0.28 U	0.70 J	0.62 J	9.3		297	28.0	304		4.8	12.1	35.8 B	
EW13S	4/20/17	N	32	13.7		2.2 B		10600 B			2260		20.0 U		5100	20	0.50 U	0.96 J	0.90 J	13	240		29.1	294		0.10 UH	16.1	37.2	
EW14D	4/19/16	N	4.2	0.49 U		3.4		301			77.4		17.5 J		0.050 J	3.5	0.35 U	0.25 U	0.23 U	2.4		137	12.0		139	0.48 H	7.2		6.5
EW14D	4/19/16	FD	3.5	0.49 U		0.75 U		292			77.8		17.2 J		0.055 J	3.1	0.35 U	0.25 U	0.23 U	2.4		136	11.9		145	0.48 H	7.1		6.3
EW6D	1/24/17	N	0.25 J	0.35 U		0.70 J		398 B			163 B		15.4 J		840	1.7	0.28 U	0.26 U	0.23 U	1.2 J		124	12.3	144		1.0	5.9	6.4 B	
Location	**Date [2]**	**Type [3]**																											
MW1	10/9/97	FD	10 U	1		2.3		3.5 U		20 J			1180		0.048 J		0.1 U	1 U	1 U	1 U		190	16			4.5	5.8		43.5
MW1	10/9/97	FD2				2 U		70.9							0.023 J														
MW1	10/9/97	N	10 U	2		2 U		61.6		20 U			1070		0.11 U		0.1 U	1 U	1 U	1 U		190	18			6.5	6.3		20
MW1	10/9/97	N2		2		2 U		2 U							0.048 J		0.1 U	1 U	1 U	1 U									
MW1	4/24/01	N	0.11 U	0.1 U		2.4		33		9830			642		0.035 J	5.6 U	0.1 U	1 U	1 U	1 U		140	24		218	6.5 =	13		3.89
MW1	4/24/01	N2	0.11 U			1 U		25 U		25 U			15 U		0.27 R											6.5			
MW1	9/11/01	N	10 U	0.5		0.7 J		4 J		35 U			0.79 J		0.093 UJ	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		130	10		170	2.6	8.2 U		3.9
MW1	9/11/01	N2				1.3		25 U		4000			450		0.066 J														
MW1	5/14/02	N				1.4 U		1.6 J		11.2 U			0.48 J		0.060 J														
MW1	8/6/02	N	10.0 U	0.067		1.4 U		7.6 J		1700			180			5 U	1 U	5 U	5 U	5 U		170	7.4		190	0.15 U	7.9		2.6
MW1	8/6/02	N2	10.0 U	0.063		1.7 J		0.3 U		11 U			0.95 J			5 U	1 U	5 U	5 U	5 U		160	7.3		190	0.15 U	7.7		3.7
MW1	8/6/02	N3				1.8 J		9.5 J		2200			230		0.1 U														
MW1	8/6/02	N4				1.4 U		0.3 U		11 U			2.2 J		0.1 UJ														
MW1	4/29/03	N	0.5 U	0.1 U		1 U		14		3160			217		0.1 UJ	7.4 U	0.5 U	5 U	5 U	5 U		174	4.3		187	2.6	10		3.2
MW1	4/29/03	N2	0.5 U			1 U		1 U		25 U			5 U		0.1 UJ														
MW1	9/24/03	N	0.5 U	0.13		1 J		21		7000 J			416			1 U	0.25 U	2.5 U	2.5 U	2.5 U		157	3.3		68.25	2.61	2 U		8.4
MW1	9/24/03	N2	0.5 U			1 U		1 J		100 J			36																
MW1	5/4/04	N	0.863 J	1.06 J		0.346 J		5.73 R		790 R	13900		135 R		0.1 UJ	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		147	4.3 R		158	2.1 J	2.0 R		6.37 J
MW1	5/4/04	N2				0.190 J		0.785 R		29.9 R			15.0 R		0.1 UJ														
MW1	9/21/04	FD	10.0 U	0.442		0.470 J		13.6 J		1210			158		0.1 U	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		140	2.7 =		1960	1.8 J	4.5 J		7.98
MW1	9/21/04	FD2				0.227 J		0.707 J		21.0 J			3.07 J		0.1 U														
MW1	9/21/04	N	10.0 U	0.348		0.353 J		8.41 J		838			103		0.1 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U		130	2.7 =		776	1.8 J	5.2 J		6.75
MW1	9/21/04	N2				0.218 J		0.605 J		18.0 J			2.60 J		0.1 U														
MW1	5/10/05	N	2.0 U	0.12		1.0 U		18		3800			360			0.92 U	0.50 U	5.0 U	5.0 U	5.0 U		110 J	3.6 J		140 J	1.7 J	14 R		3.7 R

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
	Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW1	5/10/05	N2				1.0 U		10 U		50 U			10 U		0.1 U														
MW1	9/29/05	N	2.0 U	0.12		1.0 J		23 J		4800 J			400 J		0.1 U	1.0 U	0.50 U	5.0 U	5.0 U	5.0 U		110 J	6.2 J		160 J	1.9 J	16 R		2.4 J
MW1	9/29/05	N2				1.0 UJ		10 UJ		50 UJ			3.8 J		0.039 J														
MW1	5/31/06	N	2.0 U	0.049 J		1.0 UJ		10 UJ		50 UJ			10 UJ		0.040 J	1.0 U	0.50 U	5.0 U	5.0 U	5.0 U		110 J	2.3 J		100 J	1.6 J	17		1.7 J
MW1	5/8/07	N	2.0 UJ	0.11 J		1.0 UJ		10 UJ		100 UJ			6.3 J		0.031 R	1.0 R	1.0 U	1.0 U	1.0 U	2.0 U		190 =	2.2 J		130	1.9	15 J		1.9
MW1	9/18/07	N	2.0 UJ	0.093 UJ		1.0 UJ		10 UJ		100 UJ			10 UJ		0.096 UJ	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U		110 J	9.4		170 J	3.0 J	12 J		1.1 J
MW1	10/21/08	N	2.0 UJ	0.42 UJ		2 U		10 UJ		388	21200		10 U		0.017 J	1.00 U	0.50 U	2.0 U	2.0 U	5.0 U		109	3.91		223 J	1.62 J	6.19		3.38 J
MW1	4/12/16	N	0.080 U	0.49 U		0.75 U		19.9 JB			1.4 JB		7.3 U		0.019 J	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		79.9 B	5.1		102	0.53	5.2		0.73 J
MW1	7/20/16	N	0.080 U	0.49 U		0.75 U		16.0 U			1.1 U		7.3 U		0.035 J	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		82.4	5.6	30		0.53	5.2	0.83 J	
MW1	10/12/16	N	0.16 J	0.46 J		0.67 JB		5.3 U			0.96 JB		6.2 U		0.12	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		86.2	7.5	92		0.45 H	5.2	0.59 J	
MW1	1/19/17	N	0.080 U	0.77 J		0.76 JB		8.1 JB			0.25 U		6.2 U		0.19	0.063 U	0.28 U	0.26 U	0.23 U	0.24 U		71.9	6.7	88.0		0.54	4.7	0.65 J	
MW1	1/19/17	FD	0.080 U	0.51 J		0.73 JB		5.7 JB			0.25 U		6.2 U		0.30	0.061 U	0.28 U	0.26 U	0.23 U	0.24 U		71.9	6.8	88.0		0.54	4.8	0.73 J	
MW1	4/18/17	N	0.50 U	0.37 J		2.0 U		100 U			5.0 U		20.0 U		0.12	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U	64.4		3.9	84		0.39	5.5	0.91 J	
MW10	10/15/97	N	13.5	8200 J		1.4		9.1		2190			2510 J		4.4		0.2	2	3	17		340	35			4.9	13		20
MW10	10/15/97	N2		8200 E		2 J		2.8 U							9.2		0.2	2	3	17									
MW10	4/6/00	N		9530 J												60 =													
MW10	4/6/00	N2		12900 =												5410 U													
MW10	4/26/01	N	2.9	22800		3.1		98		25200			2560		44	5.2 U	0.4	3.3	5.3	27		472	48		505	0.18	22		26
MW10	4/26/01	N2	2.9			2.4		5.9		5650			2380		25 U														
MW10	9/12/01	N	10 U	21000		3.9		3.9 J		2400			3200		9.5 J	130	0.44 U	6.3	10	55		540 J	61		630	0.13 J	23		64
MW10	9/12/01	N2				4.5		40		20000			3300		13														
MW10	8/7/02	N	11	22000 J		9.5		48.2		24400			2730		2.8 J	120	1 U	7	11	54		400	56		480	0.15 U	20		110
MW10	8/7/02	N2				7.3		10.1 J		10700			2540		6.1 J														
MW10	10/1/03	N	0.62	9000		2 J		30		5470			1960		10 J	18	0.25 U	2.5 U	2.5 U	13.5		287	22		93.58	0.05 U	3 J		25.3
MW10	10/1/03	N2	0.62			2 J		8		2590			1850		10 U														
MW10	9/23/04	N	10.0 U	38000 =		2.66		28.3		3550			2550		5.58 J	173 E	0.296 J	5.58 J	8.09 J	47.1		390	38		1640	0.0018 J	18 =		54.1
MW10	9/23/04	N2				3.01		12.4 J		24.1 J			1810		4.23 J	160													
MW10	9/27/06	N	2.0 UJ	23000 J		1.0 U		4.3 J		120			2600		20 U	50	0.50 U	2.0 J	1.7 J	16		450 J	14		440	0.10 U	24 =		21
MW10	9/21/07	N	2.4 J	1700 J		0.88 J		2.3 J		550			2700		20 UJ	12 J	1.0 U	1.3	1.0 U	7.2		380 J	20		420 J	0.68	25 J		12 J
MW10	10/23/08	FD	7 J	1720		2 UJ		10 UJ		1080	48600 J		2190 J		20 UJ	0.82 J	0.5 U	2.0 U	2.0 U	5.0 U		310 J	12.4		500 J	0.05 J	29.5		13.1
MW10	10/23/08	N	6 J	1630		2 UJ		10 UJ		1110 J	40000 J		2210 J		20 UJ	0.92 J	0.5 U	2.0 U	2.0 U	5.0 U		305 J	12.4		432 J	0.05 U	28.1		39.2
MW10	10/7/09	FD	23 J	214 J		2 UJ		10 UJ		704 J	36900 J		2310 J		20 UJ	0.996 UJ	0.1 UJ	0.094 J	0.083 J	0.49 J		282 J	9.84 J		347.47 J	0.05 UJ	59 J		2.13 J
MW10	10/7/09	N	17 J	220 J		2 UJ		8.2 J		1210 J	38800 J		2230 J		20 UJ	0.998 UJ	0.1 UJ	0.072 J	0.073 J	0.41 J		280 J	9.82 J		369.28 J	0.05 UJ	58.7 J		4.68 J
MW10	10/7/10	FD	2.3	77.1 J		2 U		8 U		396	37200		1820		20 U	1.0 UJ	0.1 U	0.4 U	0.074 J	1 U		272	7.3 J		346	0.10 UJ	47.7 J		1.8
MW10	10/7/10	N	1.8	92.4 J		2 U		8 U		488	41600		1780		20 U	1.0 UJ	0.1 U	0.4 U	0.051 J	1 U		308	7.2 J		390	0.10 UJ	48.2 J		2.2
MW10	10/20/11	FD	11 J	21		0.60 J		2 U		180	33000 B		1700		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		260	8.7		303.00	0.22	54		2.1
MW10	10/20/11	N	8.8 J	21		2.0 U		2 U		180	33000 B		1700		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		260	8.4		303.00	0.21	53		2.1
MW10	10/17/12	FD	12	14		0.50 J		10 U		180	31000 =		1600		20 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		230	8.0		292	0.067 J	69 J		1.7
MW10	10/17/12	N	12	8.7		0.55 J		10 U		190	32000 =		1600		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		240	7.8		304	0.075 J	68 J		1.7
MW10	10/10/13	FD	140 J	16		0.19 J		10.0 UJ		230 J	31000 J		1600 J		20 UJ	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		230 B	7.9			0.39 J	94		1.7
MW10	10/10/13	N	27 J	17		0.19 J		10.0 UJ		260 J	32000 J		1700 J		20 UJ	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		220 B	7.8			0.41 J	93		1.4
MW10	9/25/14	N	8.1	37	0.21 J		0.75 U		250 B			1300		7.3 U		0.061 U*	0.24 U	0.23 U	0.22 U	0.43 U		180	6.1	270		0.10	77	0.50 U	
MW10	10/15/15	N	8.2	0.49 U		1.0 J		188			861		7.3 U		150	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U		178 B	6.5	244		ND	71.8	1.8	
MW10	4/7/16	N	290	0.49 U		0.75 U		1350			719		7.3 U		1900 *	4.8	0.35 U	0.46 J	0.53 J	2.9		162 B	9.8		189	0.035 UH	46.1		8.6 B
MW10	7/25/16	N	8.6	0.49 U		3.7 B		826 B			744		7.3 U		1700 B	5.2	0.35 U	0.66 J	0.64 J	5.2		160	12.3	188		0.035 U	31.7	11.6	

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
	Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW10	10/13/16	N	5.5 B	0.46 J		1.7 JB		434 B			777		6.2 U		7300	5.4 H	0.28 U	0.79 J	0.79 J	5.7		156	14.6	186		0.035 UH	24.3	11.1 ^	
MW10	1/24/17	N	8.5	0.46 J		1.9 J		539 B			831 B		6.2 U		6200	10	0.28 U	0.96 J	0.91 J	8.1		158	17.4	220		0.035 U	24.0	19.4 B	
MW10	4/24/17	N		0.76 J		5.9 B		756 B			897 B		20.0 U		7600	20					142			234					
MW10S	10/15/97	N	10 U	30000 E		2 U		28.5 J		45.4 J			10700 J		11.6		0.4	0.9 J	1	8		260	38			0.1 U	23		49.7
MW10S	10/15/97	N2		30000 J		2 J		10.9 J							8.4		0.4	0.9 J	1	8									
MW10S	4/7/00	N		56100 J												512 =													
MW10S	4/7/00	N2		34800 =												393 F													
MW10S	12/5/00	N	0.57	3810 B		0.74 J		13 J		610			6900		25 U	152	0.1 U	5.9	2.9	70		31	15		570	1	11		300
MW10S	12/5/00	N2	0.57	3810 J		9.36		160		11000			7100		35	152									570				
MW10S	4/25/01	N	0.55	49000		18		409		131000			7990		216	306	1 U	3.5	10 U	44		142	11		425	1.49 =	8.64		503
MW10S	4/25/01	N2	0.55			2.3		46		11300			6030		45		10 U	100 U	100 U	100 U						1.49			
MW10S	9/12/01	N	10 U	82000		5.1		170		35000			8600		100	75	0.44 U	0.94 J	0.41 J	15		270 J	10		260	4.7	13		19
MW10S	9/12/01	N2				0.29 U		3.2 J		48 J			7600		3.7 U														
MW10S	8/7/02	N	10.0 U	390 J		3.9		53.3		9490			7560		22.4 J	5 U	1 U	1 J	5 U	10		170	10		4 U	0.11 J	14		10
MW10S	8/7/02	N2				3.1		2.3 J		67.3			7070		0.98 U														
MW10S	9/25/03	N	0.5 U	2200		1 U		7		1760			5910		10 U	1 U	0.25 U	2.5 U	2.5 U	3.4 J		135	6.7		52.05	3.41	2 J		6.6
MW10S	9/25/03	N2	0.5 U			1 U		1 J		50 U			5900		10 U														
MW10S	9/22/04	N	10.0 UJ	9490		1.49 J		73.1 J		14500 J			5460 J		49.7 J	51.9	5.00 U	50.0 U	50.0 U	5.42 J		120 J	24 J		1220 J	3.6 J	15 R		7.54 R
MW10S	9/22/04	N2				0.190 J		1.79 J		22.7 J			3740 J		6.07 J														
MW10S	9/29/05	N	2.0 U	0.11 U		1.0 UJ		14 J		3600 J			4000 J		8.0 J	5.6	0.50 U	5.0 U	5.0 U	0.99 J		130 J	16 J		300 J	2.0 J	120 R		3.0 J
MW10S	9/29/05	N2				1.0 UJ		10 UJ		50 UJ			3900 J		20 UJ														
MW10S	9/26/06	N	2.0 UJ	2700 J		1.0 U		2.2 J		50 U			2500		20 U	1.2	0.50 U	5.0 U	5.0 U	2.6 J		180 J	8.6		310	1.2	79 =		6.5
MW10S	9/21/07	N	2.0 U	24 J		1.0 UJ		10 UJ		100 UJ			1300		20 UJ	2.4 R	1.0 U	1.0 U	1.0 U	2.0 U		170 J	8.7		240 J	1.3	69 J		2.9 J
MW10S	10/24/08	N	2.0 UJ													3.36	0.5 U	2.0 U	2.0 U	5.0 U									
MW10S	4/18/16	N	0.080 U	0.59 J		2.6		190 B			388		7.3 U		3500	4.7	0.35 U	0.25 U	0.23 U	2.7		102	7.8		92.1	0.035 UH	9.1		9.5
MW10S	7/25/16	N	0.080 U	0.68 J		9.2 B		183 B			315		7.3 U		5200 B	13	0.35 U	0.39 J	0.23 U	5.6		107	7.7	124		0.035 U	11.8	15.6	
MW10S	10/13/16	N	0.12 JB	0.44 J		4.6 B		124 B			399		6.2 U		6600	8.4 H	0.28 U	0.30 J	0.23 U	4.6		83.7	6.1	100		0.035 UH	11.9	12.3 ^	
MW10S	1/24/17	N	0.12 J	0.80 J		2.5		254 B			624 B		6.2 U		9800	10	0.28 U	0.40 J	0.23 U	5.7		164	12.3	220		0.035 U	17.3 F1	23.4 B	
MW10S	4/24/17	N		0.74 J		3.3 B		394 B			1340 B		20.0 U		4300	11					195			332					
MW10S	4/24/17	FD		0.65 J		3.3 B		406 B			1380 B		20.0 U		3300	10					195			350					
MW11	10/15/97	N	10 U	1 U		2 U		2 U		10 U			2 U		5.3		0.3	1 JB	0.2 J	0.5 J		190	7.5			5	12		1.3
MW11	10/15/97	N2		1 U		2 J		4.2 U							10.3		0.3	1 J	0.2 J	0.5 J									
MW11	4/4/00	N		0.6 U												11 U													
MW11	4/24/01	N	0.1 U	0.1 U		1.4		25 U		58			15 U		25	5.3 U	0.1 U	1 U	1 U	1 U		185	6.16		231	3.59 =	4.57		7.9
MW11	4/24/01	N2	0.11 U	0.11 U		1.2		25 U		25 U			15 U		20	5.3 U	0.1 U	1 U	1 U	1 U		225	6.25		231	3.59	3.48		4.67
MW11	4/24/01	N3	0.11 U			1.4		25 U		151			15 U		126	5.4 U										3.74 =			
MW11	4/24/01	N4				1.3		25 U		25 U			15 U		25 U	5.4 U										3.74			
MW11	9/10/01	N	10 U	0.091 J		1.4		2.9 J		66 J			1.9		9.1 J	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		190	8		220	3.1	7.4 U		4.2
MW11	9/10/01	N2				1.1		2.2 U		35 U			0.45 J		3.7 U														
MW11	8/6/02	N	10.0 U	0.04 U		4.7		0.83 J		46			2.3 J		6.4 J	5 U	1 U	5 U	5 U	5 U		210	7.8		230	0.15 U	7.6		18
MW11	8/6/02	N2	10.0 U			1.5 J		0.3 U		11.2 U			1.2 J		8.5 J														
MW11	9/23/03	N	0.5 U	0.11 U		1 U		2		160			5 U		10 U	0.98 U	0.25 U	2.5 U	2.5 U	2.5 U		187	6.7		72.14	2.94	2 U		2.3
MW11	9/23/03	N2	0.5 U			1 U		1 U		50 U			5 U		10 U														
MW11	9/21/04	N	10.0 U	0.0656 J		0.885 J		0.620 J		15.6 J			2.81 J		6.36 J	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U		210	9.0 =		1020	3.0 J	6.2 J		14.1
MW11	9/21/04	N2				0.948 J		0.366 J		6.05 J			1.40 J		4.05 J														

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW11	9/29/05	N	2.0 U	740 =		1.0 UJ		10 UJ		50 UJ			1.6 J		20 UJ	0.95 U	0.50 U	5.0 U	5.0 U	5.0 U		200 J	14 J		280 J	2.4 J	9.7 R		1.2 J
MW11	9/29/05	N2				1.0 UJ		10 UJ		50 UJ			3.0 J		20 UJ													
MW11	9/27/06	N	2.0 UJ	0.11 U		1.0 UJ		10 UJ		50 UJ			10 UJ		20 UJ	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U		220 J	16 J		240	0.53 J	8.8 J		2.3
MW11	9/20/07	N	2.0 UJ	0.093 U		1.2 J		10 UJ		100 UJ			10 UJ		20 UJ	0.93 U	1.0 U	1.0 U	1.0 U	2.0 U		220	20		260 J	2.4	19 J		1.2 J
MW11	10/22/08	N	2.0 UJ	0.27		2 UJ		10 UJ		533	33600 J		10 UJ		20 UJ	1 U	0.5 U	2.0 U	2.0 U	5 U		234 J	19.9		433 J	2.26 J	17.8		20.2
MW11	4/11/16	N	0.080 U	0.75 J		0.75 U		32.1 JB			1.9 JB		7.3 U		0.016 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		229 B	18.0		470	1.6 H	200		0.32 J
MW12	10/15/97	N	10 U	13000 E		2 U		5		267			1660		10.6		1	2	3	14		490	50			0.1 U	15		21.7
MW12	10/15/97	N2		13000 J		2 U		6.1 U							16.3		1	2	3	14									
MW12	4/6/00	FD		10600 J												45 =													
MW12	4/6/00	FD2		14100 =												5150 U													
MW12	4/6/00	N		15000 =												5210 U													
MW12	4/6/00	N2		10300 J												47 =													
MW12	4/26/01	N	0.99	1500		1		25 U		151			1540		25 U	44	0.34	2.5	4.1	22		564	48		556	0.43	16		23
MW12	4/26/01	N2	0.99			0.91		25 U		131			1570		25 U														
MW12	9/13/01	N	10 U	18000		1.1		5 J		770			1300		9.3 J	40	0.44 U	2.3 U	3.2 U	20		490	47		470	0.53 U	16		25
MW12	9/13/01	N2				0.95 U		6.8 J		740			1400		12														
MW12	5/14/02	FD		4000																									
MW12	5/14/02	N	10 U	4000		1.4 U		5.3 J		44.5			1670		7.4 J	33	1 U	2 J	2 J	14		490	39		520	0.68 H	16		31
MW12	5/14/02	N2		4300		1.5 J		5 J		11.2 U			1670		9.3 J										520				
MW12	5/14/02	N3				1.4 U		4.9 J		11.2 U			1680		12 J														
MW12	8/8/02	N	10.0 U	6400 J		2.8		5.6 J		123			1620		7.7 J	28	1 U	2 J	2 J	15		460	37		4 U	0.46	15		28
MW12	8/8/02	N2				1.4 U		2.9 J		105			1600		3.3 J														
MW12	4/29/03	N	0.5 U	3000		1 J		5		230			1640		10 U	17	0.5 U	1.3 J	1.3 J	11		470	31		442	0.8	20		19
MW12	4/29/03	N2	0.5 U			1 U		4		25 U			1560		10 U														
MW12	9/23/03	N	0.49 J	10000		1 U		4		70 J			1420		10 U	14	0.25 U	2.5 U	2.5 U	8.6		443	30.8		151.4	1.17	2 U		15.5
MW12	9/23/03	N2	0.49 J			1 U		3		50 U			1530		10 U		0.25 U	2.5 U	2.5 U	9.4		433	29.8		153.3	1.23	2 U		16
MW12	9/23/03	N3	0.64			1 U		4		80 J			1490		10 U														
MW12	9/23/03	N4				1 U		3		50 U			1490		10 U														
MW12	5/4/04	N	1.34 J	11200 J		0.564 J		5.50 R		52.7 R	45900		1730 R		10.8 R	22.9	0.124 J	1.39 J	1.03 J	11.2		446	29 =		443	1.1 J	14 R		20.2 J
MW12	5/4/04	N2				0.600 J		3.95 R		33.6 R			1480 R		8.80 R														
MW12	9/22/04	N	10.0 UJ	9060 J		1.00 UJ		5.09 J		53.9 J			1540 J		9.53 J	28.2 J	0.113 J	1.22 J	0.866 J	9.83		440 J	26 J		1660 J	1.1 J	12 R		18.2 R
MW12	9/22/04	N2		3730 E		0.672 J		3.91 J		22.7 J			1230 J		8.10 J														
MW12	5/10/05	N	2.0 U	8300 J		1.0 U		4.2 J		50 U			1500		8.9 J	6.1	0.50 U	0.93 J	5.0 U	5.6		390 J	23 J		360 J	1.3 J	16 R		9.9 R
MW12	5/10/05	N2				1.0 U		4.8 J		50 U			1400		20 U														
MW12	9/27/05	N	2.0 UJ	8500 J		1.0 UJ		10 U		50 U			1200		7.8 J	3.3	0.50 U	0.85 J	5.0 U	4.9 J		370 J	20 J		410	1.1 J	26 J		9.2
MW12	9/27/05	N2				1.0 UJ		3.9 J		50 U			1300		20 U														
MW12	6/7/06	N	2.0 U	6100 J		1.0 UJ		2.3 J		50 R			1100 J		20 UJ	0.94 U	0.50 U	0.67 J	5.0 U	3.4 J		400 J	21 J		400 J	2.1 J	32 =		7.2 J
MW12	9/26/06	FD	2.0 UJ	2000 =		1.0 UJ		2.5 UJ		46 J			1200 J		20 UJ	1.4	0.50 U	5.0 U	5.0 U	1.7 J		390 J	15 J		370	2.0 J	15 J		10
MW12	9/26/06	N	2.0 UJ	3100 =		1.0 UJ		3.2 J		50 UJ			1200 J		16 J	1.5	0.50 U	5.0 U	5.0 U	2.9 J		390 J	14 J		380	1.9 J	15 J		10
MW12	5/9/07	N	2.0 UJ	3000 J		1.0 UJ		2.1 J		100 UJ			1100		5.2 J	0.99 J	1.0 UJ	1.0 UJ	1.0 UJ	1.9 J		340 =	13		370	2.4	37 J		7.0 UB
MW12	9/19/07	FD	2.0 UJ	1000 J		1.1 J		1.7 J		100 R			790		20 UJ	0.74 J	1.0 U	1.0 U	1.0 U	2.0 U		340	14		350 J	2.2	2.7 J		5.7 J
MW12	9/19/07	N	2.0 UJ	1100 J		0.97 J		10 UJ		100 R			820		20 UJ	0.71 J	1.0 U	1.0 U	1.0 U	2.0 U		340	14		330 J	2.8	29 J		5.6 J
MW12	5/20/08	FD	2.0 UJ	2200 J		0.61 J		3.8		100 UJ			1000		4.2 J	0.95 U	1.0 UJ	1.0 U	1.0 U	1.6 J		360 =	12		380	2.1	25		4.5 J
MW12	5/20/08	N	2.0 UJ	2100 J		0.59 J		3.7		100 UJ			1000		4.6 J	0.96 U	1.0 UJ	1.0 U	1.0 U	1.5 J		360 =	12		350	2.0	25		4.7 J
MW12	10/21/08	FD	2.0 UJ	1300.00 J		2.00 U		3.70 J		936	45000		1120		20 U	1.00 U	0.5 U	2.0 U	2.0 U	5.0 U		322	14.50		465 J	2.95 J	31.70		11.80 J

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW12	10/21/08	N	2.0 UJ	1670.00 J		2 U		4 J		927	50200		1140		11 J	1.00 U	0.5 U	2.0 U	2.0 U	5.0 U		323	13.10		519 J	2.96 J	31.80		11.70 J
MW12	6/2/09	FD	0.8 UJ	489 J		2 U		10 UJ		292 =	40600 =		1020 =		20 U	1.0 UJ	0.5 U	0.31 J	2.0 U	0.96 J	302 J		12.4		429.3758	2.64 J	62.2		1.7 J
MW12	6/2/09	N	0.8 UJ	521 J		2 U		10 UJ		310 =	34400 =		1040 =		20 U	1.0 UJ	0.5 U	0.28 J	2.0 U	0.88 J	294 J		12.3		363.3928	2.65 J	59.9		3.6 J
MW12	10/6/09	FD	0.83 UJ	289 J		2 UJ		4 J		294 J	47600 J		982 J		20 UJ	0.997 UJ	0.1 UJ	0.069 J	0.4 UJ	0.28 J		294 J	13.7 J		468.19 J	1.83 J	84.7 J		3.25 J
MW12	10/6/09	N	0.83 UJ	295 J		2 UJ		4 J		307 J	51600 J		987 J		20 UJ	0.995 UJ	0.1 UJ	0.073 J	0.4 UJ	0.28 J		297 J	13.7 J		509.63 J	1.84 J	85.4 J		3.83 J
MW12	5/19/10	FD	1.3 U	81.9		2 UJ		3.8 J		225. J	41800. J		633. J		8.2 J	1.0 U	0.5 U	5 U	5 U	5 U		308	14.7		432	1.91 J	117		36.1 UB
MW12	5/19/10	N	1.3 U	70.3		1.9 J		3.5 J		228. J	47700. J		913. J		11. J	1.0 U	0.5 U	5 U	5 U	5 U		308	14.7		496	1.87 J	116		41.8 UB
MW12	10/5/10	FD	1.3 U	42.9		2 U		8 U		332	47500 R		859		20 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U		316	14.4 J		483	1.72	119		22.9 J
MW12	10/5/10	N	1.3 U	43.7		2 U		8 U		358	41500 R		834		20 U	1.0 U	0.1 U	0.4 U	0.044	1 U		320	14.4 J		548	1.73	119		53.9 J
MW12	6/29/11	FD	0.9 U	35.1		2 UJ		10 U		291	56900		765		20 U	0.998 U	0.1 U	0.4 U	0.4 U	1 U		276	13.3 J		524.00	2.11 J	103 J		1.53 J+
MW12	6/29/11	N	0.9 U	37		1.8 J		10 U		314	62600		744		20 U	0.998 U	0.1 U	0.4 U	0.4 U	1 U		295	14.1 J		555.00	2.28	111		1.28 J+
MW12	10/18/11	FD	0.50 U	30		1.0 J		2.3 J+		50 U	42000 B		640		10 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		300	14		398.00	2.1	100		2.0
MW12	10/18/11	N	0.50 U	37		1.1 J		2.3 J+		50 U	42000 B		660		10 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		300	14		398.00	2.1	98		2.0
MW12	5/22/12	FD	0.50 U	16 J		2.0 U		4.3 J		50 U	43000 =		630		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		310	14 =		419.00	1.8	120		1.6
MW12	5/22/12	N	0.50 U	21 J		2.0 U		10 U		50 U	44000 =		670		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		300	14 =		431.00	1.8	120		1.5
MW12	10/16/12	FD	0.50 U	23		1.2 J		10 U		50 U	43000 =		420		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		290	13		424	2.0 J	130 =		1.3
MW12	10/16/12	N	0.50 U	26		0.98 J		10 U		50 U	42000 =		410		20 U	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U		280	14		413	2.0 J	120 =		1.4
MW12	5/22/13	FD	0.50 U	24		2.0 U		10 U		50 UJ	39000 B		530 B		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		290	12			2.1 J	150		1.6
MW12	5/22/13	N	0.50 U	22		2.0 U		10 U		50 U	36000 B		460 B		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		280	12			2.0 J	150		1.6
MW12	10/8/13	FD	0.50 U	22		0.37 J		10.0 U		50 U	42000 B		710 B		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		260	12			2.1 J	120		1.3
MW12	10/8/13	N	0.50 U	28		0.37 J		10.0 U		50 U	41000 B		680 B		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		270	12			2.1 J	120		1.4
MW12	5/14/14	N		19																									
MW12	9/23/14	N	0.076 J	24	0.66 JB		0.75 U		16 U			450		7.3 U		0.061 U	0.24 U	0.23 U	0.22 U	0.43 U		240	11	360		1.7	130	0.50 U	
MW12	4/20/15	N	0.070 U	16	1.1 JB		1.4 J		16 U			530		7.3 U		0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		220 B	11		410	1.7	140		0.95 J
MW12	10/13/15	N	0.080 JB	0.49 U		0.75 U		362 B			27.4		7.3 U		25	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U		279 B	11.7	74.4		1.6	159	1.2	
MW12	4/6/16	N	0.12 J	0.77 J		1.4 JB^		60.1 JB			148 B		7.3 U		5.2	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		236 B	10.6		358 F2	1.6	135		0.67 J
MW12	7/19/16	N	0.080 U	0.61 J		1.6 JB		16.0 U			388		7.3 U		14	0.061 U	0.35 U	0.25 U	0.23 U	0.52 U		238	10.1	358		1.4	134	0.96 J	
MW12	10/12/16	N	0.092 J	0.50 J		1.6 JB		10 JB			439 B		6.2 U		14	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		239	10.8	340		1.2 H	124	0.71 J	
MW12	1/18/17	N	0.13 JB	0.87 J		1.4 JB		8.5 JB			427		6.2 U		18	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		203	10.7	326		1.1 H	122	0.89 J	
MW12	4/19/17	N	0.13 J	0.46 J		1.2 JB		10.8 JB			362		20.0 U		14	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U	201		10.1	346		1	112	1	
MW13	10/8/97	N	10 U	0.7 J		2 U		3.32 U		6.7 J			27.3		2.7		0.1 U	1 U	1 U	1 U		70	2.7			1.4	1.4		17.9
MW13	10/8/97	N2		0.7 J													0.1 U	1 U	1 U	1 U									
MW13	4/5/00	N		0.8 =												10 U													
MW13	12/5/00	N	0.58 U	114 J		1 U		25 U		230			66		25 U	5.5 U	0.1 U	1 U	1 U	1 U		72	4.2		140	0.45	8.2		7.9
MW13	12/5/00	N2	0.58 U					92		26000			870		52	5.5 U	0.1 U	1 U	1 U	1 U					140				
MW13	4/23/01	N	0.12 U	0.18		14		140		56300			1300		89	5.3 U	0.1 U	1 U	1 U	1 U		70	3.52		146	1.77	35		18
MW13	4/23/01	N2	0.12 U			0.24		25 U		25 U			110		25 U														
MW13	6/19/01	N	0.12 U	0.11 U		1.1		68		32800			848		45	5.3 U	0.12	1 U	1 U	1 U		68	5.73		112	2.87 =	11		13
MW13	6/19/01	N2	0.12 U			9.1		6.1 J		141			26		25 U											2.87			
MW13	9/10/01	N	10 U	0.69		3.9		49		14000			510		37	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		75	5.4		100	2.5	7.5 U		9.5
MW13	9/10/01	N2				0.54 J		2.8 J		52 J			27		4.7 J														
MW13	8/5/02	N	10.0 U	0.64		9.1		55.3		19000			580		39.5	5 U	1 U	5 U	5 U	5 U		86	6.8		110	0.15 U	8.4		6.3
MW13	8/5/02	N2				2.2 J		2.5 J		1300			45		9.1 J														
MW13	9/23/03	N	0.5 U	2.9		3		55		24600			687		50	1 U	0.25 U	2.5 U	2.5 U	2.5 U		78	5.1		35.04	1.86	7		6
MW13	9/23/03	N2	0.5 U			1 U		8		960			182		10 U														

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW13	9/21/04	N	10.0 UJ	4.67		1.52		32.4		8770			357		24.3 J	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		68 J	6.5 J		667 J	2.4 J	6.4 R		6.30 R
MW13	9/21/04	N2				0.259 J		1.96 J		125 UJ			3.67 J		5.28 J														
MW13	9/27/05	N	2.0 UJ	0.85		1.0 J		18		6200			200		18 J	0.97 U	0.50 U	5.0 U	5.0 U	5.0 U		67 J	3.1 J		68	0.60 J	19 J		4.3
MW13	9/27/05	N2				1.0 UJ		2.5 J		50 U			7.1 J		20 U														
MW13	9/18/07	N	2.0 UJ	0.53 J		1.0 UJ		10 UJ		100 UJ			6.3 J		5.2 J	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U		71 J	2.9		100 J	0.31 J	29 J		4.1 J
MW13	10/21/08	N	2.0 UJ	0.31 UJ		2 U		10 UJ		207	10500 J		10 U		20 U	1.00 U	0.50 U	2.0 U	2.0 U	5.0 U		55	1.90		110 J	0.45 J	10.10		3.44 J
MW13	10/7/09	N	0.83 UJ	0.16 J		2 UJ		3.2 J		50 UJ	4430 J		10 UJ		20 UJ	0.996 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ		30 J	2.12 J		45.46 J	0.77 J	9.71 J		13.9 J
MW13	4/13/16	N	0.080 U	0.49 U		3.2		449			13.4		7.3 U		0.34	0.065 U	0.35 U	0.25 U	0.23 U	0.52 U		51.0	1.4		54.9	0.70	3.4		4.2
MW13	7/20/16	N	0.080 U	0.49 U		1.5 J		19.4 J			1.1 U		7.3 U		1.1	0.063 U	0.35 U	0.25 U	0.23 U	0.52 U		39.5 B	0.91 J	86		1	2.2	2.1	
MW13	10/10/16	N	0.080 U	0.87 J		2.3 B		23.2 JB			0.94 JB		6.2 U		0.37	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		49.3	0.98 J	56		0.58 H F1	3.1 F1	1.9 B	
MW13	1/19/17	N	0.080 U	0.35 J		3.1 B		17.1 JB			1.1 JB		6.2 U		0.33	0.064 U	0.28 U	0.26 U	0.23 U	0.24 U		50.8	0.71 J	52.0		0.49 H	3.6	2.2	
MW13	4/19/17	N	0.50 U	5.0 U		1.1 J		100 U			0.28 JB		20.0 U		0.24	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U	53.7		0.76 J	60		0.5	4.4	2.2	
MW14	10/9/97	N	10 U	1 U		2 U		2 U		20 U			4 J		4		0.1 U	1 U	1 U	1 U		120	8			1.6	2.4		1 U
MW14	10/9/97	N2		1 U		2 U		2 U							2 U		0.1 U	1 U	1 U	1 U									
MW14	4/6/00	N		0.5 U												11 U													
MW14	6/19/01	N	0.11 U	0.96		1.4		5.4 J		1070			57		25 U	239	0.1 U	1 U	1 U	1 U		104	12		124	2.06	3.48 J		6.41
MW14	6/19/01	N2	0.11 U			2		25 U		25 U			4.4		25 U											2.06 =			
MW14	1/23/17	N	0.080 U	1.1 J		0.62 J		5.3 U			1.6 JB		6.2 U		0.12	0.061 U	0.28 U	0.26 U	0.23 U	0.24 U		129	15.8	146		1.7 H	6.6	0.51 JB	
MW14	4/20/17	N	0.50 U	1.0 J		0.37 JB		100 U			0.33 J		20.0 U		0.10 U	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U	131		14.8	186		3.5	7	0.47 J	
MW14	4/20/17	FD	0.50 U	0.99 J		2.0 U		100 U			0.64 J		20.0 U		0.10 U	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U	133		14.7	188		1.7	7	0.49 J	
MW15	10/16/97	N	10 U	1 U		2 U		2 U		8.2 J			62.2		2 U		0.1 U	1 U	1 U	1 U		190	6.5			4.1	6.3		1.2
MW15	10/16/97	N2		1 U		2 U		3.5 U							13.9		0.1 U	1 U	1 U	1 U									
MW15	4/4/00	N		0.5 U												11 U													
MW15	4/25/01	N	0.1 U	0.11 U		0.5		25 U		58			4.8		50	5.3 U	0.1 U	1 U	1 U	1 U		240	15		276	3.97	2.61		5.24
MW15	4/25/01	N2	0.1 U	0.11 U		0.31		25 U		25 U			15 U		15	5.6 U	0.1 U	1 U	1 U	1 U		246	16		276	3.97 =	4.05		3.7
MW15	4/25/01	N3	0.12 U			0.56		25 U		174			4.1		25 U	5.6 U										3.92			
MW15	4/25/01	N4				0.42		25 U		25 U			15 U		16											3.92 =			
MW15	9/12/01	N	10 U	0.077 J		0.95 U		2.9 J		35 U			0.31 J		35	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		240	17		270	3.7	4.5 U		4.5
MW15	9/12/01	N2				0.95 U		5.7 J		63 J			2.7		36														
MW15	8/6/02	N	10.0 U	0.04 U		3.7		1.6 J		130			2.8 J		17 J	5 U	1 U	5 U	5 U	5 U		230	16		250	0.15 U	4.7		53
MW15	8/6/02	N2				2.6		0.3 U		11 U			0.42 U		11 J														
MW15	9/23/03	N	0.5 U	0.1 U		1 U		1 J		280			9 J		10 J	0.99 U	0.25 U	2.5 U	2.5 U	2.5 U		213	17.4		88.57	3.8	2 U		1.8
MW15	9/23/03	N2	0.5 U			1 U		1 U		50 U			5 U		10 U														
MW15	9/21/04	N	10.0 U	0.279		0.468 J		1.74 J		36.7			3.15 J		20.8 J	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U		230	16 =		1020	3.2 J	3.9 J		12.7
MW15	9/21/04	N2				0.482 J		0.648 J		5.57 J			0.976 J		8.97 J														
MW15	9/29/05	N	2.0 U	0.11 U		1.0 UJ		2.4 J		420 J			15 J		20 UJ	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U		220 J	17 J		300 J	4.2 J	5.8 R		0.84 J
MW15	9/29/05	N2				1.0 UJ		10 UJ		50 UJ			1.6 J		20 UJ														
MW15	9/27/06	N	2.0 UJ	0.11 U		1.0 UJ		3.5 J		50 UJ			2.0 UB		13 J	0.91 U	0.50 U	5.0 U	5.0 U	5.0 U		260 J	14 J		250	4.7 J	5.9 J		2.1
MW15	9/19/07	N	2.0 UJ	0.10 U		0.68 J		10 UJ		100 UJ			10 UJ		20 UJ	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U		250	15		250 J	5.7	13 J		1.3 J
MW15	5/20/08	N	2.0 UJ	0.18 J		0.40 J		1.0 J		100 UJ			0.52 J		20 U	0.93 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ		260 =	14		290	4.7	6.6		0.85 J
MW15	10/21/08	N	2.0 UJ	0.10 UJ		2 U		10 UJ		854	45400		10 U		20 U	1.00 U	0.5 U	2.0 U	2.0 U	5.00 U		265	14.60		567 J	6.05 J	6.99		13.60 J
MW15	6/2/09	N	0.8 UJ	0.1 UJ		2 U		10 UJ		301 =	30600 =		10 U		20 U	1.0 UJ	0.5 U	0.21 J	2.0 U	5.0 U	279 J		13.5		375.2114	5.33 J	6.42		1.7 UJ
MW15	10/7/09	N	0.83 UJ	0.1 UJ		2 UJ		3 J		293 J	25500 J		10 UJ		5.4 J	0.999 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ		260 J	12.9 J		294.28 J	4.74 J	6.52 J		1.49 J
MW15	5/18/10	N	1.3 U	0.1 U		2 UJ		10 UJ		194. J	24400. J		10 UJ		20 UJ	1.0 U	0.5 U	5 U	5 U	5 U		300	10.7		342	4.57 J	6.3		26.7 UB
MW15	10/7/10	N	1.3 U	2.32 J		2 U		8 U		311	38400		16.7 U		20 U	1.0 UJ	0.5 UJ	2 UJ	2 UJ	5 UJ		252	13.2 J		430	5.49 J	6.9 J		1.0 U

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
	Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW15	6/28/11	N	0.9 U	0.1 U		2 UJ		10 U		205	23100		10 U		20 U	0.998 U	0.1 U	0.4 U	0.4 U	1 U		239	12.1 J		307.00	5.2 J	6.91		0.77 J
MW15	10/18/11	N	0.50 U	0.10 U		0.70 J		2.7 J+		50 U	24000 B		1.7 J		10 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		240	12		261.00	4.8 J	5.3		1.0 J
MW15	5/22/12	N	0.50 U	0.024 J		2.0 U		10 U		50 U	24000 =		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		260	11		266.00	4.6 J	5.1 J		1.2
MW15	10/16/12	N	0.50 U	0.094 U		0.97 J		10 U		50 U	24000 =		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		250	12		271	5.3 J	5.0 U		0.69 J
MW15	5/21/13	N	0.50 U	0.025 J		2.0 U		10 U		50 U	26000 B		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		280	9.8			4.7 J	5.9		0.82 J
MW15	10/8/13	N	0.50 U	0.095 U		0.36 J		10.0 U		50 U	23000 B		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		220	11			5.2 J	6.5		0.50 J
MW15	5/13/14	N		0.095 U																									
MW15	9/23/14	N	0.070 U	0.054 J	1.1 JB		0.75 U		28 J			1.9 J		7.3 U		0.060 U	0.24 U	0.23 U	0.22 U	0.43 U		210	11	250		5.3	5.6	0.85 J	
MW15	4/20/15	N	0.070 U	0.015 U	0.78 JB		0.75 U		16 U			1.1 J		7.3 U		0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		190 B	11		270	5.6	5.7		0.44 J
MW15	10/12/15	N	0.080 U	0.54 J		1.0 J		16.0 U			1.1 U		7.3 U		0.015 U	0.063 U	0.35 U	0.23 U	0.25 U	0.52 U		224 B	12	302		6.7 F1	5.8	0.55	
MW15	4/5/16	N	0.080 U	0.70 J		1.7 JB		16.0 U			1.1 U		7.3 U		0.078 J	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		207 B	12.5		312	0.45	6.3		0.49 J
MW16	10/14/97	N	10 U	1 U		17.1		438		15.3 J			10300 J		210		0.1 U	1 U	1 U	1 U		170	6.1			2.6	8.1		3
MW16	10/14/97	N2		1 U		2 U		2.7 U							1.9 J		0.1 U	1 U	1 U	1 U									
MW16	4/6/00	N		0.5 U												10 U													
MW16	4/23/01	N	0.12 U	0.11 U		6.5		62		22300			1460		136	5.6 U	0.1 U	1 U	1 U	1 U		90	3.57		164	8.69 =	29		4.4
MW16	4/23/01	N2	0.12 U			1 U		25 U		26			9.4		23											8.69			
MW16	9/10/01	N	10 U	0.17		1.8		23 U		5500			520		19	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		79	1.8		120	5.8	11		0.34 U
MW16	9/10/01	N2				0.29 U		2.2 U		35 U			0.82 J		4.5 J														
MW16	8/6/02	N	10.0 U	0.035 J		3.5		25 J		6800			14		760 J	5 U	1 U	5 U	5 U	5 U		130	2		120	0.15 U	13		1.3
MW16	8/6/02	N2				1.4 U		0.3 U		78			9.1 J		13 J														
MW16	9/23/03	N	0.5 U	0.089 J		2 J		18		7470			532		10 J	1.1 U	0.25 U	2.5 U	2.5 U	2.5 U		82	6.2		37.96	3.49	3 J		2.3
MW16	9/23/03	N2	0.5 U			1 U		1 U		50 U			5 U		10 U														
MW16	9/21/04	N	10.0 U	0.0962 J		0.277 J		4.07 J		570			74.7		8.71 J	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U		82	3.7 =		1220	2.1 J	5.5 J		4.28
MW16	9/21/04	N2				0.135 J		0.509 J		25.0 U			0.617 J		2.79 J														
MW16	9/29/05	N	2.0 U	0.11 U		1.0 UJ		7.6 J		1000 J			130 J		8.1 J	1.0 U	0.50 U	5.0 U	5.0 U	5.0 U		82 J	11 J		190 J	1.5 J	71 R		0.83 J
MW16	9/29/05	N2				1.0 UJ		2.9 J		50 UJ			2.1 J		20 UJ														
MW16	9/27/06	N	2.0 UJ	0.046 J		1.0 UJ		10 UJ		50 UJ			0.59 UB		20 UJ	0.92 U	0.50 U	5.0 U	5.0 U	5.0 U		83 J	4.1 J		100	1.2 J	32 J		1.3
MW16	9/18/07	N	2.0 UJ	0.20 J		1.0 UJ		10 UJ		100 UJ			10 UJ		20 UJ	0.99 R	1.0 U	1.0 U	1.0 U	2.0 U		81 J	4.5		120 J	1.2 J	23 J		1.3 J
MW16	10/22/08	N	2.0 UJ	0.08 J		2 UJ		10 UJ		318 J	19400 J		20 J		20 UJ	1 U	0.5 U	2.0 U	2.0 U	5 U		51 J	7.51		175 J	0.99 J	43.2		92.3
MW16	10/6/09	N	0.83 UJ	0.1 UJ		2 UJ		6.6 J		458 J	8360 J		48.6 J		20 UJ	0.998 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ		40 J	6.35 J		81.869 J	1.03 J	36.7 J		1 UJ
MW16	10/5/10	N	1.3 U	0.1 U		2 U		8 U		50 U	2910 R		16.7 U		20 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U		39	5.7 J		29.3	0.63 J	6.3 J		15.7
MW16	10/19/11	N	0.50 U	0.095 U		0.44 J		2.2 J+		130	3200 B		14		10 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		32	4.2		30.70	0.63 J	12		1.0 U
MW16	10/16/12	N	0.50 U	0.099 U		0.66 J		10 U		180	3600 =		17		20 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		37	4.6		39.8	0.52 J	17 J		1.3
MW16	10/8/13	N	0.50 U	0.029 J		0.61 J		10.0 U		1500 B	3300 B		100 B		59 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		34	6.2			0.57 J	6.3		1.1
MW16	9/23/14	N	0.070 U	0.036 J	0.41 JB		0.75 U		16 U			1.1 U		7.3 U		0.060 U	0.24 U	0.23 U	0.22 U	0.43 U		31	5.4	60		0.54	2.8	1.1	
MW16	10/13/15	N	0.080 U	0.49 U		1.0 J		45.2 JB			2.1 J		7.3 U		0.015 U	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U		48.4 B	4.3	84.4		0.61	5.9	0.70 J	
MW16	4/6/16	N	0.080 U	0.49 U		1.9 J		168 B			14.6 B		7.3 U		0.015 U	0.11 J	0.35 U	0.25 U	0.23 U	0.52 U		32.6 B	2.2		31.8	0.41	2.6		2.3
MW16	7/19/16	N	0.080 U	0.49 U		2.2 B		114			11.5		7.3 U		0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		32.4	2.2	34		0.42	2.6	5.8	
MW16	10/12/16	N	0.080 U	0.40 J		1.7 JB		61.7 JB			5.3 B		6.2 U		0.18	0.061 U	0.28 U	0.26 U	0.23 U	0.24 U		33.1	2.4	24		0.30 H	2.2	0.58 J	
MW16	1/18/17	N	0.080 U	0.47 J		1.3 JB		11.5 JB			1.2 J		6.2 U		0.015 U	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		31.3	3.2	46.0		0.46 H	3.6 F1	1.1	
MW16	4/19/17	N	0.50 U	5.0 U		1.6 JB		7.7 JB			0.80 J		20.0 U		0.10 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U	39		3.3	60		0.57	4.5	2	
MW17	10/15/97	N	10 U	1 U		2 U		2		10 U			2 U		17.6		0.1 U	1 JB	1 U	0.6 J		180	4.8			4.1	10		0.7 J
MW17	10/15/97	N2		1 U		2 U		2.3 U							2.5		0.1 U	1 J	1 U	0.6 J									
MW17	10/28/97	N		5																									
MW17	4/6/00	N		0.5 U												11 U													

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
	Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW17	4/26/01	N	0.12 U	0.72		0.6		25 U		33			15 U		12	54	0.1 U	1 U	1 U	1 U		202	4.12		228	4.98	6.82		1.57
MW17	4/26/01	N2	0.12 U			0.69		25 U		25 U			15 U		25 U											4.98 =			
MW17	9/11/01	N	10 U	0.059 U		0.94		2.2 U		330			0.27 U		3.7 U	0.29 U	0.44 U	0.5 U	0.4 U	1.2 U		180	4.8		210	4.4	9.3 U		1 J
MW17	9/11/01	N2				1		2.2 U		310			0.27 U		3.7 U														
MW17	8/8/02	N	10.0 U	0.032 J		3		0.47 J		11 U			0.42 U		0.98 U	5 U	1 U	5 U	5 U	5 U		200	4.6		210	0.15 U	7.4		0.73
MW17	8/8/02	N2				1.9 J		0.3 U		11 U			0.42 U		15 J														
MW17	9/25/03	N	0.5 U	0.46		1 U		1 U		50 U			18		10 U	0.96 U	0.25 U	2.5 U	2.5 U	2.5 U		184	4.4		71.56	5.1	2 U		2.1
MW17	9/25/03	N2	0.5 U			1 U		1 U		50 U			5 U		10 U														
MW17	9/22/04	N	10.0 UJ	2.82		0.0787 J		0.774 J		11.5 UB			0.371 J		2.46 J	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		190 J	4.1 J		1100 J	4.8 J	8.6 R		1.67 R
MW17	9/22/04	N2				0.782 J		0.847 J		13.9 J			45.0 J		2.09 J														
MW17	9/27/05	N	2.0 UJ	0.054 J		1.0 UJ		10 U		50 U			0.44 J		20 U	0.92 U	0.50 U	5.0 U	5.0 U	5.0 U		160 J	3.9 J		180	5.1 J	7.8 J		0.91 J
MW17	9/27/05	N2				1.0 UJ		10 U		50 U			10 U		20 U														
MW17	9/26/06	N	2.0 UJ	0.11 U		1.0 UJ		10 UJ		50 UJ			10 UJ		7.5 J	0.91 U	0.50 U	5.0 U	5.0 U	5.0 U		170 J	2.9 J		170	5.5 J	6.5 J		1.1
MW17	9/19/07	N	2.0 UJ	0.099 U		1.0 J		10 UJ		100 UJ			10 UJ		20 UJ	0.94 U	1.0 U	1.0 U	1.0 U	2.0 U		160	4.7		160 J	5.6	14 J		1.2 J
MW17	10/22/08	N	2.0 UJ	0.1		2 UJ		10 UJ		374 J	29200 J		10 UJ		20 UJ	1 U	0.5 U	2.0 U	2.0 U	5 U		155 J	7.78		295 J	5.75 J	7.75		20.2
MW17	10/6/09	N	0.83 UJ	0.1 UJ		2 UJ		10 UJ		160 J	26700 J		10 UJ		20 UJ	0.995 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ		60 J	6.54 J		295.228 J	1.65 J	6.86 J		1 UJ
MW17	10/5/10	N	1.3 U	0.1 U		2 U		10 U		163	20500		10 U		20 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U		160	11.6 J		225	5.18	9.7 J		1.6
MW17	10/18/11	N	0.50 U	0.095 U		1.1 J		2 U		50 U	17000 B		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		140	16		180.00	3.9	24		0.89 J
MW17	10/16/12	N	0.50 U	0.095 U		1.2 J		10 U		50 U	17000 =		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		150	16		187	4.7	23 J		0.59 J
MW17	10/8/13	N	0.50 U	0.095 U		0.72 J		10.0 U		50 U	18000 B		10 U		20 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		140	16			4.5 J	36		0.40 J
MW17	9/24/14	N	0.070 U	0.015 U	0.83 J		0.75 U		16 U			1.3 J		7.3 U		0.061 U	0.24 U	0.23 U	0.22 U	0.43 U		150	15	250		4.8	40	0.72 J	
MW17	10/13/15	N	0.080 U	1.1 J		0.75 U		16.0 U			1.1 U		7.3 U		0.015 U	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U		184 J	14.8	265		4.2 H	45.3	0.59	
MW17	4/5/16	N	0.080 U	0.81 J		1.8 JB		16.0 U			1.1 U		7.3 U		0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		173 B	13.6		289	3.5	85.4		0.46 J
MW17	7/19/16	N	0.080 U	0.84 J		1.4 JB		16.0 U			1.1 U		7.3 U		0.015 U	0.061 U	0.35 U	0.25 U	0.23 U	0.52 U		195	14.7	336		2.8	142	0.52 J	
MW17	10/11/16	N	0.080 U	0.80 J		0.76 JB		5.3 U			0.28 JB		6.2 U		0.015 U	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		208	17.0	348		2.7	136	0.36 JB	
MW17	1/23/17	N	0.13 J	0.73 J		1.4 J		5.3 U			0.25 U		6.2 U		0.099	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		202	17.4	390		2.1 H	167	0.81 JB	
MW17	1/23/17	FD	0.080 U	0.76 J		0.66 J		5.3 U			0.25 U		6.2 U		0.015 U	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		213	17.4	380		2.1 H	167	0.50 JB	
MW17	4/20/17	N	0.50 U	0.71 J		0.77 JB		100 U			0.45 J		20.0 U		0.10 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U	201		16.1	460		2.2	164	0.48 J	
MW17	4/20/17	FD	0.50 U	0.68 J		0.65 JB		100 U			0.58 J		20.0 U		0.10 U	0.24 U	0.50 U	1.0 U	1.0 U	2.0 U	223		16.1	470		2.2	165	0.43 J	
MW18	10/10/97	N	10 U	27000 J		8.2		43.5 J		32000 J			10600		2.6		0.1 U	2	16	19		260	49			0.1 U	11		154
MW18	10/10/97	N2		27000 E		8.9		62.5							5.3		0.1 U	2	16	19									
MW18	6/19/01	N	0.13 U	27400		4.9		21 J		13700			6650		25 U	5 U	1.1	14	10 U	20		168	19		182	0.13 U	33 J		6.63
MW18	6/19/01	N2	0.13 U			5		43		15200			6540		25 U														
MW19	10/16/97	N	10 U	19000 J		2 U		38 J		10 U			2690 J		46		0.2	1 U	1 U	0.2 J		180	47			3.8	19		32.8
MW19	10/16/97	N2		19000 E		2 U		3.4 U							2 U		0.2	1 U	1 U	0.2 J									
MW19	4/7/00	N		11800 =												5260 U													
MW19	4/7/00	N2		11000 J												22 =													
MW19	4/26/01	N	0.5	25600		2.2		38		10000			1840		27	325 =	1 U	10 U	10 U	10		236	39		323	3.37 =	47		33
MW19	4/26/01	N2	0.5			1 U		25 U		25 U			1790		25 U	325	10 U	100 U	100 U	100 U						3.37			
MW19	9/12/01	N	16	400000		0.29 U		6.4 J		71 J			1800		5.8 J	240	0.44 U	1.9 U	1.7 U	28		320 J	19		270	1.3	9.7 U		34
MW19	9/12/01	N2				1.7 J		44		5600			2100		53 J														
MW19	5/13/02	N		14000		1.4 U		5.1 J		11.2 U			2070		9.4 J	190													
MW19	8/8/02	N	10.0 U	11000 J		7		30.2		719			3100		290	210	1 U	2 J	1 J	29		130	22		4 U	0.16	16		65
MW19	8/8/02	N2				1.4 U		7.1 J		218			3110		5.7 J														
MW19	4/29/03	N	2.4	4900		2 J		24		2030			3670		10 U	1200	500 U	5000 U	5000 U	5000 U		118	19.6		162	3	27		53

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Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW19	4/29/03	N2	2.4			1 U		5		25 U			3590		10 U														
MW19	9/25/03	N	5.7	15000		1 U		27		950			2210		10 U	3200	1 U	10 U	10 U	46.6		160	17.5 J		71.57	2 J	90 J		129 J
MW19	9/25/03	N2	5.7			1 U		9		50 J			4470		10 U											2 J			
MW19	5/4/04	N	1.13 J	70000 J		0.284 J		22.2 R		892 R	17600		4040 R		11.6 R	201	2.50 U	2.13 J	1.98 J	30.0		144	25 =		176	0.71 J	16 R		43.7 J
MW19	5/4/04	N2				0.169 J		5.77 R		31.4			3360 R		6.93 R														
MW19	9/22/04	N	10.0 UJ	111000		1.00 UJ		13.5 J		402 J			3160 J		16.7 J	260	0.500 U	3.45 J	2.25 J	50.3		110 J	15 J		1120 J	1.5 J	23 R		31.3 R
MW19	9/22/04	N2				0.159 J		6.26 J		125 U			2650		16.0 J														
MW19	5/10/05	N	2.0 U	45000 J		1.0 U		6.3 J		50 U			2300		9.8 J	2300 =	100 UJ	1000 UJ	1000 UJ	1000 UJ		97 J	18 J		140 J	0.76 J	29 R		35 R
MW19	5/10/05	N2				1.0 U		15		630			2100		8.4 J														
MW19	9/29/05	N	2.0 U	13000 =		1.0 UJ		11 J		97 J			2600 J		20 UJ	78	0.50 U	1.2 J	1.1 J	18		140 J	19 J		5 UJ	0.75 J	40 R		32 J
MW19	9/29/05	N2				1.0 UJ		5.0 J		50 UJ			2700 J		20 UJ														
MW19	6/7/06	N	2.0 U	17000 J		1.0 UJ		4.4 J		50 UJ			2700 J		20 UJ	59	0.50 U	1.5 J	1.3 J	22		120 J	18 J		360 J	0.76 J	36 =		20 J
MW19	9/27/06	N	2.0 UJ	8200 J		1.0 U		6.4 J		50 U			3100		20 U	69	0.50 U	1.4 J	1.2 J	19		160 J	14		190	0.66 J	30 =		35
MW19	5/9/07	N	2.0 UJ	11000 J		1.0 UJ		3.7 J		100 UJ			2600		20 UJ	54 J	1.0 U	1.4	1.5	17		230 =	15		160	0.29	59 J		33 UB
MW19	9/21/07	N		3500 J		1.0 UJ		4.0 J		100 UJ			3100		20 UJ	47 R	1.0 U	1.8	2.0	21		190 J	17		240 J	0.28	42 J		38 J
MW19	5/20/08	N	2.0 U	23000 J		1.0 U		3.4		100 UJ			2900		2.3 J	140	1.0 UJ	5.0	4.8	54 J		220 =	16		260	0.44	42		18 J
MW19	10/24/08	N	2.1 J	27900		2 UJ		5 J		510 J	28700 J		4850 J		20 UJ	120	0.5 U	5.11	5.08 =	50.3		221 J	15.9		373 J	0.04 J	46.2		29.8
MW19	6/2/09	N	3.9 J	18600 J		2 U		10 UJ		222 =	29900 =		4050 =		20 U	110 J	0.5 U	7.93	6.66	74.6	249 J		12.8		317.6445	0.01 UB	44.7		13
MW19	10/7/09	N	2 J	31800 J		2 UJ		3.8 J		237 J	27400 J		3190 J		7.2 J	137 J	0.1 UJ	7.62 J	5.77 J	60.7 J		228 J	14.3 J		271.39 J	0.05 UJ	42 J		20.4 J
MW19	5/20/10	N	1.4	26000.		2 UJ		3.2 J		92.2 UJ	19900. J		1870. J		20 UJ	123.	0.5 U	7.95	5.65	64.3		136	21.5		199	0.05 UJ	32.4		50.4 UB
MW19	10/7/10	N	1.3 U	4470 J		2 U		2.9 J		114	7130		942		20 U	102 J	0.5 UJ	3.21 J	1.7 J	44.7 J		84	13.6 J		77.8	0.10 UJ	18.7 J		17.4
MW19	6/29/11	N	0.9 U	8880		2 UJ		14.8 J		131	9550		1300		20 U	42.1	0.1 U	1.12	1.09	22.7		43	16.6 J		90.00	0.26	20.1		85.4
MW19	10/20/11	N	0.33 J	13000		2.0 U		12 B		52 J+	8600 B		1700		14 J+	2.8	0.84 U	1.1 J	1.0 J	23		57	19		85.40	0.30	17		92
MW19	5/22/12	N	0.71	5300		2.0 U		7.6 J		50 U	7600 =		1300		20 U	50	2.0 U	0.88 J	0.76 J	16		51	15		76.20	1.1	12		38
MW19	10/17/12	N	0.50 U	8100		2.0 U		6.9 J		50 U	5800 =		900		20 U	8.4	2.0 U	4.0 U	0.67 J	9.7		36	12		66.3	1.4	11 J		27
MW19	5/22/13	N	0.84 J	5800		2.0 U		7.3 J		50 U	8700 B		1100 B		20 U	29 J	0.50 U	0.99 J	1.5	19		54	14			1.1 J	11		45
MW19	10/10/13	N	0.50 U	7900		0.26 J		10.0 UJ		50 UJ	5800 J		990 J		20 UJ	3.0	2.5 U	5.0 U	1.1 J	15		36 B	12			1.1 J	11		31
MW19	5/14/14	N		18000																									
MW2	10/9/97	N	10 U	1 U		2 U		10.2 J		20 J			50.6		0.033 J		0.1 U	1 U	1 U	1 U		300	3.5			1.1	17		2.6
MW2	10/9/97	N2		1 U		2 U		11.4 J							0.027 J		0.1 U	1 U	1 U	1 U									
MW2	4/5/00	N		0.5 U											0.035 J	10 U													
MW2	6/18/01	N	0.14	0.1 U		0.37 J		25 U		24 U			8.3		0.045 J	5 U	0.1 U	1 U	1 U	1 U		36	5.73		66	38 =	105		5.57
MW2	6/18/01	N2	0.14			6.7		109		39900			1230		0.094 UJ											38			
MW2	9/12/01	N	10 U	0.51		3.9		110		29000			1200		0.095 U	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		49	6.2		140	2.3	10		4.2
MW2	9/12/01	N2				0.29 U		2.2 U		35 U			57		0.094 UJ														
MW2	8/6/02	N	10.0 U	0.12		6.4		30		10000			420		0.095 U	5 U	1 U	5 U	5 U	5 U		66	3		98	0.15 U	10		3.2
MW2	8/6/02	N2				1.4 U		0.3 U		48			18		0.029 J														
MW2	9/24/03	N	0.5 U	0.28		8		100		41300 J			1180		0.031 J	0.99 U	0.25 U	2.5 U	2.5 U	2.5 U		80	1 J		106.2	2.02	3 J		2.3
MW2	9/24/03	N2	0.5 U			1 U		16		3030 J			443		0.040 J														
MW2	9/21/04	N	10.0 UJ	1.26		4.03 J		87.2 J		25800 J			972 J		0.097 U	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		110 J	12 J		921 J	1.4 J	4.0 R		5.23 R
MW2	9/21/04	N2				0.237 J		3.10 J		662			22.2 J		0.051 J														
MW2	9/28/05	N	2.0 U	2.2 =		6.7		140 J		40000 J			1300 J		0.043 J	0.98 U	0.50 U	5.0 U	5.0 U	5.0 U		150 J	5.6 J		270 J	0.10 UJ	27 R		2.5 J
MW2	9/28/05	N2				1.0 UJ		2.5 J		65 J			9.3 J		0.015 U														
MW2	9/26/06	N	2.0 UJ	2.3		1.0 U		10 UJ		50 U			2.6 UB		0 U	1.7 U	0.50 U	5.0 U	5.0 U	5.0 U		160 J	1.6 J		220	0.12 J	20 J		3.1
MW2	9/19/07	N	2.0 UJ	3.7 J		0.62 J		10 UJ		100 UJ			6.5 J			0.97 R	1.0 U	1.0 U	1.0 U	2.0 U		160 J	3.6		200 J	0.22 J	16 J		2.1 J

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Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
	Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW2	10/21/08	N	2.0 UJ	1.60 J		2 U		10 UJ		424 J	27900		5.20 J		2	1.00 U	0.5 U	2.0 U	2.0 U	5.0 U		138	3.17		276 J	1.10 J	12.90		2.59 J
MW2	10/6/09	N	0.83 UJ	2.21 J		2 UJ		10 UJ		129 J	19000 J		10 UJ		0.9 J	0.996 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ		122 J	1.97 J		190.6 J	0.81 J	11.6 J		5.33 J
MW2	10/6/10	N	1.3 U	0.1 U		2 U		8 U		43 J	4680		9.4 J		1 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U		62	0.6 J		52.5	1.01 J	4.2 J		24
MW2	10/19/11	N	0.50 U	0.097 U		2.0 U		2.2 J+		47 J	9400 B		3.7 J		1 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		63	7.7		93.60	0.50 J	33		1.0 U
MW2	10/16/12	N	0.50 U	0.33		0.82 J		6.2 J		810	8800 =		25		0.1 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		54	4.1		91.2	0.90 J	32 J		6.7
MW2	10/9/13	N	0.50 U	0.94 J		2.0 UJ		10.0 UJ		50 UJ	6900 J		10 UJ		9.5	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U*		39 J	2.8			2.9 J	28		4.5 J
MW2	10/9/13	N2													0.1 U											2.9 J			
MW2	9/24/14	N	0.070 U	0.32	0.18 U		0.75 U		16 U			1.4 J		7.3 U	0.1 U	0.061 U	0.24 U	0.23 U	0.22 U	0.43 U		62	0.69 J	68		0.73	2.4	0.50 U	
MW2	10/14/15	N	0.080 U	0.49 U		0.75 J		56.7 J			2.9 J		7.3 U		0.05 U	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U		50.7 B	0.55 J	60.3		0.63	2.1	1.3	
MW2	4/14/16	N	0.080 U	1.3 J		20.1		6580			171		19.7 J		0.05 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		34.4	0.51 J		49.0	0.38	1.8		3.6
MW20	10/15/97	N	10 U	29000 J													0.1 U	1 U	1 U	0.1 U									
MW20	4/26/01	N	2.73	36600		8.2		196		33200			3120		126	9970 =	1 U	10 U	10 U	29		198	24		301	0.13 U	67		478
MW20	4/26/01	N2	2.73			1.1		14		841			2250		23	9970	10 U	100 U	100 U	71									
MW20	9/12/01	N	10 U	83000		3.6		81		7900			3200		36	890	0.44 U	3.4 U	4.1 U	37		260 J	16		250	0.15 J	24		65
MW20	9/12/01	N2				1.5		15 U		35 U			2800		12 U														
MW20	8/7/02	N	10.0 U	30000 J		8.9		87.4		4910			3520		16.6 J	1400	1 U	12	9	120		220	22		4 U	0.15 U	25		71
MW20	8/7/02	N2				2.6		5.8 J		206			3280		15.4 J														
MW20	9/25/03	N	5.4	13000		2 J		58		7220			3310		20 J	830	1 U	10 U	10 U	60.9		233	19.4 J		86.67	1.25 U	80 J		150 J
MW20	9/25/03	N2	5.4			1 U		11		350			3250		10 J											1.25 U			
MW20	9/22/04	N	10.0 UJ	133000		1.00 UJ		30.4 J		1320 J			2770 J		18.7 J	282	2.50 U	3.01 J	3.21 J	40.3		190 J	24 J		1320 J	0.29 J	23 R		46.3 R
MW20	9/22/04	N2				0.498 J		35.2 J		2070			2320		47.0 J														
MW20	10/25/05	N	2.0 UJ	63000 =		1.0 U		16 J		780 J			2300 J		20 UJ		0.50 U	5.5	5.4	62		170 J	13 J		190 J	2.1 J	39 R		21 R
MW20	10/25/05	N2				1.0 UJ		2.7 UJ		140 J			2400 J		20 UJ														
MW20	9/27/06	FD	2.0 UJ	44000 J		1.0 UJ		4.8 J		94 J			4200		20 U	180 =	0.50 U	5.1	4.1 J	53		230 J	16		380	0.19	65 =		22
MW20	9/27/06	N	2.0 UJ	35000 J		1.0 U		3.8 J		48 J			4200		20 U	160 =	0.50 U	4.8 J	4.1 J	51		220 J	16		240	0.22	71 =		23
MW20	9/21/07	N	2.0 U	9500 J		1.0 UJ		10 UJ		100 UJ			4800		20 UJ	71 R	1.0 U	6.4	4.4	62		230 J	18		300 J	0.10 U	98 J		13 J
MW20	10/23/08	N	2.0 UJ	41000		2 UJ		17.3 J		462	31700 J		3400 J		20 UJ	1150	0.5 U	2.99 =	2.94 =	38.7		127 J	15.7		332 J	0.13 J	28.9		121
MW21	2/9/98	FD	10	1		3.1		83.9		7.3 U			1380		98.9		0.1 U	1 U	1 U	1 U		196	67.3				8.9		0.47 U
MW21	2/9/98	FD2				2 U		9.5 U							33.8														
MW21	2/9/98	N	11	1 U		3		70.1		5.5 U			1210		113		0.1 U	1 U	1 U	1 U		176	70.6				9.1		0.47 U
MW21	2/9/98	N2		1 U		2 U		9.5 U							32.6 U		0.1 U	1 U	1 U	1 U									
MW21	5/14/02	N				1.9 J		1.3 J		130			9.7 J		11 J														
MW21	8/6/02	N		0.035 J		4.4		50		10000			930		29	5 U	1 U	5 U	5 U	5 U		120	49		150	0.15 U	9.6		8.3
MW21	8/6/02	N2				1.6 J		0.3 U		11 U			0.63 J		6.8 J														
MW21	4/29/03	N	0.5 U	0.15		1 U		12		3440			227		10 U	7.4 U	0.5 U	5 U	5 U	5 U		144	41		169	2.5	12		1.5
MW21	4/29/03	N2	0.5 U			1 U		1 U		25 U			5 U		10 U														
MW21	9/24/03	N	0.5 U	0.063 J		1 U		260		68400			3750		150	1 U	0.25 U	2.5 U	2.5 U	2.5 U		165	48		81.46	2.62	2 U		3.6
MW21	9/24/03	N2	0.5 U			1 U		1 U		50 UJ			5 U		10 U														
MW21	5/4/04	N	10.0 U	0.135 UB		2.31 J		72.5 R		14000 R	19300		1970 R		46.5 R	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		165	67 =		188	2.3 J	3.6 R		3.12 J
MW21	5/4/04	N2				0.122 J		1.28 R		28.6 R			0.718 R		4.48 R														
MW21	9/21/04	N	10.0 UJ	0.474		1.80 J		48.2 J		10300 J			983 J		32.6 J	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		150 J	63 J		1030 J	2.4 J	4.8 R		2.76 R
MW21	9/21/04	N2				0.130 J		0.955 J		25.0 UJ			0.484 J		3.30 J														
MW21	5/10/05	N	2.0 U	0.33		1.0 U		10 U		50 U			0.47 J		20 U	0.98 U	0.50 U	5.0 U	5.0 U	5.0 U		130 J	49 J		170 J	2.8 J	12 R		2.2 R
MW21	5/10/05	N2				1.0 U		25		6200			480		16 J														
MW21	9/27/05	N	2.0 UJ	0.046 J		7.1		230		56000			3400		110	0.91 U	0.50 U	5.0 U	5.0 U	5.0 U		130 J	47 J		370	2.4 J	17 J		1.2

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW21	9/27/05	N2				1.0 UJ		2.6 J		36 J			9.8 J		20 U														
MW21	6/1/06	N	2.0 U	0.023 J		1.0 UJ		10 UJ		47 J			17 J		20 UJ	0.99 U	0.50 U	5.0 U	5.0 U	5.0 U		140 J	65 J		140	2.7 J	20		1.5 J
MW21	5/8/07	N	2.0 UJ	0.098 UJ		1.0 UJ		10 UJ		100 UJ			10 UJ		4.2 J	1.0 R	1.0 U	1.0 U	1.0 U	2.0 U		210 =	33 J		120	4.2	9.3 J		1.7
MW21	9/18/07	N	2.0 UJ	0.13 J		1.0 UJ		10 UJ		100 UJ			10 UJ		20 UJ	0.98 R	1.0 U	1.0 U	1.0 U	2.0 U		110 J	29		120 J	3.7 J	12 J		1.2 J
MW21	10/21/08	N	2.0 UJ	0.10 UJ		2 U		10 UJ		294 J	14900 J		10 U		20 U	1.00 U	0.50 U	2.00 U	2.0 U	5.00 U		66	68.80		149 J	2.69 J	7.27 U		2.38 J
MW21	4/6/16	N	0.092 J	0.70 J		1.0 J		22.8 J			1.7 J		7.3 U		0.016 Jp*	0.063 U	0.35 U	0.25 U	0.23 U	0.52 U		25.9 B	101		83.6	1.8 H	6.8		0.63 JB
MW21	7/20/16	N	0.11 J	0.49 U		1.3 J		29.4 J			1.1 U		7.3 U		8.5	0.062 U	0.35 U	0.25 U	0.23 U	0.52 U		29.4 B	84.5	84		1.7	6.8	0.93 J	
MW21	7/20/16	FD	0.080 U	0.49 U		0.86 J		23.5 J			1.1 U		7.3 U		5.5	0.075 U	0.35 U	0.25 U	0.23 U	0.52 U		29.9 B	84.9	78		1.7	6.6	0.90 J	
MW21	10/11/16	N	0.080 U	0.38 J		1.8 JB		6.2 JB			0.44 JB		6.2 U		5.7	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		30.5	74.4	82		1.8	6.6	0.61 JB	
MW21	1/18/17	N	0.080 U	0.39 J		2.2 B		6.8 JB			0.25 U		6.2 U		2.9	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		25.4	86.8	88.0		1.8 H	7.4	0.75 J	
MW21	4/18/17	N	0.50 U	5.0 U		0.44 J		100 U			5.0 U		20.0 U		0.017 Jp	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U	26.7		78.6	92		1.8	7.5	0.77 J	
MW22	2/9/98	N	13	1 U		4		255		5.5 U			3700		121		0.1 U	1 U	1 U	1 U		186	56.3				17.9		0.47 U
MW22	2/9/98	N2		1 U		2 U		9.5 U							12.6		0.1 U	1 U	1 U	1 U									
MW22	5/14/02	N				1.4 U		0.3 U		22.9 J			3.5 J		2.7 J														
MW22	8/6/02	N	10.0 U	0.078		2.2 J		9.8 J		2500			170		7.3 J	5 U	1 U	5 U	5 U	5 U		150	7.2		170	0.15 U	12		1.3
MW22	8/6/02	N2				1.4 U		0.3 U		25 J			0.42 U		4.9 J														
MW22	9/24/03	N	0.5 U	0.34		7		140		56900			2570		120 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		132	4.9		101.8	2.15	3 J		1.7
MW22	9/24/03	N2	0.5 U			1 U		20		2770			542		20 J														
MW22	9/21/04	N	10.0 UJ	0.220		2.76 J		71.6 J		13600 J			963 J		48.4 J	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		130 J	11 J		885 J	2.2 J	6.7 R		3.86 R
MW22	9/21/04	N2				0.164 J		0.473 J		25.0 UJ			15.0 UJ		2.31 J														
MW22	9/28/05	N	2.0 U	0.16 J		1.0 UJ		9.8 J		2100 J			130 J		8.0 J	1.0 U	0.50 U	5.0 U	5.0 U	5.0 U		91 J	9.6 J		130 J	1.7 J	18 R		0.94 J
MW22	9/28/05	N2				1.0 UJ		10 UJ		50 UJ			1.3 J		20 UJ														
MW22	9/18/07	N	2.0 UJ	0.13 J		1.0 UJ		10 UJ		100 UJ			10 UJ		20 UJ	0.99 R	1.0 U	1.0 U	1.0 U	2.0 U		110 J	8.2		160 J	2.5 J	10 J		1.0 J
MW22	5/20/08	N	2.0 UJ	0.77 J		1.0 U		0.98 J		100 UJ			3.6		5.4 J	0.95 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ		110 =	8.4		200	2.3	12		3.0 J
MW22	10/21/08	N	2.0 UJ	0.09 UJ		2.60 J		10 UJ		303 J	11100 J		0.01 U		20 U	1.00 U	0.5 U	2.0 U	2.0 U	5.0 U		90	4.69		111 J	1.48 J	6.95		21.10 J
MW22	6/2/09	N	0.8 UJ	0.1 UJ		2 U		10 UJ		83.1 =	10000 J		10 U		20 U	1.0 UJ	0.5 U	0.22 J	2.0 U	5.0 U	70 J		6.92		99.6098	1.97 J	6.73		1.7 UJ
MW22	10/6/09	N	0.83 UJ	0.1 UJ		2 UJ		13.1 J		1560 J	11500 J		168 J		6.7 J	0.994 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ		147 J	7 J		106.54 J	5.31 J	7.53 J		8.62 J
MW22	5/18/10	N	1.3 U	0.1 U													0.5 U	5 U	5 U	5 U		66 UB	9.21			1.9 J	6.9		58.8 UB
MW22	10/6/10	N	1.3 U	0.13 UB		2 U		4.1 J		74.2 J	3680		16.7 U		20 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U		62	1.8 J		40.9	0.90 J	5.6 J		24.6
MW22	6/29/11	N	0.9 U	0.1 U		2 UJ		4.5 J		499	3700		27.6		20 U	0.999 U	0.1 U	0.4 U	0.4 U	1 U		32.	0.78 J+		34.10	0.46 J	3.9 J		11
MW22	10/18/11	N	0.50 U	0.098 U		0.45 J		2.1 J+		50 U	3600 B		2.7 J		10 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		43	1.0 U		37.30	0.50 J	3.5 J		1.0 U
MW22	5/22/12	N	0.50 U	0.084 J		2.0 U		2.3 J		160	5000 =		13		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		49	3.4		50.60	0.76 J	3.9 J		10
MW22	10/16/12	N	0.50 U	0.096 U		0.59 J		10 U		50 U	5000 =		5.7 J		20 U	0.19 U	2.5 UJ	5.0 UJ	5.0 UJ	10 UJ		48	4.1		53.1	0.48 J	5.0 U		36
MW22	5/22/13	N	0.50 U	0.11		2.0 U		10 U		50 U	4000 B		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		41	3.7			1.0 J	3.9		15
MW22	10/8/13	N	0.50 U	0.14		0.24 J		10.0 U		50 U	5200 B		2.8 J		20 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		45	7.2			1.4 J	4.7		10
MW22	5/14/14	N		0.093 J																									
MW22	9/24/14	N	0.070 U	0.27	0.22 J		0.75 U		25 JB			19		7.3 U		0.060 U	0.24 U	0.23 U	0.22 U	0.43 U		51	1.7	60		0.69	3.6	0.71 J	
MW22	4/21/15	N	0.070 U	0.072 J	0.60 JB		2.8		390 B			23		7.3 U		0.065 U	0.35 U	0.25 U	0.23 U	0.52 U		42 B	1.9		57	0.69	3.7		0.57 J
MW22	10/13/15	N	0.080 U	0.49 U		1.2 J		16.0 U			1.1 U		7.3 U		0.041 J	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U		46.3 B	1.7	52.3		0.65 H	2.8	0.74 J	
MW22	4/6/16	N	0.080 U	0.49 U		0.92 J		17.5 J			2.2 J		7.3 U		0.025 Jp*	0.061 U	0.35 U	0.25 U	0.23 U	0.52 U		50.8 B	1.3		57.7	0.61 H	2.9		5.3 B
MW22	7/20/16	N	0.080 U	0.49 U		3.4		235			10		7.3 U		0.030 J	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		58.6 B	1.2	64		0.6	3.1	1.7	
MW22	10/12/16	N	0.080 U	0.41 J		1.7 JB		85.4 JB			5.4 B		6.2 U		0.043 J	0.061 U	0.28 U	0.26 U	0.23 U	0.24 U		67.2	1.7	70		0.53 H	3.5	0.96 J	
MW22	1/18/17	N	0.080 JB	0.44 J		3.4 B		186 B			10.6		6.2 U		0.058 J	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		58.4	2.1	94.0		0.65 H	3.8	1.1	
MW22	4/21/17	N	0.50 U	5.0 U		2.6 B		100 U			0.31 J		20.0 U		0.090 J	0.23 U	0.50 U	1.0 U	1.0 U	2.0 U	62.9		2.8	110		0.77	4.4	0.93 J	
MW23	2/26/98	N	57	1 U		2 U		17.6 U		5.5 U			128		43.6		2	1 U	77	2		120	8.7				7.6		0.47 U

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW23	2/26/98	N2		1 U		2 U		14.2 U					140		6.6		2 =	1 U	77 =	2 =									
MW23	9/11/01	N	10 U	0.49		1.2		6.3 J		630			140		37	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		110	10		140	0.13 U	8.2 U		5.6
MW23	9/11/01	N2				0.62 J		2.2 U		35 U			29		4.7 J													
MW23	4/13/16	N	0.080 U	0.58 J		0.75 U		35.1 J			1.1 U		7.3 U		0.015 U	0.063 U	0.35 U	0.25 U	0.23 U	0.52 U		197	29.5		255	1.8	7.1		0.62 J
MW23	7/20/16	N	0.080 U	0.70 J		0.75 U		16.0 U			1.1 U		7.3 U		0.31	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		195 B	30.6	230		1.8	7.2	0.66 J	
MW23	10/11/16	N	0.080 U	0.71 J		0.90 JB		5.3 U			0.38 JB		6.2 U		0.015 U	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		194	32.3	230		1.9	8.1	0.54 JB	
MW23	1/19/17	N	0.080 U	0.75 J		0.64 JB		5.3 U			0.25 U		6.2 U		0.015 U	0.061 U	0.28 U	0.26 U	0.23 U	0.24 U		177	35.1	238		1.8 H	8.2	0.81 J	
MW23	4/19/17	N	0.50 U	0.59 J		2.0 U		100 U			5.0 U		20.0 U		0.095 U	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U	179		34.7	304		1.9	9.1	0.76 J	
MW24	2/8/98	N	10 U	4 U		4.3		53		5.5 U			1030		50.7		3 U	2 U	3 U	5 U		253	18.7				5.2		1.8
MW24	2/8/98	N2		4 U		2 U		9.5 U							23		3 U	2 U	3 U	5 U									
MW24	12/6/00	N	0.53 U	123 J		1.6		27		6500			530		11	5.9 U	0.1 U	1 U	0.29	1 U		180	21		310	2.3	7.1		5.5
MW24	12/6/00	N2	0.53 U			0.29		25 U		25 U			15 U		25 U	5.9 U	0.1 U	1 U	0.29	1 U									
MW24	4/24/01	N	0.1 U	0.11		2.4		30		7310			508		23	5.3 U	0.1 U	1 U	1 U	1 U		256	36		348	3.64 =	12		3.36
MW24	4/24/01	N2	0.1 U			0.29		5.2		25 U			2.4		11	5.3 U										3.64			
MW24	4/7/16	N	0.11 J	0.49 U		3.0		420			28.4		7.3 U		0.044 Jp*	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		168 B	9.1		135	1.9	17.4		0.79 JB
MW25	2/9/98	N	17	1		6.6		462		30.2 U			4480		321		0.1 U	1 U	1 U	1 U		455	15.6				9.9		0.47 U
MW25	2/9/98	N2		1 =		2 U		9.5 U							16.4		0.1 U	1 U	1 U	1 U									
MW25	4/11/16	N	0.080 U	1.1 J		17.6 B		6090 B			148 B		12.4 JB		0.024 Jp	0.064 U	0.35 U	0.25 U	0.23 U	0.52 U		33.7 B	37.8		137	2.4	3.8		1.5
MW25	7/26/16	N	0.080 U	0.35 U		1.3 J		28.8 J			1.0 J		6.2 U		0.30 B	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		40.3	49.1	108		3.2	5	0.70 J^	
MW25	10/10/16	N	0.080 U	0.35 U		0.62 JB		5.4 JB			0.46 JB		6.2 U		0.23	0.062 U	0.28 U	0.26 U	0.23 U	0.24 U		31.1	17.5	52		1.6 H	2.8	0.44 JB	
MW25	10/10/16	D	0.080 U	0.35 U		0.71 JB		5.3 U			0.27 JB		6.2 U		0.17	0.066 U	0.28 U	0.26 U	0.23 U	0.24 U		31.1	16.9	54		1.6	2.7	0.44 JB	
MW25	1/18/17	N	0.080 U	0.35 U		1.2 JB		28.2 JB			0.70 J		6.2 U		4.9	0.063 U	0.28 U	0.26 U	0.23 U	0.24 U		46.0	45.2	112		2.8 H	4.9	0.78 J	
MW25	4/18/17	N	0.50 U	5.0 U		1.4 J		100 U			5.0 U		20.0 U		0.094 U	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U	81.3		29	108		2.9	7.3	0.82 J	
MW26	12/6/00	N	0.65 U	118 J		1.1		21		25 U			94		17	5 U	0.1 U	1 U	1 U	1 U		230	29		350	2.8	540		8
MW26	12/6/00	N2	0.65 U	115 J		2.8		27		16000			300		35	5 U	0.1 U	1 U	1 U	1 U		270	28		330	2.8	770		6.1
MW26	12/6/00	N3	0.7 U			4		25 U		25 U			89		25 U	5 U	0.1 U	1 U	1 U	1 U									
MW26	12/6/00	N4				1.1		25		16000			290		33														
MW26	4/24/01	N	0.1 U	0.1 U		3		13		6980			132		24	5.4 U	0.1 U	1 U	1 U	1 U		240	22		294	5 =	10		2.79
MW26	4/24/01	N2	0.1 U			0.24		25 U		36			15 U		19700											5			
MW26	6/18/01	N	0.1 U	1		1.1		25 U		25 U			15 U		25 U	5 U	0.1 U	1 U	1 U	1 U		230	27		326	30	13		6.67
MW26	6/18/01	N2	0.1 U			3.6		18		9140			232		28											30 =			
MW26	9/10/01	N	10 U	0.16 J		1.5		10 U		2300			94		24	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		260	30		300	3.2	12		0.34 U
MW26	9/10/01	N2	10 U	0.16 J		0.8 J		4 J		100 J			4 U		3.8 J	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		260	29		310	3.2	12		2.7
MW26	9/10/01	N3				0.75 J		2.9 J		55 J			1.5 U		3.7 U														
MW26	9/10/01	N4				1.6		13		2500			96		24														
MW26	5/14/02	N		0.1		1.4 J		5 J		1530			57.2		9.7 J	5 U	1 U	5 U	5 U	5 U		260	27		300	3 H	15		5
MW26	5/14/02	N2				1.4 U		1.2 J		11.2 U			0.73 J		9.3 J										300				
MW26	8/5/02	N	10.0 U	0.03 J		3		2.5 J		385			17.2		16.3 J	5 U	1 U	5 U	5 U	5 U		270	18		310	0.15 U	14		4.5
MW26	8/5/02	N2	10.0 U	0.035 J		1.4 U		0.3 U		11.2 U			0.56 J		13.7 J	5 U	1 U	5 U	5 U	5 U		280	19		310	0.15 U	11		24
MW26	8/5/02	N3				2.7		3.9 J		728			26		18.7 J														
MW26	8/5/02	N4				3.2		0.3 U		11.2 U			0.42 U		7.4 J														
MW26	4/29/03	N	0.5 U	0.1 U		1 U		4		1290			46		10 U	7.1 U	0.5 U	5 U	5 U	5 U		248	18		262	3.5	14		7
MW26	4/29/03	N2	0.5 U	0.11 U		1 U		2 J		25 U			5 U		10 U	7.1 U	0.5 U	5 U	5 U	5 U		250	18.7		257	3.6	14		12
MW26	4/29/03	N3	0.5 U			2 J		5		1690			48		20														
MW26	4/29/03	N4				1 U		1 U		25 U			5 U		10 U														

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

		Compound [1]	Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW26	9/23/03	N	0.5 U	0.11 U		1 U		1 J		740			29		10 U	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	11		90.28	3.74	2 U		6.4
MW26	9/23/03	N2	0.5 U			1 U		1 U		50 U			5 U		10 U														
MW26	5/4/04	FD	10.0 U	0.219 UB		0.295 J		2.37 R		399 R	27400		15.2 R		7.82 R	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		242	17 =		291	4.0 J	44 R		4.35 J
MW26	5/4/04	FD2				0.323 J		1.19 R		49.3 R			2.07 R		4.15 R														
MW26	5/4/04	N	10.0 U	0.242 UB		0.264 J		2.62 R		458 R	26700		17.8 R		10.5 R	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		242	17 =		284	3.9 J	42 R		3.75 J
MW26	5/4/04	N2				0.289 J		1.24 R		39.0 R			1.23 R		4.36 R														
MW26	9/23/04	FD	10.0 U	5.97 BE		1.00 U		3.10 J		542			22.2		6.95 J	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		280	28		1770	1.5 J	170 =		1.95
MW26	9/23/04	FD2		4.11 =		0.354 J		2.01 J		6.48 J			4.00 J		3.80 J														
MW26	9/23/04	N	10.0 U	0.393 =		1.00 U		3.73 J		620			24.8		7.86 J	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		280	28		1670	1.5 J	120 =		2.40
MW26	9/23/04	N2				0.314 J		1.57 J		8.81 J			19.3		4.70 J														
MW26	5/10/05	FD	2.0 U	0.11 U		1.0 U		10 U		50 U			0.59 J		20 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U		240 J	26 J		370 J	2.2 J	180 R		1.1 R
MW26	5/10/05	FD2				1.0 U		2.2 J		510			14		17 J														
MW26	5/10/05	N	2.0 U	0.061 J		1.0 U		10 U		50 U			1.8 J		20 U	0.94 U	0.50 U	5.0 U	5.0 U	5.0 U		250 J	26 J		340 J	2.8 J	200 R		2.1 R
MW26	5/10/05	N2				1.0 U		2.4 J		680			18		7.5 J														
MW26	9/27/05	FD	2.0 UJ	0.024 J		1.0 UJ		10 U		50 U			1.7 J		20 U	0.92 U						250 J	25 J		380	2.0 J	160 J		0.68 J
MW26	9/27/05	FD2				1.0 UJ		2.6 J		50 UJ			10 U		20 U														
MW26	9/27/05	N	2.0 UJ	0.027 J		1.0 UJ		10 U		50 U			2.3 J		20 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U		240 J	25 J		350	1.9 J	170 =		0.72 J
MW26	9/27/05	N2				1.0 UJ		2.2 J		50 U			10 U		20 U														
MW26	6/7/06	FD	2.0 U	0.091 J		1.0 UJ		10 UJ		50 UJ			1.0 UJ		20 UJ	0.94 U	0.50 U	5.0 U	5.0 U	5.0 U		250 J	29 J		350 J	1.8 J	150 =		0.94 J
MW26	6/7/06	N	2.0 U	0.11 UJ		1.0 UJ		10 UJ		50 UJ			2.5 UJ		20 UJ	0.95 U	0.50 U	5.0 U	5.0 U	5.0 U		260 J	29 J		320 J	1.8 J	140 =		1.4 J
MW26	9/26/06	N	2.0 UJ	0.11 U		1.0 UJ		10 UJ		50 UJ			10 UJ		20 UJ	0.91 U	0.50 U	5.0 U	5.0 U	5.0 U		270 J	23 J		350	1.5 J	87 J		2.0
MW26	5/8/07	FD	2.0 UJ	0.095 UJ		1.0 UJ		10 UJ		100 UJ			10 UJ		20 UJ	0.92 R	1.0 U	1.0 U	1.0 U	2.0 U		270 =	21 J		360	1.6	250 J		0.76 J
MW26	5/8/07	N	2.0 UJ	0.093 UJ		1.0 UJ		10 UJ		100 UJ			10 UJ		20 UJ	0.92 R	1.0 U	1.0 U	1.0 U	2.0 U		260 =	21 J		360	1.5	210 J		0.68 J
MW26	9/19/07	N	2.0 UJ	0.095 U		1.0 UJ		10 UJ		100 R			10 UJ		20 UJ	0.93 U	1.0 U	1.0 U	1.0 U	2.0 U		240	25		500 J	1.3	220 J		0.84 J
MW26	5/20/08	N	2.0 UJ	0.096 UJ		0.34 J		0.47 J		100 UJ			2.5 U		20 U	0.96 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ		240 =	22		430	1.8	230		0.65 J
MW26	10/22/08	N	2.0 UJ	0.1 U		2 UJ		6.2 J		777 J	35100 J		10 UJ		20 UJ	1 U	0.5 U	2.0 U	2.0 U	5.0 U		256 J	21.7		432 J	2.36 J	235		18.6
MW26	6/2/09	N	0.8 UJ	0.1 UJ		2 U		10 UJ		341 =	33400 =		10 U		20 U	1.0 UJ	0.5 UB	0.3 J	2.0 UB	5.0 U	229 J		203		414.7082	1.83 J	2360		1.7 UJ
MW26	10/6/09	N	0.83 UJ	0.1 UJ		2 UJ		3.8 J		325 J	42900 J		10 UJ		20 UJ	0.997 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ		227 J	20.7 J		491.28 J	1.7 J	212 J		1 UJ
MW26	5/19/10	N	1.3 U	0.13 J		1.8 J		10 UJ		236. J	39800. J		10 UJ		15. J	1.0 U	0.5 U	5 U	5 U	5 U		230	20.4		486	2.41 J	279		20.1 J
MW26	10/5/10	N	1.3 U	0.1 UJ		2 U		10 U		376	37900		10 U		20 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U		236	20.0 J		478	1.77	232		0.6 J
MW26	6/29/11	N	0.9 U	0.1 U		2 UJ		10 U		274	41600		10 U		20 U	0.992 U	0.1 U	0.4 U	0.4 U	1 U		202	18.3 J		463.00	1.83 J	230		1 U
MW26	10/19/11	N	0.50 U	0.099 U		0.87 J		2 U		50 U	29000 B		10 U		10 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		230	19		329.00	1.6 J	200		0.88 J
MW26	5/22/12	N	0.50 U	0.10 U		2.0 U		10 U		50 U	28000 =		10 U		20 U	0.19 UJ	0.50 U	1.0 U	1.0 U	2.0 U		200	19		325.00	1.7	210		0.43 J
MW26	10/16/12	N	0.50 U	0.095 U		0.99 J		10 U		50 U	29000 =		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 UJ	2.0 U		190	19		344	1.8 J	200 =		0.30 J
MW26	5/22/13	N	0.50 U	0.094 U		2.0 U		10 U		50 U	25000 B		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		170	18			1.9 J	230		0.55 J
MW26	10/8/13	N	0.50 U	0.095 U		0.37 J		10.0 U		50 U	26000 B		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		160	18			1.5 J	110 J		1.0 U
MW26	5/14/14	N		0.095 U																									
MW26	9/24/14	FD	0.070 U	0.015 U	0.32 J		0.75 U		16 U			1.1 U		7.3 U		0.060 U	0.24 U	0.23 U	0.22 U	0.43 U		150	17	280		1.2	160	0.50 U	
MW26	9/24/14	N	0.070 U	0.015 U	0.43 J		0.75 U		16 U			1.1 U		7.3 U		0.060 U	0.24 U	0.23 U	0.22 U	0.43 U		150	17	290		1.2	160	0.50 U	
MW26	4/21/15	FD		0.015 U	0.76 JB		0.75 U		16 U			1.1 U		7.3 U		0.060 U													
MW26	4/21/15	N	0.070 U	0.015 U	0.71 JB		0.75 U		16 U			4.4 J		7.3 U		0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		160 B	16		240	2.4	82		0.26 U
MW26	10/13/15	FD	0.080 U	0.50 J		0.75 U		16.0 U			1.1 U		7.3 U		0.015 U	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U		194 B	15.5	235		1.9 H	75.7	0.33 J	
MW26	10/13/15	N	0.080 U	0.76 J		0.75 U		16.0 U			1.1 U		7.3 U		0.015 U	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U		198 B	15.3	229		1.9 H	74.6	0.32 J	
MW26	4/5/16	N	0.15 J	0.57 J		1.5 JB^		21.4 JB			58.7 B		7.3 U		0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		154 B	9.4		183	1.4	36.1		0.26 J
MW27	10/20/11	N	0.10 J	0.17		1.7 J		2.3 J+		50 U	2300 B		10 U		10 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		63	10		28.70	3.1	9.1		1.6

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
	Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW27	4/7/16	N	0.092 J	0.59 J		1.9 J		21.1 J			1.1 U		7.3 U		0.15 *	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		137 B	20.0		113	6.5 F1	14.2		1.9 B
MW27	4/7/16	FD		0.49 U		0.75 U		29.9 J			2.3 J		7.3 U		0.015 U*	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
MW28	10/20/11	N	0.19 J	690		0.55 J		2 U		50 U	12000 B		6.0 J		10 U	0.19 U	0.50 U	1.0 U	1.0 U	0.38 J		130	5.5		132.00	1.3	5.2		2.7
MW28	10/17/12	N	0.50 U	0.095 U		0.48 J		10 U		50 U	12000 =		10 U		20 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		120	11		134	1.8	5.0 U		0.81 J
MW28	10/9/13	N	0.50 U	0.049 J		2.0 UJ		10.0 UJ		50 UJ	12000 J		10 UJ		20 UJ	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U*		120 J	21			2.2 J	6.5		0.49 J
MW28	10/9/13	N2																								2.2 J			
MW28	9/25/14	N	0.070 U	0.099	0.31 J		0.75 U		16 U			1.1 U		7.3 U		0.060 U*	0.24 U	0.23 U	0.22 U	0.43 U		120	18	150		1.3	5.1	0.85 J	
MW28	10/14/15	N	0.080 U	0.49 U		0.75 U		16.0 U			1.1 U		7.3 U		0.32	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U		126 B	15.5	155		2	5.4	0.69 J	
MW28	4/6/16	N	0.20 J	0.49 U		0.76 J		29.7 J			2.7 J		7.3 U		47 *	0.065 U	0.35 U	0.25 U	0.23 U	0.52 U		122 B	9.4		125	1.2 H	4.8		1.6 B
MW28	7/21/16	N	0.10 J	0.49 J		0.75 U		25.9 JB			10.8		7.3 U		100	0.061 U	0.35 U	0.25 U	0.23 U	0.52 U		127	11.4	138		1.9	5.4	1.9	
MW28	10/13/16	N	0.28 JB	0.39 J		0.76 JB		9.8 JB			8.5		6.2 U		1900	0.060 UH	0.28 U	0.26 U	0.23 U	1.4 J		128	11.4	148		1.7 H	5.8	12.3 ^	
MW28	10/13/16	D	0.36 JB	0.38 J		0.61 JB		5.3 U			7.9		6.2 U		1200	0.060 UH	0.28 U	0.26 U	0.23 U	1.4 J		125	11.4	142		1.7 H	5.6	12.3 ^	
MW28	1/20/17	N	0.20 J	0.47 J		1.0 JB		5.3 U			10.3 B		6.2 U		290	0.063 U	0.28 U	0.26 U	0.23 U	0.24 U		113	13.4	138		2.0	6.1	4.9	
MW28	4/20/17	N	0.50 U	0.55 J		1.0 JB		11.9 JB			4.0 J		20.0 U		22	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U	123		22.5	186		3.3	7.1	1.6	
MW29	4/13/16	N	1.4	0.49 U		6.7		1660			2270		7.3 U		14000	34	0.35 U	0.58 J	0.90 J	7.2		87.0	4.5		120	0.035 U	6.4		70.2
MW29	7/21/16	N	0.67	0.49 U		2.1 B		1290 B			2800		7.3 U		11000	35	0.35 U	0.74 J	1.3	9.1		84	9.2	110		0.035 U	10.4	50.5	
MW29	7/21/16	FD	0.69	0.49 U		2.1 B		1250 B			2740		7.3 U		9100	30	0.35 U	0.83 J	1.2	9.3		83.8	9.2	110		0.035 U	10.5	51.6	
MW29	10/14/16	N	0.32 JB	0.35 J		2.6 B		1970 B			3220		6.2 U		20000	32	0.28 U	0.98 J	1.6	11		83	15.9	124		0.035 U	16.3	56.9 ^	
MW29	1/24/17	N	0.40 J	0.35 U		1.9 J		1400 B			3290 B		6.2 U		56000	40	0.28 U	0.98 J	1.2	12		113	4.3	120		0.035 U	6.8	51.4 B	
MW29	1/24/17	FD	0.37 J	0.35 U		3.3		1380 B			3170 B		6.2 U		67000	41	0.28 U	0.90 J	1.3	12		112	4.3	122		0.035 U	6.9	49.9 B	
MW3	10/8/97	N	10 U	1 U		2 U		2 U		257			10.9		0.1		0.1 U	1 U	1 U	1 U		370	42 J			4.4 J	16		1.2
MW3	10/8/97	N2		1 U											0.04 U		0.1 U	1 U	1 U	1 U								
MW3	4/4/00	N		0.6 U											0.04 U	12 U												
MW3	4/25/01	N		0.11 U		1 U		25 U		147			7.3		0.11 U	6.1 U	0.1 U	1 U	0.46	1 U		442	47		544	4.42	11		1 U
MW3	4/25/01	N2				1 U		25 U		142			7.9		0.11 U	6.1 U										4.42 =			
MW3	9/13/01	N	10 U	0.092 J		0.29 U		2.2 U		930			31		0.11 U	0.26 U	0.44 U	0.5 U	0.4 U	1.2 U		440	58		480	4	14		1.1
MW3	9/13/01	N2				0.35 J		2.2 U		2400			31		0.0252 UB														
MW3	8/7/02	N	10.0 U	0.11		1.7 J		2.3 J		480			15 J		0.398	5 U	1 U	5 U	5 U	5 U		420	69		540	0.15 U	16		1.4
MW3	8/7/02	N2				1.9 J		0.58 J		160			12 J		0.0962 U														
MW3	9/23/03	N	2.5	0.31		1 U		1 J		150			5 U		0.11 U	1.1 U	0.25 U	2.5 U	2.5 U	2.5 U		357	52.4		160	4.43	2 U		1.6
MW3	9/23/03	N2	2.5												0.11 U														
MW3	9/24/03	N				1 U		1 U		1 U			8 J		0.11 UJ														
MW3	9/21/04	N	5.71 J	0.367		0.189 J		356 J		278 J			6.45 J		0.11 U	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		430 J	62 J		3250 J	3.5 J	8.9 R		2.16 R
MW3	9/21/04	N2				0.119 J		1.91 J		137 J			4.99 J		0.092 UJ														
MW3	9/28/05	FD													0.093 UJ		0.50 U	5.0 U	5.0 U	5.0 U								
MW3	9/28/05	N	2.0 U	0.20 J		1.0 U		4.9 J		23000 J			93 J		0.095 UJ	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U		370 J	62 J		490 J	3.3 J	24 R		1.4 J
MW3	9/28/05	N2				1.0 U		3.0 J		120 J			6.7 J																
MW3	10/21/08	N	4.90 J	0.10 UJ		2.00 U		10 UJ		2140	58700		15.20 J		0.1 U	3.13 U	0.50 U	2.0 U	2.0 U	5.0 U		513	60.50		836	2.73 J	15.20		18 J
MW3	10/7/09	N	21 J	0.1 UJ		2 UJ		10 UJ		722 J	46000 J		12.4 J		0.1 UJ	0.997 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ		482 J	53.8 J		581.46 J	2.55 J	11 J		3.42 J
MW3	10/5/10	N	1.6	0.1 U		2 U		10 U		805	69100		12 J		0.1 UJ	1.0 U	0.1 U	0.4 U	0.4 U	1 U		510	67.2		906	3.62	19.8 J		2.2 J
MW3	10/18/11	N	140	0.58		0.76 J		2 U		510	44000 B		41		0.1 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		510	64		531.00	3.3	16		2.9
MW3	10/16/12	N	13	0.46		0.59 J		10 U		260	41000 =		8.3 J		0.1 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		460	69		493	3.6 J	17 =		2.4
MW3	10/8/13	N	4.3	0.38		0.088 J		10.0 U		50 U	42000 B		8.3 J		0.1 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		390	70			3.5 J	16		1.6
MW3	9/25/14	N	15	0.35	0.18 U		0.75 U		160 B			7.6		7.3 U	0.095 U	0.060 U*	0.24 U	0.23 U	0.22 U	0.43 U		290	72	360		2.1	12	0.91 J	
MW3	10/15/15	FD	5.7	0.49 U		1.2 J		56.6 J			7.9		7.3 U		0.097 U	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U		258 B	52.3	312		1.7 J	11.2 F1	1.2	

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
	Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW3	10/15/15	N	5.1	0.49 U		0.93 J		58.2 J			7.4		7.3 U		0.037 J	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U		258 B	52.5	322		1.7 J	11.1	1.1	
MW3	4/5/16	N	4.4	0.49 U		1.4 JB^		716			20.4 B		7.3 U		0.057 J	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		224 B	48.2		299	1.4	10.1		0.98 J
MW3	4/5/16	FD	4.2	0.49 U		0.99 JB^		514			18.6 B		7.3 U		0.094 UJ	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		221 B	48.6		283	1.4	10.0		0.94 J
MW3	7/21/16	N	2.5	0.49 U		0.75 U		317 B			16.2		7.3 U		0.095 U	0.061 U	0.35 U	0.25 U	0.23 U	0.52 U		215	45.5	248		1.4	9.2	1	
MW3	10/11/16	N	1.5	0.35 U		1.7 JB		171 B			14.8 B		6.2 U		0.45	0.062 U	0.28 U	0.26 U	0.23 U	0.24 U		233	46.8	268		1.8	12.7	1.1 B	
MW3	1/20/17	N	1.9	0.35 U		2.0 B		812 B			16.4 B		6.2 U		0.93	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		230	47.3	284		1.9	14.5	1.6	
MW3	4/20/17	N	1.3	5.0 U		1.7 JB		83.6 JB			23		20.0 U		0.47	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U	232		45.5	358		1.8 H	15	1.4	
MW30	4/13/16	N	0.080 U	0.49 U		0.81 J		46.1 J			147		7.3 U		0.72	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		42.0	3.2		82.3	3.4	32.8		1.2
MW30	7/21/16	N	0.080 U	0.49 U		0.75 U		16.0 U			52.9		7.3 U		1.7	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		44.5	2.9	82		4	29.9	1.4	
MW30	10/12/16	N	0.084 J	0.35 U		1.1 JB		13.8 JB			67.3 B		6.2 U		3.8	0.062 U	0.28 U	0.26 U	0.23 U	0.24 U		52.2	3.8	86		1.6 H	30.5	NA	
MW30	1/20/17	N	0.080 U	0.35 U		1.0 JB		9.4 JB			52.8 B		6.2 U		5.5	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U		45.9	2.4	60.0		0.80	9.9	1.4	
MW30	4/21/17	N	0.50 U	5.0 U		0.95 JB		8.1 JB			37.7		20.0 U		3.6	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U	46.2		0.57 J	250		1.1	5.4	0.93 J	
MW31	4/12/16	N	0.080 U	0.49 U		0.75 U		20.9 JB			7.7 B		7.3 U		0.030 Jp	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		122 B	0.99 J		125	0.68	4.0		0.59 J
MW31	7/20/16	N	0.080 U	0.49 U		0.86 J		16.0 U			2.2 J		7.3 U		4.6	0.063 U	0.35 U	0.25 U	0.23 U	0.52 U		105 B	0.76 J	100		0.49	1.9	0.68 J	
MW31	10/13/16	N	0.11 JB	0.35 U		0.76 JB		5.3 U			0.25 U		6.2 U		3.7	0.062 UH	0.28 U	0.26 U	0.23 U	0.24 U		110	0.63 J	104		0.46 H	1.5	0.29 J^	
MW31	1/17/17	N	0.20 JB	0.59 J		1.4 JB		10.5 JB			0.52 J		6.2 U		0.69	0.061 U	0.28 U	0.26 U	0.23 U	0.24 U		113	0.53 J	118		0.51 HF1	1.7	0.74 J	
MW31	4/18/17	N	0.21 J	5.0 U		0.58 J		100 U			0.63 JB		20.0 U		0.026 Jp	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U	111		0.68 J	136		0.73	2.8	0.72 J	
MW4	10/9/97	N	139	1 U		2 J		2 U		35.9 J			55.9		0.094 UJ		2	3	1	3		94	7.3			0.1 U	6.3		12.3
MW4	10/9/97	N2		1 U		2 U		2.4 U							0.097 U		2	3	1	3									
MW4	4/4/00	N		0.5 U											0.094 U	10 U													
MW4	1/20/17	N	0.92	1.5 J		0.36 U		124 B			37.9 B		6.2 U		3.0	0.063 U	0.28 U	0.26 U	0.23 U	0.24 U		87.9	22.7	132		0.23	11.6	0.53 J	
MW4	4/21/17	N	10	1.2 J		2.0 U		85.4 JB			39		20.0 U		0.11	0.22 U	0.50 U	1.0 U	1.0 U	2.0 U	82.8		32.9	170		0.15	13.2	0.60 J	
MW5	10/10/97	FD	10 U	31000 J		4.3		26.2 J		5070			15500		0.095 U		0.1 U	2	4	18		370	50			0.1 U	16		160
MW5	10/10/97	FD2				4.6		4835 J							0.015 U														
MW5	10/10/97	N	10 U	28000 J		3.8		48.5 J		4860			12900		0.015 U		0.1 U	3	5	21		370	50			0.1 U	15		115
MW5	10/10/97	N2		28000 E		3.2		24 J							0 U		0.1 U	3	5	21									
MW5	4/7/00	N		20600 =												76 U													
MW5	4/26/01	N	0.4	20600		5.6		74		20400			11200		1 U	38	0.22	0.84	1.8	8.1		352	42		349	0.13 U	28		43
MW5	4/26/01	N2	0.4			3.9		25 U		7630			11300		0.1 J														
MW5	9/13/01	N	10 U	6300		3.7		5.1 J		4100			8500		0.1 U	23	0.44 U	0.54 J	0.78 J	4.3		270	29		240	0.17 J	22		27
MW5	9/13/01	N2				8.2		100		26000			8500		0.05 U														
MW5	8/7/02	N		510 J		4.1		28		34500			8130		0.094 J	3.2 J	1 U	5 U	5 U	5 U		220	26		4 U	0.15 U	21		25
MW5	8/7/02	N2				2 J		1.5 J		7900			7840		0.04 U														
MW5	9/25/03	N	0.47 J	1100		4		50		35100			9450		0.11 U	2.5	0.25 U	2.5 U	2.5 U	2.5 U		228	22.1		78.48	0.05 U	20		6.2
MW5	9/25/03	N2	0.47 J			3		7		13400			8320		0.11 U														
MW5	9/22/04	N	10.0 UJ	194		0.488 J		17.3 J		30500			7150		0.0952 U	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		250 J	29 J		1490 J	0.01 R	24 R		18.8 R
MW5	9/22/04	N2		214 E		0.612 J		1.44 J		7480 J			5650 J		2.18														
MW5	9/28/05	N	2.3	1100 =		1.0 UJ		6.0 J		18000 J			7600 J		0.0962 U	1.8	0.50 U	5.0 U	5.0 U	5.0 U		260 J	18 J		480 J	0.10 UJ	35 R		7.4 J
MW5	9/28/05	N2				1.0 UJ		10 UJ		19000 J			7600 J		0.11 U														
MW5	9/26/06	N	8.7 J	460 =		1.0 UJ		10 UJ		23000 J			8000 J		0.11 U	1.4 U	0.50 U	5.0 U	5.0 U	5.0 U		290 J	16 J		370	0.10 J	27 J		6.6
MW5	9/20/07	N	9.8	31 J		1.0 UJ		10 UJ		25000			7600		0.11 UJ	0.74 R	1.0 U	1.0 U	1.0 U	2.0 U		230 J	13		270 J	0.10 U	39 J		4.1 J
MW5	10/22/08	N	11 J	206		2 UJ		10 UJ		10500 J	31400 J		9700 J		0.11 U	1 U	0.5 U	2.0 U	2.0 U	5.0 U		267 J	8.68		357 J	0.05 U	24.8		30.5
MW5	10/7/09	N	17 J	33.3 J		2 UJ		10 UJ		6000 J	33600 J		11800 J		0.092 UJ	0.998 UJ	0.1 UJ	0.4 UJ	0.4 UJ	0.14 J		256 J	8.59 J		344.62 J	0.05 UJ	55.1 J		3.5 J
MW5	10/6/10	N	4.1	39.8 J		3.36 J		8 U		3030	43600		12600		0.093 UJ	1.0 U	0.1 U	0.4 U	0.4 U	1 U		274	11.4 J		437	0.10 UJ	79.4		4.2
MW5	10/19/11	N	38 J	0.97		1.0 J		2 U		2600	40000 B		11000		0.097 UJ	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		260	15		397.00	0.10 U	150		2.6

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
	Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW5	10/17/12	N	17	0.59 J		0.57 J		10 U		2700	29000 =		7000			0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		180	11		302	0.10 UH	130 =		1.8
MW5	10/10/13	N	19	0.60		0.39 J		10.0 UJ		2200 J	20000 J		4700 J		0.1 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		150 B	9.2 J			0.10 UJ	140 J		1.8
MW5	9/24/14	FD	10	12	0.42 J		0.75 U		1200 B			2200		7.3 U	0.1 UJ	0.061 U	0.24 U	0.23 U	0.22 U	0.43 U		97	4.3	150		0.12	48	0.50 U	
MW5	9/24/14	N	12	12	0.41 J		0.75 U		1200 B			2200		7.3 U	0.1 UJ	0.061 U	0.24 U	0.23 U	0.22 U	0.43 U		100	4.3	150		0.14	48	2.3	
MW5	10/14/15	N	1.8 B	0.49 U		0.75 U		954			2230		7.3 U		0.1 U	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U		98.7 B	12.7	159		0.053 J	48.9	3.3	
MW5	4/7/16	N	4.3	0.49 U		0.75 U		931			1990		7.3 U		0.1 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		72.0 B	12.7		113	0.97 H	38.0		4.6 B
MW5	4/7/16	FD	4.9	0.49 U		0.75 U		940			2070		7.3 U		0.1 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		71.3 B	12.5		113	0.96	37.6		4.5 B
MW6	4/19/16	N	0.78	0.49 U		5.2		282			5.6		9.0 J		0.095 U	0.063 U	0.35 U	0.25 U	0.23 U	0.52 U		183	35.0		245	10.2 H	26.3		6.2
MW6	4/19/16	FD		0.49 U		0.75 U		16.0 U			3.2 J		7.3 U		0.097 U	0.066 U	0.35 U	0.25 U	0.23 U	0.52 U									
MW6S	10/9/97	N	10 U	1 U		5.1		473		20 U			4720		0.015 J		0.1 U	1 U	1 U	1 U		62	72 J			4.5	0.9		1.6
MW6S	10/9/97	N2		1 U		2 U		2 U							0.095 U		0.1 U	1 U	1 U	1 U									
MW6S	4/26/01	N	0.12 U	2.5		15		202		82800			1950		0.095 UJ	5.4 U	0.1 U	1 U	1 U	1 U		148	14		285	0.87	12		5.29
MW6S	4/26/01	N2	0.12 U			0.26		25 U		25 U			347		0.053 J														
MW6S	9/12/01	N	10 U	1.1		7.4		190		42000			1900		0.096 U	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		160	12		290	1.1	16		6.3
MW6S	9/12/01	N2				0.58 J		3.1 J		35 U			800		0.095 U														
MW6S	8/7/02	N	270	88 J		5.5		69.1		7570			2210		0.015 U	5 U	1 U	5 U	5 U	5 U		270	17		4 U	0.15 U	18		5.8
MW6S	8/7/02	N2				2.7		9.9 J		3330			1790		0.015 U														
MW6S	9/25/03	N	130	0.33		1 J		22		5900			1190		0.015 U	1 U	0.25 U	2.5 U	2.5 U	2.5 U		282	23.9		104	1.01	17		8.2
MW6S	9/25/03	N2	130			1 J		9		1100			961		0 U														
MW6S	9/27/06	N	3.5 J	0.21		1.0 U		2.6 J		50 U			590			1.1 U	0.50 U	5.0 U	5.0 U	5.0 U		320 J	18		350	3.9 =	18		4.1
MW6S	9/20/07	FD	2.7	0.14 J		1.0 UJ		10 UJ		390			190		1 U	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U		230 J	29		330 J	4.7	36 J		5.2 J
MW6S	9/20/07	N	3.0	0.099 J		1.0 UJ		10 UJ		510			200		0.1 U	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U		230 J	30		320 J	4.7	34 J		4.7 J
MW6S	10/23/08	N	2.0 UJ	2.65		2 UJ		4.4 J		438 J	6260 J		65.3 J		0.073 J	1 U	0.5 U	2.0 U	2.0 U	5.0 U		4.98 J	28.3		90 J	7.11 J	11		8.3
MW6S	10/7/10	N	1.3 U	0.1 UJ		2 U		5 J		531	4780		19.7 J		0.1 U	1.0 UJ	0.5 UJ	2 U	2 U	5 U		11 UB	21.3		56.9	6.94 J	11 J		6.8
MW6S	10/19/11	N	0.50 U	0.10 U		2.0 U		3.7 J		50 U	4400 B		14		0.05 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		15	17		45.60	5.3	9.8		1.0 U
MW6S	10/17/12	N	0.50 U	0.10 U		0.54 J		10 U		50 U	4600 =		3.9 J		0.13	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		18	16		51.4	5.5 H	11 J		3.2
MW6S	10/9/13	N	0.50 U	0.52 J		2.0 UJ		10.0 UJ		1500 J	6000 J		32 J		0.04 U	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U*		5.0 UJ	29			9.0 J	9.5		8.0 J
MW6S	10/9/13	N2													0.11 U											8.9 J			
MW6S	9/24/14	N	0.082 J	0.27	1.3 J		27		6000 B			110		41 B	0.11 U	0.062 U	0.24 U	0.23 U	0.22 U	0.43 U		22	9.3	100		3.6	7.3	0.50 U	
MW6S	10/14/15	N	0.080 U	0.49 U		2.5		16.8			1.4 J		7.3 U		0.100 U	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U		12.5 B	10.8	76.4		3.6	6.7	3.4	
MW6S	4/19/16	N	0.080 U	0.51 J		4.7		831 B			15.4		7.3 U		0.266	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		42.0	7.4		70.6	4.8	6.3		18.2
MW6S	7/25/16	N	0.080 U	0.49 U		3.4 B		118 B			6.1		7.3 U		0.0962 R	0.061 U	0.35 U	0.25 U	0.23 U	0.52 U		49.4	13.8	86		7.7 F1	8	3.7	
MW6S	10/13/16	N	0.080 U	0.71 J		19.7 B		2290 B			52.7		11.7 J		0.20	0.061 UH	0.28 U	0.26 U	0.23 U	0.24 U		126	14.5	152		6.9 H	8.1	4.2 ^	
MW6S	1/23/17	N	0.080 U	0.35 U		2.8		5.3 U			6.0 B		6.2 U		0.059 J	0.063 U	0.28 U	0.26 U	0.23 U	0.24 U		188	6.6	212		3.1	6.0	3.8 B	
MW6S	4/24/17	N		5.0 U		3.3 B		8.3 JB			7.4 B		20.0 U		0.13	0.23 U					198			268					
MW7	10/14/97	N	10 U	1 U		2 U		6.2		622			13.4		0.11 U		0.1 U	1 U	1 U	1 U		350	7.6			4.9	6		1.6
MW7	10/14/97	N2		1 U		2 U		2 U							0.11 U		0.1 U	1 U	1 U	1 U									
MW7	4/4/00	FD		0.5 U											0.11 UJ	10 U													
MW7	4/4/00	N		0.5 U											0.11 U	10 U													
MW7	4/25/01	N	4.65	0.1 U		1 U		25 U		352			5.4		0.093 UJ	5.2 U	0.1 U	1 U	1 U	1 U		352	8.36		388	3.63	6.54		2.8
MW7	4/25/01	N2	4.65			1 U		25 U		154			6.6		0.093 UJ	5.2 U										3.63 =			
MW7	9/11/01	N	12	0.083 J		0.4 J		2.2 U		560			6.4		0.093 UJ	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		340	23		410	3	10		2
MW7	9/11/01	N2	10 U	0.13 J		0.29 U		2.2 U		230			4.4			0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		350	24		400	3	10		1.8
MW7	9/11/01	N3				0.47 J		2.2 U		560			5.7		0.1 U														
MW7	9/11/01	N4				0.29 U		2.2 U		230			4.6		0.1 UJ														

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
Units			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW7	8/7/02	N	10.0 U	0.03 J		1.5 J		0.3 U		730			6.5 J		0.15 J	5 U	1 U	5 U	5 U	5 U		390	21		450	0.15 U	10		1.5
MW7	8/7/02	N2				1.4 U		0.3 U		300			4 J		0.1 UJ														
MW7	9/24/03	N	4.9	0.044 J		1 U		1 U		280 J			6 J		0.1 U	0.96 U	0.25 U	2.5 U	2.5 U	2.5 U		346	12.2		133.3	2.97	2 U		1.2
MW7	9/24/03	N2	4.9			1 U		1 U		90 J			5 U		0.1 U														
MW7	9/22/04	N	10.0 UJ	9.18 E		1.00 UJ		1.09 J		1640 J			9.86 J		0.1 U	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		300 J	7.2 J		1560 J	3.4 J	6.8 R		1.98 R
MW7	9/22/04	N2		5.75		0.108 J		0.847 J		25.0 UJ			9.75 J		0.095 U														
MW7	9/27/05	N	2.0 UJ	0.12 U		1.0 U		10 U		1300			18		0.094 U	0.91 UJ	0.50 U	5.0 U	5.0 U	5.0 U		260 J	18 J		450	1.8 J	130 J		0.96 J
MW7	9/27/05	N2				1.0 U		10 U		880			16 J		0.071 J														
MW7	9/26/06	N	4.3 J	0.087 J		1.0 U		10 U		50 U			68 J		0.095 U	0.92 U	0.50 U	5.0 U	5.0 U	5.0 U		280 J	15		390	1.8 =	110 =		2.4
MW7	9/20/07	N	3.7	0.093 U		1.0 UJ		10 UJ		260			22		0.094 UJ	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U		270 J	16		370 J	1.5	170 J		1.1 J
MW7	10/22/08	N	110 J	0.1 U		2 UJ		4 J		926 J	37700 J		41.6 J		0.094 U	1 U	0.5 U	2.0 U	2.0 U	5 U		277 J	14.1		535 J	1.54 J	98.9		4.16
MW7	10/22/08	N2													0.095 U														4.41
MW7	10/7/09	N	2.4 J	0.403 J		2 UJ		10 UJ		687 J	32600 J		109 J		0.023 J	0.999 UJ	0.1 UJ	0.4 UJ	0.4 UJ	0.14 J		245 J	12.2 J		396.43 J	1.91 J	152 J		14.5 J
MW7	10/6/10	N	28	0.1 U		2 U		8 U		989	38900		63.2		0.015 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U		226	13.8 J		482	2.24 J	168		10.4
MW7	10/19/11	N	15	0.098 U		0.48 J		2 U		81	21000 B		21		0.015 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		230	12		249.00	1.9 J	92		1.5 J
MW7	10/17/12	N	2.2	0.096 U		2.0 U		10 U		230	21000 =		22		0 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U		210	11		254	1.5 H	120 =		0.97 J
MW7	10/9/13	N	2.2 B	0.094 U		0.34 J		10.0 UJ		10000 J	21000 J		74 J			0.19 U	0.50 U	1.0 U	1.0 U	2.0 U*		200 J	12			1.8 J	120		0.75 J
MW7	10/9/13	N2													0.0935 U											1.8 J			
MW7	9/23/14	N	15	0.034 J	0.28 JB		0.75 U		260			33		30 B	0.293	0.060 U	0.24 U	0.23 U	0.22 U	0.43 U		200	9.0	240		1.9 H	110	0.96 J	
MW7	10/12/15	N	6.5 B	0.88 J		1.6 J		16.0 U			423		7.3 U		0.0962 U	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U		228 B	8.3	229		1.5	46.2	0.85 J	
MW7	4/6/16	N	13	0.49 U		1.9 JB^		5270 B			117 B		36.2 B		0.11 U	0.065 U	0.35 U	0.25 U	0.23 U	0.52 U		212 B	10.3		237	1.7	25.7		0.58 J
MW8	10/14/97	N	36.5	1 U		2 U		2 U		148			17.8		0.11 U		0.1 U	1 U	1 U	1 U		170	4.2			1.4	4.5		2.3
MW8	10/14/97	N2		1 U		2 J		2 U							0.11 UJ		0.1 U	1 U	1 U	1 U									
MW8	4/5/00	N		0.5 U											0.11 U	10 U													
MW8	4/25/01	N	11.6	0.2		0.99		25 U		829			32		0.092 UJ	5 U	0.1 U	1 U	1 U	1 U		154	3.25		181	1.52	7.47		1.46
MW8	4/25/01	N2	11.6			0.75		25 U		25 U			27		0.093 UJ														
MW8	4/25/01	N3				0.57		25 U		25 U			22		0.095 UJ														
MW8	9/11/01	N	10 U	0.062 J		1		2.2 U		70 J			18			0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		150	3.8		170	1.5	7.6 U		1 J
MW8	9/11/01	N2				1.2		2.2 U		350			19		0.1 U														
MW8	8/8/02	N	10.0 U	0.04 U		1.4 U		0.3 U		98			6.4 J		0.1 UJ	5 U	1 U	5 U	5 U	5 U		180	4.2		310	0.15 U	6		1.1
MW8	8/8/02	N2				1.8 J		0.27 U		11 J			5.3 J		0.1 UJ														
MW8	9/25/03	N	8.9	0.047 J		1 U		1 U		140			8 J		0.1 U	0.95 U	0.25 U	2.5 U	2.5 U	2.5 U		182	11		69.57	2.61	2 U		1.7
MW8	9/25/03	N2	9.2	0.11 U		1 U		1 U		50 U			8 J		0.1 U	1 U	0.25 U	2.5 U	2.5 U	2.5 U		184	11		69.44	2.6	2 U		2.3
MW8	9/25/03	N3	9.2			1 U		1 U		240			8 J		0.1 U														
MW8	9/25/03	N4				1 U		1 U		50 U			6 J		0.095 U														
MW8	9/23/04	N	3.75 J	1.94 =		0.127 J		0.465 J		256			15.1		0.095 U	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		200	15		1160	2.4 J	5.8 J		1.40
MW8	9/23/04	N2				0.539 J		0.660 J		11.0 J			12.0 J		0.030 J														
MW8	9/28/05	FD	2.0 U	0.12 U		1.0 UJ		2.3 J		4500 J			56 J		0.095 UJ	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U		160 J	19 J		200 J	2.0 J	19 R		1.0 J
MW8	9/28/05	FD2				1.0 UJ		10 UJ		120 J			13 J		0.095 U														
MW8	9/28/05	N	2.6	0.031 J		1.0 UJ		3.8 J		4700 J			63 J		0.095 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U		160 J	20 J		240 J	2.0 J	19 R		1.2 J
MW8	9/28/05	N2				1.0 UJ		10 UJ		130 J			16 J		0.098 U														
MW8	9/20/07	N	2.0 UJ	0.093 U		0.61 J		10 UJ		210			13 J		0.095 U	0.93 U	1.0 U	1.0 U	1.0 U	2.0 U		180	21		260 J	1.5	76 J		1.1 J
MW8	10/22/08	N	0.78 J	0.1 U		2 UJ		10 UJ		707 J	40400 J		13.1 J		0.015 U	1 U	0.5 U	2.0 U	2.0 U	5 U		178 J	24.3		496 J	1.92 J	73.1		16.1
MW8	4/11/16	N	1.5	0.60 J		0.75 U		197 B			10.9 B		7.3 U		0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		174 B	18.0		421	1.3 H	201		0.26 J
MW9	10/8/97	N	10 U	1 U		2 U		4.2 U		20 U			19.7		0.016 U		0.1 U	1 U	1 U	1 U		60	45			4.2	3.4		6.5

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
	Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
MW9	10/8/97	N2		1 U											0.015 U		0.1 U	1 U	1 U	1 U									
MW9	4/5/00	N		0.6 =											0.015 U	10 U													
MW9	4/23/01	N	0.12 U	0.12		0.38		25 U		470			46		0.015 U	5.3 U	0.1 U	1 U	1 U	1 U		60	3.22		59	2.46 =	27		9.94
MW9	4/23/01	N2	0.12 U												0.018 J											2.46			
MW9	4/24/01	N				0.28		25 U		25 U			34		0.015 U														
MW9	9/12/01	N	10 U	0.76		0.43 J		6.1 J		300			27		11 J	0.24 U	0.44 U	0.5 U	0.4 U	1.2 U		62	6.5		64	3.3	6.8 U		5.1
MW9	9/12/01	N2				0.34 J		2.2 U		110			16		6.6 J														
MW9	8/6/02	N	10.0 U	0.54		1.4 U		1.6 J		200			14 J		6.4 J	5 U	1 U	5 U	5 U	5 U		64	11		95	0.15 U	22		8.4
MW9	8/6/02	N2				1.4 U		0.3 U		11 U			6.3 J		9.6 J														
MW9	9/25/03	N	0.5 U	2.3		1 J		20		7400			229		20 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		59	4.4		32.83	2.36	24		6.5
MW9	9/25/03	N2	0.5 U			1 U		1 U		240			16		10 U														
MW9	9/22/04	N	10.0 UJ	2.92		0.134 J		2.07 J		231 J			16.5 J		4.60 J	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U		58 J	3.2 J		776 J	1.8 J	26 R		6.48 R
MW9	9/22/04	N2				0.265 J		2.88 J		125 U			8.51 J		14.9 J														
MW9	9/27/05	N	2.0 UJ			1.0 UJ		10 U		50 U			6.3 J		20 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U		55 J	2.6 J		70	1.9 J	20 J		2.0
MW9	9/27/05	N2				1.0 UJ		10 U		50 U			5.4 J		20 U														
MW9	10/18/05	N		0.57																									
MW9	9/21/07	N	2.0 U	0.37 J		1.0 UJ		5.9 J		100 UJ			4.1 J		20 UJ	0.97 R	1.0 U	1.0 U	1.0 U	2.0 U		58 J	2.6		86 J	3.8	15 J		3.3 J
MW9	10/22/08	N	2.0 UJ	0.1 U		2 UJ		6 J		166 J	11600 J		10 UJ		20 UJ	1 U	0.5 U	2.0 U	2.0 U	5 U		55 J	3.44		113 J	2.48 J	14.9		11.2
MW9	5/18/10	N	1.3 U	0.073 J		2 UJ		10 UJ		120. UJ	6230. J		7.1 J		20 UJ	1.0 U	0.5 U	5 U	5 U	5 U		63 UB	2.63		67.9	2.42 J	11		25.7 UB
MW9	10/6/10	N	1.3 U	0.1 U		2 U		8 U		109 J	8540		16.7 U		20 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U		27	3.3 J		88.1	3.35	14 J		7.6
MW9	10/19/11	N	0.50 U	0.098 U		2.0 U		3.5 J+		50 U	8400 B		2.9 J		10 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		69	1.0 U		82.00	3.1	8.9		1.0 U
MW9	10/16/12	N	0.50 U	0.39		0.91 J		10 U		50 U	8400 =		10 U		20 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U		63	2.8 J		82	5.9 J	10 J		3.8
MW9	10/9/13	N	0.50 U	0.41 J		2.0 UJ		10.0 UJ		50 UJ	6200 J		10 UJ		20 UJ	0.21 U	0.50 U	1.0 U	1.0 U	2.0 U*		47 J	1.2			3.8 J	12		1.6 J
MW9	10/9/13	N2																								3.8 J			
MW9	9/24/14	N	0.070 U	1.6	0.18 U		0.75 U		16 U			1.1 U		7.3 U		0.061 U	0.24 U	0.23 U	0.22 U	0.43 U		14	1.1	41		2.4	10	2.5	
MW9	10/13/15	N	0.080 U	0.49 U		1.3 J		21.1 J			1.1 U		7.3 U		0.17	0.066 U	0.35 U	0.23 U	0.25 U	0.52 U		31.0 B	0.70 J	40.2		1.5 H	7.4	4.4	
MW9	4/13/16	N	0.080 U	0.49 U		1.4 J		33.6 J			1.5 J		7.3 U		0.28	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U		26.6	0.99 J		37.2	1.4	7.3		30.2
RW01	10/9/97	N													1 U														
RW01	4/23/01	N													0.1 U	5.3 U	0.5 U	5 U	5 U										
RW01	9/11/01	N													0.071 J	0.26 U	0.44 U	0.5 U	0.4 U	1.2 U									
RW01	9/28/01	N													0.1 U														
RW01	9/28/01	N2													0.05 U														
RW01	5/14/02	N													0.23	5 U	1 U	5 U	2 J	2 J									
RW01	8/6/02	N													0.04	5 U	1 U	5 U	5 U	5 U									
RW01	4/29/03	N													0.1 J	7.1 U	0.5 U	5 U	5 U	5 U									
RW01	9/23/03	N													0.28	0.97 U	0.25 U	2.5 U	2.5 U	2.5 U									
RW01	11/20/03	N													0.24														
RW01	5/4/04	FD													0.134 UB	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW01	5/4/04	N													0.140 UB	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW01	9/22/04	FD													1.51	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW01	9/22/04	N													0.201	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW01	11/1/04	N													0.0952 U														
RW01	5/10/05	FD													0.053 J	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW01	5/10/05	N													0.068 J	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW01	7/7/05	FD													0.035 J	0.96 U	0.50 U	5.0 U	5.0 U	5.0 U									

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
RW01	7/7/05	N													0.043 J	0.95 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW01	9/27/05	FD													0.049 J	0.93 UJ	0.50 U	5.0 U	5.0 U	5.0 U									
RW01	9/27/05	N													0.050 J	0.92 UJ	0.50 U	5.0 U	5.0 U	5.0 U									
RW01	5/31/06	FD													0.055 J	0.94 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW01	5/31/06	N													0.048 J	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW01	9/25/06	FD													0.023 J	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW01	9/25/06	N													0.11 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW01	5/9/07	FD													0.048 J	0.95 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW01	5/9/07	N													0.035 J	0.95 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW01	9/18/07	FD													0.27 R	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW01	9/18/07	N													0.093 UJ	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW01	5/20/08	FD													0.066 J	0.95 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ									
RW01	5/20/08	N													0.060 J	0.95 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ									
RW01	10/23/08	FD														1 U													
RW01	10/23/08	N														1 U													
RW01	12/11/08	FD													0.1 U		0.1 U	0.4 U	0.4 U	1.0 U									
RW01	12/11/08	N													0.1 UJ		0.1 U	0.4 U	0.4 U	1.0 U									
RW01	6/2/09	FD													0.1 UJ	1.0 UJ	0.5 UB	2.0 UB	2.0 UB	5.0 UB									
RW01	6/2/09	N													0.1 UJ	1.0 UJ	0.5 UB	2.0 UB	2.0 UB	5.0 U									
RW01	7/6/09	FD															0.5 U	2.0 U	2.0 U	5.0 U									
RW01	7/6/09	N															0.5 U	2.0 U	2.0 U	5.0 U									
RW01	10/7/09	FD													0.1 UJ	0.997 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ									
RW01	10/7/09	N													0.1 UJ	1 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ									
RW01	5/19/10	FD													0.1 U	1.0 U	0.4 U	5 U	5 U	5 U									
RW01	5/19/10	N													0.1 U	1.0 U	0.4 UJ	5 UJ	5 UJ	5 UJ									
RW01	10/5/10	FD													0.1 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U									
RW01	10/5/10	N													0.1 U	1.0 U	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ									
RW01	11/30/10	N															0.1 U	0.4 U	0.4 U	1 U									
RW01	6/30/11	FD													0.1 U	1 U	0.1 U	0.4 U	0.4 U	1 U									
RW01	6/30/11	N													0.1 U	0.997 U	0.1 U	0.4 U	0.4 U	1 U									
RW01	10/20/11	FD													0.039 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW01	10/20/11	N													0.040 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW01	12/16/11	FD													0.031 R														
RW01	12/16/11	N													0.096 UJ														
RW01	5/23/12	FD													0.017 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW01	5/23/12	N													0.019 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW01	7/11/12	FD													0.035 J														
RW01	7/11/12	FD2													0.033 J														
RW01	7/11/12	N													0.027 J														
RW01	10/17/12	FD													0.035 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW01	10/17/12	N													0.045 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW01	12/3/12	FD													0.094 UJ														
RW01	12/3/12	FD2													0.095 U														
RW01	12/3/12	N													0.094 UJ														
RW01	12/3/12	N2													0.095 U														

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Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
RW01	5/21/13	FD													0.029 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW01	5/21/13	N													0.031 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW01	10/8/13	N													0.040 J	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW01	10/8/13	N2													0.097 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW01	5/13/14	N													0.051 J														
RW01	9/25/14	N													0.043 J	0.060 U	0.24 U	0.23 U	0.22 U	0.43 U									
RW01	4/21/15	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW01	10/15/15	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW01	4/5/16	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW01	4/19/17	N													0.015 J	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U									
RW02	10/9/97	FD													2														
RW02	10/9/97	N													0.9 J														
RW02	10/24/97	N													1 U														
RW02	4/8/98	N													1 U														
RW02	4/24/01	N													0.1 U	5.4 U	0.1 U	1 U	1 U	1 U									
RW02	9/11/01	N													9.5	0.25 U	0.44 U	0.5 U	0.4 U	1.2 U									
RW02	9/28/01	N													0.1 U														
RW02	9/28/01	N2													0.1 U														
RW02	9/28/01	N3													0.05 U														
RW02	9/28/01	N4													0.05 U														
RW02	5/14/02	N													0.1	5 U	1 U	5 U	5 U	5 U									
RW02	8/6/02	N													0.04 U	5 U	1 U	5 U	5 U	5 U									
RW02	8/6/02	N2													0.04 U	5 U	1 U	5 U	5 U	5 U									
RW02	4/29/03	N													0.11 U	6.8 U	0.5 U	5 U	5 U	5 U									
RW02	9/24/03	N													0.11 U	0.97 U	0.25 U	2.5 U	2.5 U	2.5 U									
RW02	9/24/03	N2													0.11 U	0.96 U	0.25 U	2.5 U	2.5 U	2.5 U									
RW02	5/4/04	N													0.0252 UB	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW02	9/22/04	N													0.398	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW02	11/1/04	N													0.0962 U														
RW02	5/10/05	N													0.11 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW02	9/27/05	N													0.11 U	0.92 UJ	0.50 U	5.0 U	5.0 U	5.0 U									
RW02	5/31/06	N													0.11 UJ	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW02	9/25/06	N													0.11 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW02	5/9/07	N													0.092 UJ	0.97 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW02	9/18/07	N													0.093 UJ	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW02	5/20/08	N													0.095 UJ	0.95 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ									
RW02	10/23/08	N														1.33 U													
RW02	12/10/08	N													0.1 U		0.1 U	0.4 U	0.4 U	1.0 U									
RW02	6/2/09	N													0.1 UJ	1.0 UJ	0.5 U	2.0 U	2.0 U	5.0 U									
RW02	10/7/09	N													0.1 UJ	0.997 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ									
RW02	5/19/10	N													0.1 U	1.0 U	0.4 U	5 U	5 U	5 U									
RW02	10/5/10	N													0.1 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U									
RW02	6/30/11	N													0.1 U	0.999 U	0.1 U	0.4 U	0.4 U	1 U									
RW02	10/20/11	N													0.095 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW02	5/23/12	N													0.097 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									

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Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
RW02	10/17/12	N													0.037 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW02	10/17/12	N2													0.057 J														
RW02	10/17/12	N3													0.094 UJ														
RW02	12/3/12	N													0.095 U														
RW02	12/3/12	N2													0.094 UJ														
RW02	5/21/13	N													0.097 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW02	10/8/13	N													0.094 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW02	5/13/14	N													0.095 U														
RW02	9/25/14	N													0.015 U	0.060 U	0.24 U	0.23 U	0.22 U	0.43 U									
RW02	4/21/15	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW02	10/15/15	N													0.015 U	0.061 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW02	4/5/16	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW02	4/17/17	N													0.015 U	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U									
RW03	10/9/97	N													1 U														
RW03	9/11/01	N													0.1 J	0.28 U	0.44 U	0.5 U	0.4 U	1.2 U									
RW03	9/28/01	N													0.1 U														
RW03	9/28/01	N2													0.05 U														
RW03	5/14/02	N													0.094 J	5 U	1 U	5 U	5 U	5 U									
RW03	8/6/02	N													0.04 U	5 U	1 U	5 U	5 U	5 U									
RW03	4/29/03	N													0.11 U	6.8 U	0.5 U	5 U	5 U	5 U									
RW03	9/23/03	N													0.11 U	0.96 U	0.25 U	2.5 U	2.5 U	2.5 U									
RW03	5/4/04	N													0.0952 U	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW03	9/22/04	N													2.18	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW03	11/1/04	N													0.0962 U														
RW03	5/10/05	N													0.11 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW03	9/27/05	N													0.11 U	0.93 UJ	0.50 U	5.0 U	5.0 U	5.0 U									
RW03	5/31/06	N													0.11 UJ	0.94 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW03	9/25/06	N													0.11 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW03	5/9/07	N													0.092 UJ	0.95 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW03	9/18/07	N													0.093 UJ	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW03	5/20/08	N													0.097 UJ	0.96 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ									
RW03	10/23/08	N														1 U													
RW03	12/10/08	N													0.1 U		0.1 U	0.4 U	0.4 U	1.0 U									
RW03	6/2/09	N													0.1 UJ	1.0 UJ	0.5 U	2.0 U	2.0 U	5.0 U									
RW03	10/7/09	N													0.1 UJ	0.997 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ									
RW03	5/19/10	N													0.1 U	1.0 U	0.4 UJ	5 UJ	5 UJ	5 UJ									
RW03	10/5/10	N													0.1 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U									
RW03	6/30/11	N													0.1 U	0.994 U	0.1 U	0.4 U	0.4 U	1 U									
RW03	10/20/11	N													0.095 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW03	5/23/12	N													0.097 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW03	10/17/12	N													0.015 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW03	12/3/12	N													0.095 U														
RW03	12/3/12	N2													0.095 UJ														
RW03	5/21/13	N													0.053 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW03	10/8/13	N													0.096 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
RW03	5/13/14	N													0.095 U														
RW03	9/25/14	FD													0.015 U	0.060 U	0.24 U	0.23 U	0.22 U	0.43 U									
RW03	9/25/14	N													0.015 U	0.060 U	0.24 U	0.23 U	0.22 U	0.43 U									
RW03	4/21/15	N													0.015 U	0.063 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW03	10/15/15	N													0.015 U	0.061 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW03	4/5/16	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW03	4/17/17	N													0.015 U	0.061 U	0.28 U	0.26 U	0.23 U	0.24 U									
RW04	10/9/97	N													1 U														
RW04	4/23/01	N													0.1 U	5 U	0.5 U	5 U	5 U										
RW04	9/11/01	N													0.073 J	0.25 U	0.44 U	0.5 U	0.4 U	1.2 U									
RW04	9/28/01	N													0.1 U														
RW04	9/28/01	N2													0.05 U														
RW04	5/14/02	N													0.13	5 U	1 U	5 U	5 U	5 U									
RW04	8/6/02	N													0.04 U	5 U	1 U	5 U	5 U	5 U									
RW04	4/29/03	N													0.11 U	7.4 U	0.5 U	5 U	5 U	5 U									
RW04	9/23/03	N													0.11 U	0.99 U	0.25 U	2.5 U	2.5 U	2.5 U									
RW04	5/4/04	N													0.100 U	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW04	9/22/04	N													0.266	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW04	10/1/04	N													0.0962 R														
RW04	5/10/05	N													0.11 U	0.94 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW04	9/27/05	N													0.11 U	0.91 UJ	0.50 U	5.0 U	5.0 U	5.0 U									
RW04	5/31/06	N													0.11 UJ	0.97 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW04	9/25/06	N													0.11 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW04	5/9/07	N													0.093 UJ	0.96 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW04	9/18/07	N													0.093 UJ	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW04	5/20/08	N													0.093 UJ	0.96 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ									
RW04	10/23/08	N														1 U													
RW04	12/10/08	N													0.1 U		0.1 U	0.4 U	0.4 U	1.0 U									
RW04	6/2/09	N													0.1 UJ	1.0 UJ	0.5 U	2.0 U	2.0 U	5.0 U									
RW04	10/7/09	N													0.15 J	0.994 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ									
RW04	10/20/09	N													0.1 UJ														
RW04	5/19/10	N													0.1 U	1.0 U	0.4 UJ	5 UJ	5 UJ	5 UJ									
RW04	10/5/10	N													0.1 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U									
RW04	6/30/11	N													0.1 U	0.992 U	0.1 U	0.4 U	0.4 U	1 U									
RW04	10/20/11	N													0.095 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW04	5/23/12	N													0.094 U	0.20 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW04	10/17/12	N													0.071 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW04	12/3/12	N													0.095 U														
RW04	12/3/12	N2													0.094 UJ														
RW04	5/21/13	N													0.094 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW04	10/8/13	N													0.095 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW04	5/13/14	N													0.023 J														
RW04	9/25/14	N													0.015 U	0.060 U	0.24 U	0.23 U	0.22 U	0.43 U									
RW04	4/21/15	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW04	10/15/15	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW04	4/5/16	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									

Appendix A.1

Historical Groundwater Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Compound [1]			Methane	Arsenic (dissolved)	Arsenic	Copper (dissolved)	Copper	Iron (dissolved)	Iron	Magnesium	Manganese (dissolved)	Manganese	Zinc (dissolved)	Zinc	Pentachlorophenol	Naphthalene	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Alkalinity, hydroxide (as CACO3)	Alkalinity, total (as CaCO3)	Chloride	Hardness, carbonate	Hardness	Nitrate (as N)	Sulfate	TOC averages	Total organic carbon (TOC)
		Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DW01	9/24/03	N	0.5 U		1 U		2		50 UJ			5 UJ		30	0.05 J	1 U	0.25 U	2.5 U	2.5 U	2.5 U		250	66.9		110.8	1.48	2 U		1.5
RW04	4/17/17	N													0.015 U	0.060 U	0.34 JB	0.26 U	0.23 U	0.24 U									
RW05	5/4/04	N													0.0935 U	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW05	9/22/04	N													0.293	5.00 U	0.500 U	5.00 U	5.00 U	5.00 U									
RW05	11/1/04	N													0.0962 U														
RW05	5/10/05	N													0.11 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW05	9/27/05	N													0.11 U	0.92 UJ	0.50 U	5.0 U	5.0 U	5.0 U									
RW05	5/31/06	N													0.11 UJ	0.94 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW05	9/25/06	N													0.11 U	0.93 U	0.50 U	5.0 U	5.0 U	5.0 U									
RW05	5/9/07	N													0.092 UJ	0.93 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW05	9/18/07	N													0.093 UJ	1.0 R	1.0 U	1.0 U	1.0 U	2.0 U									
RW05	5/20/08	N													0.095 UJ	0.95 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ									
RW05	10/23/08	N														1 U													
RW05	12/10/08	N													0.1 U		0.1 U	0.4 U	0.4 U	1.0 U									
RW05	6/2/09	N													0.1 UJ	1.0 UJ	0.5 U	2.0 U	2.0 U	5.0 U									
RW05	10/7/09	N													0.1 UJ	0.997 UJ	0.1 UJ	0.4 UJ	0.4 UJ	1 UJ									
RW05	5/19/10	N													0.1 U	1.0 U	0.4 U	5 U	5 U	5 U									
RW05	10/5/10	N													0.1 U	1.0 U	0.1 U	0.4 U	0.4 U	1 U									
RW05	6/30/11	N													0.1 U	0.991 U	0.1 U	0.4 U	0.4 U	1 U									
RW05	10/20/11	N													0.095 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW05	5/23/12	N													0.095 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW05	10/17/12	N													0.030 J	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW05	12/4/12	N													0.095 UJ														
RW05	12/4/12	N2													0.095 U														
RW05	5/21/13	N													0.095 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW05	10/8/13	N													0.098 U	0.19 U	0.50 U	1.0 U	1.0 U	2.0 U									
RW05	5/13/14	N													0.095 U														
RW05	9/25/14	N													0.015 U	0.060 U	0.24 U	0.23 U	0.22 U	0.43 U									
RW05	4/21/15	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW05	10/15/15	N													0.016 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW05	4/5/16	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW05	4/17/17	N													0.015 U	0.060 U	0.39 JB	0.26 U	0.23 U	0.24 U									
RW06	9/25/14	N													0.015 U	0.060 U	0.24 U	0.23 U	0.22 U	0.43 U									
RW06	4/21/15	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW06	10/15/15	N													0.018 J	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW06	4/5/16	N													0.015 U	0.060 U	0.35 U	0.25 U	0.23 U	0.52 U									
RW06	4/18/17	N													0.015 U	0.060 U	0.28 U	0.26 U	0.23 U	0.24 U									

Appendix A.2

Historical LNAPL Thickness - Monitoring Wells
Penta Wood Products Superfund Site
Siren, Wisconsin

	Monitoring Well LNAPL Thickness (feet)				
Date	**MW10S**	**MW18**	**MW19**	**MW20**	**MW29**
Sep-01	0.01	0.27	0.51	0.11	NA
May-02	0.00	0.29	0.23	0.00	NA
Aug-02	0.00	0.33	0.22	0.00	NA
May-03	0.00	0.00	0.00	0.00	NA
Sep-03	0.00	0.32	0.24	0.04	NA
May-04	0.00	0.45	0.36	0.35	NA
Sep-04	0.21	0.54	0.67	0.52	NA
May-05	0.29	0.48	0.63	0.36	NA
Sep-05	0.87	0.06	0.83	1.15	NA
May-06	0.00	0.00	0.29	0.00	NA
Sep-06	0.00	0.05	0.80	0.69	NA
Apr-07	0.58	0.04	0.74	1.22	NA
May-07	0.58	0.03	0.54	1.20	NA
Sep-07	0.04	0.16	1.07	0.00	NA
May-08	0.40	1.19	0.90	1.71	NA
Oct-08	0.14	0.04	0.00	0.00	NA
Jun-09	0.54	1.58	1.60	1.45	NA
Oct-09	0.63	1.92	1.46	1.02	NA
May-10	0.51	2.01	1.10	0.85	NA
Oct-10	0.00	0.57	0.59	0.00	NA
Jun-11	0.00	0.42	0.79	0.00	NA
Oct-11	0.00	0.53	1.07	0.00	NA
May-12	0.69	0.79	0.80	2.17	NA
Aug-12	0.04	0.43	0.89	0.30	NA
Oct-12	0.00	0.45	0.91	0.88	NA
Dec-12	0.02	0.44	1.06	0.95	NA
May-13	0.17	0.53	0.94	1.08	NA
Oct-13	0.00	0.70	1.25	0.81	NA
May-14	0.00	0.79	0.22	0.22	NA
Sep-14	0.00	0.56	0.30	0.00	NA
2/13/15	0.00	0.56	0.24	0.00	NA
2/20/15	0.00	0.53	0.23	0.00	NA
3/24/15	0.00	0.34	0.52	0.00	NA
4/16/15	0.00	0.58	NM	0.00	NA
5/14/15	0.00	0.57	NM	0.00	NA
10/12/15	0.00	0.42	0.07	0.01	NA
4/4/16	0.00	0.66	0.25	0.01	0.00
7/18/16	0.00	0.52	0.00	0.00	0.00
10/7/16	0.00	0.67	0.01	0.01	0.00
1/11/17	0.00	NM	0.18	0.02	0.00
4/17/17	0.00	0.53	0.27	0.01	0.47

Notes:

NM - Not Measured
NA - Not Applicable

Appendix A.3

Historical Groundwater Extraction Summary
Penta Wood Products Superfund Site
Siren, Wisconsin

Operation Period	Volume of Groundwater Extracted (gallons)
09/27/00 to 12/18/00	11,712,960
02/02/01 to 02/08/01	691,200
03/16/01 to 06/10/01	9,288,000
06/15/01 to 09/27/01	6,822,720
02/27/04 to 12/31/04	18,548,154
01/01/05 to 12/31/05	21,374,796
01/01/06 to 12/31/06	14,759,392
01/01/07 to 12/31/07	16,551,336
01/01/08 to 12/31/08	18,118,696
01/01/09 to 12/31/09	18,533,648
01/01/10 to 12/31/10	18,561,632
01/01/11 to 12/31/11	17,796,668
01/01/12 to 12/31/12	23,051,892
01/01/13 to 12/31/13	29,793,563
01/01/14 to 12/31/14	18,415,098
01/01/15 to 06/30/15	6,282,127
07/01/15 to 11/23/15	5,125,729
Total Gallons Extracted	255,427,611

Appendix A.4

Historical Influent Pentachlorophenol Concentrations
Penta Wood Products Superfund Site
Siren, Wisconsin

Date	Influent PCP Concentration (ug/L)
02/27/2004 to 12/31/2004*	9,227
01/01/2005 to 12/31/2005*	7,300
01/01/2006 to 12/31/2006*	6,425
01/01/2007 to 12/31/2007*	3,557
01/01/2008 to 12/31/2008*	3,255
March 2009	3,560
July 2009	3,140
September 2009	2,800
December 2009	2,030
March 2010	2050 J
June 2010	1,970
September 2010	1,830
December 2010	1,940
March 2011	2,470
June 2011	2,170
August 2011	1,700
October 2011	1,600
February 2012	2,600
May 2012	2,200
July 2012	1,900
October 2012	1,800
February 2013	1,100
May 2013	1,100
July 2013	1,800
October 2013	1,400
February 2014	1,800
May 2014	1,600
August 2014	2,100
September 2014	2,400
October 2014	2,400
November 2014	2,100
December 2014	4,600
January 2015	1,800
February 2015	480
March 2015	390
April 2015*	1,767
May 2015*	355
June 2015	550
July 2015*	1,100
August 2015	370
September 2015	750
October 2015	600
November 2015	1,100

Note:

* Average PCP influent concentration for that time period.

Appendix A.5

Historical Hazardous Waste Generation Summary
Penta Wood Products Superfund Site
Siren, Wisconsin

Date	Filter Cake (lb)	Misc. Debris (lb)	Carbon (lb)	LNAPL (lb)	Liquids‡ (gallons)	Yearly Total (lb)
2000	0	200	6,000	5,009*	0	11,209
2001	0	400	56,100	6,166*	0	62,666
2002	0	1,400	48,000	10,790*	27,756	87,946
2003	0	600	0	3,083*	1,376	5,059
2004	155,960	3,200	102,000	53,522*	0	314,682
2005	178,784	1,290	104,860	23,847*	0	308,924
2006	112,640	1,200	136,520	52,892*	0	303,252
2007	174,020	2,200	245,377	77,615*	0	517,387
2008	211,402	3,176	70,007	28,036	0	312,621
2009	233,840	1,116	49,757	35,659	0	320,372
2010	210,940	0	81,227	34,937	0	327,104
2011	292,903	0	74,247	0	0	367,150
2012	182,280	0	65,420	25,493	0	273,193
2013	156,760	0	46,571	27,252	0	230,582
2014	110,754	13,513	65,995	11,720	0	201,982
2015	0	0	22,248	0	0	22,248
2016	0	15,212†	34,877	14,374	0	49,251
2017	0	0	0	0	2,759	2,759

Note:

* - Volume shows the amount of waste disposed offsite and is estimated to be approximately 50 percent pure LNAPL and 50 percent mixture of water and emulsified LNAPL.

† - Miscellaneous debris includes sludge, filter cake, and drill cuttings from system decommissioning.

‡ - Prior to 2017, all liquids disposed were water. In 2017, liquids disposed were ferric sulfate

Appendix A.6

LNAPL Thickness and Recovery Summary - Extraction Wells
Penta Wood Products Superfund Site
Siren, Wisconsin

Well ID	Date	Depth to Water (feet) [1]	Depth to LNAPL (feet) [1]	LNAPL Thickness (feet)	Recovered LNAPL Volume (gallons)	Comments
EW02	2/18/2015	97.51	NP	0.00	NA	Groundwater extraction rate increased to 10 gpm
EW02	2/20/2015	97.52	NP	0.00	NA	
EW02	2/24/2015	97.59	NP	0.00	NA	
EW02	3/10/2015	97.67	NP	0.00	NA	
EW02	3/24/2015	97.76	NP	0.00	NA	
EW02	4/10/2015	97.79	NP	0.00	NA	
EW02	4/16/2015	97.76	NP	0.00	NA	
EW02	5/8/2015	97.77	NP	0.00	NA	Groundwater extraction rate increased to 12 gpm on 4/30/2015
EW02	5/21/2015	97.89	NP	0.00	NA	
EW02	6/3/2015	97.92	NP	0.00	NA	
EW02	6/16/2015	97.99	NP	0.00	NA	
EW02	7/8/2015	98.12	NP	0.00	NA	
EW02	7/21/2015	98.11	NP	0.00	NA	
EW02	7/29/2015	98.11	NP	0.00	NA	Groundwater extraction rate increased to 13.5 gpm
EW02	8/5/2015	98.18	NP	0.00	NA	
EW02	8/19/2015	98.11	NP	0.00	NA	
EW02	9/4/2015	97.83	NP	0.00	NA	
EW02	9/21/2015	97.76	NP	0.00	NA	
EW02	10/8/2015	97.72	NP	0.00	NA	
EW02	10/22/2015	97.64	NP	0.00	NA	
EW02	11/2/2015	97.58	NP	0.00	NA	
EW02	11/23/2015	NM	NM	NM	NA	Groundwater extraction pump turned off for pilot study
				Total LNAPL Recovered	0.0	

Appendix A.6

LNAPL Thickness and Recovery Summary - Extraction Wells
Penta Wood Products Superfund Site
Siren, Wisconsin

Well ID	Date	Depth to Water (feet) [1]	Depth to LNAPL (feet) [1]	LNAPL Thickness (feet)	Recovered LNAPL Volume (gallons)	Comments
EW04	11/4/2014	114.30	NP	0.00	NA	
EW04	12/11/2014	115.39	NP	0.00	NA	
EW04	12/23/2014	115.34	NP	0.00	NA	Groundwater extraction system shutdown pending carbon change-out
EW04	12/30/2014	115.26	NP	0.00	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW04	1/8/2015	115.22	NP	0.00	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW04	1/19/2015	115.23	NP	0.00	NA	Groundwater extraction system restarted after carbon change-out
EW04	1/22/2015	115.36	NP	0.00	NA	
EW04	1/30/2015	115.47	NP	0.00	NA	
EW04	2/3/2015	115.48	NP	0.00	NA	
EW04	2/13/2015	115.51	NP	0.00	NA	
EW04	2/17/2015	115.48	NP	0.00	NA	Groundwater extraction rate increased to 10 gpm
EW04	2/18/2015	115.51	NP	0.00	NA	
EW04	2/20/2015	115.43	NP	0.00	NA	
EW04	2/24/2015	115.53	NP	0.00	NA	
EW04	3/10/2015	115.58	NP	0.00	NA	
EW04	3/24/2015	115.67	NP	0.00	NA	
EW04	4/10/2015	115.69	NP	0.00	NA	
EW04	4/16/2015	115.69	NP	0.00	NA	
EW04	5/8/2015	115.69	NP	0.00	NA	Groundwater extraction rate increased to 12 gpm on 4/30/2015
EW04	5/21/2015	115.74	NP	0.00	NA	
EW04	6/3/2015	115.75	NP	0.00	NA	
EW04	6/16/2015	115.82	NP	0.00	NA	
EW04	7/8/2015	115.93	NP	0.00	NA	
EW04	7/21/2015	115.92	NP	0.00	NA	
EW04	7/29/2015	115.91	NP	0.00	NA	Groundwater extraction rate increased to 13.5 gpm
EW04	8/5/2015	115.97	NP	0.00	NA	
EW04	8/19/2015	115.95	NP	0.00	NA	
EW04	9/4/2015	115.78	NP	0.00	NA	
EW04	9/21/2015	115.61	NP	0.00	NA	
EW04	10/8/2015	115.58	NP	0.00	NA	
EW04	10/22/2015	115.58	NP	0.00	NA	
EW04	11/2/2015	115.45	NP	0.00	NA	
EW04	11/23/2015	NM	NM	NM	NA	Groundwater extraction pump turned off for pilot study
				Total LNAPL Recovered	0.0	

Appendix A.6

LNAPL Thickness and Recovery Summary - Extraction Wells
Penta Wood Products Superfund Site
Siren, Wisconsin

Well ID	Date	Depth to Water (feet) [1]	Depth to LNAPL (feet) [1]	LNAPL Thickness (feet)	Recovered LNAPL Volume (gallons)	Comments
EW05	11/4/2014	83.35	83.25	0.10	NA	
EW05	11/6/2014	NM	NM	NM	<0.1	
EW05	11/7/2014	91.51	91.44	0.07	NA	
EW05	11/11/2014	91.75	91.56	0.19	NA	
EW05	11/12/2014	91.65	91.48	0.17	NA	Temporary system shutdown due to alarm condition
EW05	11/17/2014	91.64	91.51	0.13	NA	
EW05	12/1/2014	91.58	91.46	0.12	NA	
EW05	12/8/2014	91.55	91.51	0.04	NA	
EW05	12/11/2014	91.65	91.52	0.13	NA	
EW05	12/23/2014	91.40	91.39	0.01	NA	Groundwater extraction system shutdown pending carbon change-out
EW05	12/30/2014	91.37	91.36	0.01	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW05	1/8/2015	91.31	NP	0.00	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW05	1/19/2015	91.32	NP	0.00	NA	Groundwater extraction system restarted after carbon change-out
EW05	1/22/2015	91.95	91.45	0.50	NA	
EW05	1/30/2015	92.00	91.49	0.51	0.1	Measurements recorded prior to LNAPL removal
EW05	2/3/2015	92.17	91.54	0.63	NA	
EW05	2/13/2015	92.14	91.54	0.60	NA	Groundwater extraction pump turned off
EW05	2/17/2015	91.72	91.49	0.23	NA	
EW05	2/20/2015	91.96	91.54	0.42	NA	
EW05	2/24/2015	91.91	91.56	0.35	NA	
EW05	2/27/2015	NM	NM	NM	0.3	Measurements recorded prior to LNAPL removal
EW05	3/10/2015	92.30	91.58	0.72	0.1	Measurements recorded prior to LNAPL removal
EW05	3/26/2015	92.42	91.62	0.80	NA	
EW05	3/31/2015	NM	NM	NM	0.5	
EW05	4/10/2015	92.50	91.71	0.79	NA	
EW05	4/16/2015	92.51	91.69	0.82	NA	
EW05	4/27/2015	NM	NM	NM	1.0	
EW05	5/8/2015	92.03	91.70	0.33	NA	
EW05	5/21/2015	92.34	91.76	0.58	1.0	
EW05	6/3/2015	92.29	91.79	0.50	0.4	
EW05	6/16/2015	92.40	91.86	0.54	0.3	
EW05	7/8/2015	92.34	91.95	0.39	NA	
EW05	7/10/2015	NM	NM	NM	0.5	
EW05	7/21/2015	92.58	91.93	0.65	NA	
EW05	7/23/2015	NM	NM	NM	0.5	
EW05	7/29/2015	92.69	91.96	0.73	NA	
EW05	8/5/2015	92.60	92.04	0.56	NA	
EW05	8/7/2015	NM	NM	NM	0.3	
EW05	8/19/2015	92.45	91.94	0.51	NA	
EW05	8/21/2015	NM	NM	NM	0.3	
EW05	9/4/2015	92.02	91.82	0.20	NA	
EW05	9/11/2015	NM	NM	NM	<0.1	
EW05	9/21/2015	91.67	91.66	0.01	NA	
EW05	10/8/2015	91.87	91.67	0.20	NA	
EW05	10/22/2015	91.66	91.65	0.01	NA	
EW05	11/2/2015	91.51	91.50	0.01	NA	
				Total LNAPL Recovered	5.5	

Appendix A.6

LNAPL Thickness and Recovery Summary - Extraction Wells
Penta Wood Products Superfund Site
Siren, Wisconsin

Well ID	Date	Depth to Water (feet) [1]	Depth to LNAPL (feet) [1]	LNAPL Thickness (feet)	Recovered LNAPL Volume (gallons)	Comments
EW06	11/5/2014	111.22	98.06	13.16	12.0	
EW06	11/12/2014	107.80	98.30	9.50	NA	Temporary system shutdown due to alarm condition
EW06	11/17/2014	110.34	98.52	11.82	NA	
EW06	11/24/2014	111.05	98.45	12.60	10.0	
EW06	11/25/2014	105.63	98.55	7.08	NA	
EW06	12/1/2014	108.60	98.53	10.07	NA	
EW06	12/4/2014	109.35	98.48	10.87	NA	
EW06	12/8/2014	101.90	97.89	4.01	NA	
EW06	12/11/2014	111.91	98.01	13.90	NA	Measurements recorded prior to LNAPL removal
EW06	12/11/2014	100.35	98.40	1.95	12.0	Measurements recorded immediately after LNAPL removal
EW06	12/15/2014	108.40	98.01	10.39	NA	
EW06	12/23/2014	109.35	98.01	11.34	NA	Measurements recorded prior to LNAPL removal
EW06	12/23/2014	99.50	98.35	1.15	13.0	Measurements recorded immediately after LNAPL removal, groundwater extraction system shutdown pending carbon change-out
EW06	12/30/2014	98.59	97.83	0.76	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW06	1/8/2015	99.00	97.92	1.08	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW06	1/19/2015	99.54	97.80	1.74	NA	Groundwater extraction system restarted after carbon change-out
EW06	1/22/2015	111.10	98.18	12.92	NA	
EW06	1/23/2015	98.90	98.50	0.40	12.0	Measurements recorded immediately after LNAPL removal
EW06	1/30/2015	109.35	98.22	11.13	NA	
EW06	2/3/2015	112.61	98.22	14.39	12.0	Measurements recorded prior to LNAPL removal
EW06	2/13/2015	112.44	98.22	14.22	14.0	Groundwater extraction pump turned off
EW06	2/17/2015	101.95	98.12	3.83	NA	
EW06	2/20/2015	105.20	98.18	7.02	NA	
EW06	2/24/2015	105.37	98.02	7.35	8.0	Measurements recorded prior to LNAPL removal
EW06	3/10/2015	108.36	98.22	10.14	8.0	Measurements recorded prior to LNAPL removal
EW06	3/24/2015	NM	NM	NM	8.0	Not measured due to equipment breakdown
EW06	3/26/2015	105.87	98.21	7.66	NA	
EW06	4/10/2015	105.55	98.39	7.16	10.0	
EW06	4/16/2015	106.02	98.36	7.66	10.0	
EW06	4/30/2015	106.33	98.47	7.86	8.0	Groundwater extraction rate increased to 6 gpm
EW06	5/8/2015	100.72	98.32	2.40	4.0	
EW06	5/21/2015	106.84	98.27	8.57	10.0	
EW06	6/3/2015	106.55	98.41	8.14	NA	
EW06	6/4/2015	NM	NM	NM	10.0	
EW06	6/16/2015	105.85	98.49	7.36	7.0	
EW06	7/8/2015	107.10	98.42	8.68	20.0	
EW06	7/10/2015	107.10	98.60	8.50	17.0	
EW06	7/21/2015	107.90	98.54	9.36	17.0	
EW06	7/29/2015	105.87	98.59	7.28	NA	Groundwater extraction rate decreased to 3 gpm
EW06	8/5/2015	105.98	98.65	7.33	14.0	
EW06	8/7/2015	NM	NM	NM	14.0	
EW06	8/19/2015	103.95	98.51	5.44	10.0	
EW06	9/4/2015	105.31	98.31	7.00	10.0	
EW06	9/21/2015	104.49	98.28	6.21	10.0	
EW06	10/8/2015	100.38	98.25	2.13	5.0	
EW06	10/22/2015	105.54	98.23	7.31	8.0	
EW06	11/2/2015	105.15	98.05	7.10	NA	
EW06	11/5/2015	NM	NM	NM	8.0	
EW06	11/23/2015	NM	NM	NM	NA	Groundwater extraction pump turned off for pilot study
				Total LNAPL Recovered	301.0	

Appendix A.6

LNAPL Thickness and Recovery Summary - Extraction Wells
Penta Wood Products Superfund Site
Siren, Wisconsin

Well ID	Date	Depth to Water (feet) [1]	Depth to LNAPL (feet) [1]	LNAPL Thickness (feet)	Recovered LNAPL Volume (gallons)	Comments
EW10	11/4/2014	108.20	103.92	4.28	NA	
EW10	11/5/2014	108.77	104.70	4.07	4.0	
EW10	11/18/2014	107.60	104.35	3.25	NA	
EW10	11/24/2014	107.45	103.94	3.51	0.0	LNAPL pump inoperable, unable to recover LNAPL
EW10	11/25/2014	107.50	103.91	3.59	NA	
EW10	12/1/2014	107.30	104.14	3.16	NA	
EW10	12/4/2014	107.33	104.11	3.22	NA	Measurements recorded prior to LNAPL removal
EW10	12/4/2014	105.35	104.05	1.30	2.0	Measurements recorded immediately after LNAPL removal
EW10	12/8/2014	104.29	103.17	1.12	NA	
EW10	12/11/2014	106.95	104.05	2.90	NA	Measurements recorded prior to LNAPL removal
EW10	12/11/2014	105.46	104.12	1.34	2.0	Measurements recorded immediately after LNAPL removal
EW10	12/15/2014	106.68	104.00	2.68	NA	
EW10	12/23/2014	107.25	103.91	3.34	NA	Measurements recorded prior to LNAPL removal
EW10	12/23/2014	104.75	104.06	0.69	4.0	Measurements recorded immediately after LNAPL removal, groundwater extraction system shutdown pending carbon change-out
EW10	12/30/2014	104.59	103.00	1.59	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW10	1/8/2015	104.55	103.10	1.45	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW10	1/19/2015	104.70	103.00	1.70	NA	Groundwater extraction system restarted after carbon change-out
EW10	1/22/2015	106.38	104.31	2.07	NA	
EW10	1/23/2015	104.40	104.38	0.02	2.0	Measurements recorded immediately after LNAPL removal
EW10	1/30/2015	105.76	104.28	1.48	NA	
EW10	2/3/2015	106.00	104.27	1.73	2.0	Measurements recorded prior to LNAPL removal
EW10	2/13/2015	106.82	104.24	2.58	3.0	Groundwater extraction pump turned off
EW10	2/17/2015	105.80	103.65	2.15	NA	
EW10	2/20/2015	106.40	103.81	2.59	NA	
EW10	2/24/2015	106.85	103.79	3.06	2.0	Measurements recorded prior to LNAPL removal
EW10	3/10/2015	107.80	103.81	3.99	2.0	Measurements recorded prior to LNAPL removal
EW10	3/24/2015	108.21	103.84	4.37	2.0	Measurements recorded prior to LNAPL removal
EW10	4/10/2015	108.96	103.86	5.10	3.0	
EW10	4/16/2015	108.18	103.90	4.28	2.0	
EW10	4/30/2015	107.81	103.84	3.97	2.0	
EW10	5/8/2015	106.84	103.46	3.38	2.5	
EW10	5/21/2015	107.46	103.62	3.84	2.5	
EW10	6/3/2015	107.51	103.60	3.91	NA	
EW10	6/4/2015	NM	NM	NM	2.5	
EW10	6/16/2015	108.20	103.85	4.35	2.0	
EW10	7/8/2015	108.53	103.96	4.57	3.0	
EW10	7/10/2015	107.85	103.97	3.88	NA	
EW10	7/21/2015	108.48	103.96	4.52	3.0	
EW10	7/29/2015	108.10	104.00	4.10	NA	
EW10	8/5/2015	108.85	104.00	4.85	2.5	
EW10	8/19/2015	108.57	103.74	4.83	3.0	
EW10	9/4/2015	108.91	103.60	5.31	3.0	
EW10	9/21/2015	108.35	103.62	4.73	3.0	
EW10	10/8/2015	107.72	103.33	4.39	2.5	
EW10	10/22/2015	109.10	103.56	5.54	3.0	
EW10	11/2/2015	109.50	103.27	6.23	NA	
EW10	11/5/2015	NM	NM	NM	3.0	
				Total LNAPL Recovered	67.5	

Appendix A.6

LNAPL Thickness and Recovery Summary - Extraction Wells
Penta Wood Products Superfund Site
Siren, Wisconsin

Well ID	Date	Depth to Water (feet) [1]	Depth to LNAPL (feet) [1]	LNAPL Thickness (feet)	Recovered LNAPL Volume (gallons)	Comments
EW12	11/4/2014	105.26	105.04	0.22	NA	
EW12	11/6/2014	NM	NM	NM	<0.1	
EW12	11/7/2014	108.26	108.15	0.11	NA	
EW12	11/11/2014	108.39	108.22	0.17	NA	
EW12	11/12/2014	101.16	101.14	0.02	NA	Temporary system shutdown due to alarm condition
EW12	11/17/2014	108.00	107.98	0.02	NA	
EW12	12/8/2014	100.99	NP	0.00	NA	
EW12	12/11/2014	108.98	108.97	0.01	NA	
EW12	12/23/2014	109.75	NP	0.00	NA	Groundwater extraction system shutdown pending carbon change-out
EW12	12/30/2014	101.10	100.88	0.22	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW12	1/8/2015	101.20	100.84	0.36	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW12	1/19/2015	101.35	100.85	0.50	NA	Groundwater extraction system restarted after carbon change-out
EW12	1/22/2015	108.16	108.15	0.01	NA	
EW12	1/30/2015	108.96	108.96	0.00	NA	
EW12	2/3/2015	109.13	109.13	0.00	NA	
EW12	2/13/2015	109.98	NP	0.00	NA	Groundwater extraction pump turned off
EW12	2/17/2015	101.56	101.08	0.48	NA	
EW12	2/20/2015	101.90	101.32	0.58	NA	
EW12	2/24/2015	102.01	101.31	0.70	NA	
EW12	2/27/2015	NM	NM	NM	0.1	Measurements recorded prior to LNAPL removal
EW12	3/10/2015	102.35	101.35	1.00	0.1	Measurements recorded prior to LNAPL removal
EW12	3/24/2015	102.45	101.33	1.12	NA	
EW12	3/31/2015	NM	NM	NM	1.0	
EW12	4/10/2015	102.22	101.36	0.86	NA	
EW12	4/16/2015	102.32	101.36	0.96	NA	
EW12	4/27/2015	NM	NM	NM	1.0	
EW12	5/8/2015	101.99	101.19	0.80	NA	
EW12	5/21/2015	102.39	101.40	0.99	1.0	
EW12	6/3/2015	102.34	101.45	0.89	0.4	
EW12	6/16/2015	102.27	101.50	0.77	0.3	
EW12	7/8/2015	102.26	101.54	0.72	NA	
EW12	7/10/2015	NM	NM	NM	0.5	
EW12	7/21/2015	102.10	101.61	0.49	NA	
EW12	7/23/2015	NM	NM	NM	0.5	
EW12	7/29/2015	102.11	101.65	0.46	NA	
EW12	8/5/2015	102.39	101.69	0.70	NA	
EW12	8/7/2015	NM	NM	NM	0.3	
EW12	8/19/2015	101.27	100.45	0.82	NA	
EW12	8/21/2015	NM	NM	NM	0.1	
EW12	9/4/2015	101.87	101.47	0.40	NA	
EW12	9/11/2015	NM	NM	NM	0.3	
EW12	9/21/2015	101.60	101.29	0.31	NA	
EW12	10/1/2015	NM	NM	NM	0.2	
EW12	10/8/2015	101.39	101.15	0.24	NA	
EW12	10/22/2015	101.52	101.23	0.29	NA	
EW12	11/2/2015	101.51	101.18	0.33	NA	
				Total LNAPL Recovered	5.9	

Appendix A.6

LNAPL Thickness and Recovery Summary - Extraction Wells
Penta Wood Products Superfund Site
Siren, Wisconsin

Well ID	Date	Depth to Water (feet) [1]	Depth to LNAPL (feet) [1]	LNAPL Thickness (feet)	Recovered LNAPL Volume (gallons)	Comments
EW13	11/4/2014	111.48	NP	0.00	NA	
EW13	12/11/2014	114.81	NP	0.00	NA	
EW13	12/23/2014	115.11	NP	0.00	NA	Groundwater extraction system shutdown pending carbon change-out
EW13	12/30/2014	107.34	NP	0.00	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW13	1/8/2015	107.27	NP	0.00	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW13	1/19/2015	107.33	NP	0.00	NA	Groundwater extraction system restarted after carbon change-out
EW13	1/22/2015	115.05	NP	0.00	NA	
EW13	1/30/2015	115.49	NP	0.00	NA	
EW13	2/3/2015	115.28	NP	0.00	NA	
EW13	2/13/2015	115.74	NP	0.00	NA	
EW13	2/17/2015	117.05	NP	0.00	NA	Groundwater extraction rate increased to 10 gpm
EW13	2/18/2015	119.19	NP	0.00	NA	
EW13	2/20/2015	119.37	NP	0.00	NA	
EW13	2/24/2015	119.50	NP	0.00	NA	
EW13	3/10/2015	120.13	NP	0.00	NA	
EW13	3/24/2015	116.72	NP	0.00	NA	
EW13	4/10/2015	118.55	NP	0.00	NA	
EW13	4/16/2015	120.92	NP	0.00	NA	
EW13	5/8/2015	107.18	NP	0.00	NA	Groundwater extraction pump turned off on 4/30/2015
EW13	5/21/2015	104.94	NP	0.00	NA	
EW13	6/3/2015	105.88	NP	0.00	NA	
EW13	6/16/2015	106.44	NP	0.00	NA	
EW13	7/8/2015	107.42	NP	0.00	NA	
EW13	7/21/2015	107.70	NP	0.00	NA	
EW13	7/29/2015	107.91	NP	0.00	NA	
EW13	8/5/2015	107.89	NP	0.00	NA	
EW13	8/19/2015	107.80	NP	0.00	NA	
EW13	9/4/2015	107.63	NP	0.00	NA	
EW13	9/21/2015	107.63	NP	0.00	NA	
EW13	10/8/2015	107.49	NP	0.00	NA	
EW13	10/22/2015	107.72	NP	0.00	NA	
EW13	11/2/2015	107.48	NP	0.00	NA	
			Total LNAPL Recovered		0.0	

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LNAPL Thickness and Recovery Summary - Extraction Wells
Penta Wood Products Superfund Site
Siren, Wisconsin

Well ID	Date	Depth to Water (feet) [1]	Depth to LNAPL (feet) [1]	LNAPL Thickness (feet)	Recovered LNAPL Volume (gallons)	Comments
EW14	11/4/2014	112.55	112.45	0.10	NA	
EW14	11/6/2014	NM	NM	NM	<0.1	
EW14	11/7/2014	112.54	112.49	0.05	NA	
EW14	11/11/2014	112.68	112.60	0.08	NA	
EW14	11/12/2014	112.91	112.87	0.04	NA	Temporary system shutdown due to alarm condition
EW14	11/17/2014	111.82	111.55	0.27	NA	
EW14	12/8/2014	112.89	112.85	0.04	NA	
EW14	12/11/2014	113.83	113.75	0.08	NA	
EW14	12/23/2014	113.74	113.65	0.09	NA	Groundwater extraction system shutdown pending carbon change-out
EW14	12/30/2014	112.85	112.76	0.09	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW14	1/8/2015	112.77	112.71	0.06	NA	Groundwater extraction system remained shutdown pending carbon change-out
EW14	1/19/2015	112.92	112.78	0.14	NA	Groundwater extraction system restarted after carbon change-out
EW14	1/22/2015	113.80	113.72	0.08	NA	
EW14	1/30/2015	113.79	113.66	0.13	<0.1	
EW14	2/3/2015	113.74	113.65	0.09	NA	
EW14	2/13/2015	113.90	113.68	0.22	NA	
EW14	2/17/2015	113.85	113.79	0.06	NA	Groundwater extraction rate increased to 10 gpm
EW14	2/18/2015	114.29	114.21	0.08	NA	
EW14	2/20/2015	114.26	114.18	0.08	NA	
EW14	2/24/2015	114.25	114.21	0.04	NA	
EW14	3/10/2015	114.36	114.30	0.06	NA	
EW14	3/24/2015	114.41	114.36	0.05	NA	
EW14	3/31/2015	NM	NM	NM	<0.1	
EW14	4/10/2015	114.43	114.42	0.01	NA	
EW14	4/16/2015	114.47	114.44	0.03	NA	
EW14	5/8/2015	113.30	113.14	0.16	NA	Groundwater extraction pump turned off on 4/30/2015
EW14	5/21/2015	113.71	113.49	0.22	NA	
EW14	6/3/2015	113.72	113.50	0.22	0.2	
EW14	6/16/2015	113.71	113.58	0.13	0.1	
EW14	7/8/2015	113.71	113.62	0.09	NA	
EW14	7/21/2015	113.78	113.68	0.10	NA	
EW14	7/29/2015	113.83	113.72	0.11	NA	
EW14	8/5/2015	113.84	113.72	0.12	NA	
EW14	8/7/2015	NM	NM	NM	<0.1	
EW14	8/19/2015	113.80	113.70	0.10	NA	
EW14	9/4/2015	113.68	113.59	0.09	NA	
EW14	9/11/2015	NM	NM	NM	<0.1	
EW14	9/21/2015	113.43	113.38	0.05	NA	
EW14	10/8/2015	113.12	113.06	0.06	NA	
EW14	10/22/2015	113.48	113.39	0.09	NA	
EW14	11/2/2015	113.44	113.32	0.12	NA	
				Total LNAPL Recovered	0.8	
			Total LNAPL Recovered (all wells)		380.7	Since system modification in October 2014; system shutdown and LNAPL recovery terminated in November 2015

Notes:

[1] Depth to water and depth to LNAPL measurements before December 2014 were not consistently recorded from the same benchmark location/elevation. Measurements were consistently recorded from the same benchmark location at the top of the well vault starting in December 2014.

NM - Not measured

NP - LNAPL was not present in a measurable quantity

NA - Not applicable

Appendix B
Groundwater Sample Laboratory Reports

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-78384-1
Client Project/Site: 86165-04-05, Penta Wood

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson

Denise D Heckler

Authorized for release by:
5/4/2017 7:54:31 AM

Denise Heckler, Project Manager II
(330)966-9477
denise.heckler@testamericainc.com

Table of Contents

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Qualifiers

GC VOA

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.

GC Semi VOA

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

Metals

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.
B	Compound was found in the blank and sample.

General Chemistry

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Job ID: 240-78384-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-78384-1

Comments
No additional comments.

Receipt
The samples were received on 4/20/2017 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 9 coolers at receipt time were 0.5º C, 1.5º C, 2.5º C, 2.7º C, 2.7º C, 2.9º C, 3.1º C, 3.3º C and 4.5º C.

GC/MS VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC/MS Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC VOA
Method(s) RSK-175: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 240-277025.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8270C	Semivolatile Organic Compounds (GC/MS)	SW846	TAL CAN
RSK-175	Dissolved Gases (GC)	RSK	TAL CAN
8151A	Herbicides (GC)	SW846	TAL PIT
6020	Metals (ICP/MS)	SW846	TAL CAN
2320B-1997	Alkalinity, Total	SM	TAL CAN
2340C-1997	Hardness, Total	SM	TAL CAN
300.0	Anions, Ion Chromatography	MCAWW	TAL CAN
9060	Organic Carbon, Total (TOC)	SW846	TAL CAN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Sample Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-78384-1	W-170418-PS-01	Water	04/18/17 13:00	04/20/17 09:20
240-78384-2	W-170418-PS-02	Water	04/18/17 13:40	04/20/17 09:20
240-78384-3	W-170418-PS-03	Water	04/18/17 14:35	04/20/17 09:20
240-78384-4	W-170418-PS-04	Water	04/18/17 15:20	04/20/17 09:20
240-78384-5	W-170419-PS-05	Water	04/19/17 08:00	04/20/17 09:20
240-78384-6	W-170419-PS-06	Water	04/19/17 08:50	04/20/17 09:20
240-78384-7	W-170419-PS-07	Water	04/19/17 09:45	04/20/17 09:20
240-78384-8	W-170419-PS-08	Water	04/19/17 10:20	04/20/17 09:20
240-78384-9	TRIP BLANK-001	Water	04/19/17 11:00	04/20/17 09:20

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170418-PS-01 — Lab Sample ID: 240-78384-1

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.12		0.094	0.015	ug/L	4		8151A	Total/NA
Arsenic	0.37	J	5.0	0.35	ug/L	1		6020	Dissolved
Alkalinity	64.4		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	84.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	3.9		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	0.39		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	5.5		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.91	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170418-PS-02 — Lab Sample ID: 240-78384-2

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.017	J p	0.094	0.015	ug/L	4		8151A	Total/NA
Copper	0.44	J	2.0	0.36	ug/L	1		6020	Dissolved
Alkalinity	26.7		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	92.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	78.6		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	1.8		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	7.5		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.77	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170418-PS-03 — Lab Sample ID: 240-78384-3

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Copper	1.4	J	2.0	0.36	ug/L	1		6020	Dissolved
Alkalinity	81.3		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	108		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	29.0		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	2.9		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	7.3		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.82	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170418-PS-04 — Lab Sample ID: 240-78384-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	0.21	J	0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	0.026	J p	0.095	0.015	ug/L	4		8151A	Total/NA
Copper	0.58	J	2.0	0.36	ug/L	1		6020	Dissolved
Manganese	0.63	J B	5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	111		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	136		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	0.68	J	1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	0.73		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	2.8		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.72	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170419-PS-05 — Lab Sample ID: 240-78384-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.24		0.096	0.015	ug/L	4		8151A	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170419-PS-05 (Continued) — Lab Sample ID: 240-78384-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Copper	1.1	J	2.0	0.36	ug/L	1		6020	Dissolved
Manganese	0.28	J B	5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	53.7		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	60.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	0.76	J	1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	0.50		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	4.4		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	2.2		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170419-PS-06 — Lab Sample ID: 240-78384-6

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.59	J	5.0	0.35	ug/L	1		6020	Dissolved
Alkalinity	179		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	304		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	34.7		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	1.9		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	9.1		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.76	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170419-PS-07 — Lab Sample ID: 240-78384-7

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	35		0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	0.13		0.098	0.015	ug/L	4		8151A	Total/NA
Copper	0.58	J	2.0	0.36	ug/L	1		6020	Dissolved
Iron	2930	B	100	5.3	ug/L	1		6020	Dissolved
Manganese	129	B	5.0	0.25	ug/L	1		6020	Dissolved
Zinc	19.0	J	20.0	6.2	ug/L	1		6020	Dissolved
Alkalinity	152		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	238		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	11.4		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	5.2		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	97.3		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	3.2		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170419-PS-08 — Lab Sample ID: 240-78384-8

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	0.26	J	0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	0.20		0.096	0.015	ug/L	4		8151A	Total/NA
Copper	1.8	J	2.0	0.36	ug/L	1		6020	Dissolved
Iron	445	B	100	5.3	ug/L	1		6020	Dissolved
Manganese	185	B	5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	45.9		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	122		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	9.2		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	8.6		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	36.8		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	3.5		1.0	0.080	mg/L	1		9060	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Canton

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: TRIP BLANK-001 **Lab Sample ID: 240-78384-9**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: W-170418-PS-01
Date Collected: 04/18/17 13:00
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 14:56	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 14:56	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 14:56	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 14:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*85*		*61 - 138*		*04/27/17 14:56*	*1*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*04/27/17 14:56*	*1*
Toluene-d8 (Surr)	*92*		*73 - 120*		*04/27/17 14:56*	*1*
Dibromofluoromethane (Surr)	*93*		*69 - 124*		*04/27/17 14:56*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.068		0.22	0.068	ug/L		04/24/17 08:33	04/27/17 12:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*74*		*42 - 120*	*04/24/17 08:33*	*04/27/17 12:40*	*1*
2-Fluorophenol (Surr)	*46*		*10 - 120*	*04/24/17 08:33*	*04/27/17 12:40*	*1*
2,4,6-Tribromophenol (Surr)	*85*		*35 - 125*	*04/24/17 08:33*	*04/27/17 12:40*	*1*
Nitrobenzene-d5 (Surr)	*75*		*36 - 120*	*04/24/17 08:33*	*04/27/17 12:40*	*1*
Phenol-d5 (Surr)	*28*		*10 - 120*	*04/24/17 08:33*	*04/27/17 12:40*	*1*
Terphenyl-d14 (Surr)	*87*		*17 - 120*	*04/24/17 08:33*	*04/27/17 12:40*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/01/17 17:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*83*		*76 - 121*		*05/01/17 17:11*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.12**		0.094	0.015	ug/L		04/22/17 08:10	04/25/17 15:46	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*55*		*18 - 125*	*04/22/17 08:10*	*04/25/17 15:46*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.37**	**J**	5.0	0.35	ug/L		04/21/17 14:00	04/24/17 22:10	1
Copper	<0.36		2.0	0.36	ug/L		04/21/17 14:00	04/24/17 22:10	1
Iron	<5.3		100	5.3	ug/L		04/21/17 14:00	04/24/17 22:10	1
Manganese	<0.25		5.0	0.25	ug/L		04/21/17 14:00	04/24/17 22:10	1
Zinc	<6.2		20.0	6.2	ug/L		04/21/17 14:00	04/24/17 22:10	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**64.4**		5.0	1.9	mg/L			04/25/17 18:39	1
Hardness as calcium carbonate	**84.0**		5.0	3.1	mg/L			04/25/17 13:34	1
Chloride	**3.9**		1.0	0.41	mg/L			04/20/17 11:54	1
Nitrate as N	**0.39**		0.10	0.035	mg/L			04/20/17 11:54	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170418-PS-01
Date Collected: 04/18/17 13:00
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-1
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	5.5		1.0	0.13	mg/L			04/20/17 11:54	1
Total Organic Carbon	0.91	J	1.0	0.080	mg/L			04/27/17 07:00	1

Client Sample ID: W-170418-PS-02
Date Collected: 04/18/17 13:40
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 15:20	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 15:20	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 15:20	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 15:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*61 - 138*		*04/27/17 15:20*	*1*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*04/27/17 15:20*	*1*
Toluene-d8 (Surr)	*92*		*73 - 120*		*04/27/17 15:20*	*1*
Dibromofluoromethane (Surr)	*98*		*69 - 124*		*04/27/17 15:20*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.067		0.22	0.067	ug/L		04/24/17 08:33	04/27/17 13:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*74*		*42 - 120*	*04/24/17 08:33*	*04/27/17 13:06*	*1*
2-Fluorophenol (Surr)	*47*		*10 - 120*	*04/24/17 08:33*	*04/27/17 13:06*	*1*
2,4,6-Tribromophenol (Surr)	*76*		*35 - 125*	*04/24/17 08:33*	*04/27/17 13:06*	*1*
Nitrobenzene-d5 (Surr)	*74*		*36 - 120*	*04/24/17 08:33*	*04/27/17 13:06*	*1*
Phenol-d5 (Surr)	*29*		*10 - 120*	*04/24/17 08:33*	*04/27/17 13:06*	*1*
Terphenyl-d14 (Surr)	*85*		*17 - 120*	*04/24/17 08:33*	*04/27/17 13:06*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/01/17 17:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*83*		*76 - 121*		*05/01/17 17:28*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.017**	**J p**	0.094	0.015	ug/L		04/22/17 08:10	04/25/17 16:11	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*65*		*18 - 125*	*04/22/17 08:10*	*04/25/17 16:11*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/21/17 14:00	04/24/17 22:14	1
Copper	**0.44**	**J**	2.0	0.36	ug/L		04/21/17 14:00	04/24/17 22:14	1
Iron	<5.3		100	5.3	ug/L		04/21/17 14:00	04/24/17 22:14	1
Manganese	<0.25		5.0	0.25	ug/L		04/21/17 14:00	04/24/17 22:14	1
Zinc	<6.2		20.0	6.2	ug/L		04/21/17 14:00	04/24/17 22:14	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**26.7**		5.0	1.9	mg/L			04/25/17 18:47	1
Hardness as calcium carbonate	**92.0**		5.0	3.1	mg/L			04/25/17 13:36	1
Chloride	**78.6**		1.0	0.41	mg/L			04/20/17 12:14	1
Nitrate as N	**1.8**		0.10	0.035	mg/L			04/20/17 12:14	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170418-PS-02
Date Collected: 04/18/17 13:40
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-2
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	7.5		1.0	0.13	mg/L			04/20/17 12:14	1
Total Organic Carbon	0.77	J	1.0	0.080	mg/L			04/27/17 07:43	1

Client Sample ID: W-170418-PS-03

Date Collected: 04/18/17 14:35
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-3

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 15:44	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 15:44	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 15:44	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 15:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*61 - 138*		*04/27/17 15:44*	*1*
4-Bromofluorobenzene (Surr)	*97*		*69 - 120*		*04/27/17 15:44*	*1*
Toluene-d8 (Surr)	*89*		*73 - 120*		*04/27/17 15:44*	*1*
Dibromofluoromethane (Surr)	*95*		*69 - 124*		*04/27/17 15:44*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.067		0.21	0.067	ug/L		04/24/17 08:33	04/27/17 13:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*81*		*42 - 120*	*04/24/17 08:33*	*04/27/17 13:31*	*1*
2-Fluorophenol (Surr)	*49*		*10 - 120*	*04/24/17 08:33*	*04/27/17 13:31*	*1*
2,4,6-Tribromophenol (Surr)	*81*		*35 - 125*	*04/24/17 08:33*	*04/27/17 13:31*	*1*
Nitrobenzene-d5 (Surr)	*80*		*36 - 120*	*04/24/17 08:33*	*04/27/17 13:31*	*1*
Phenol-d5 (Surr)	*30*		*10 - 120*	*04/24/17 08:33*	*04/27/17 13:31*	*1*
Terphenyl-d14 (Surr)	*90*		*17 - 120*	*04/24/17 08:33*	*04/27/17 13:31*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/01/17 17:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*83*		*76 - 121*		*05/01/17 17:45*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.015		0.094	0.015	ug/L		04/22/17 08:10	04/25/17 16:35	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*61*		*18 - 125*	*04/22/17 08:10*	*04/25/17 16:35*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/21/17 14:00	04/24/17 22:18	1
Copper	**1.4**	**J**	2.0	0.36	ug/L		04/21/17 14:00	04/24/17 22:18	1
Iron	<5.3		100	5.3	ug/L		04/21/17 14:00	04/24/17 22:18	1
Manganese	<0.25		5.0	0.25	ug/L		04/21/17 14:00	04/24/17 22:18	1
Zinc	<6.2		20.0	6.2	ug/L		04/21/17 14:00	04/24/17 22:18	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**81.3**		5.0	1.9	mg/L			04/25/17 18:56	1
Hardness as calcium carbonate	**108**		5.0	3.1	mg/L			04/25/17 13:38	1
Chloride	**29.0**		1.0	0.41	mg/L			04/20/17 12:34	1
Nitrate as N	**2.9**		0.10	0.035	mg/L			04/20/17 12:34	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170418-PS-03
Date Collected: 04/18/17 14:35
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-3
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	7.3		1.0	0.13	mg/L			04/20/17 12:34	1
Total Organic Carbon	0.82	J	1.0	0.080	mg/L			04/27/17 08:10	1

Client Sample ID: W-170418-PS-04
Date Collected: 04/18/17 15:20
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 16:08	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 16:08	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 16:08	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 16:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*61 - 138*		*04/27/17 16:08*	*1*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*04/27/17 16:08*	*1*
Toluene-d8 (Surr)	*91*		*73 - 120*		*04/27/17 16:08*	*1*
Dibromofluoromethane (Surr)	*96*		*69 - 124*		*04/27/17 16:08*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.069		0.22	0.069	ug/L		04/24/17 08:33	04/27/17 13:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*79*		*42 - 120*	*04/24/17 08:33*	*04/27/17 13:56*	*1*
2-Fluorophenol (Surr)	*49*		*10 - 120*	*04/24/17 08:33*	*04/27/17 13:56*	*1*
2,4,6-Tribromophenol (Surr)	*77*		*35 - 125*	*04/24/17 08:33*	*04/27/17 13:56*	*1*
Nitrobenzene-d5 (Surr)	*79*		*36 - 120*	*04/24/17 08:33*	*04/27/17 13:56*	*1*
Phenol-d5 (Surr)	*30*		*10 - 120*	*04/24/17 08:33*	*04/27/17 13:56*	*1*
Terphenyl-d14 (Surr)	*84*		*17 - 120*	*04/24/17 08:33*	*04/27/17 13:56*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.21**	**J**	0.50	0.080	ug/L			05/01/17 18:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*83*		*76 - 121*		*05/01/17 18:19*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.026**	**J p**	0.095	0.015	ug/L		04/22/17 08:10	04/25/17 16:59	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*69*		*18 - 125*	*04/22/17 08:10*	*04/25/17 16:59*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/21/17 14:00	04/24/17 22:22	1
Copper	**0.58**	**J**	2.0	0.36	ug/L		04/21/17 14:00	04/24/17 22:22	1
Iron	<5.3		100	5.3	ug/L		04/21/17 14:00	04/24/17 22:22	1
Manganese	**0.63**	**J B**	5.0	0.25	ug/L		04/21/17 14:00	04/24/17 22:22	1
Zinc	<6.2		20.0	6.2	ug/L		04/21/17 14:00	04/24/17 22:22	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**111**		5.0	1.9	mg/L			04/25/17 19:04	1
Hardness as calcium carbonate	**136**		5.0	3.1	mg/L			04/25/17 13:39	1
Chloride	**0.68**	**J**	1.0	0.41	mg/L			04/20/17 12:54	1
Nitrate as N	**0.73**		0.10	0.035	mg/L			04/20/17 12:54	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170418-PS-04
Date Collected: 04/18/17 15:20
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-4
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	2.8		1.0	0.13	mg/L			04/20/17 12:54	1
Total Organic Carbon	0.72	J	1.0	0.080	mg/L			04/27/17 08:37	1

Client Sample ID: W-170419-PS-05

Date Collected: 04/19/17 08:00
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-5

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 16:31	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 16:31	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 16:31	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 16:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*86*		*61 - 138*		*04/27/17 16:31*	*1*
4-Bromofluorobenzene (Surr)	*100*		*69 - 120*		*04/27/17 16:31*	*1*
Toluene-d8 (Surr)	*93*		*73 - 120*		*04/27/17 16:31*	*1*
Dibromofluoromethane (Surr)	*94*		*69 - 124*		*04/27/17 16:31*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.067		0.21	0.067	ug/L		04/24/17 08:33	04/27/17 14:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*69*		*42 - 120*	*04/24/17 08:33*	*04/27/17 14:21*	*1*
2-Fluorophenol (Surr)	*42*		*10 - 120*	*04/24/17 08:33*	*04/27/17 14:21*	*1*
2,4,6-Tribromophenol (Surr)	*71*		*35 - 125*	*04/24/17 08:33*	*04/27/17 14:21*	*1*
Nitrobenzene-d5 (Surr)	*69*		*36 - 120*	*04/24/17 08:33*	*04/27/17 14:21*	*1*
Phenol-d5 (Surr)	*25*		*10 - 120*	*04/24/17 08:33*	*04/27/17 14:21*	*1*
Terphenyl-d14 (Surr)	*76*		*17 - 120*	*04/24/17 08:33*	*04/27/17 14:21*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/02/17 04:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*77*		*76 - 121*		*05/02/17 04:19*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.24**		0.096	0.015	ug/L		04/22/17 08:10	04/25/17 17:24	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*42*		*18 - 125*	*04/22/17 08:10*	*04/25/17 17:24*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/21/17 14:00	04/24/17 22:26	1
Copper	**1.1**	**J**	2.0	0.36	ug/L		04/21/17 14:00	04/24/17 22:26	1
Iron	<5.3		100	5.3	ug/L		04/21/17 14:00	04/24/17 22:26	1
Manganese	**0.28**	**J B**	5.0	0.25	ug/L		04/21/17 14:00	04/24/17 22:26	1
Zinc	<6.2		20.0	6.2	ug/L		04/21/17 14:00	04/24/17 22:26	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**53.7**		5.0	1.9	mg/L			05/02/17 15:01	1
Hardness as calcium carbonate	**60.0**		5.0	3.1	mg/L			04/25/17 13:40	1
Chloride	**0.76**	**J**	1.0	0.41	mg/L			04/20/17 18:16	1
Nitrate as N	**0.50**		0.10	0.035	mg/L			04/20/17 18:16	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170419-PS-05
Date Collected: 04/19/17 08:00
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-5
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.4		1.0	0.13	mg/L			04/20/17 18:16	1
Total Organic Carbon	2.2		1.0	0.080	mg/L			04/27/17 09:04	1

Client Sample ID: W-170419-PS-06

Date Collected: 04/19/17 08:50
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-6

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 16:55	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 16:55	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 16:55	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 16:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*61 - 138*		*04/27/17 16:55*	*1*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*04/27/17 16:55*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*04/27/17 16:55*	*1*
Dibromofluoromethane (Surr)	*95*		*69 - 124*		*04/27/17 16:55*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.067		0.22	0.067	ug/L		04/24/17 08:33	04/26/17 19:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*69*		*42 - 120*	*04/24/17 08:33*	*04/26/17 19:15*	*1*
2-Fluorophenol (Surr)	*40*		*10 - 120*	*04/24/17 08:33*	*04/26/17 19:15*	*1*
2,4,6-Tribromophenol (Surr)	*57*		*35 - 125*	*04/24/17 08:33*	*04/26/17 19:15*	*1*
Nitrobenzene-d5 (Surr)	*69*		*36 - 120*	*04/24/17 08:33*	*04/26/17 19:15*	*1*
Phenol-d5 (Surr)	*24*		*10 - 120*	*04/24/17 08:33*	*04/26/17 19:15*	*1*
Terphenyl-d14 (Surr)	*72*		*17 - 120*	*04/24/17 08:33*	*04/26/17 19:15*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/02/17 04:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*76*		*76 - 121*		*05/02/17 04:36*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.015		0.095	0.015	ug/L		04/22/17 08:10	04/25/17 17:48	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*70*		*18 - 125*	*04/22/17 08:10*	*04/25/17 17:48*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.59**	**J**	5.0	0.35	ug/L		04/21/17 14:00	04/24/17 22:31	1
Copper	<0.36		2.0	0.36	ug/L		04/21/17 14:00	04/24/17 22:31	1
Iron	<5.3		100	5.3	ug/L		04/21/17 14:00	04/24/17 22:31	1
Manganese	<0.25		5.0	0.25	ug/L		04/21/17 14:00	04/24/17 22:31	1
Zinc	<6.2		20.0	6.2	ug/L		04/21/17 14:00	04/24/17 22:31	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**179**		5.0	1.9	mg/L			05/02/17 15:16	1
Hardness as calcium carbonate	**304**		5.0	3.1	mg/L			04/25/17 13:41	1
Chloride	**34.7**		1.0	0.41	mg/L			04/20/17 19:57	1
Nitrate as N	**1.9**		0.10	0.035	mg/L			04/20/17 19:57	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170419-PS-06
Date Collected: 04/19/17 08:50
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-6
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	9.1		1.0	0.13	mg/L			04/20/17 19:57	1
Total Organic Carbon	0.76	J	1.0	0.080	mg/L			04/27/17 09:31	1

Client Sample ID: W-170419-PS-07

Date Collected: 04/19/17 09:45
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-7

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 17:19	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 17:19	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 17:19	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 17:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*61 - 138*		*04/27/17 17:19*	*1*
4-Bromofluorobenzene (Surr)	*92*		*69 - 120*		*04/27/17 17:19*	*1*
Toluene-d8 (Surr)	*88*		*73 - 120*		*04/27/17 17:19*	*1*
Dibromofluoromethane (Surr)	*91*		*69 - 124*		*04/27/17 17:19*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.070		0.22	0.070	ug/L		04/24/17 08:33	04/26/17 19:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*64*		*42 - 120*	*04/24/17 08:33*	*04/26/17 19:40*	*1*
2-Fluorophenol (Surr)	*39*		*10 - 120*	*04/24/17 08:33*	*04/26/17 19:40*	*1*
2,4,6-Tribromophenol (Surr)	*64*		*35 - 125*	*04/24/17 08:33*	*04/26/17 19:40*	*1*
Nitrobenzene-d5 (Surr)	*65*		*36 - 120*	*04/24/17 08:33*	*04/26/17 19:40*	*1*
Phenol-d5 (Surr)	*23*		*10 - 120*	*04/24/17 08:33*	*04/26/17 19:40*	*1*
Terphenyl-d14 (Surr)	*74*		*17 - 120*	*04/24/17 08:33*	*04/26/17 19:40*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**35**		0.50	0.080	ug/L			05/02/17 04:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*77*		*76 - 121*		*05/02/17 04:53*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.13**		0.098	0.015	ug/L		04/22/17 08:10	04/25/17 18:13	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*40*		*18 - 125*	*04/22/17 08:10*	*04/25/17 18:13*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/21/17 14:00	04/24/17 22:35	1
Copper	**0.58**	**J**	2.0	0.36	ug/L		04/21/17 14:00	04/24/17 22:35	1
Iron	**2930**	**B**	100	5.3	ug/L		04/21/17 14:00	04/24/17 22:35	1
Manganese	**129**	**B**	5.0	0.25	ug/L		04/21/17 14:00	04/24/17 22:35	1
Zinc	**19.0**	**J**	20.0	6.2	ug/L		04/21/17 14:00	04/24/17 22:35	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**152**		5.0	1.9	mg/L			05/02/17 15:25	1
Hardness as calcium carbonate	**238**		5.0	3.1	mg/L			04/25/17 13:42	1
Chloride	**11.4**		1.0	0.41	mg/L			04/20/17 20:57	1
Nitrate as N	**5.2**		0.10	0.035	mg/L			04/20/17 20:57	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170419-PS-07
Date Collected: 04/19/17 09:45
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-7
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	97.3		1.0	0.13	mg/L			04/20/17 20:57	1
Total Organic Carbon	3.2		1.0	0.080	mg/L			04/27/17 10:15	1

Client Sample ID: W-170419-PS-08

Date Collected: 04/19/17 10:20
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-8

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 17:43	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 17:43	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 17:43	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 17:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*86*		*61 - 138*		*04/27/17 17:43*	*1*
4-Bromofluorobenzene (Surr)	*94*		*69 - 120*		*04/27/17 17:43*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*04/27/17 17:43*	*1*
Dibromofluoromethane (Surr)	*94*		*69 - 124*		*04/27/17 17:43*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.071		0.23	0.071	ug/L		04/24/17 08:33	04/27/17 14:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*76*		*42 - 120*	*04/24/17 08:33*	*04/27/17 14:46*	*1*
2-Fluorophenol (Surr)	*44*		*10 - 120*	*04/24/17 08:33*	*04/27/17 14:46*	*1*
2,4,6-Tribromophenol (Surr)	*73*		*35 - 125*	*04/24/17 08:33*	*04/27/17 14:46*	*1*
Nitrobenzene-d5 (Surr)	*75*		*36 - 120*	*04/24/17 08:33*	*04/27/17 14:46*	*1*
Phenol-d5 (Surr)	*27*		*10 - 120*	*04/24/17 08:33*	*04/27/17 14:46*	*1*
Terphenyl-d14 (Surr)	*79*		*17 - 120*	*04/24/17 08:33*	*04/27/17 14:46*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.26**	**J**	0.50	0.080	ug/L			05/02/17 17:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*81*		*76 - 121*		*05/02/17 17:07*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.20**		0.096	0.015	ug/L		04/22/17 08:10	04/25/17 18:37	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*60*		*18 - 125*	*04/22/17 08:10*	*04/25/17 18:37*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/21/17 14:00	04/24/17 22:39	1
Copper	**1.8**	**J**	2.0	0.36	ug/L		04/21/17 14:00	04/24/17 22:39	1
Iron	**445**	**B**	100	5.3	ug/L		04/21/17 14:00	04/24/17 22:39	1
Manganese	**185**	**B**	5.0	0.25	ug/L		04/21/17 14:00	04/24/17 22:39	1
Zinc	<6.2		20.0	6.2	ug/L		04/21/17 14:00	04/24/17 22:39	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**45.9**		5.0	1.9	mg/L			05/02/17 15:33	1
Hardness as calcium carbonate	**122**		5.0	3.1	mg/L			04/25/17 13:43	1
Chloride	**9.2**		1.0	0.41	mg/L			04/20/17 21:17	1
Nitrate as N	**8.6**		0.10	0.035	mg/L			04/20/17 21:17	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170419-PS-08
Date Collected: 04/19/17 10:20
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-8
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	36.8		1.0	0.13	mg/L			04/20/17 21:17	1
Total Organic Carbon	3.5		1.0	0.080	mg/L			04/27/17 10:41	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: TRIP BLANK-001
Date Collected: 04/19/17 11:00
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78384-9
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 18:07	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 18:07	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 18:07	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 18:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*61 - 138*		*04/27/17 18:07*	*1*
4-Bromofluorobenzene (Surr)	*95*		*69 - 120*		*04/27/17 18:07*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*04/27/17 18:07*	*1*
Dibromofluoromethane (Surr)	*94*		*69 - 124*		*04/27/17 18:07*	*1*

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(61-138)	(69-120)	(73-120)	(69-124)
240-78384-1	W-170418-PS-01	85	96	92	93
240-78384-2	W-170418-PS-02	89	96	92	98
240-78384-3	W-170418-PS-03	90	97	89	95
240-78384-4	W-170418-PS-04	87	96	91	96
240-78384-5	W-170419-PS-05	86	100	93	94
240-78384-6	W-170419-PS-06	89	96	90	95
240-78384-7	W-170419-PS-07	91	92	88	91
240-78384-8	W-170419-PS-08	86	94	90	94
240-78384-9	TRIP BLANK-001	89	95	90	94
LCS 240-276435/4	Lab Control Sample	87	102	92	96
MB 240-276435/7	Method Blank	91	97	92	95

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		FBP	2FP	TBP	NBZ	PHL	TPH
Lab Sample ID	Client Sample ID	(42-120)	(10-120)	(35-125)	(36-120)	(10-120)	(17-120)
240-78384-1	W-170418-PS-01	74	46	85	75	28	87
240-78384-2	W-170418-PS-02	74	47	76	74	29	85
240-78384-3	W-170418-PS-03	81	49	81	80	30	90
240-78384-4	W-170418-PS-04	79	49	77	79	30	84
240-78384-5	W-170419-PS-05	69	42	71	69	25	76
240-78384-6	W-170419-PS-06	69	40	57	69	24	72
240-78384-7	W-170419-PS-07	64	39	64	65	23	74
240-78384-8	W-170419-PS-08	76	44	73	75	27	79
LCS 240-275892/20-A	Lab Control Sample	78	52	87	85	33	76
MB 240-275892/19-A	Method Blank	73	48	59	72	29	84

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPH = Terphenyl-d14 (Surr)

Method: RSK-175 - Dissolved Gases (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		rifluoroet
Lab Sample ID	Client Sample ID	(76-121)
240-78384-1	W-170418-PS-01	83

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	1,1,1-Trifluoroet (76-121)						
240-78384-2	W-170418-PS-02	83						
240-78384-3	W-170418-PS-03	83						
240-78384-4	W-170418-PS-04	83						
240-78384-5	W-170419-PS-05	77						
240-78384-6	W-170419-PS-06	76						
240-78384-7	W-170419-PS-07	77						
240-78384-8	W-170419-PS-08	81						
LCS 240-276952/5	Lab Control Sample	85						
LCS 240-277025/5	Lab Control Sample	81						
LCS 240-277132/5	Lab Control Sample	87						
MB 240-276952/4	Method Blank	90						
MB 240-277025/28	Method Blank	87						
MB 240-277132/4	Method Blank	86						

Surrogate Legend

1,1,1-Trifluoroethane = 1,1,1-Trifluoroethane

Method: 8151A - Herbicides (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	DCPA1 (18-125)	DCPA2 (18-125)					
240-78384-1	W-170418-PS-01	54	55					
240-78384-2	W-170418-PS-02	63	65					
240-78384-3	W-170418-PS-03	58	61					
240-78384-4	W-170418-PS-04	66	69					
240-78384-5	W-170419-PS-05	42	42					
240-78384-6	W-170419-PS-06	68	70					
240-78384-7	W-170419-PS-07	40	38					
240-78384-8	W-170419-PS-08	60	59					
LCS 180-209011/2-A	Lab Control Sample	50	52					
MB 180-209011/1-A	Method Blank	34	36					

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-276435/7
Matrix: Water
Analysis Batch: 276435

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 09:59	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 09:59	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 09:59	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 09:59	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*61 - 138*		*04/27/17 09:59*	*1*
4-Bromofluorobenzene (Surr)	*97*		*69 - 120*		*04/27/17 09:59*	*1*
Toluene-d8 (Surr)	*92*		*73 - 120*		*04/27/17 09:59*	*1*
Dibromofluoromethane (Surr)	*95*		*69 - 124*		*04/27/17 09:59*	*1*

Lab Sample ID: LCS 240-276435/4
Matrix: Water
Analysis Batch: 276435

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	20.0	20.6		ug/L		103	79 - 120
Ethylbenzene	20.0	19.1		ug/L		95	80 - 120
Toluene	20.0	19.1		ug/L		96	78 - 120
Xylenes, Total	40.0	37.7		ug/L		94	80 - 120
m-Xylene & p-Xylene	20.0	19.1		ug/L		95	80 - 120
o-Xylene	20.0	18.6		ug/L		93	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*87*		*61 - 138*
4-Bromofluorobenzene (Surr)	*102*		*69 - 120*
Toluene-d8 (Surr)	*92*		*73 - 120*
Dibromofluoromethane (Surr)	*96*		*69 - 124*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-275892/19-A
Matrix: Water
Analysis Batch: 276239

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 275892

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/24/17 08:33	04/26/17 12:28	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*73*		*42 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
2-Fluorophenol (Surr)	*48*		*10 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
2,4,6-Tribromophenol (Surr)	*59*		*35 - 125*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Nitrobenzene-d5 (Surr)	*72*		*36 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Phenol-d5 (Surr)	*29*		*10 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Terphenyl-d14 (Surr)	*84*		*17 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-275892/20-A
Matrix: Water
Analysis Batch: 276239

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 275892

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	20.0	15.3		ug/L		76	54 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*78*		*42 - 120*
2-Fluorophenol (Surr)	*52*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*87*		*35 - 125*
Nitrobenzene-d5 (Surr)	*85*		*36 - 120*
Phenol-d5 (Surr)	*33*		*10 - 120*
Terphenyl-d14 (Surr)	*76*		*17 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 240-276952/4
Matrix: Water
Analysis Batch: 276952

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/01/17 15:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*90*		*76 - 121*		*05/01/17 15:10*	*1*

Lab Sample ID: LCS 240-276952/5
Matrix: Water
Analysis Batch: 276952

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	199	193		ug/L		97	80 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*85*		*76 - 121*

Lab Sample ID: MB 240-277025/28
Matrix: Water
Analysis Batch: 277025

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/02/17 08:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*87*		*76 - 121*		*05/02/17 08:29*	*1*

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCS 240-277025/5
Matrix: Water
Analysis Batch: 277025

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methane			199	188		ug/L		94	80 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*81*		*76 - 121*

Lab Sample ID: MB 240-277132/4
Matrix: Water
Analysis Batch: 277132

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/02/17 14:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*86*		*76 - 121*		*05/02/17 14:32*	*1*

Lab Sample ID: LCS 240-277132/5
Matrix: Water
Analysis Batch: 277132

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methane			199	187		ug/L		94	80 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*87*		*76 - 121*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-209011/1-A
Matrix: Water
Analysis Batch: 209222

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 209011

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/22/17 08:10	04/25/17 10:26	4

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*36*		*18 - 125*	*04/22/17 08:10*	*04/25/17 10:26*	*4*

Lab Sample ID: LCS 180-209011/2-A
Matrix: Water
Analysis Batch: 209222

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 209011

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Pentachlorophenol			1.00	0.881		ug/L		88	30 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*52*		*18 - 125*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 240-275782/1-A
Matrix: Water
Analysis Batch: 276068

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 275782

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/21/17 14:00	04/24/17 20:43	1
Copper	<0.36		2.0	0.36	ug/L		04/21/17 14:00	04/24/17 20:43	1
Iron	44.52	J	100	5.3	ug/L		04/21/17 14:00	04/24/17 20:43	1
Manganese	0.360	J	5.0	0.25	ug/L		04/21/17 14:00	04/24/17 20:43	1
Zinc	<6.2		20.0	6.2	ug/L		04/21/17 14:00	04/24/17 20:43	1

Lab Sample ID: LCS 240-275782/3-A
Matrix: Water
Analysis Batch: 276068

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 275782

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	1004		ug/L		100	80 - 120
Copper	1000	1057		ug/L		106	80 - 120
Iron	10000	10800		ug/L		108	80 - 120
Manganese	1000	1056		ug/L		106	80 - 120
Zinc	1000	1124		ug/L		112	80 - 120

Method: 2320B-1997 - Alkalinity, Total

Lab Sample ID: MB 240-276285/5
Matrix: Water
Analysis Batch: 276285

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	<1.9		5.0	1.9	mg/L			04/25/17 17:54	1

Lab Sample ID: LCS 240-276285/4
Matrix: Water
Analysis Batch: 276285

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	377	366.5		mg/L		97	86 - 123

Lab Sample ID: MB 240-277244/18
Matrix: Water
Analysis Batch: 277244

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	<1.9		5.0	1.9	mg/L			05/02/17 10:50	1

Lab Sample ID: LCS 240-277244/17
Matrix: Water
Analysis Batch: 277244

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	377	333.1		mg/L		88	86 - 123

Method: 2340C-1997 - Hardness, Total

Lab Sample ID: MB 240-276169/1
Matrix: Water
Analysis Batch: 276169

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	<3.1		5.0	3.1	mg/L			04/25/17 13:32	1

Lab Sample ID: LCS 240-276169/2
Matrix: Water
Analysis Batch: 276169

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	170	180.0		mg/L		106	80 - 120

Lab Sample ID: 240-78384-1 DU
Matrix: Water
Analysis Batch: 276169

Client Sample ID: W-170418-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Hardness as calcium carbonate	84.0		80.00		mg/L		5	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-275511/27
Matrix: Water
Analysis Batch: 275511

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.41		1.0	0.41	mg/L			04/20/17 19:16	1
Sulfate	<0.13		1.0	0.13	mg/L			04/20/17 19:16	1

Lab Sample ID: MB 240-275511/3
Matrix: Water
Analysis Batch: 275511

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.41		1.0	0.41	mg/L			04/20/17 10:47	1
Sulfate	<0.13		1.0	0.13	mg/L			04/20/17 10:47	1

Lab Sample ID: LCS 240-275511/28
Matrix: Water
Analysis Batch: 275511

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.10		mg/L		102	90 - 110
Sulfate	50.0	51.27		mg/L		103	90 - 110

Lab Sample ID: LCS 240-275511/4
Matrix: Water
Analysis Batch: 275511

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	50.96		mg/L		102	90 - 110
Sulfate	50.0	51.21		mg/L		102	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 240-78384-6 MS
Matrix: Water
Analysis Batch: 275511

Client Sample ID: W-170419-PS-06
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	34.7		50.0	84.58		mg/L		100	80 - 120
Sulfate	9.1		50.0	61.19		mg/L		104	80 - 120

Lab Sample ID: 240-78384-6 MSD
Matrix: Water
Analysis Batch: 275511

Client Sample ID: W-170419-PS-06
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	34.7		50.0	84.53		mg/L		100	80 - 120	0	15
Sulfate	9.1		50.0	61.53		mg/L		105	80 - 120	1	15

Lab Sample ID: MB 240-275512/27
Matrix: Water
Analysis Batch: 275512

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.035		0.10	0.035	mg/L			04/20/17 19:16	1

Lab Sample ID: MB 240-275512/3
Matrix: Water
Analysis Batch: 275512

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.035		0.10	0.035	mg/L			04/20/17 10:47	1

Lab Sample ID: LCS 240-275512/28
Matrix: Water
Analysis Batch: 275512

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	2.50	2.57		mg/L		103	90 - 110

Lab Sample ID: LCS 240-275512/4
Matrix: Water
Analysis Batch: 275512

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	2.50	2.55		mg/L		102	90 - 110

Lab Sample ID: 240-78384-6 MS
Matrix: Water
Analysis Batch: 275512

Client Sample ID: W-170419-PS-06
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	1.9		2.50	4.41		mg/L		101	80 - 120

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 240-78384-6 MSD — **Client Sample ID: W-170419-PS-06**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 275512

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	1.9		2.50	4.43		mg/L		102	80 - 120	1	15

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 240-276610/4 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<0.080		1.0	0.080	mg/L			04/27/17 06:43	1

Lab Sample ID: LCS 240-276610/40 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	46.3	46.78		mg/L		101	80 - 120

Lab Sample ID: LLCS 240-276610/5 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	4.63	4.62		mg/L		100	88 - 115

Lab Sample ID: 240-78384-1 MS — **Client Sample ID: W-170418-PS-01**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	0.91	J	5.00	6.04		mg/L		103	65 - 134

Lab Sample ID: 240-78384-1 MSD — **Client Sample ID: W-170418-PS-01**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	0.91	J	5.00	5.97		mg/L		101	65 - 134	1	10

GC/MS VOA

Analysis Batch: 276435

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	8260B	
240-78384-2	W-170418-PS-02	Total/NA	Water	8260B	
240-78384-3	W-170418-PS-03	Total/NA	Water	8260B	
240-78384-4	W-170418-PS-04	Total/NA	Water	8260B	
240-78384-5	W-170419-PS-05	Total/NA	Water	8260B	
240-78384-6	W-170419-PS-06	Total/NA	Water	8260B	
240-78384-7	W-170419-PS-07	Total/NA	Water	8260B	
240-78384-8	W-170419-PS-08	Total/NA	Water	8260B	
240-78384-9	TRIP BLANK-001	Total/NA	Water	8260B	
MB 240-276435/7	Method Blank	Total/NA	Water	8260B	
LCS 240-276435/4	Lab Control Sample	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 275892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	3510C	
240-78384-2	W-170418-PS-02	Total/NA	Water	3510C	
240-78384-3	W-170418-PS-03	Total/NA	Water	3510C	
240-78384-4	W-170418-PS-04	Total/NA	Water	3510C	
240-78384-5	W-170419-PS-05	Total/NA	Water	3510C	
240-78384-6	W-170419-PS-06	Total/NA	Water	3510C	
240-78384-7	W-170419-PS-07	Total/NA	Water	3510C	
240-78384-8	W-170419-PS-08	Total/NA	Water	3510C	
MB 240-275892/19-A	Method Blank	Total/NA	Water	3510C	
LCS 240-275892/20-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 276239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-6	W-170419-PS-06	Total/NA	Water	8270C	275892
240-78384-7	W-170419-PS-07	Total/NA	Water	8270C	275892
MB 240-275892/19-A	Method Blank	Total/NA	Water	8270C	275892
LCS 240-275892/20-A	Lab Control Sample	Total/NA	Water	8270C	275892

Analysis Batch: 276417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	8270C	275892
240-78384-2	W-170418-PS-02	Total/NA	Water	8270C	275892
240-78384-3	W-170418-PS-03	Total/NA	Water	8270C	275892
240-78384-4	W-170418-PS-04	Total/NA	Water	8270C	275892
240-78384-5	W-170419-PS-05	Total/NA	Water	8270C	275892
240-78384-8	W-170419-PS-08	Total/NA	Water	8270C	275892

GC VOA

Analysis Batch: 276952

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	RSK-175	
240-78384-2	W-170418-PS-02	Total/NA	Water	RSK-175	
240-78384-3	W-170418-PS-03	Total/NA	Water	RSK-175	

GC VOA (Continued)

Analysis Batch: 276952 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-4	W-170418-PS-04	Total/NA	Water	RSK-175	
MB 240-276952/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-276952/5	Lab Control Sample	Total/NA	Water	RSK-175	

Analysis Batch: 277025

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-5	W-170419-PS-05	Total/NA	Water	RSK-175	
240-78384-6	W-170419-PS-06	Total/NA	Water	RSK-175	
240-78384-7	W-170419-PS-07	Total/NA	Water	RSK-175	
MB 240-277025/28	Method Blank	Total/NA	Water	RSK-175	
LCS 240-277025/5	Lab Control Sample	Total/NA	Water	RSK-175	

Analysis Batch: 277132

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-8	W-170419-PS-08	Total/NA	Water	RSK-175	
MB 240-277132/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-277132/5	Lab Control Sample	Total/NA	Water	RSK-175	

GC Semi VOA

Prep Batch: 209011

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	8151A	
240-78384-2	W-170418-PS-02	Total/NA	Water	8151A	
240-78384-3	W-170418-PS-03	Total/NA	Water	8151A	
240-78384-4	W-170418-PS-04	Total/NA	Water	8151A	
240-78384-5	W-170419-PS-05	Total/NA	Water	8151A	
240-78384-6	W-170419-PS-06	Total/NA	Water	8151A	
240-78384-7	W-170419-PS-07	Total/NA	Water	8151A	
240-78384-8	W-170419-PS-08	Total/NA	Water	8151A	
MB 180-209011/1-A	Method Blank	Total/NA	Water	8151A	
LCS 180-209011/2-A	Lab Control Sample	Total/NA	Water	8151A	

Analysis Batch: 209222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	8151A	209011
240-78384-2	W-170418-PS-02	Total/NA	Water	8151A	209011
240-78384-3	W-170418-PS-03	Total/NA	Water	8151A	209011
240-78384-4	W-170418-PS-04	Total/NA	Water	8151A	209011
240-78384-5	W-170419-PS-05	Total/NA	Water	8151A	209011
240-78384-6	W-170419-PS-06	Total/NA	Water	8151A	209011
240-78384-7	W-170419-PS-07	Total/NA	Water	8151A	209011
240-78384-8	W-170419-PS-08	Total/NA	Water	8151A	209011
MB 180-209011/1-A	Method Blank	Total/NA	Water	8151A	209011
LCS 180-209011/2-A	Lab Control Sample	Total/NA	Water	8151A	209011

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Metals

Prep Batch: 275782

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Dissolved	Water	3005A	
240-78384-2	W-170418-PS-02	Dissolved	Water	3005A	
240-78384-3	W-170418-PS-03	Dissolved	Water	3005A	
240-78384-4	W-170418-PS-04	Dissolved	Water	3005A	
240-78384-5	W-170419-PS-05	Dissolved	Water	3005A	
240-78384-6	W-170419-PS-06	Dissolved	Water	3005A	
240-78384-7	W-170419-PS-07	Dissolved	Water	3005A	
240-78384-8	W-170419-PS-08	Dissolved	Water	3005A	
MB 240-275782/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-275782/3-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 276068

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Dissolved	Water	6020	275782
240-78384-2	W-170418-PS-02	Dissolved	Water	6020	275782
240-78384-3	W-170418-PS-03	Dissolved	Water	6020	275782
240-78384-4	W-170418-PS-04	Dissolved	Water	6020	275782
240-78384-5	W-170419-PS-05	Dissolved	Water	6020	275782
240-78384-6	W-170419-PS-06	Dissolved	Water	6020	275782
240-78384-7	W-170419-PS-07	Dissolved	Water	6020	275782
240-78384-8	W-170419-PS-08	Dissolved	Water	6020	275782
MB 240-275782/1-A	Method Blank	Total Recoverable	Water	6020	275782
LCS 240-275782/3-A	Lab Control Sample	Total Recoverable	Water	6020	275782

General Chemistry

Analysis Batch: 275511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	300.0	
240-78384-2	W-170418-PS-02	Total/NA	Water	300.0	
240-78384-3	W-170418-PS-03	Total/NA	Water	300.0	
240-78384-4	W-170418-PS-04	Total/NA	Water	300.0	
240-78384-5	W-170419-PS-05	Total/NA	Water	300.0	
240-78384-6	W-170419-PS-06	Total/NA	Water	300.0	
240-78384-7	W-170419-PS-07	Total/NA	Water	300.0	
240-78384-8	W-170419-PS-08	Total/NA	Water	300.0	
MB 240-275511/27	Method Blank	Total/NA	Water	300.0	
MB 240-275511/3	Method Blank	Total/NA	Water	300.0	
LCS 240-275511/28	Lab Control Sample	Total/NA	Water	300.0	
LCS 240-275511/4	Lab Control Sample	Total/NA	Water	300.0	
240-78384-6 MS	W-170419-PS-06	Total/NA	Water	300.0	
240-78384-6 MSD	W-170419-PS-06	Total/NA	Water	300.0	

Analysis Batch: 275512

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	300.0	
240-78384-2	W-170418-PS-02	Total/NA	Water	300.0	
240-78384-3	W-170418-PS-03	Total/NA	Water	300.0	
240-78384-4	W-170418-PS-04	Total/NA	Water	300.0	
240-78384-5	W-170419-PS-05	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 275512 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-6	W-170419-PS-06	Total/NA	Water	300.0	
240-78384-7	W-170419-PS-07	Total/NA	Water	300.0	
240-78384-8	W-170419-PS-08	Total/NA	Water	300.0	
MB 240-275512/27	Method Blank	Total/NA	Water	300.0	
MB 240-275512/3	Method Blank	Total/NA	Water	300.0	
LCS 240-275512/28	Lab Control Sample	Total/NA	Water	300.0	
LCS 240-275512/4	Lab Control Sample	Total/NA	Water	300.0	
240-78384-6 MS	W-170419-PS-06	Total/NA	Water	300.0	
240-78384-6 MSD	W-170419-PS-06	Total/NA	Water	300.0	

Analysis Batch: 276169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	2340C-1997	
240-78384-2	W-170418-PS-02	Total/NA	Water	2340C-1997	
240-78384-3	W-170418-PS-03	Total/NA	Water	2340C-1997	
240-78384-4	W-170418-PS-04	Total/NA	Water	2340C-1997	
240-78384-5	W-170419-PS-05	Total/NA	Water	2340C-1997	
240-78384-6	W-170419-PS-06	Total/NA	Water	2340C-1997	
240-78384-7	W-170419-PS-07	Total/NA	Water	2340C-1997	
240-78384-8	W-170419-PS-08	Total/NA	Water	2340C-1997	
MB 240-276169/1	Method Blank	Total/NA	Water	2340C-1997	
LCS 240-276169/2	Lab Control Sample	Total/NA	Water	2340C-1997	
240-78384-1 DU	W-170418-PS-01	Total/NA	Water	2340C-1997	

Analysis Batch: 276285

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	2320B-1997	
240-78384-2	W-170418-PS-02	Total/NA	Water	2320B-1997	
240-78384-3	W-170418-PS-03	Total/NA	Water	2320B-1997	
240-78384-4	W-170418-PS-04	Total/NA	Water	2320B-1997	
MB 240-276285/5	Method Blank	Total/NA	Water	2320B-1997	
LCS 240-276285/4	Lab Control Sample	Total/NA	Water	2320B-1997	

Analysis Batch: 276610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-1	W-170418-PS-01	Total/NA	Water	9060	
240-78384-2	W-170418-PS-02	Total/NA	Water	9060	
240-78384-3	W-170418-PS-03	Total/NA	Water	9060	
240-78384-4	W-170418-PS-04	Total/NA	Water	9060	
240-78384-5	W-170419-PS-05	Total/NA	Water	9060	
240-78384-6	W-170419-PS-06	Total/NA	Water	9060	
240-78384-7	W-170419-PS-07	Total/NA	Water	9060	
240-78384-8	W-170419-PS-08	Total/NA	Water	9060	
MB 240-276610/4	Method Blank	Total/NA	Water	9060	
LCS 240-276610/40	Lab Control Sample	Total/NA	Water	9060	
LLCS 240-276610/5	Lab Control Sample	Total/NA	Water	9060	
240-78384-1 MS	W-170418-PS-01	Total/NA	Water	9060	
240-78384-1 MSD	W-170418-PS-01	Total/NA	Water	9060	

General Chemistry (Continued)

Analysis Batch: 277244

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78384-5	W-170419-PS-05	Total/NA	Water	2320B-1997	
240-78384-6	W-170419-PS-06	Total/NA	Water	2320B-1997	
240-78384-7	W-170419-PS-07	Total/NA	Water	2320B-1997	
240-78384-8	W-170419-PS-08	Total/NA	Water	2320B-1997	
MB 240-277244/18	Method Blank	Total/NA	Water	2320B-1997	
LCS 240-277244/17	Lab Control Sample	Total/NA	Water	2320B-1997	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170418-PS-01

Lab Sample ID: 240-78384-1

Date Collected: 04/18/17 13:00

Matrix: Water

Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276435	04/27/17 14:56	HMB	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276417	04/27/17 12:40	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	276952	05/01/17 17:11	BPM	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 15:46	JMO	TAL PIT
Dissolved	Prep	3005A			275782	04/21/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276068	04/24/17 22:10	AMM2	TAL CAN
Total/NA	Analysis	2320B-1997		1	276285	04/25/17 18:39	JMB	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:34	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275511	04/20/17 11:54	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275512	04/20/17 11:54	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 07:00	TPH	TAL CAN

Client Sample ID: W-170418-PS-02

Lab Sample ID: 240-78384-2

Date Collected: 04/18/17 13:40

Matrix: Water

Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276435	04/27/17 15:20	HMB	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276417	04/27/17 13:06	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	276952	05/01/17 17:28	BPM	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 16:11	JMO	TAL PIT
Dissolved	Prep	3005A			275782	04/21/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276068	04/24/17 22:14	AMM2	TAL CAN
Total/NA	Analysis	2320B-1997		1	276285	04/25/17 18:47	JMB	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:36	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275511	04/20/17 12:14	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275512	04/20/17 12:14	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 07:43	TPH	TAL CAN

Client Sample ID: W-170418-PS-03

Lab Sample ID: 240-78384-3

Date Collected: 04/18/17 14:35

Matrix: Water

Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276435	04/27/17 15:44	HMB	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276417	04/27/17 13:31	MRU	TAL CAN

Client Sample ID: W-170418-PS-03

Lab Sample ID: 240-78384-3

Date Collected: 04/18/17 14:35

Matrix: Water

Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	276952	05/01/17 17:45	BPM	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 16:35	JMO	TAL PIT
Dissolved	Prep	3005A			275782	04/21/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276068	04/24/17 22:18	AMM2	TAL CAN
Total/NA	Analysis	2320B-1997		1	276285	04/25/17 18:56	JMB	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:38	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275511	04/20/17 12:34	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275512	04/20/17 12:34	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 08:10	TPH	TAL CAN

Client Sample ID: W-170418-PS-04

Lab Sample ID: 240-78384-4

Date Collected: 04/18/17 15:20

Matrix: Water

Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276435	04/27/17 16:08	HMB	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276417	04/27/17 13:56	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	276952	05/01/17 18:19	BPM	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 16:59	JMO	TAL PIT
Dissolved	Prep	3005A			275782	04/21/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276068	04/24/17 22:22	AMM2	TAL CAN
Total/NA	Analysis	2320B-1997		1	276285	04/25/17 19:04	JMB	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:39	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275511	04/20/17 12:54	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275512	04/20/17 12:54	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 08:37	TPH	TAL CAN

Client Sample ID: W-170419-PS-05

Lab Sample ID: 240-78384-5

Date Collected: 04/19/17 08:00

Matrix: Water

Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276435	04/27/17 16:31	HMB	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276417	04/27/17 14:21	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	277025	05/02/17 04:19	BPM	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 17:24	JMO	TAL PIT
Dissolved	Prep	3005A			275782	04/21/17 14:00	AJC	TAL CAN

Client Sample ID: W-170419-PS-05

Lab Sample ID: 240-78384-5

Date Collected: 04/19/17 08:00

Matrix: Water

Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6020		1	276068	04/24/17 22:26	AMM2	TAL CAN
Total/NA	Analysis	2320B-1997		1	277244	05/02/17 15:01	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:40	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275511	04/20/17 18:16	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275512	04/20/17 18:16	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 09:04	TPH	TAL CAN

Client Sample ID: W-170419-PS-06

Lab Sample ID: 240-78384-6

Date Collected: 04/19/17 08:50

Matrix: Water

Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276435	04/27/17 16:55	HMB	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 19:15	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	277025	05/02/17 04:36	BPM	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 17:48	JMO	TAL PIT
Dissolved	Prep	3005A			275782	04/21/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276068	04/24/17 22:31	AMM2	TAL CAN
Total/NA	Analysis	2320B-1997		1	277244	05/02/17 15:16	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:41	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275511	04/20/17 19:57	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275512	04/20/17 19:57	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 09:31	TPH	TAL CAN

Client Sample ID: W-170419-PS-07

Lab Sample ID: 240-78384-7

Date Collected: 04/19/17 09:45

Matrix: Water

Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276435	04/27/17 17:19	HMB	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 19:40	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	277025	05/02/17 04:53	BPM	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 18:13	JMO	TAL PIT
Dissolved	Prep	3005A			275782	04/21/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276068	04/24/17 22:35	AMM2	TAL CAN
Total/NA	Analysis	2320B-1997		1	277244	05/02/17 15:25	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:42	LKG	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Client Sample ID: W-170419-PS-07

Lab Sample ID: 240-78384-7

Date Collected: 04/19/17 09:45
Date Received: 04/20/17 09:20

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	275511	04/20/17 20:57	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275512	04/20/17 20:57	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 10:15	TPH	TAL CAN

Client Sample ID: W-170419-PS-08

Lab Sample ID: 240-78384-8

Date Collected: 04/19/17 10:20
Date Received: 04/20/17 09:20

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276435	04/27/17 17:43	HMB	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276417	04/27/17 14:46	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	277132	05/02/17 17:07	BPM	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 18:37	JMO	TAL PIT
Dissolved	Prep	3005A			275782	04/21/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276068	04/24/17 22:39	AMM2	TAL CAN
Total/NA	Analysis	2320B-1997		1	277244	05/02/17 15:33	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:43	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275511	04/20/17 21:17	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275512	04/20/17 21:17	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 10:41	TPH	TAL CAN

Client Sample ID: TRIP BLANK-001

Lab Sample ID: 240-78384-9

Date Collected: 04/19/17 11:00
Date Received: 04/20/17 09:20

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276435	04/27/17 18:07	HMB	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396
TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78384-1

Laboratory: TestAmerica Canton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999518190	08-31-17 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
RSK-175		Water	Methane

Laboratory: TestAmerica Pittsburgh

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	998027800	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

3.6/C3.3 1.8/C1.5 2.0/C2.7 3.2/C2.9 3.0/C2.7

CAMBRIDGE

Chain of Custody Record

CAMBRIDGE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

240506 4.8/C4.5 2.8/C2.5 0.8/C0.5 240506 3.4/C3.1

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Client Information	Sampler: Peter Storlie	Lab PM: Heckler, Denise D	Carrier Tracking No(s):	COC No: 240-42024-18273.1
Client Contact: Mr. Grant Anderson	Phone: 651-247-4218	E-Mail: denise.heckler@testamericainc.com		Page: Page 1 of 4
Company: GHD Services Inc.				Job #:
Address: 1801 Old Highway 8 NW Suite 114	Due Date Requested:			
City: St. Paul	TAT Requested (days): Standard.			
State, Zip: MN, 55112				
Phone: 651-639-0913(Tel) 651-639-0923(Fax)	PO #: 34001059			
Email: grant.anderson@ghd.com	WO #: 86165			
Project Name: 86165-03-11, Penta Wood	Project #: 24012755			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3

240-78384 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - BTEX	8151A - Pentachlorophenol	2320B - Alkalinity	2340C - Hardness, Total (mg/l as CaCO3)	6020 - As, Cu, Zn, Fe, Mn	8260B, RSK_175	8270C - Naphthalene	300.0_28D - Chloride & Sulfate & Nitrate	9060 - TOC	Total Number of	Special Instructions/Note:
		Preservation Code:					A	N	N	D	D	A	N	N	S		
W-170418-PS-01	4-18-2017	1300	G	Water	N		X	X	X	X	X	X	X	X	X		Note: Nitrate has 48-hr hold. All nitrates are in one cooler.
02		1340		Water			X	X	X	X	X	X	X	X	X		
03		1435		Water			X	X	X	X	X	X	X	X	X		
04		1520		Water			X	X	X	X	X	X	X	X	X		
W-170419-PS-05	4-19-2017	0800		Water			X	X	X	X	X	X	X	X	X		
06		0850		Water			X	X	X	X	X	X	X	X	X		
07		0945		Water			X	X	X	X	X	X	X	X	X		
08		1020		Water			X	X	X	X	X	X	X	X	X		
TRIP BLANK-001	4-19-2017	1100		Water			X										
				Water													
				Water													

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 4-19-2017/1300	Company: GHD	Received by:	Date/Time: 4-20-17 920	Company: TA
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 78384**
Canton Facility

Client GHD Site Name

Cooler Received on 4-20-17 Opened on 4-20-17

Cooler unpacked by:

FedEx: 1st Grd Exp UPS FAS Stetson Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # Foam Box Client Cooler Box Other

Packing material used: Bubble Wrap Foam Plastic Bag None Other

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☑ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.3** °C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
   IR GUN #36 (CF **+0.8**°C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 18 Yes No
   -Were custody seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 11-15 have been checked at the originating laboratory.
11. Were sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC682547**
12. Were VOAs on the COC? Yes No
13. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes No
15. Was a LL Hg or Me Hg trip blank present? Yes No

Contacted PM Date by via Verbal Voice Mail Other

Concerning

14. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

15. SAMPLE CONDITION

Sample(s) were received after the recommended holding time had expired.
Sample(s) were received in a broken container.
Sample(s) were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) were further preserved in the laboratory.
Time preserved: Preservative(s) added/Lot number(s):

TestAmerica Multiple Cooler Receipt Form/Narrative **Login # :** 78384
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
Client	8	3.6	3.3	ICE
		1.8	1.5	
		2.0	2.7	
		3.2	2.9	
		3.0	2.7	
		4.8	4.5	
		2.8	2.5	
		0.8	0.5	
		3.4	3.1	

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
W-170418-PS-01	240-78384-L-1	Plastic 250ml - with Nitric Acid	<2		
W-170418-PS-01	240-78384-M-1	Plastic 500ml - with Nitric Acid	<2		
W-170418-PS-02	240-78384-L-2	Plastic 250ml - with Nitric Acid	<2		
W-170418-PS-02	240-78384-M-2	Plastic 500ml - with Nitric Acid	<2		
W-170418-PS-03	240-78384-L-3	Plastic 250ml - with Nitric Acid	<2		
W-170418-PS-03	240-78384-M-3	Plastic 500ml - with Nitric Acid	<2		
W-170418-PS-04	240-78384-L-4	Plastic 250ml - with Nitric Acid	<2		
W-170418-PS-04	240-78384-M-4	Plastic 500ml - with Nitric Acid	<2		
W-170419-PS-05	240-78384-L-5	Plastic 250ml - with Nitric Acid	<2		
W-170419-PS-05	240-78384-M-5	Plastic 500ml - with Nitric Acid	<2		
W-170419-PS-06	240-78384-L-6	Plastic 250ml - with Nitric Acid	<2		
W-170419-PS-06	240-78384-M-6	Plastic 500ml - with Nitric Acid	<2		
W-170419-PS-07	240-78384-L-7	Plastic 250ml - with Nitric Acid	<2		
W-170419-PS-07	240-78384-M-7	Plastic 500ml - with Nitric Acid	<2		
W-170419-PS-08	240-78384-L-8	Plastic 250ml - with Nitric Acid	<2		
W-170419-PS-08	240-78384-M-8	Plastic 500ml - with Nitric Acid	<2		

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-78384-1

Login Number: 78384
List Number: 2
Creator: Say, Thomas C

List Source: TestAmerica Pittsburgh
List Creation: 04/21/17 03:17 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-78470-1
Client Project/Site: 86165-04-05, Penta Wood

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson

Denise D Heckler

Authorized for release by:
5/4/2017 9:07:25 AM

Denise Heckler, Project Manager II
(330)966-9477
denise.heckler@testamericainc.com

Table of Contents

Qualifiers

GC/MS Semi VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

GC VOA

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.
X	Surrogate is outside control limits

GC Semi VOA

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Reported value was between the limit of detection and the limit of quantitation.

General Chemistry

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Job ID: 240-78470-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-78470-1

Comments
Sample W-170419-PS-09: did not receive volume for Alkalinity, Hardness, RSK, Chloride, Sulfate, Nitrate, TOC.

Receipt
The samples were received on 4/21/2017 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 6 coolers at receipt time were 1.3º C, 1.7º C, 2.1º C, 2.5º C, 2.7º C and 3.1º C.

GC/MS VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC/MS Semi VOA
Method(s) 8270C: Surrogate recovery for the following sample was outside control limits: W-170420-PS-15 (240-78470-7). Re-extraction and/or re-analysis was performed outside of holding time with acceptable results. Both sets of data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC VOA
Method(s) RSK-175: Surrogate low in the MSD: W-170420-PS-14 (240-78470-6[MSD]). Recovery is at 74% and the low limit is 76%. The MS and parent pass limits. The RPD between MS/MSD for Methane is within limits. Data reported and qualified.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method(s) 8151A: The following samples was diluted due to the abundance of target analytes: W-170419-PS-11 (240-78470-3), W-170420-PS-14 (240-78470-6), W-170420-PS-14 (240-78470-6[MS]) and W-170420-PS-14 (240-78470-6[MSD])Spiked compounds were diluted out.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8270C	Semivolatile Organic Compounds (GC/MS)	SW846	TAL CAN
RSK-175	Dissolved Gases (GC)	RSK	TAL CAN
8151A	Herbicides (GC)	SW846	TAL PIT
6020	Metals (ICP/MS)	SW846	TAL CAN
2320B-1997	Alkalinity, Total	SM	TAL CAN
2340C-1997	Hardness, Total	SM	TAL CAN
300.0	Anions, Ion Chromatography	MCAWW	TAL CAN
9060	Organic Carbon, Total (TOC)	SW846	TAL CAN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Sample Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-78470-1	W-170419-PS-09	Water	04/19/17 15:00	04/21/17 09:30
240-78470-2	W-170419-PS-10	Water	04/19/17 15:25	04/21/17 09:30
240-78470-3	W-170419-PS-11	Water	04/19/17 15:15	04/21/17 09:30
240-78470-4	W-170420-PS-12	Water	04/20/17 10:00	04/21/17 09:30
240-78470-5	W-170420-PS-13	Water	04/20/17 10:10	04/21/17 09:30
240-78470-6	W-170420-PS-14	Water	04/20/17 11:05	04/21/17 09:30
240-78470-7	W-170420-PS-15	Water	04/20/17 12:05	04/21/17 09:30
240-78470-8	W-170420-PS-16	Water	04/20/17 12:15	04/21/17 09:30
240-78470-9	TRIP BLANK -004	Water	04/19/17 00:00	04/21/17 09:30

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170419-PS-09 — Lab Sample ID: 240-78470-1

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Copper	1.7	J B	2.0	0.36	ug/L	1		6020	Dissolved

Client Sample ID: W-170419-PS-10 — Lab Sample ID: 240-78470-2

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Copper	1.6	J B	2.0	0.36	ug/L	1		6020	Dissolved
Iron	7.7	J B	100	5.3	ug/L	1		6020	Dissolved
Manganese	0.80	J	5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	39.0		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	60.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	3.3		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	0.57		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	4.5		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	2.0		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170419-PS-11 — Lab Sample ID: 240-78470-3

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	0.13	J	0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	14		1.0	0.16	ug/L	40		8151A	Total/NA
Arsenic	0.46	J	5.0	0.35	ug/L	1		6020	Dissolved
Copper	1.2	J B	2.0	0.36	ug/L	1		6020	Dissolved
Iron	10.8	J B	100	5.3	ug/L	1		6020	Dissolved
Manganese	362		5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	201		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	346		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	10.1		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	1.0		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	112		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	1.0		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170420-PS-12 — Lab Sample ID: 240-78470-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.71	J	5.0	0.35	ug/L	1		6020	Dissolved
Copper	0.77	J B	2.0	0.36	ug/L	1		6020	Dissolved
Manganese	0.45	J	5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	201		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	460		25.0	15.5	mg/L	1		2340C-1997	Total/NA
Chloride	16.1		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	2.2		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	164		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.48	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170420-PS-13 — Lab Sample ID: 240-78470-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.68	J	5.0	0.35	ug/L	1		6020	Dissolved
Copper	0.65	J B	2.0	0.36	ug/L	1		6020	Dissolved
Manganese	0.58	J	5.0	0.25	ug/L	1		6020	Dissolved

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170420-PS-13 (Continued) — Lab Sample ID: 240-78470-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	223		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	470		25.0	15.5	mg/L	1		2340C-1997	Total/NA
Chloride	16.1		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	2.2		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	165		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.43	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170420-PS-14 — Lab Sample ID: 240-78470-6

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	22		1.0	0.16	ug/L	40		8151A	Total/NA
Arsenic	0.55	J	5.0	0.35	ug/L	1		6020	Dissolved
Copper	1.0	J B	2.0	0.36	ug/L	1		6020	Dissolved
Iron	11.9	J B	100	5.3	ug/L	1		6020	Dissolved
Manganese	4.0	J	5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	123		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	186		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	22.5		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	3.3		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	7.1		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	1.6		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170420-PS-15 — Lab Sample ID: 240-78470-7

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Arsenic	1.0	J	5.0	0.35	ug/L	1		6020	Dissolved
Copper	0.37	J B	2.0	0.36	ug/L	1		6020	Dissolved
Manganese	0.33	J	5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	131		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	186		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	14.8		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	3.5		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	7.0		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.47	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170420-PS-16 — Lab Sample ID: 240-78470-8

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.99	J	5.0	0.35	ug/L	1		6020	Dissolved
Manganese	0.64	J	5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	133		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	188		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	14.7		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	1.7		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	7.0		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.49	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: TRIP BLANK -004 — Lab Sample ID: 240-78470-9

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Canton

Client Sample ID: W-170419-PS-09
Date Collected: 04/19/17 15:00
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 10:41	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 10:41	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 10:41	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 10:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*86*		*61 - 138*		*04/28/17 10:41*	*1*
4-Bromofluorobenzene (Surr)	*95*		*69 - 120*		*04/28/17 10:41*	*1*
Toluene-d8 (Surr)	*89*		*73 - 120*		*04/28/17 10:41*	*1*
Dibromofluoromethane (Surr)	*93*		*69 - 124*		*04/28/17 10:41*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.060		0.19	0.060	ug/L		04/24/17 08:23	04/27/17 13:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*79*		*42 - 120*	*04/24/17 08:23*	*04/27/17 13:58*	*1*
2-Fluorophenol (Surr)	*41*		*10 - 120*	*04/24/17 08:23*	*04/27/17 13:58*	*1*
2,4,6-Tribromophenol (Surr)	*80*		*35 - 125*	*04/24/17 08:23*	*04/27/17 13:58*	*1*
Nitrobenzene-d5 (Surr)	*78*		*36 - 120*	*04/24/17 08:23*	*04/27/17 13:58*	*1*
Phenol-d5 (Surr)	*24*		*10 - 120*	*04/24/17 08:23*	*04/27/17 13:58*	*1*
Terphenyl-d14 (Surr)	*74*		*17 - 120*	*04/24/17 08:23*	*04/27/17 13:58*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.11	0.016	ug/L		04/25/17 15:10	04/26/17 11:23	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*73*		*18 - 125*	*04/25/17 15:10*	*04/26/17 11:23*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/24/17 14:00	04/25/17 16:02	1
Copper	**1.7**	**J B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 16:02	1
Iron	<5.3		100	5.3	ug/L		04/24/17 14:00	04/25/17 16:02	1
Manganese	<0.25		5.0	0.25	ug/L		04/24/17 14:00	04/25/17 16:02	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 16:02	1

Client Sample ID: W-170419-PS-10
Date Collected: 04/19/17 15:25
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 11:05	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 11:05	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 11:05	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 11:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*85*		*61 - 138*		*04/28/17 11:05*	*1*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*04/28/17 11:05*	*1*
Toluene-d8 (Surr)	*92*		*73 - 120*		*04/28/17 11:05*	*1*
Dibromofluoromethane (Surr)	*94*		*69 - 124*		*04/28/17 11:05*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.060		0.19	0.060	ug/L		04/24/17 08:23	04/27/17 14:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*70*		*42 - 120*	*04/24/17 08:23*	*04/27/17 14:23*	*1*
2-Fluorophenol (Surr)	*30*		*10 - 120*	*04/24/17 08:23*	*04/27/17 14:23*	*1*
2,4,6-Tribromophenol (Surr)	*82*		*35 - 125*	*04/24/17 08:23*	*04/27/17 14:23*	*1*
Nitrobenzene-d5 (Surr)	*68*		*36 - 120*	*04/24/17 08:23*	*04/27/17 14:23*	*1*
Phenol-d5 (Surr)	*19*		*10 - 120*	*04/24/17 08:23*	*04/27/17 14:23*	*1*
Terphenyl-d14 (Surr)	*41*		*17 - 120*	*04/24/17 08:23*	*04/27/17 14:23*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/02/17 19:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*80*		*76 - 121*		*05/02/17 19:07*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/25/17 15:10	04/26/17 11:48	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*58*		*18 - 125*	*04/25/17 15:10*	*04/26/17 11:48*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/24/17 14:00	04/25/17 16:14	1
Copper	**1.6**	**J B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 16:14	1
Iron	**7.7**	**J B**	100	5.3	ug/L		04/24/17 14:00	04/25/17 16:14	1
Manganese	**0.80**	**J**	5.0	0.25	ug/L		04/24/17 14:00	04/25/17 16:14	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 16:14	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**39.0**		5.0	1.9	mg/L			05/03/17 07:57	1
Hardness as calcium carbonate	**60.0**		5.0	3.1	mg/L			04/25/17 13:54	1
Chloride	**3.3**		1.0	0.41	mg/L			04/21/17 12:40	1
Nitrate as N	**0.57**		0.10	0.035	mg/L			04/21/17 12:40	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170419-PS-10
Date Collected: 04/19/17 15:25
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-2
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.5		1.0	0.13	mg/L			04/21/17 12:40	1
Total Organic Carbon	2.0		1.0	0.080	mg/L			04/27/17 21:54	1

Client Sample ID: W-170419-PS-11

Date Collected: 04/19/17 15:15
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-3

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 11:29	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 11:29	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 11:29	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 11:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*61 - 138*		*04/28/17 11:29*	*1*
4-Bromofluorobenzene (Surr)	*97*		*69 - 120*		*04/28/17 11:29*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*04/28/17 11:29*	*1*
Dibromofluoromethane (Surr)	*93*		*69 - 124*		*04/28/17 11:29*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/24/17 08:23	04/27/17 14:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*83*		*42 - 120*	*04/24/17 08:23*	*04/27/17 14:47*	*1*
2-Fluorophenol (Surr)	*41*		*10 - 120*	*04/24/17 08:23*	*04/27/17 14:47*	*1*
2,4,6-Tribromophenol (Surr)	*90*		*35 - 125*	*04/24/17 08:23*	*04/27/17 14:47*	*1*
Nitrobenzene-d5 (Surr)	*83*		*36 - 120*	*04/24/17 08:23*	*04/27/17 14:47*	*1*
Phenol-d5 (Surr)	*25*		*10 - 120*	*04/24/17 08:23*	*04/27/17 14:47*	*1*
Terphenyl-d14 (Surr)	*80*		*17 - 120*	*04/24/17 08:23*	*04/27/17 14:47*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.13**	**J**	0.50	0.080	ug/L			05/02/17 19:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*76*		*76 - 121*		*05/02/17 19:24*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**14**		1.0	0.16	ug/L		04/25/17 15:10	04/27/17 10:08	40

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*105*		*18 - 125*	*04/25/17 15:10*	*04/27/17 10:08*	*40*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.46**	**J**	5.0	0.35	ug/L		04/24/17 14:00	04/25/17 16:19	1
Copper	**1.2**	**J B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 16:19	1
Iron	**10.8**	**J B**	100	5.3	ug/L		04/24/17 14:00	04/25/17 16:19	1
Manganese	**362**		5.0	0.25	ug/L		04/24/17 14:00	04/25/17 16:19	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 16:19	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**201**		5.0	1.9	mg/L			05/03/17 08:00	1
Hardness as calcium carbonate	**346**		5.0	3.1	mg/L			04/25/17 13:55	1
Chloride	**10.1**		1.0	0.41	mg/L			04/21/17 13:01	1
Nitrate as N	**1.0**		0.10	0.035	mg/L			04/21/17 13:01	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170419-PS-11
Date Collected: 04/19/17 15:15
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-3
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	112		1.0	0.13	mg/L			04/21/17 13:01	1
Total Organic Carbon	1.0		1.0	0.080	mg/L			04/27/17 22:21	1

Client Sample ID: W-170420-PS-12

Date Collected: 04/20/17 10:00
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-4

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 11:53	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 11:53	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 11:53	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 11:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*61 - 138*		*04/28/17 11:53*	*1*
4-Bromofluorobenzene (Surr)	*92*		*69 - 120*		*04/28/17 11:53*	*1*
Toluene-d8 (Surr)	*89*		*73 - 120*		*04/28/17 11:53*	*1*
Dibromofluoromethane (Surr)	*92*		*69 - 124*		*04/28/17 11:53*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.060		0.19	0.060	ug/L		04/24/17 08:23	04/28/17 12:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*84*		*42 - 120*	*04/24/17 08:23*	*04/28/17 12:59*	*1*
2-Fluorophenol (Surr)	*37*		*10 - 120*	*04/24/17 08:23*	*04/28/17 12:59*	*1*
2,4,6-Tribromophenol (Surr)	*75*		*35 - 125*	*04/24/17 08:23*	*04/28/17 12:59*	*1*
Nitrobenzene-d5 (Surr)	*82*		*36 - 120*	*04/24/17 08:23*	*04/28/17 12:59*	*1*
Phenol-d5 (Surr)	*22*		*10 - 120*	*04/24/17 08:23*	*04/28/17 12:59*	*1*
Terphenyl-d14 (Surr)	*74*		*17 - 120*	*04/24/17 08:23*	*04/28/17 12:59*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/02/17 23:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*80*		*76 - 121*		*05/02/17 23:58*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/25/17 15:10	04/26/17 13:02	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*64*		*18 - 125*	*04/25/17 15:10*	*04/26/17 13:02*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.71**	**J**	5.0	0.35	ug/L		04/24/17 14:00	04/25/17 16:23	1
Copper	**0.77**	**J B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 16:23	1
Iron	<5.3		100	5.3	ug/L		04/24/17 14:00	04/25/17 16:23	1
Manganese	**0.45**	**J**	5.0	0.25	ug/L		04/24/17 14:00	04/25/17 16:23	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 16:23	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**201**		5.0	1.9	mg/L			05/03/17 08:40	1
Hardness as calcium carbonate	**460**		25.0	15.5	mg/L			04/25/17 13:56	1
Chloride	**16.1**		1.0	0.41	mg/L			04/21/17 14:01	1
Nitrate as N	**2.2**		0.10	0.035	mg/L			04/21/17 14:01	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170420-PS-12
Date Collected: 04/20/17 10:00
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-4
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	164		1.0	0.13	mg/L			04/21/17 14:01	1
Total Organic Carbon	0.48	J	1.0	0.080	mg/L			04/27/17 22:48	1

Client Sample ID: W-170420-PS-13

Date Collected: 04/20/17 10:10
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-5

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 12:18	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 12:18	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 12:18	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 12:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*61 - 138*		*04/28/17 12:18*	*1*
4-Bromofluorobenzene (Surr)	*93*		*69 - 120*		*04/28/17 12:18*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*04/28/17 12:18*	*1*
Dibromofluoromethane (Surr)	*92*		*69 - 124*		*04/28/17 12:18*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.076		0.24	0.076	ug/L		04/24/17 08:23	04/26/17 17:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*79*		*42 - 120*	*04/24/17 08:23*	*04/26/17 17:28*	*1*
2-Fluorophenol (Surr)	*45*		*10 - 120*	*04/24/17 08:23*	*04/26/17 17:28*	*1*
2,4,6-Tribromophenol (Surr)	*74*		*35 - 125*	*04/24/17 08:23*	*04/26/17 17:28*	*1*
Nitrobenzene-d5 (Surr)	*76*		*36 - 120*	*04/24/17 08:23*	*04/26/17 17:28*	*1*
Phenol-d5 (Surr)	*28*		*10 - 120*	*04/24/17 08:23*	*04/26/17 17:28*	*1*
Terphenyl-d14 (Surr)	*77*		*17 - 120*	*04/24/17 08:23*	*04/26/17 17:28*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/03/17 00:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*80*		*76 - 121*		*05/03/17 00:32*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/25/17 15:10	04/26/17 13:27	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*63*		*18 - 125*	*04/25/17 15:10*	*04/26/17 13:27*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.68**	**J**	5.0	0.35	ug/L		04/24/17 14:00	04/25/17 16:27	1
Copper	**0.65**	**J B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 16:27	1
Iron	<5.3		100	5.3	ug/L		04/24/17 14:00	04/25/17 16:27	1
Manganese	**0.58**	**J**	5.0	0.25	ug/L		04/24/17 14:00	04/25/17 16:27	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 16:27	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**223**		5.0	1.9	mg/L			05/03/17 08:43	1
Hardness as calcium carbonate	**470**		25.0	15.5	mg/L			04/25/17 13:57	1
Chloride	**16.1**		1.0	0.41	mg/L			04/21/17 16:01	1
Nitrate as N	**2.2**		0.10	0.035	mg/L			04/21/17 16:01	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170420-PS-13
Date Collected: 04/20/17 10:10
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-5
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	165		1.0	0.13	mg/L			04/21/17 16:01	1
Total Organic Carbon	0.43	J	1.0	0.080	mg/L			04/27/17 23:59	1

Client Sample ID: W-170420-PS-14

Date Collected: 04/20/17 11:05
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-6

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 12:42	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 12:42	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 12:42	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 12:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*61 - 138*		*04/28/17 12:42*	*1*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*04/28/17 12:42*	*1*
Toluene-d8 (Surr)	*92*		*73 - 120*		*04/28/17 12:42*	*1*
Dibromofluoromethane (Surr)	*94*		*69 - 124*		*04/28/17 12:42*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.061		0.19	0.061	ug/L		04/25/17 08:44	05/01/17 18:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*87*		*42 - 120*	*04/25/17 08:44*	*05/01/17 18:47*	*1*
2-Fluorophenol (Surr)	*50*		*10 - 120*	*04/25/17 08:44*	*05/01/17 18:47*	*1*
2,4,6-Tribromophenol (Surr)	*69*		*35 - 125*	*04/25/17 08:44*	*05/01/17 18:47*	*1*
Nitrobenzene-d5 (Surr)	*91*		*36 - 120*	*04/25/17 08:44*	*05/01/17 18:47*	*1*
Phenol-d5 (Surr)	*29*		*10 - 120*	*04/25/17 08:44*	*05/01/17 18:47*	*1*
Terphenyl-d14 (Surr)	*89*		*17 - 120*	*04/25/17 08:44*	*05/01/17 18:47*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/03/17 00:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*80*		*76 - 121*		*05/03/17 00:49*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**22**		1.0	0.16	ug/L		04/25/17 15:10	04/27/17 10:33	40

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*100*		*18 - 125*	*04/25/17 15:10*	*04/27/17 10:33*	*40*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.55**	**J**	5.0	0.35	ug/L		04/24/17 14:00	04/25/17 14:42	1
Copper	**1.0**	**J B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 14:42	1
Iron	**11.9**	**J B**	100	5.3	ug/L		04/24/17 14:00	04/25/17 14:42	1
Manganese	**4.0**	**J**	5.0	0.25	ug/L		04/24/17 14:00	04/25/17 14:42	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 14:42	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**123**		5.0	1.9	mg/L			05/03/17 08:49	1
Hardness as calcium carbonate	**186**		5.0	3.1	mg/L			04/26/17 11:56	1
Chloride	**22.5**		1.0	0.41	mg/L			04/21/17 15:01	1
Nitrate as N	**3.3**		0.10	0.035	mg/L			04/21/17 15:01	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170420-PS-14
Date Collected: 04/20/17 11:05
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-6
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	7.1		1.0	0.13	mg/L			04/21/17 15:01	1
Total Organic Carbon	1.6		1.0	0.080	mg/L			04/27/17 18:07	1

Client Sample ID: W-170420-PS-15

Date Collected: 04/20/17 12:05
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-7

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 13:06	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 13:06	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 13:06	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 13:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*61 - 138*		*04/28/17 13:06*	*1*
4-Bromofluorobenzene (Surr)	*94*		*69 - 120*		*04/28/17 13:06*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*04/28/17 13:06*	*1*
Dibromofluoromethane (Surr)	*93*		*69 - 124*		*04/28/17 13:06*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.065		0.21	0.065	ug/L		04/24/17 08:23	04/28/17 13:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*29*	*X*	*42 - 120*	*04/24/17 08:23*	*04/28/17 13:23*	*1*
2-Fluorophenol (Surr)	*14*		*10 - 120*	*04/24/17 08:23*	*04/28/17 13:23*	*1*
2,4,6-Tribromophenol (Surr)	*24*	*X*	*35 - 125*	*04/24/17 08:23*	*04/28/17 13:23*	*1*
Nitrobenzene-d5 (Surr)	*26*	*X*	*36 - 120*	*04/24/17 08:23*	*04/28/17 13:23*	*1*
Phenol-d5 (Surr)	*9*	*X*	*10 - 120*	*04/24/17 08:23*	*04/28/17 13:23*	*1*
Terphenyl-d14 (Surr)	*31*		*17 - 120*	*04/24/17 08:23*	*04/28/17 13:23*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS) - RE

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*78*		*42 - 120*	*05/02/17 08:39*	*05/03/17 12:50*	*1*
2-Fluorophenol (Surr)	*40*		*10 - 120*	*05/02/17 08:39*	*05/03/17 12:50*	*1*
2,4,6-Tribromophenol (Surr)	*90*		*35 - 125*	*05/02/17 08:39*	*05/03/17 12:50*	*1*
Nitrobenzene-d5 (Surr)	*81*		*36 - 120*	*05/02/17 08:39*	*05/03/17 12:50*	*1*
Phenol-d5 (Surr)	*26*		*10 - 120*	*05/02/17 08:39*	*05/03/17 12:50*	*1*
Terphenyl-d14 (Surr)	*83*		*17 - 120*	*05/02/17 08:39*	*05/03/17 12:50*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/03/17 01:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*77*		*76 - 121*		*05/03/17 01:40*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/25/17 15:10	04/26/17 14:17	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*78*		*18 - 125*	*04/25/17 15:10*	*04/26/17 14:17*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.0**	**J**	5.0	0.35	ug/L		04/24/17 14:00	04/25/17 16:31	1
Copper	**0.37**	**J B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 16:31	1
Iron	<5.3		100	5.3	ug/L		04/24/17 14:00	04/25/17 16:31	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170420-PS-15
Date Collected: 04/20/17 12:05
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-7
Matrix: Water

Method: 6020 - Metals (ICP/MS) - Dissolved (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.33	J	5.0	0.25	ug/L		04/24/17 14:00	04/25/17 16:31	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 16:31	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	131		5.0	1.9	mg/L			05/03/17 08:55	1
Hardness as calcium carbonate	186		5.0	3.1	mg/L			04/26/17 11:56	1
Chloride	14.8		1.0	0.41	mg/L			04/21/17 13:41	1
Nitrate as N	3.5		0.10	0.035	mg/L			04/21/17 13:41	1
Sulfate	7.0		1.0	0.13	mg/L			04/21/17 13:41	1
Total Organic Carbon	0.47	J	1.0	0.080	mg/L			04/28/17 00:27	1

Client Sample ID: W-170420-PS-16

Date Collected: 04/20/17 12:15
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-8

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 13:30	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 13:30	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 13:30	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 13:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*61 - 138*		*04/28/17 13:30*	*1*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*04/28/17 13:30*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*04/28/17 13:30*	*1*
Dibromofluoromethane (Surr)	*92*		*69 - 124*		*04/28/17 13:30*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.070		0.22	0.070	ug/L		04/24/17 08:23	04/28/17 17:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*81*		*42 - 120*	*04/24/17 08:23*	*04/28/17 17:01*	*1*
2-Fluorophenol (Surr)	*43*		*10 - 120*	*04/24/17 08:23*	*04/28/17 17:01*	*1*
2,4,6-Tribromophenol (Surr)	*74*		*35 - 125*	*04/24/17 08:23*	*04/28/17 17:01*	*1*
Nitrobenzene-d5 (Surr)	*77*		*36 - 120*	*04/24/17 08:23*	*04/28/17 17:01*	*1*
Phenol-d5 (Surr)	*28*		*10 - 120*	*04/24/17 08:23*	*04/28/17 17:01*	*1*
Terphenyl-d14 (Surr)	*81*		*17 - 120*	*04/24/17 08:23*	*04/28/17 17:01*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/03/17 01:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*76*		*76 - 121*		*05/03/17 01:57*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/25/17 15:10	04/26/17 16:20	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*57*		*18 - 125*	*04/25/17 15:10*	*04/26/17 16:20*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.99**	**J**	5.0	0.35	ug/L		04/24/17 14:00	04/25/17 16:36	1
Copper	<0.36		2.0	0.36	ug/L		04/24/17 14:00	04/25/17 16:36	1
Iron	<5.3		100	5.3	ug/L		04/24/17 14:00	04/25/17 16:36	1
Manganese	**0.64**	**J**	5.0	0.25	ug/L		04/24/17 14:00	04/25/17 16:36	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 16:36	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**133**		5.0	1.9	mg/L			05/03/17 08:58	1
Hardness as calcium carbonate	**188**		5.0	3.1	mg/L			04/26/17 11:56	1
Chloride	**14.7**		1.0	0.41	mg/L			04/21/17 13:21	1
Nitrate as N	**1.7**		0.10	0.035	mg/L			04/21/17 13:21	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170420-PS-16
Date Collected: 04/20/17 12:15
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-8
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	7.0		1.0	0.13	mg/L			04/21/17 13:21	1
Total Organic Carbon	0.49	J	1.0	0.080	mg/L			04/28/17 01:12	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: TRIP BLANK -004
Date Collected: 04/19/17 00:00
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-9
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 13:54	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 13:54	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 13:54	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 13:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*61 - 138*		*04/28/17 13:54*	*1*
4-Bromofluorobenzene (Surr)	*94*		*69 - 120*		*04/28/17 13:54*	*1*
Toluene-d8 (Surr)	*91*		*73 - 120*		*04/28/17 13:54*	*1*
Dibromofluoromethane (Surr)	*94*		*69 - 124*		*04/28/17 13:54*	*1*

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(61-138)	(69-120)	(73-120)	(69-124)
240-78470-1	W-170419-PS-09	86	95	89	93
240-78470-2	W-170419-PS-10	85	96	92	94
240-78470-3	W-170419-PS-11	87	97	90	93
240-78470-4	W-170420-PS-12	88	92	89	92
240-78470-5	W-170420-PS-13	87	93	90	92
240-78470-6	W-170420-PS-14	87	96	92	94
240-78470-6 MS	W-170420-PS-14	82	102	95	94
240-78470-6 MSD	W-170420-PS-14	86	100	92	92
240-78470-7	W-170420-PS-15	89	94	90	93
240-78470-8	W-170420-PS-16	89	96	90	92
240-78470-9	TRIP BLANK -004	87	94	91	94
LCS 240-276640/4	Lab Control Sample	88	101	94	95
MB 240-276640/7	Method Blank	91	97	93	95

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		FBP	2FP	TBP	NBZ	PHL	TPH
Lab Sample ID	Client Sample ID	(42-120)	(10-120)	(35-125)	(36-120)	(10-120)	(17-120)
240-78470-1	W-170419-PS-09	79	41	80	78	24	74
240-78470-2	W-170419-PS-10	70	30	82	68	19	41
240-78470-3	W-170419-PS-11	83	41	90	83	25	80
240-78470-4	W-170420-PS-12	84	37	75	82	22	74
240-78470-5	W-170420-PS-13	79	45	74	76	28	77
240-78470-6	W-170420-PS-14	87	50	69	91	29	89
240-78470-6 MS	W-170420-PS-14	82	44	89	91	27	60
240-78470-6 MSD	W-170420-PS-14	81	43	91	93	28	65
240-78470-7	W-170420-PS-15	29 X	14	24 X	26 X	9 X	31
240-78470-7 - RE	W-170420-PS-15	78	40	90	81	26	83
240-78470-8	W-170420-PS-16	81	43	74	77	28	81
LCS 240-275884/20-A	Lab Control Sample	84	50	92	87	32	86
LCS 240-276083/13-A	Lab Control Sample	82	52	82	93	33	85
LCS 240-277083/20-A	Lab Control Sample	91	60	123	93	39	101
LCSD 240-275884/21-A	Lab Control Sample Dup	90	57	96	94	37	90
MB 240-275884/19-A	Method Blank	85	54	83	83	34	89
MB 240-276083/12-A	Method Blank	77	49	60	78	29	96
MB 240-277083/19-A	Method Blank	76	44	87	75	29	85

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)

PHL = Phenol-d5 (Surr)
TPH = Terphenyl-d14 (Surr)

Method: RSK-175 - Dissolved Gases (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	'rifluoroet (76-121)
240-78470-2	W-170419-PS-10	80
240-78470-3	W-170419-PS-11	76
240-78470-4	W-170420-PS-12	80
240-78470-5	W-170420-PS-13	80
240-78470-6	W-170420-PS-14	80
240-78470-6 MS	W-170420-PS-14	76
240-78470-6 MSD	W-170420-PS-14	74 X
240-78470-7	W-170420-PS-15	77
240-78470-8	W-170420-PS-16	76
LCS 240-277132/5	Lab Control Sample	87
LCS 240-277219/5	Lab Control Sample	84
MB 240-277132/4	Method Blank	86
MB 240-277219/4	Method Blank	86

Surrogate Legend

1,1,1-Trifluoroethane = 1,1,1-Trifluoroethane

Method: 8151A - Herbicides (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCPA1 (18-125)	DCPA2 (18-125)
240-78470-1	W-170419-PS-09	70	73
240-78470-2	W-170419-PS-10	57	58
240-78470-3	W-170419-PS-11	105	76
240-78470-4	W-170420-PS-12	62	64
240-78470-5	W-170420-PS-13	61	63
240-78470-6	W-170420-PS-14	100	74
240-78470-6 MS	W-170420-PS-14	113	87
240-78470-6 MSD	W-170420-PS-14	91	70
240-78470-7	W-170420-PS-15	76	78
240-78470-8	W-170420-PS-16	54	57
LCS 180-209292/2-A	Lab Control Sample	77	80
MB 180-209292/1-A	Method Blank	52	54

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-276640/7
Matrix: Water
Analysis Batch: 276640

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 09:57	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 09:57	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 09:57	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 09:57	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*61 - 138*		*04/28/17 09:57*	*1*
4-Bromofluorobenzene (Surr)	*97*		*69 - 120*		*04/28/17 09:57*	*1*
Toluene-d8 (Surr)	*93*		*73 - 120*		*04/28/17 09:57*	*1*
Dibromofluoromethane (Surr)	*95*		*69 - 124*		*04/28/17 09:57*	*1*

Lab Sample ID: LCS 240-276640/4
Matrix: Water
Analysis Batch: 276640

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	20.0	19.5		ug/L		98	79 - 120
Ethylbenzene	20.0	18.2		ug/L		91	80 - 120
Toluene	20.0	18.2		ug/L		91	78 - 120
Xylenes, Total	40.0	35.8		ug/L		90	80 - 120
m-Xylene & p-Xylene	20.0	17.9		ug/L		89	80 - 120
o-Xylene	20.0	17.9		ug/L		89	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*88*		*61 - 138*
4-Bromofluorobenzene (Surr)	*101*		*69 - 120*
Toluene-d8 (Surr)	*94*		*73 - 120*
Dibromofluoromethane (Surr)	*95*		*69 - 124*

Lab Sample ID: 240-78470-6 MS
Matrix: Water
Analysis Batch: 276640

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	<0.28		20.0	19.3		ug/L		97	69 - 127
Ethylbenzene	<0.26		20.0	17.3		ug/L		87	72 - 121
Toluene	<0.23		20.0	17.6		ug/L		88	69 - 125
Xylenes, Total	<0.24		40.0	33.9		ug/L		85	71 - 122
m-Xylene & p-Xylene	<0.24		20.0	16.8		ug/L		84	70 - 121
o-Xylene	<0.28		20.0	17.1		ug/L		86	71 - 125

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*82*		*61 - 138*
4-Bromofluorobenzene (Surr)	*102*		*69 - 120*
Toluene-d8 (Surr)	*95*		*73 - 120*
Dibromofluoromethane (Surr)	*94*		*69 - 124*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-78470-6 MSD
Matrix: Water
Analysis Batch: 276640

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	<0.28		20.0	19.4		ug/L		97	69 - 127	0	10
Ethylbenzene	<0.26		20.0	17.6		ug/L		88	72 - 121	1	15
Toluene	<0.23		20.0	17.7		ug/L		89	69 - 125	1	14
Xylenes, Total	<0.24		40.0	34.5		ug/L		86	71 - 122	2	14
m-Xylene & p-Xylene	<0.24		20.0	17.1		ug/L		85	70 - 121	2	15
o-Xylene	<0.28		20.0	17.4		ug/L		87	71 - 125	2	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*86*		*61 - 138*
4-Bromofluorobenzene (Surr)	*100*		*69 - 120*
Toluene-d8 (Surr)	*92*		*73 - 120*
Dibromofluoromethane (Surr)	*92*		*69 - 124*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-275884/19-A
Matrix: Water
Analysis Batch: 276254

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 275884

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/24/17 08:23	04/26/17 09:19	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*85*		*42 - 120*	*04/24/17 08:23*	*04/26/17 09:19*	*1*
2-Fluorophenol (Surr)	*54*		*10 - 120*	*04/24/17 08:23*	*04/26/17 09:19*	*1*
2,4,6-Tribromophenol (Surr)	*83*		*35 - 125*	*04/24/17 08:23*	*04/26/17 09:19*	*1*
Nitrobenzene-d5 (Surr)	*83*		*36 - 120*	*04/24/17 08:23*	*04/26/17 09:19*	*1*
Phenol-d5 (Surr)	*34*		*10 - 120*	*04/24/17 08:23*	*04/26/17 09:19*	*1*
Terphenyl-d14 (Surr)	*89*		*17 - 120*	*04/24/17 08:23*	*04/26/17 09:19*	*1*

Lab Sample ID: LCS 240-275884/20-A
Matrix: Water
Analysis Batch: 276254

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 275884

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	15.9		ug/L		79	54 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*84*		*42 - 120*
2-Fluorophenol (Surr)	*50*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*92*		*35 - 125*
Nitrobenzene-d5 (Surr)	*87*		*36 - 120*
Phenol-d5 (Surr)	*32*		*10 - 120*
Terphenyl-d14 (Surr)	*86*		*17 - 120*

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 240-275884/21-A
Matrix: Water
Analysis Batch: 276254

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 275884

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Naphthalene			20.0	17.0		ug/L		85	54 - 120	7	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*90*		*42 - 120*
2-Fluorophenol (Surr)	*57*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*96*		*35 - 125*
Nitrobenzene-d5 (Surr)	*94*		*36 - 120*
Phenol-d5 (Surr)	*37*		*10 - 120*
Terphenyl-d14 (Surr)	*90*		*17 - 120*

Lab Sample ID: MB 240-276083/12-A
Matrix: Water
Analysis Batch: 276860

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276083

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/25/17 08:44	05/01/17 09:57	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*77*		*42 - 120*	*04/25/17 08:44*	*05/01/17 09:57*	*1*
2-Fluorophenol (Surr)	*49*		*10 - 120*	*04/25/17 08:44*	*05/01/17 09:57*	*1*
2,4,6-Tribromophenol (Surr)	*60*		*35 - 125*	*04/25/17 08:44*	*05/01/17 09:57*	*1*
Nitrobenzene-d5 (Surr)	*78*		*36 - 120*	*04/25/17 08:44*	*05/01/17 09:57*	*1*
Phenol-d5 (Surr)	*29*		*10 - 120*	*04/25/17 08:44*	*05/01/17 09:57*	*1*
Terphenyl-d14 (Surr)	*96*		*17 - 120*	*04/25/17 08:44*	*05/01/17 09:57*	*1*

Lab Sample ID: LCS 240-276083/13-A
Matrix: Water
Analysis Batch: 276860

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276083

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene			20.0	15.5		ug/L		78	54 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*82*		*42 - 120*
2-Fluorophenol (Surr)	*52*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*82*		*35 - 125*
Nitrobenzene-d5 (Surr)	*93*		*36 - 120*
Phenol-d5 (Surr)	*33*		*10 - 120*
Terphenyl-d14 (Surr)	*85*		*17 - 120*

Lab Sample ID: 240-78470-6 MS
Matrix: Water
Analysis Batch: 276860

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA
Prep Batch: 276083

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	<0.061		19.4	15.0		ug/L		77	37 - 120

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-78470-6 MS
Matrix: Water
Analysis Batch: 276860

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA
Prep Batch: 276083

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*82*		*42 - 120*
2-Fluorophenol (Surr)	*44*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*89*		*35 - 125*
Nitrobenzene-d5 (Surr)	*91*		*36 - 120*
Phenol-d5 (Surr)	*27*		*10 - 120*
Terphenyl-d14 (Surr)	*60*		*17 - 120*

Lab Sample ID: 240-78470-6 MSD
Matrix: Water
Analysis Batch: 276860

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA
Prep Batch: 276083

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Naphthalene	<0.061		20.0	15.7		ug/L		79	37 - 120	5	33

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*81*		*42 - 120*
2-Fluorophenol (Surr)	*43*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*91*		*35 - 125*
Nitrobenzene-d5 (Surr)	*93*		*36 - 120*
Phenol-d5 (Surr)	*28*		*10 - 120*
Terphenyl-d14 (Surr)	*65*		*17 - 120*

Lab Sample ID: MB 240-277083/19-A
Matrix: Water
Analysis Batch: 277260

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 277083

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		05/02/17 08:39	05/03/17 10:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*76*		*42 - 120*	*05/02/17 08:39*	*05/03/17 10:35*	*1*
2-Fluorophenol (Surr)	*44*		*10 - 120*	*05/02/17 08:39*	*05/03/17 10:35*	*1*
2,4,6-Tribromophenol (Surr)	*87*		*35 - 125*	*05/02/17 08:39*	*05/03/17 10:35*	*1*
Nitrobenzene-d5 (Surr)	*75*		*36 - 120*	*05/02/17 08:39*	*05/03/17 10:35*	*1*
Phenol-d5 (Surr)	*29*		*10 - 120*	*05/02/17 08:39*	*05/03/17 10:35*	*1*
Terphenyl-d14 (Surr)	*85*		*17 - 120*	*05/02/17 08:39*	*05/03/17 10:35*	*1*

Lab Sample ID: LCS 240-277083/20-A
Matrix: Water
Analysis Batch: 277260

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 277083

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	17.8		ug/L		89	54 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*91*		*42 - 120*
2-Fluorophenol (Surr)	*60*		*10 - 120*

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-277083/20-A
Matrix: Water
Analysis Batch: 277260

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 277083

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*123*		*35 - 125*
Nitrobenzene-d5 (Surr)	*93*		*36 - 120*
Phenol-d5 (Surr)	*39*		*10 - 120*
Terphenyl-d14 (Surr)	*101*		*17 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 240-277132/4
Matrix: Water
Analysis Batch: 277132

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/02/17 14:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*86*		*76 - 121*		*05/02/17 14:32*	*1*

Lab Sample ID: LCS 240-277132/5
Matrix: Water
Analysis Batch: 277132

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	199	187		ug/L		94	80 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*87*		*76 - 121*

Lab Sample ID: MB 240-277219/4
Matrix: Water
Analysis Batch: 277219

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/02/17 21:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*86*		*76 - 121*		*05/02/17 21:24*	*1*

Lab Sample ID: LCS 240-277219/5
Matrix: Water
Analysis Batch: 277219

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	199	191		ug/L		96	80 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*84*		*76 - 121*

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: 240-78470-6 MS
Matrix: Water
Analysis Batch: 277219

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	<0.080		199	187		ug/L		94	48 - 159

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*76*		*76 - 121*

Lab Sample ID: 240-78470-6 MSD
Matrix: Water
Analysis Batch: 277219

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	<0.080		199	184		ug/L		92	48 - 159	2	23

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,1,1-Trifluoroethane	*74*	*X*	*76 - 121*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-209292/1-A
Matrix: Water
Analysis Batch: 209380

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 209292

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/25/17 15:10	04/26/17 10:58	4

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*54*		*18 - 125*	*04/25/17 15:10*	*04/26/17 10:58*	*4*

Lab Sample ID: LCS 180-209292/2-A
Matrix: Water
Analysis Batch: 209380

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 209292

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Pentachlorophenol			1.00	0.930		ug/L		93	30 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*80*		*18 - 125*

Lab Sample ID: 240-78470-6 MS
Matrix: Water
Analysis Batch: 209497

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA
Prep Batch: 209292

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Pentachlorophenol	22		1.02	<0.16	4 D	ug/L		0	30 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*113*		*18 - 125*

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: 240-78470-6 MSD
Matrix: Water
Analysis Batch: 209497

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA
Prep Batch: 209292

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Pentachlorophenol	22		1.03	<0.16	4 D	ug/L		0	30 - 150	NC	35

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*91*		*18 - 125*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 240-275975/1-A
Matrix: Water
Analysis Batch: 276243

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 275975

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/24/17 14:00	04/25/17 14:34	1
Copper	0.421	J	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 14:34	1
Iron	21.93	J	100	5.3	ug/L		04/24/17 14:00	04/25/17 14:34	1
Manganese	<0.25		5.0	0.25	ug/L		04/24/17 14:00	04/25/17 14:34	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 14:34	1

Lab Sample ID: LCS 240-275975/2-A
Matrix: Water
Analysis Batch: 276243

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 275975

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	1031		ug/L		103	80 - 120
Copper	1000	1081		ug/L		108	80 - 120
Iron	10000	10520		ug/L		105	80 - 120
Manganese	1000	1052		ug/L		105	80 - 120
Zinc	1000	1073		ug/L		107	80 - 120

Lab Sample ID: 240-78470-6 MS
Matrix: Water
Analysis Batch: 276243

Client Sample ID: W-170420-PS-14
Prep Type: Dissolved
Prep Batch: 275975

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.55	J	1000	1010		ug/L		101	75 - 125
Copper	1.0	J B	1000	1068		ug/L		107	75 - 125
Iron	11.9	J B	10000	10510		ug/L		105	75 - 125
Manganese	4.0	J	1000	1044		ug/L		104	75 - 125
Zinc	<6.2		1000	1042		ug/L		104	75 - 125

Lab Sample ID: 240-78470-6 MSD
Matrix: Water
Analysis Batch: 276243

Client Sample ID: W-170420-PS-14
Prep Type: Dissolved
Prep Batch: 275975

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.55	J	1000	1024		ug/L		102	75 - 125	1	20
Copper	1.0	J B	1000	1066		ug/L		106	75 - 125	0	20
Iron	11.9	J B	10000	10400		ug/L		104	75 - 125	1	20

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: 240-78470-6 MSD
Matrix: Water
Analysis Batch: 276243

Client Sample ID: W-170420-PS-14
Prep Type: Dissolved
Prep Batch: 275975

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Manganese	4.0	J	1000	1056		ug/L		105	75 - 125	1	20
Zinc	<6.2		1000	1046		ug/L		105	75 - 125	0	20

Method: 2320B-1997 - Alkalinity, Total

Lab Sample ID: MB 240-277255/3
Matrix: Water
Analysis Batch: 277255

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	<1.9		5.0	1.9	mg/L			05/03/17 07:45	1

Lab Sample ID: LCS 240-277255/2
Matrix: Water
Analysis Batch: 277255

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	377	371.0		mg/L		98	86 - 123

Lab Sample ID: 240-78470-6 DU
Matrix: Water
Analysis Batch: 277255

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	123		118.0		mg/L		4	20

Method: 2340C-1997 - Hardness, Total

Lab Sample ID: MB 240-276169/1
Matrix: Water
Analysis Batch: 276169

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	<3.1		5.0	3.1	mg/L			04/25/17 13:32	1

Lab Sample ID: LCS 240-276169/2
Matrix: Water
Analysis Batch: 276169

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	170	180.0		mg/L		106	80 - 120

Lab Sample ID: MB 240-276330/1
Matrix: Water
Analysis Batch: 276330

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	<3.1		5.0	3.1	mg/L			04/26/17 11:56	1

Method: 2340C-1997 - Hardness, Total (Continued)

Lab Sample ID: LCS 240-276330/2
Matrix: Water
Analysis Batch: 276330

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	170	168.0		mg/L		99	80 - 120

Lab Sample ID: 240-78470-6 MS
Matrix: Water
Analysis Batch: 276330

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	186		1000	1350		mg/L		116	80 - 120

Lab Sample ID: 240-78470-6 MSD
Matrix: Water
Analysis Batch: 276330

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hardness as calcium carbonate	186		1000	1350		mg/L		116	80 - 120	0	10

Lab Sample ID: 240-78470-6 DU
Matrix: Water
Analysis Batch: 276330

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Hardness as calcium carbonate	186		186.0		mg/L		0	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-275767/5
Matrix: Water
Analysis Batch: 275767

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.41		1.0	0.41	mg/L			04/21/17 10:24	1
Sulfate	<0.13		1.0	0.13	mg/L			04/21/17 10:24	1

Lab Sample ID: LCS 240-275767/6
Matrix: Water
Analysis Batch: 275767

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	50.98		mg/L		102	90 - 110
Sulfate	50.0	51.40		mg/L		103	90 - 110

Lab Sample ID: 240-78470-6 MS
Matrix: Water
Analysis Batch: 275767

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	22.5		50.0	74.11		mg/L		103	80 - 120
Sulfate	7.1		50.0	61.19		mg/L		108	80 - 120

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 240-78470-6 MSD — **Client Sample ID: W-170420-PS-14**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 275767

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	22.5		50.0	72.25		mg/L		100	80 - 120	3	15
Sulfate	7.1		50.0	58.70		mg/L		103	80 - 120	4	15

Lab Sample ID: MB 240-275768/5 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 275768

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.035		0.10	0.035	mg/L			04/21/17 10:24	1

Lab Sample ID: LCS 240-275768/6 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 275768

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	2.50	2.56		mg/L		102	90 - 110

Lab Sample ID: 240-78470-6 MS — **Client Sample ID: W-170420-PS-14**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 275768

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	3.3		2.50	5.86		mg/L		103	80 - 120

Lab Sample ID: 240-78470-6 MSD — **Client Sample ID: W-170420-PS-14**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 275768

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	3.3		2.50	5.75		mg/L		99	80 - 120	2	15

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 240-276610/38 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<0.080		1.0	0.080	mg/L			04/27/17 17:43	1

Lab Sample ID: LCS 240-276610/40 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	46.3	46.78		mg/L		101	80 - 120

Method: 9060 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LLCS 240-276610/39
Matrix: Water
Analysis Batch: 276610

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon			4.63	4.49		mg/L		97	88 - 115		

Lab Sample ID: 240-78470-6 MS
Matrix: Water
Analysis Batch: 276610

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon	1.6		25.0	26.01		mg/L		98	65 - 134		

Lab Sample ID: 240-78470-6 MSD
Matrix: Water
Analysis Batch: 276610

Client Sample ID: W-170420-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	1.6		25.0	25.84		mg/L		97	65 - 134	1	10

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

GC/MS VOA

Analysis Batch: 276640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-1	W-170419-PS-09	Total/NA	Water	8260B	
240-78470-2	W-170419-PS-10	Total/NA	Water	8260B	
240-78470-3	W-170419-PS-11	Total/NA	Water	8260B	
240-78470-4	W-170420-PS-12	Total/NA	Water	8260B	
240-78470-5	W-170420-PS-13	Total/NA	Water	8260B	
240-78470-6	W-170420-PS-14	Total/NA	Water	8260B	
240-78470-7	W-170420-PS-15	Total/NA	Water	8260B	
240-78470-8	W-170420-PS-16	Total/NA	Water	8260B	
240-78470-9	TRIP BLANK -004	Total/NA	Water	8260B	
MB 240-276640/7	Method Blank	Total/NA	Water	8260B	
LCS 240-276640/4	Lab Control Sample	Total/NA	Water	8260B	
240-78470-6 MS	W-170420-PS-14	Total/NA	Water	8260B	
240-78470-6 MSD	W-170420-PS-14	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 275884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-1	W-170419-PS-09	Total/NA	Water	3510C	
240-78470-2	W-170419-PS-10	Total/NA	Water	3510C	
240-78470-3	W-170419-PS-11	Total/NA	Water	3510C	
240-78470-4	W-170420-PS-12	Total/NA	Water	3510C	
240-78470-5	W-170420-PS-13	Total/NA	Water	3510C	
240-78470-7	W-170420-PS-15	Total/NA	Water	3510C	
240-78470-8	W-170420-PS-16	Total/NA	Water	3510C	
MB 240-275884/19-A	Method Blank	Total/NA	Water	3510C	
LCS 240-275884/20-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 240-275884/21-A	Lab Control Sample Dup	Total/NA	Water	3510C	

Prep Batch: 276083

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-6	W-170420-PS-14	Total/NA	Water	3510C	
MB 240-276083/12-A	Method Blank	Total/NA	Water	3510C	
LCS 240-276083/13-A	Lab Control Sample	Total/NA	Water	3510C	
240-78470-6 MS	W-170420-PS-14	Total/NA	Water	3510C	
240-78470-6 MSD	W-170420-PS-14	Total/NA	Water	3510C	

Analysis Batch: 276254

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-5	W-170420-PS-13	Total/NA	Water	8270C	275884
MB 240-275884/19-A	Method Blank	Total/NA	Water	8270C	275884
LCS 240-275884/20-A	Lab Control Sample	Total/NA	Water	8270C	275884
LCSD 240-275884/21-A	Lab Control Sample Dup	Total/NA	Water	8270C	275884

Analysis Batch: 276439

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-1	W-170419-PS-09	Total/NA	Water	8270C	275884
240-78470-2	W-170419-PS-10	Total/NA	Water	8270C	275884
240-78470-3	W-170419-PS-11	Total/NA	Water	8270C	275884

GC/MS Semi VOA (Continued)

Analysis Batch: 276678

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-4	W-170420-PS-12	Total/NA	Water	8270C	275884
240-78470-7	W-170420-PS-15	Total/NA	Water	8270C	275884
240-78470-8	W-170420-PS-16	Total/NA	Water	8270C	275884

Analysis Batch: 276860

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-6	W-170420-PS-14	Total/NA	Water	8270C	276083
MB 240-276083/12-A	Method Blank	Total/NA	Water	8270C	276083
LCS 240-276083/13-A	Lab Control Sample	Total/NA	Water	8270C	276083
240-78470-6 MS	W-170420-PS-14	Total/NA	Water	8270C	276083
240-78470-6 MSD	W-170420-PS-14	Total/NA	Water	8270C	276083

Prep Batch: 277083

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-7 - RE	W-170420-PS-15	Total/NA	Water	3510C	
MB 240-277083/19-A	Method Blank	Total/NA	Water	3510C	
LCS 240-277083/20-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 277260

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-7 - RE	W-170420-PS-15	Total/NA	Water	8270C	277083
MB 240-277083/19-A	Method Blank	Total/NA	Water	8270C	277083
LCS 240-277083/20-A	Lab Control Sample	Total/NA	Water	8270C	277083

GC VOA

Analysis Batch: 277132

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-2	W-170419-PS-10	Total/NA	Water	RSK-175	
240-78470-3	W-170419-PS-11	Total/NA	Water	RSK-175	
MB 240-277132/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-277132/5	Lab Control Sample	Total/NA	Water	RSK-175	

Analysis Batch: 277219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-4	W-170420-PS-12	Total/NA	Water	RSK-175	
240-78470-5	W-170420-PS-13	Total/NA	Water	RSK-175	
240-78470-6	W-170420-PS-14	Total/NA	Water	RSK-175	
240-78470-7	W-170420-PS-15	Total/NA	Water	RSK-175	
240-78470-8	W-170420-PS-16	Total/NA	Water	RSK-175	
MB 240-277219/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-277219/5	Lab Control Sample	Total/NA	Water	RSK-175	
240-78470-6 MS	W-170420-PS-14	Total/NA	Water	RSK-175	
240-78470-6 MSD	W-170420-PS-14	Total/NA	Water	RSK-175	

GC Semi VOA

Prep Batch: 209292

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-1	W-170419-PS-09	Total/NA	Water	8151A	

GC Semi VOA (Continued)

Prep Batch: 209292 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-2	W-170419-PS-10	Total/NA	Water	8151A	
240-78470-3	W-170419-PS-11	Total/NA	Water	8151A	
240-78470-4	W-170420-PS-12	Total/NA	Water	8151A	
240-78470-5	W-170420-PS-13	Total/NA	Water	8151A	
240-78470-6	W-170420-PS-14	Total/NA	Water	8151A	
240-78470-7	W-170420-PS-15	Total/NA	Water	8151A	
240-78470-8	W-170420-PS-16	Total/NA	Water	8151A	
MB 180-209292/1-A	Method Blank	Total/NA	Water	8151A	
LCS 180-209292/2-A	Lab Control Sample	Total/NA	Water	8151A	
240-78470-6 MS	W-170420-PS-14	Total/NA	Water	8151A	
240-78470-6 MSD	W-170420-PS-14	Total/NA	Water	8151A	

Analysis Batch: 209380

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-1	W-170419-PS-09	Total/NA	Water	8151A	209292
240-78470-2	W-170419-PS-10	Total/NA	Water	8151A	209292
240-78470-4	W-170420-PS-12	Total/NA	Water	8151A	209292
240-78470-5	W-170420-PS-13	Total/NA	Water	8151A	209292
240-78470-7	W-170420-PS-15	Total/NA	Water	8151A	209292
240-78470-8	W-170420-PS-16	Total/NA	Water	8151A	209292
MB 180-209292/1-A	Method Blank	Total/NA	Water	8151A	209292
LCS 180-209292/2-A	Lab Control Sample	Total/NA	Water	8151A	209292

Analysis Batch: 209497

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-3	W-170419-PS-11	Total/NA	Water	8151A	209292
240-78470-6	W-170420-PS-14	Total/NA	Water	8151A	209292
240-78470-6 MS	W-170420-PS-14	Total/NA	Water	8151A	209292
240-78470-6 MSD	W-170420-PS-14	Total/NA	Water	8151A	209292

Metals

Prep Batch: 275975

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-1	W-170419-PS-09	Dissolved	Water	3005A	
240-78470-2	W-170419-PS-10	Dissolved	Water	3005A	
240-78470-3	W-170419-PS-11	Dissolved	Water	3005A	
240-78470-4	W-170420-PS-12	Dissolved	Water	3005A	
240-78470-5	W-170420-PS-13	Dissolved	Water	3005A	
240-78470-6	W-170420-PS-14	Dissolved	Water	3005A	
240-78470-7	W-170420-PS-15	Dissolved	Water	3005A	
240-78470-8	W-170420-PS-16	Dissolved	Water	3005A	
MB 240-275975/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-275975/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-78470-6 MS	W-170420-PS-14	Dissolved	Water	3005A	
240-78470-6 MSD	W-170420-PS-14	Dissolved	Water	3005A	

Analysis Batch: 276243

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-1	W-170419-PS-09	Dissolved	Water	6020	275975

Metals (Continued)

Analysis Batch: 276243 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-2	W-170419-PS-10	Dissolved	Water	6020	275975
240-78470-3	W-170419-PS-11	Dissolved	Water	6020	275975
240-78470-4	W-170420-PS-12	Dissolved	Water	6020	275975
240-78470-5	W-170420-PS-13	Dissolved	Water	6020	275975
240-78470-6	W-170420-PS-14	Dissolved	Water	6020	275975
240-78470-7	W-170420-PS-15	Dissolved	Water	6020	275975
240-78470-8	W-170420-PS-16	Dissolved	Water	6020	275975
MB 240-275975/1-A	Method Blank	Total Recoverable	Water	6020	275975
LCS 240-275975/2-A	Lab Control Sample	Total Recoverable	Water	6020	275975
240-78470-6 MS	W-170420-PS-14	Dissolved	Water	6020	275975
240-78470-6 MSD	W-170420-PS-14	Dissolved	Water	6020	275975

General Chemistry

Analysis Batch: 275767

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-2	W-170419-PS-10	Total/NA	Water	300.0	
240-78470-3	W-170419-PS-11	Total/NA	Water	300.0	
240-78470-4	W-170420-PS-12	Total/NA	Water	300.0	
240-78470-5	W-170420-PS-13	Total/NA	Water	300.0	
240-78470-6	W-170420-PS-14	Total/NA	Water	300.0	
240-78470-7	W-170420-PS-15	Total/NA	Water	300.0	
240-78470-8	W-170420-PS-16	Total/NA	Water	300.0	
MB 240-275767/5	Method Blank	Total/NA	Water	300.0	
LCS 240-275767/6	Lab Control Sample	Total/NA	Water	300.0	
240-78470-6 MS	W-170420-PS-14	Total/NA	Water	300.0	
240-78470-6 MSD	W-170420-PS-14	Total/NA	Water	300.0	

Analysis Batch: 275768

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-2	W-170419-PS-10	Total/NA	Water	300.0	
240-78470-3	W-170419-PS-11	Total/NA	Water	300.0	
240-78470-4	W-170420-PS-12	Total/NA	Water	300.0	
240-78470-5	W-170420-PS-13	Total/NA	Water	300.0	
240-78470-6	W-170420-PS-14	Total/NA	Water	300.0	
240-78470-7	W-170420-PS-15	Total/NA	Water	300.0	
240-78470-8	W-170420-PS-16	Total/NA	Water	300.0	
MB 240-275768/5	Method Blank	Total/NA	Water	300.0	
LCS 240-275768/6	Lab Control Sample	Total/NA	Water	300.0	
240-78470-6 MS	W-170420-PS-14	Total/NA	Water	300.0	
240-78470-6 MSD	W-170420-PS-14	Total/NA	Water	300.0	

Analysis Batch: 276169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-2	W-170419-PS-10	Total/NA	Water	2340C-1997	
240-78470-3	W-170419-PS-11	Total/NA	Water	2340C-1997	
240-78470-4	W-170420-PS-12	Total/NA	Water	2340C-1997	
240-78470-5	W-170420-PS-13	Total/NA	Water	2340C-1997	
MB 240-276169/1	Method Blank	Total/NA	Water	2340C-1997	
LCS 240-276169/2	Lab Control Sample	Total/NA	Water	2340C-1997	

General Chemistry (Continued)

Analysis Batch: 276330

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-6	W-170420-PS-14	Total/NA	Water	2340C-1997	
240-78470-7	W-170420-PS-15	Total/NA	Water	2340C-1997	
240-78470-8	W-170420-PS-16	Total/NA	Water	2340C-1997	
MB 240-276330/1	Method Blank	Total/NA	Water	2340C-1997	
LCS 240-276330/2	Lab Control Sample	Total/NA	Water	2340C-1997	
240-78470-6 MS	W-170420-PS-14	Total/NA	Water	2340C-1997	
240-78470-6 MSD	W-170420-PS-14	Total/NA	Water	2340C-1997	
240-78470-6 DU	W-170420-PS-14	Total/NA	Water	2340C-1997	

Analysis Batch: 276610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-2	W-170419-PS-10	Total/NA	Water	9060	
240-78470-3	W-170419-PS-11	Total/NA	Water	9060	
240-78470-4	W-170420-PS-12	Total/NA	Water	9060	
240-78470-5	W-170420-PS-13	Total/NA	Water	9060	
240-78470-6	W-170420-PS-14	Total/NA	Water	9060	
240-78470-7	W-170420-PS-15	Total/NA	Water	9060	
240-78470-8	W-170420-PS-16	Total/NA	Water	9060	
MB 240-276610/38	Method Blank	Total/NA	Water	9060	
LCS 240-276610/40	Lab Control Sample	Total/NA	Water	9060	
LLCS 240-276610/39	Lab Control Sample	Total/NA	Water	9060	
240-78470-6 MS	W-170420-PS-14	Total/NA	Water	9060	
240-78470-6 MSD	W-170420-PS-14	Total/NA	Water	9060	

Analysis Batch: 277255

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78470-2	W-170419-PS-10	Total/NA	Water	2320B-1997	
240-78470-3	W-170419-PS-11	Total/NA	Water	2320B-1997	
240-78470-4	W-170420-PS-12	Total/NA	Water	2320B-1997	
240-78470-5	W-170420-PS-13	Total/NA	Water	2320B-1997	
240-78470-6	W-170420-PS-14	Total/NA	Water	2320B-1997	
240-78470-7	W-170420-PS-15	Total/NA	Water	2320B-1997	
240-78470-8	W-170420-PS-16	Total/NA	Water	2320B-1997	
MB 240-277255/3	Method Blank	Total/NA	Water	2320B-1997	
LCS 240-277255/2	Lab Control Sample	Total/NA	Water	2320B-1997	
240-78470-6 DU	W-170420-PS-14	Total/NA	Water	2320B-1997	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170419-PS-09

Lab Sample ID: 240-78470-1

Date Collected: 04/19/17 15:00

Matrix: Water

Date Received: 04/21/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276640	04/28/17 10:41	HMB	TAL CAN
Total/NA	Prep	3510C			275884	04/24/17 08:23	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276439	04/27/17 13:58	JMG	TAL CAN
Total/NA	Prep	8151A			209292	04/25/17 15:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209380	04/26/17 11:23	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 16:02	AS1	TAL CAN

Client Sample ID: W-170419-PS-10

Lab Sample ID: 240-78470-2

Date Collected: 04/19/17 15:25

Matrix: Water

Date Received: 04/21/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276640	04/28/17 11:05	HMB	TAL CAN
Total/NA	Prep	3510C			275884	04/24/17 08:23	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276439	04/27/17 14:23	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	277132	05/02/17 19:07	BPM	TAL CAN
Total/NA	Prep	8151A			209292	04/25/17 15:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209380	04/26/17 11:48	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 16:14	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277255	05/03/17 07:57	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:54	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275767	04/21/17 12:40	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275768	04/21/17 12:40	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 21:54	TPH	TAL CAN

Client Sample ID: W-170419-PS-11

Lab Sample ID: 240-78470-3

Date Collected: 04/19/17 15:15

Matrix: Water

Date Received: 04/21/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276640	04/28/17 11:29	HMB	TAL CAN
Total/NA	Prep	3510C			275884	04/24/17 08:23	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276439	04/27/17 14:47	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	277132	05/02/17 19:24	BPM	TAL CAN
Total/NA	Prep	8151A			209292	04/25/17 15:10	CBY	TAL PIT
Total/NA	Analysis	8151A		40	209497	04/27/17 10:08	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 16:19	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277255	05/03/17 08:00	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:55	LKG	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170419-PS-11

Lab Sample ID: 240-78470-3

Date Collected: 04/19/17 15:15
Matrix: Water
Date Received: 04/21/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	275767	04/21/17 13:01	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275768	04/21/17 13:01	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 22:21	TPH	TAL CAN

Client Sample ID: W-170420-PS-12

Lab Sample ID: 240-78470-4

Date Collected: 04/20/17 10:00
Matrix: Water
Date Received: 04/21/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276640	04/28/17 11:53	HMB	TAL CAN
Total/NA	Prep	3510C			275884	04/24/17 08:23	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276678	04/28/17 12:59	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	277219	05/02/17 23:58	BPM	TAL CAN
Total/NA	Prep	8151A			209292	04/25/17 15:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209380	04/26/17 13:02	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 16:23	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277255	05/03/17 08:40	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:56	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275767	04/21/17 14:01	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275768	04/21/17 14:01	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 22:48	TPH	TAL CAN

Client Sample ID: W-170420-PS-13

Lab Sample ID: 240-78470-5

Date Collected: 04/20/17 10:10
Matrix: Water
Date Received: 04/21/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276640	04/28/17 12:18	HMB	TAL CAN
Total/NA	Prep	3510C			275884	04/24/17 08:23	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276254	04/26/17 17:28	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	277219	05/03/17 00:32	BPM	TAL CAN
Total/NA	Prep	8151A			209292	04/25/17 15:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209380	04/26/17 13:27	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 16:27	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277255	05/03/17 08:43	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276169	04/25/17 13:57	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275767	04/21/17 16:01	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275768	04/21/17 16:01	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 23:59	TPH	TAL CAN

Client Sample ID: W-170420-PS-14

Date Collected: 04/20/17 11:05
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276640	04/28/17 12:42	HMB	TAL CAN
Total/NA	Prep	3510C			276083	04/25/17 08:44	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276860	05/01/17 18:47	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	277219	05/03/17 00:49	BPM	TAL CAN
Total/NA	Prep	8151A			209292	04/25/17 15:10	CBY	TAL PIT
Total/NA	Analysis	8151A		40	209497	04/27/17 10:33	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 14:42	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277255	05/03/17 08:49	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276330	04/26/17 11:56	TPH	TAL CAN
Total/NA	Analysis	300.0		1	275767	04/21/17 15:01	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275768	04/21/17 15:01	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 18:07	TPH	TAL CAN

Client Sample ID: W-170420-PS-15

Date Collected: 04/20/17 12:05
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276640	04/28/17 13:06	HMB	TAL CAN
Total/NA	Prep	3510C			275884	04/24/17 08:23	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276678	04/28/17 13:23	JMG	TAL CAN
Total/NA	Prep	3510C	RE		277083	05/02/17 08:39	KEH	TAL CAN
Total/NA	Analysis	8270C	RE	1	277260	05/03/17 12:50	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	277219	05/03/17 01:40	BPM	TAL CAN
Total/NA	Prep	8151A			209292	04/25/17 15:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209380	04/26/17 14:17	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 16:31	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277255	05/03/17 08:55	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276330	04/26/17 11:56	TPH	TAL CAN
Total/NA	Analysis	300.0		1	275767	04/21/17 13:41	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275768	04/21/17 13:41	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/28/17 00:27	TPH	TAL CAN

Client Sample ID: W-170420-PS-16

Date Collected: 04/20/17 12:15
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78470-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276640	04/28/17 13:30	HMB	TAL CAN
Total/NA	Prep	3510C			275884	04/24/17 08:23	KEH	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Client Sample ID: W-170420-PS-16

Lab Sample ID: 240-78470-8

Date Collected: 04/20/17 12:15
Matrix: Water
Date Received: 04/21/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8270C		1	276678	04/28/17 17:01	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	277219	05/03/17 01:57	BPM	TAL CAN
Total/NA	Prep	8151A			209292	04/25/17 15:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209380	04/26/17 16:20	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 16:36	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277255	05/03/17 08:58	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	276330	04/26/17 11:56	TPH	TAL CAN
Total/NA	Analysis	300.0		1	275767	04/21/17 13:21	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275768	04/21/17 13:21	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/28/17 01:12	TPH	TAL CAN

Client Sample ID: TRIP BLANK -004

Lab Sample ID: 240-78470-9

Date Collected: 04/19/17 00:00
Matrix: Water
Date Received: 04/21/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276640	04/28/17 13:54	HMB	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78470-1

Laboratory: TestAmerica Canton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999518190	08-31-17 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
RSK-175		Water	Methane

Laboratory: TestAmerica Pittsburgh

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	998027800	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

CAMBRIDGE 240506 3.4/C3.1 2.8/C2.5 3.0/C2.7 1.6/C1.3 2.0/C1.7 2.4/C2.1

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Chain of Custody Record

CAMBRIDGE 240506

TestAmerica — THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Peter Storlie	Lab PM: Heckler, Denise D	Carrier Tracking No(s):
Client Contact: Mr. Grant Anderson	Phone: 651-247-4218	E-Mail: denise.heckler@testamericainc.com	COC No: 240-42024-18273.2
Company: GHD Services Inc.			Page: Page 2 of 4
Address: 1801 Old Highway 8 NW Suite 114	Due Date Requested:		Job #:
City: St. Paul	TAT Requested (days): standard		
State, Zip: MN, 55112			
Phone: 651-639-0913(Tel) 651-639-0923(Fax)	PO #: 34001059		
Email: grant.anderson@ghd.com	WO #: 86165		
Project Name: 86165-03-11, Penta Wood	Project #: 24012755		
Site:	SSOW#:		

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water
M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2O3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA

240-78470 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - BTEX	8151A - Pentachlorophenol	2320B - Alkalinity	2340C - Hardness, Total (mg/l as CaCO3)	6020 - As, Cu, Zn, Fe, Mn (field filtered)	8260B, RSK_175 (methane)	8270C - Naphthalene	300.0_28D - Chloride & Sulfate & Nitrate	9060 - TOC	Total Number of containers	Special Instructions/Note:
				Preservation Code:	X	X	A	N	N	D	D	A	N	N	S	X	
W-170419-PS-09	4-19-2017	1500	G	Water			X	X	X	X	X	X	X	X	X	17	Note: Nitrates have 48-hr Extraction. All nitrates are in one cooler 1/6
10	↓	1525	↓	Water			X	X	X	X	X	X	X	X	X	17	
11	↓	1515	↓	Water			X	X	X	X	X	X	X	X	X	17	
W-170420-PS-12	4-20-2017	1000	↓	Water			X	X	X	X	X	X	X	X	X	17	
13	↓	1010	↓	Water			X	X	X	X	X	X	X	X	X	17	
14 (MS/MSD)	↓	1105	↓	Water		Y	X	X	X	X	X	X	X	X	X	51	
15	↓	1205	↓	Water			X	X	X	X	X	X	X	X	X	17	
16	↓	1215	↓	Water			X	X	X	X	X	X	X	X	X	17	
Trip Blank-004	↓	1250	↓	Water			X									1	
				Water													
				Water													

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	4-20-2017 / 1400	GHD			
			[signature]	4/21/17 0930	TA NC

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
W-170419-PS-10	240-78470-L-2	Plastic 250ml - with Nitric Acid	<2		
W-170419-PS-10	240-78470-M-2	Plastic 500ml - with Nitric Acid	<2		
W-170419-PS-11	240-78470-L-3	Plastic 250ml - with Nitric Acid	<2		
W-170419-PS-11	240-78470-M-3	Plastic 500ml - with Nitric Acid	<2		
W-170420-PS-12	240-78470-L-4	Plastic 250ml - with Nitric Acid	<2		
W-170420-PS-12	240-78470-M-4	Plastic 500ml - with Nitric Acid	<2		
W-170420-PS-13	240-78470-L-5	Plastic 250ml - with Nitric Acid	<2		
W-170420-PS-13	240-78470-M-5	Plastic 500ml - with Nitric Acid	<2		
W-170420-PS-14	240-78470-AH-6	Plastic 250ml - with Nitric Acid	<2		
W-170420-PS-14	240-78470-AI-6	Plastic 250ml - with Nitric Acid	<2		
W-170420-PS-14	240-78470-AJ-6	Plastic 250ml - with Nitric Acid	<2		
W-170420-PS-14	240-78470-AK-6	Plastic 500ml - with Nitric Acid	<2		
W-170420-PS-14	240-78470-AL-6	Plastic 500ml - with Nitric Acid	<2		
W-170420-PS-14	240-78470-AM-6	Plastic 500ml - with Nitric Acid	<2		
W-170420-PS-15	240-78470-L-7	Plastic 250ml - with Nitric Acid	<2		
W-170420-PS-15	240-78470-M-7	Plastic 500ml - with Nitric Acid	<2		
W-170420-PS-16	240-78470-L-8	Plastic 250ml - with Nitric Acid	<2		
W-170420-PS-16	240-78470-M-8	Plastic 500ml - with Nitric Acid	<2		

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 178470**
Canton Facility

Client GHD Site Name Pine Wood Cooler unpacked by:

Cooler Received on 4/21/17 Opened on 4/21/17

FedEx: 1st Grd (Exp) UPS FAS Stetson Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # Foam Box Client Cooler Box Other

Packing material used: (Bubble Wrap) Foam Plastic Bag None Other

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☒ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.3** °C) Observed Cooler Temp.____°C Corrected Cooler Temp.____°C
   IR GUN #36 (CF **+0.8**°C) Observed Cooler Temp.____°C Corrected Cooler Temp.____°C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 12 (Yes) No 2/cooler
   -Were custody seals on the outside of the cooler(s) signed & dated? (Yes) No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes (No)
3. Shippers' packing slip attached to the cooler(s)? (Yes) No
4. Did custody papers accompany the sample(s)? (Yes) No
5. Were the custody papers relinquished & signed in the appropriate place? (Yes) No
6. Was/were the person(s) who collected the samples clearly identified on the COC? (Yes) No
7. Did all bottles arrive in good condition (Unbroken)? Yes (No)
8. Could all bottle labels be reconciled with the COC? (Yes) No
9. Were correct bottle(s) used for the test(s) indicated? (Yes) No
10. Sufficient quantity received to perform indicated analyses? Yes (No)
11. Are these work share samples? Yes (No)
    If yes, Questions 11-15 have been checked at the originating laboratory.
11. Were sample(s) at the correct pH upon receipt? (Yes) No NA pH Strip Lot# **HC682547**
12. Were VOAs on the COC? (Yes) No
13. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. (Yes) No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # 55-320 (Yes) No
15. Was a LL Hg or Me Hg trip blank present? Yes (No)

Contacted PM DDH Date 4/21/17 by JM via (Verbal) Voice Mail Other

Concerning #14 & #15

14. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

The laboratory did not receive volume for Alkalinity, Hardness, RSK-175, Chloride, Sulfate, nitrate, and TOC for sample W-170419-PS-04

15. SAMPLE CONDITION

Sample(s) ____ were received after the recommended holding time had expired.

Sample(s) W-170419-PS-10 1xL were received in a broken container.

Sample(s) 2x40 vials for Trip Blank-004 were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) ____ were further preserved in the laboratory.

Time preserved: ____ Preservative(s) added/Lot number(s): ____

TestAmerica Multiple Cooler Receipt Form/Narrative **Login # :** 78470
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
TA no #	8	3.4	3.1	Ice
TA no #	8	2.8	2.5	"
TA no #	8	3.0	2.7	"
TA no #	8	1.6	1.3	"
TA no #	8	2.0	1.7	"
L565	8	2.4	2.1	"

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-78470-1

Login Number: 78470
List Number: 2
Creator: Say, Thomas C

List Source: TestAmerica Pittsburgh
List Creation: 04/22/17 03:38 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-78518-1
Client Project/Site: 86165-04-05, Penta Wood

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson

Denise D Heckler

Authorized for release by:
5/5/2017 7:56:16 AM

Denise Heckler, Project Manager II
(330)966-9477
denise.heckler@testamericainc.com

Table of Contents

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.

GC/MS Semi VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

GC Semi VOA

Qualifier	Qualifier Description
D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
X	Surrogate is outside control limits
J	Reported value was between the limit of detection and the limit of quantitation.

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Reported value was between the limit of detection and the limit of quantitation.

General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
J	Reported value was between the limit of detection and the limit of quantitation.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-78518-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-78518-1

Comments
No additional comments.

Receipt
The samples were received on 4/22/2017 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 1.7º C, 2.5º C and 2.7º C.

GC/MS VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC/MS Semi VOA
Method(s) 8270C: Six surrogates are used for this analysis. The laboratory's SOP allows one of these surrogates, per fraction, to be outside acceptance criteria without performing re-extraction/re-analysis. The following samples contained an allowable number of surrogate compounds outside limits: W-170420-PS-18 (240-78518-2) and W-170421-PS-22 (240-78518-6). These results have been reported and qualified.

Method(s) 8270C: The following sample was diluted due to the nature of the sample matrix: W-170420-PS-19 (240-78518-3). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC VOA
Method(s) RSK-175: The matrix spike duplicate (MSD) recoveries for analytical batch 240-277266 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method(s) 8151A: The continuing calibration verification (CCV) associated with batch 209497 recovered above the upper control limit for Pentachlorophenol, Silvex and 2,4-D. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. Or the other column passed and result was reported from the passing column.

Method(s) 8151A: The following sample was diluted due to the abundance of target analytes: W-170420-PS-19 (240-78518-3)Surrogate diluted out.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method(s) 300.0: The following sample(s) was received with less than 2 days remaining on the holding time or less than one shift (8 hours) remaining on a test with a holding time of 48 hours or less. As such, the laboratory had insufficient time remaining to perform the analysis within holding time: W-170420-PS-18 (240-78518-2) and W-170420-PS-19 (240-78518-3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method(s) 3510C, 625: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 240-276082.

Job ID: 240-78518-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

Method(s) 8151A: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 180-209442.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8270C	Semivolatile Organic Compounds (GC/MS)	SW846	TAL CAN
RSK-175	Dissolved Gases (GC)	RSK	TAL CAN
8151A	Herbicides (GC)	SW846	TAL PIT
6020	Metals (ICP/MS)	SW846	TAL CAN
2320B-1997	Alkalinity, Total	SM	TAL CAN
2340C-1997	Hardness, Total	SM	TAL CAN
300.0	Anions, Ion Chromatography	MCAWW	TAL CAN
9060	Organic Carbon, Total (TOC)	SW846	TAL CAN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Sample Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-78518-1	W-170420-PS-17	Water	04/20/17 14:00	04/22/17 10:15
240-78518-2	W-170420-PS-18	Water	04/20/17 14:40	04/22/17 10:15
240-78518-3	W-170420-PS-19	Water	04/20/17 15:30	04/22/17 10:15
240-78518-4	W-170421-PS-20	Water	04/21/17 09:45	04/22/17 10:15
240-78518-5	W-170421-PS-21	Water	04/21/17 10:45	04/22/17 10:15
240-78518-6	W-170421-PS-22	Water	04/21/17 11:30	04/22/17 10:15
240-78518-7	TRIP BLANK-005	Water	04/21/17 13:00	04/22/17 10:15

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Client Sample ID: W-170420-PS-17 — Lab Sample ID: 240-78518-1

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Iron	7.2	J B	100	5.3	ug/L	1		6020	Dissolved

Client Sample ID: W-170420-PS-18 — Lab Sample ID: 240-78518-2

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	1.3		0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	0.47		0.10	0.016	ug/L	4		8151A	Total/NA
Copper	1.7	J B	2.0	0.36	ug/L	1		6020	Dissolved
Iron	83.6	J B	100	5.3	ug/L	1		6020	Dissolved
Manganese	23.0		5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	232		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	358		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	45.5		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	1.8	H	0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	15.0		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	1.4		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170420-PS-19 — Lab Sample ID: 240-78518-3

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	0.96	J	1.0	0.26	ug/L	1		8260B	Total/NA
Toluene	0.90	J	1.0	0.23	ug/L	1		8260B	Total/NA
Xylenes, Total	13		2.0	0.24	ug/L	1		8260B	Total/NA
Naphthalene	20		1.1	0.34	ug/L	5		8270C	Total/NA
Methane	32		0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	5100		260	41	ug/L	10000		8151A	Total/NA
Arsenic	13.7		5.0	0.35	ug/L	1		6020	Dissolved
Copper	2.2	B	2.0	0.36	ug/L	1		6020	Dissolved
Iron	10600	B	100	5.3	ug/L	1		6020	Dissolved
Manganese	2260		5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	240		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	294		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	29.1		1.0	0.41	mg/L	1		300.0	Total/NA
Sulfate	16.1		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	37.2		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170421-PS-20 — Lab Sample ID: 240-78518-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	10		0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	0.11		0.11	0.016	ug/L	4		8151A	Total/NA
Arsenic	1.2	J	5.0	0.35	ug/L	1		6020	Dissolved
Iron	85.4	J B	100	5.3	ug/L	1		6020	Dissolved
Manganese	39.0		5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	82.8		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	170		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	32.9		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	0.15		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	13.2		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.60	J	1.0	0.080	mg/L	1		9060	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Client Sample ID: W-170421-PS-21 — Lab Sample ID: 240-78518-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	3.6		0.10	0.016	ug/L	4		8151A	Total/NA
Copper	0.95	J B	2.0	0.36	ug/L	1		6020	Dissolved
Iron	8.1	J B	100	5.3	ug/L	1		6020	Dissolved
Manganese	37.7		5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	46.2		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	250		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	0.57	J	1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	1.1		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	5.4		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.93	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170421-PS-22 — Lab Sample ID: 240-78518-6

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.090	J	0.10	0.016	ug/L	4		8151A	Total/NA
Copper	2.6	B	2.0	0.36	ug/L	1		6020	Dissolved
Manganese	0.31	J	5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	62.9		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	110		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	2.8		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	0.77		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	4.4		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.93	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: TRIP BLANK-005 — Lab Sample ID: 240-78518-7

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: W-170420-PS-17

Date Collected: 04/20/17 14:00
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-1

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 21:40	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 21:40	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 21:40	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 21:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*61 - 138*		*04/28/17 21:40*	*1*
4-Bromofluorobenzene (Surr)	*93*		*69 - 120*		*04/28/17 21:40*	*1*
Toluene-d8 (Surr)	*100*		*73 - 120*		*04/28/17 21:40*	*1*
Dibromofluoromethane (Surr)	*88*		*69 - 124*		*04/28/17 21:40*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/24/17 14:17	04/26/17 14:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*71*		*42 - 120*	*04/24/17 14:17*	*04/26/17 14:36*	*1*
2-Fluorophenol (Surr)	*38*		*10 - 120*	*04/24/17 14:17*	*04/26/17 14:36*	*1*
2,4,6-Tribromophenol (Surr)	*61*		*35 - 125*	*04/24/17 14:17*	*04/26/17 14:36*	*1*
Nitrobenzene-d5 (Surr)	*71*		*36 - 120*	*04/24/17 14:17*	*04/26/17 14:36*	*1*
Phenol-d5 (Surr)	*22*		*10 - 120*	*04/24/17 14:17*	*04/26/17 14:36*	*1*
Terphenyl-d14 (Surr)	*75*		*17 - 120*	*04/24/17 14:17*	*04/26/17 14:36*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/26/17 14:50	04/27/17 12:13	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*67*		*18 - 125*	*04/26/17 14:50*	*04/27/17 12:13*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/24/17 14:00	04/25/17 15:36	1
Copper	<0.36		2.0	0.36	ug/L		04/24/17 14:00	04/25/17 15:36	1
Iron	**7.2**	**J B**	100	5.3	ug/L		04/24/17 14:00	04/25/17 15:36	1
Manganese	<0.25		5.0	0.25	ug/L		04/24/17 14:00	04/25/17 15:36	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 15:36	1

Client Sample ID: W-170420-PS-18
Date Collected: 04/20/17 14:40
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 22:03	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 22:03	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 22:03	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 22:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*61 - 138*		*04/28/17 22:03*	*1*
4-Bromofluorobenzene (Surr)	*93*		*69 - 120*		*04/28/17 22:03*	*1*
Toluene-d8 (Surr)	*101*		*73 - 120*		*04/28/17 22:03*	*1*
Dibromofluoromethane (Surr)	*88*		*69 - 124*		*04/28/17 22:03*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.069		0.22	0.069	ug/L		04/25/17 08:39	04/28/17 19:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*72*		*42 - 120*	*04/25/17 08:39*	*04/28/17 19:02*	*1*
2-Fluorophenol (Surr)	*44*		*10 - 120*	*04/25/17 08:39*	*04/28/17 19:02*	*1*
2,4,6-Tribromophenol (Surr)	*13*	*X*	*35 - 125*	*04/25/17 08:39*	*04/28/17 19:02*	*1*
Nitrobenzene-d5 (Surr)	*72*		*36 - 120*	*04/25/17 08:39*	*04/28/17 19:02*	*1*
Phenol-d5 (Surr)	*27*		*10 - 120*	*04/25/17 08:39*	*04/28/17 19:02*	*1*
Terphenyl-d14 (Surr)	*80*		*17 - 120*	*04/25/17 08:39*	*04/28/17 19:02*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**1.3**		0.50	0.080	ug/L			05/03/17 14:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*82*		*76 - 121*		*05/03/17 14:55*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.47**		0.10	0.016	ug/L		04/26/17 14:50	04/27/17 12:38	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*52*		*18 - 125*	*04/26/17 14:50*	*04/27/17 12:38*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/24/17 14:00	04/25/17 15:41	1
Copper	**1.7**	**J B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 15:41	1
Iron	**83.6**	**J B**	100	5.3	ug/L		04/24/17 14:00	04/25/17 15:41	1
Manganese	**23.0**		5.0	0.25	ug/L		04/24/17 14:00	04/25/17 15:41	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 15:41	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**232**		5.0	1.9	mg/L			05/04/17 07:32	1
Hardness as calcium carbonate	**358**		5.0	3.1	mg/L			04/26/17 11:56	1
Chloride	**45.5**		1.0	0.41	mg/L			04/22/17 18:09	1
Nitrate as N	**1.8**	**H**	0.10	0.035	mg/L			04/22/17 18:09	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Client Sample ID: W-170420-PS-18
Date Collected: 04/20/17 14:40
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-2
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	15.0		1.0	0.13	mg/L			04/22/17 18:09	1
Total Organic Carbon	1.4		1.0	0.080	mg/L			04/27/17 23:15	1

Client Sample ID: W-170420-PS-19

Date Collected: 04/20/17 15:30
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-3

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 22:25	1
Ethylbenzene	**0.96**	**J**	1.0	0.26	ug/L			04/28/17 22:25	1
Toluene	**0.90**	**J**	1.0	0.23	ug/L			04/28/17 22:25	1
Xylenes, Total	**13**		2.0	0.24	ug/L			04/28/17 22:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*61 - 138*		*04/28/17 22:25*	*1*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*04/28/17 22:25*	*1*
Toluene-d8 (Surr)	*99*		*73 - 120*		*04/28/17 22:25*	*1*
Dibromofluoromethane (Surr)	*88*		*69 - 124*		*04/28/17 22:25*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	**20**		1.1	0.34	ug/L		04/25/17 08:39	05/01/17 15:00	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*73*		*42 - 120*	*04/25/17 08:39*	*05/01/17 15:00*	*5*
2-Fluorophenol (Surr)	*49*		*10 - 120*	*04/25/17 08:39*	*05/01/17 15:00*	*5*
2,4,6-Tribromophenol (Surr)	*90*		*35 - 125*	*04/25/17 08:39*	*05/01/17 15:00*	*5*
Nitrobenzene-d5 (Surr)	*86*		*36 - 120*	*04/25/17 08:39*	*05/01/17 15:00*	*5*
Phenol-d5 (Surr)	*29*		*10 - 120*	*04/25/17 08:39*	*05/01/17 15:00*	*5*
Terphenyl-d14 (Surr)	*76*		*17 - 120*	*04/25/17 08:39*	*05/01/17 15:00*	*5*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**32**		0.50	0.080	ug/L			05/03/17 15:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*84*		*76 - 121*		*05/03/17 15:12*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**5100**		260	41	ug/L		04/26/17 14:50	04/28/17 08:18	10000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*04/26/17 14:50*	*04/28/17 08:18*	*10000*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**13.7**		5.0	0.35	ug/L		04/24/17 14:00	04/25/17 15:45	1
Copper	**2.2**	**B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 15:45	1
Iron	**10600**	**B**	100	5.3	ug/L		04/24/17 14:00	04/25/17 15:45	1
Manganese	**2260**		5.0	0.25	ug/L		04/24/17 14:00	04/25/17 15:45	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 15:45	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**240**		5.0	1.9	mg/L			05/04/17 07:52	1
Hardness as calcium carbonate	**294**		5.0	3.1	mg/L			04/26/17 11:56	1
Chloride	**29.1**		1.0	0.41	mg/L			04/22/17 18:29	1
Nitrate as N	<0.035	H	0.10	0.035	mg/L			04/22/17 18:29	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Client Sample ID: W-170420-PS-19
Date Collected: 04/20/17 15:30
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-3
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	16.1		1.0	0.13	mg/L			04/22/17 18:29	1
Total Organic Carbon	37.2		1.0	0.080	mg/L			04/28/17 01:37	1

Client Sample ID: W-170421-PS-20

Lab Sample ID: 240-78518-4

Date Collected: 04/21/17 09:45

Matrix: Water

Date Received: 04/22/17 10:15

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 22:49	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 22:49	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 22:49	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 22:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*61 - 138*		*04/28/17 22:49*	*1*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*04/28/17 22:49*	*1*
Toluene-d8 (Surr)	*102*		*73 - 120*		*04/28/17 22:49*	*1*
Dibromofluoromethane (Surr)	*87*		*69 - 124*		*04/28/17 22:49*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.070		0.22	0.070	ug/L		04/25/17 08:39	04/27/17 18:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*72*		*42 - 120*	*04/25/17 08:39*	*04/27/17 18:08*	*1*
2-Fluorophenol (Surr)	*45*		*10 - 120*	*04/25/17 08:39*	*04/27/17 18:08*	*1*
2,4,6-Tribromophenol (Surr)	*73*		*35 - 125*	*04/25/17 08:39*	*04/27/17 18:08*	*1*
Nitrobenzene-d5 (Surr)	*75*		*36 - 120*	*04/25/17 08:39*	*04/27/17 18:08*	*1*
Phenol-d5 (Surr)	*27*		*10 - 120*	*04/25/17 08:39*	*04/27/17 18:08*	*1*
Terphenyl-d14 (Surr)	*78*		*17 - 120*	*04/25/17 08:39*	*04/27/17 18:08*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**10**		0.50	0.080	ug/L			05/03/17 15:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*82*		*76 - 121*		*05/03/17 15:29*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.11**		0.11	0.016	ug/L		04/26/17 14:50	04/27/17 14:44	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*48*		*18 - 125*	*04/26/17 14:50*	*04/27/17 14:44*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.2**	**J**	5.0	0.35	ug/L		04/24/17 14:00	04/25/17 15:49	1
Copper	<0.36		2.0	0.36	ug/L		04/24/17 14:00	04/25/17 15:49	1
Iron	**85.4**	**J B**	100	5.3	ug/L		04/24/17 14:00	04/25/17 15:49	1
Manganese	**39.0**		5.0	0.25	ug/L		04/24/17 14:00	04/25/17 15:49	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 15:49	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**82.8**		5.0	1.9	mg/L			05/04/17 08:01	1
Hardness as calcium carbonate	**170**		5.0	3.1	mg/L			04/26/17 11:56	1
Chloride	**32.9**		1.0	0.41	mg/L			04/22/17 18:49	1
Nitrate as N	**0.15**		0.10	0.035	mg/L			04/22/17 18:49	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Client Sample ID: W-170421-PS-20
Date Collected: 04/21/17 09:45
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-4
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	13.2		1.0	0.13	mg/L			04/22/17 18:49	1
Total Organic Carbon	0.60	J	1.0	0.080	mg/L			04/28/17 02:07	1

Client Sample ID: W-170421-PS-21

Date Collected: 04/21/17 10:45
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-5

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 23:12	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 23:12	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 23:12	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 23:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*61 - 138*		*04/28/17 23:12*	*1*
4-Bromofluorobenzene (Surr)	*94*		*69 - 120*		*04/28/17 23:12*	*1*
Toluene-d8 (Surr)	*99*		*73 - 120*		*04/28/17 23:12*	*1*
Dibromofluoromethane (Surr)	*86*		*69 - 124*		*04/28/17 23:12*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.065		0.21	0.065	ug/L		04/25/17 08:39	04/27/17 18:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*75*		*42 - 120*	*04/25/17 08:39*	*04/27/17 18:33*	*1*
2-Fluorophenol (Surr)	*47*		*10 - 120*	*04/25/17 08:39*	*04/27/17 18:33*	*1*
2,4,6-Tribromophenol (Surr)	*78*		*35 - 125*	*04/25/17 08:39*	*04/27/17 18:33*	*1*
Nitrobenzene-d5 (Surr)	*75*		*36 - 120*	*04/25/17 08:39*	*04/27/17 18:33*	*1*
Phenol-d5 (Surr)	*29*		*10 - 120*	*04/25/17 08:39*	*04/27/17 18:33*	*1*
Terphenyl-d14 (Surr)	*84*		*17 - 120*	*04/25/17 08:39*	*04/27/17 18:33*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/04/17 13:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*87*		*76 - 121*		*05/04/17 13:48*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**3.6**		0.10	0.016	ug/L		04/26/17 14:50	04/27/17 15:09	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*61*		*18 - 125*	*04/26/17 14:50*	*04/27/17 15:09*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/24/17 14:00	04/25/17 15:53	1
Copper	**0.95**	**J B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 15:53	1
Iron	**8.1**	**J B**	100	5.3	ug/L		04/24/17 14:00	04/25/17 15:53	1
Manganese	**37.7**		5.0	0.25	ug/L		04/24/17 14:00	04/25/17 15:53	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 15:53	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**46.2**		5.0	1.9	mg/L			05/04/17 08:10	1
Hardness as calcium carbonate	**250**		5.0	3.1	mg/L			04/26/17 11:56	1
Chloride	**0.57**	**J**	1.0	0.41	mg/L			04/22/17 19:50	1
Nitrate as N	**1.1**		0.10	0.035	mg/L			04/22/17 19:50	1

Client Sample ID: W-170421-PS-21
Date Collected: 04/21/17 10:45
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-5
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	5.4		1.0	0.13	mg/L			04/22/17 19:50	1
Total Organic Carbon	0.93	J	1.0	0.080	mg/L			04/28/17 02:35	1

Client Sample ID: W-170421-PS-22
Date Collected: 04/21/17 11:30
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 23:35	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 23:35	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 23:35	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 23:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*61 - 138*		*04/28/17 23:35*	*1*
4-Bromofluorobenzene (Surr)	*95*		*69 - 120*		*04/28/17 23:35*	*1*
Toluene-d8 (Surr)	*102*		*73 - 120*		*04/28/17 23:35*	*1*
Dibromofluoromethane (Surr)	*88*		*69 - 124*		*04/28/17 23:35*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.073		0.23	0.073	ug/L		04/25/17 08:39	04/28/17 18:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*65*		*42 - 120*	*04/25/17 08:39*	*04/28/17 18:37*	*1*
2-Fluorophenol (Surr)	*41*		*10 - 120*	*04/25/17 08:39*	*04/28/17 18:37*	*1*
2,4,6-Tribromophenol (Surr)	*28*	*X*	*35 - 125*	*04/25/17 08:39*	*04/28/17 18:37*	*1*
Nitrobenzene-d5 (Surr)	*65*		*36 - 120*	*04/25/17 08:39*	*04/28/17 18:37*	*1*
Phenol-d5 (Surr)	*27*		*10 - 120*	*04/25/17 08:39*	*04/28/17 18:37*	*1*
Terphenyl-d14 (Surr)	*66*		*17 - 120*	*04/25/17 08:39*	*04/28/17 18:37*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/03/17 16:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*79*		*76 - 121*		*05/03/17 16:04*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.090**	**J**	0.10	0.016	ug/L		04/26/17 14:50	04/27/17 15:34	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*76*		*18 - 125*	*04/26/17 14:50*	*04/27/17 15:34*	*4*

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/24/17 14:00	04/25/17 15:58	1
Copper	**2.6**	**B**	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 15:58	1
Iron	<5.3		100	5.3	ug/L		04/24/17 14:00	04/25/17 15:58	1
Manganese	**0.31**	**J**	5.0	0.25	ug/L		04/24/17 14:00	04/25/17 15:58	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 15:58	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**62.9**		5.0	1.9	mg/L			05/04/17 08:19	1
Hardness as calcium carbonate	**110**		5.0	3.1	mg/L			04/26/17 11:56	1
Chloride	**2.8**		1.0	0.41	mg/L			04/22/17 20:10	1
Nitrate as N	**0.77**		0.10	0.035	mg/L			04/22/17 20:10	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Client Sample ID: W-170421-PS-22
Date Collected: 04/21/17 11:30
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-6
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.4		1.0	0.13	mg/L			04/22/17 20:10	1
Total Organic Carbon	0.93	J	1.0	0.080	mg/L			04/28/17 03:02	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Client Sample ID: TRIP BLANK-005
Date Collected: 04/21/17 13:00
Date Received: 04/22/17 10:15

Lab Sample ID: 240-78518-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 23:58	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 23:58	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 23:58	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 23:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*61 - 138*		*04/28/17 23:58*	*1*
4-Bromofluorobenzene (Surr)	*94*		*69 - 120*		*04/28/17 23:58*	*1*
Toluene-d8 (Surr)	*100*		*73 - 120*		*04/28/17 23:58*	*1*
Dibromofluoromethane (Surr)	*87*		*69 - 124*		*04/28/17 23:58*	*1*

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(61-138)	(69-120)	(73-120)	(69-124)
240-78518-1	W-170420-PS-17	90	93	100	88
240-78518-2	W-170420-PS-18	90	93	101	88
240-78518-3	W-170420-PS-19	92	96	99	88
240-78518-4	W-170421-PS-20	92	96	102	87
240-78518-5	W-170421-PS-21	87	94	99	86
240-78518-6	W-170421-PS-22	91	95	102	88
240-78518-7	TRIP BLANK-005	89	94	100	87
LCS 240-276782/4	Lab Control Sample	88	97	102	87
MB 240-276782/7	Method Blank	91	96	105	86

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		FBP	2FP	TBP	NBZ	PHL	TPH
Lab Sample ID	Client Sample ID	(42-120)	(10-120)	(35-125)	(36-120)	(10-120)	(17-120)
240-78518-1	W-170420-PS-17	71	38	61	71	22	75
240-78518-2	W-170420-PS-18	72	44	13 X	72	27	80
240-78518-3	W-170420-PS-19	73	49	90	86	29	76
240-78518-4	W-170421-PS-20	72	45	73	75	27	78
240-78518-5	W-170421-PS-21	75	47	78	75	29	84
240-78518-6	W-170421-PS-22	65	41	28 X	65	27	66
LCS 240-275892/20-A	Lab Control Sample	78	52	87	85	33	76
LCS 240-276082/13-A	Lab Control Sample	81	52	91	87	35	88
MB 240-275892/19-A	Method Blank	73	48	59	72	29	84
MB 240-276082/12-A	Method Blank	76	44	67	74	27	93

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPH = Terphenyl-d14 (Surr)

Method: RSK-175 - Dissolved Gases (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		rifluoroet
Lab Sample ID	Client Sample ID	(76-121)
240-78518-2	W-170420-PS-18	82
240-78518-3	W-170420-PS-19	84
240-78518-4	W-170421-PS-20	82

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	rifluoroet (76-121)
240-78518-5	W-170421-PS-21	87
240-78518-6	W-170421-PS-22	79
LCS 240-277266/5	Lab Control Sample	84
LCS 240-277484/5	Lab Control Sample	85
MB 240-277266/4	Method Blank	82
MB 240-277484/4	Method Blank	86

Surrogate Legend

1,1,1-Trifluoroethane = 1,1,1-Trifluoroethane

Method: 8151A - Herbicides (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCPA1 (18-125)	DCPA2 (18-125)
240-78518-1	W-170420-PS-17	65	67
240-78518-2	W-170420-PS-18	52	52
240-78518-3	W-170420-PS-19	0 X D	0 X D
240-78518-4	W-170421-PS-20	45	48
240-78518-5	W-170421-PS-21	61	55
240-78518-6	W-170421-PS-22	74	76
LCS 180-209442/2-A	Lab Control Sample	108	112
LCSD 180-209442/3-A	Lab Control Sample Dup	93	93
MB 180-209442/1-A	Method Blank	61	62
MB 180-209442/1-A	Method Blank	53	56

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-276782/7
Matrix: Water
Analysis Batch: 276782

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/28/17 20:54	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/28/17 20:54	1
Toluene	<0.23		1.0	0.23	ug/L			04/28/17 20:54	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/28/17 20:54	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*61 - 138*		*04/28/17 20:54*	*1*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*04/28/17 20:54*	*1*
Toluene-d8 (Surr)	*105*		*73 - 120*		*04/28/17 20:54*	*1*
Dibromofluoromethane (Surr)	*86*		*69 - 124*		*04/28/17 20:54*	*1*

Lab Sample ID: LCS 240-276782/4
Matrix: Water
Analysis Batch: 276782

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	20.0	18.5		ug/L		93	79 - 120
Ethylbenzene	20.0	21.1		ug/L		105	80 - 120
Toluene	20.0	20.9		ug/L		105	78 - 120
Xylenes, Total	40.0	41.3		ug/L		103	80 - 120
m-Xylene & p-Xylene	20.0	20.9		ug/L		105	80 - 120
o-Xylene	20.0	20.4		ug/L		102	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*88*		*61 - 138*
4-Bromofluorobenzene (Surr)	*97*		*69 - 120*
Toluene-d8 (Surr)	*102*		*73 - 120*
Dibromofluoromethane (Surr)	*87*		*69 - 124*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-275892/19-A
Matrix: Water
Analysis Batch: 276239

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 275892

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/24/17 08:33	04/26/17 12:28	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*73*		*42 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
2-Fluorophenol (Surr)	*48*		*10 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
2,4,6-Tribromophenol (Surr)	*59*		*35 - 125*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Nitrobenzene-d5 (Surr)	*72*		*36 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Phenol-d5 (Surr)	*29*		*10 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Terphenyl-d14 (Surr)	*84*		*17 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-275892/20-A
Matrix: Water
Analysis Batch: 276239

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 275892

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	15.3		ug/L		76	54 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*78*		*42 - 120*
2-Fluorophenol (Surr)	*52*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*87*		*35 - 125*
Nitrobenzene-d5 (Surr)	*85*		*36 - 120*
Phenol-d5 (Surr)	*33*		*10 - 120*
Terphenyl-d14 (Surr)	*76*		*17 - 120*

Lab Sample ID: MB 240-276082/12-A
Matrix: Water
Analysis Batch: 276417

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276082

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/25/17 08:39	04/27/17 10:34	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*76*		*42 - 120*	*04/25/17 08:39*	*04/27/17 10:34*	*1*
2-Fluorophenol (Surr)	*44*		*10 - 120*	*04/25/17 08:39*	*04/27/17 10:34*	*1*
2,4,6-Tribromophenol (Surr)	*67*		*35 - 125*	*04/25/17 08:39*	*04/27/17 10:34*	*1*
Nitrobenzene-d5 (Surr)	*74*		*36 - 120*	*04/25/17 08:39*	*04/27/17 10:34*	*1*
Phenol-d5 (Surr)	*27*		*10 - 120*	*04/25/17 08:39*	*04/27/17 10:34*	*1*
Terphenyl-d14 (Surr)	*93*		*17 - 120*	*04/25/17 08:39*	*04/27/17 10:34*	*1*

Lab Sample ID: LCS 240-276082/13-A
Matrix: Water
Analysis Batch: 276417

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276082

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	15.6		ug/L		78	54 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*81*		*42 - 120*
2-Fluorophenol (Surr)	*52*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*91*		*35 - 125*
Nitrobenzene-d5 (Surr)	*87*		*36 - 120*
Phenol-d5 (Surr)	*35*		*10 - 120*
Terphenyl-d14 (Surr)	*88*		*17 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 240-277266/4
Matrix: Water
Analysis Batch: 277266

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/03/17 11:47	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*82*		*76 - 121*		*05/03/17 11:47*	*1*

Lab Sample ID: LCS 240-277266/5
Matrix: Water
Analysis Batch: 277266

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methane			199	196		ug/L		99	80 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*84*		*76 - 121*

Lab Sample ID: MB 240-277484/4
Matrix: Water
Analysis Batch: 277484

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/04/17 13:14	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*86*		*76 - 121*		*05/04/17 13:14*	*1*

Lab Sample ID: LCS 240-277484/5
Matrix: Water
Analysis Batch: 277484

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methane			199	196		ug/L		99	80 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*85*		*76 - 121*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-209442/1-A
Matrix: Water
Analysis Batch: 209497

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 209442

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/26/17 14:50	04/27/17 11:48	4

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*56*		*18 - 125*	*04/26/17 14:50*	*04/27/17 11:48*	*4*

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: MB 180-209442/1-A
Matrix: Water
Analysis Batch: 209497

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 209442

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.078		0.50	0.078	ug/L		04/26/17 14:50	04/27/17 15:58	20

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*62*		*18 - 125*	*04/26/17 14:50*	*04/27/17 15:58*	*20*

Lab Sample ID: LCS 180-209442/2-A
Matrix: Water
Analysis Batch: 209497

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 209442

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Pentachlorophenol	5.00	6.93		ug/L		139	30 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*112*		*18 - 125*

Lab Sample ID: LCSD 180-209442/3-A
Matrix: Water
Analysis Batch: 209497

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 209442

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Pentachlorophenol	5.00	5.31		ug/L		106	30 - 150	35	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*93*		*18 - 125*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 240-275975/1-A
Matrix: Water
Analysis Batch: 276243

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 275975

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/24/17 14:00	04/25/17 14:34	1
Copper	0.421	J	2.0	0.36	ug/L		04/24/17 14:00	04/25/17 14:34	1
Iron	21.93	J	100	5.3	ug/L		04/24/17 14:00	04/25/17 14:34	1
Manganese	<0.25		5.0	0.25	ug/L		04/24/17 14:00	04/25/17 14:34	1
Zinc	<6.2		20.0	6.2	ug/L		04/24/17 14:00	04/25/17 14:34	1

Lab Sample ID: LCS 240-275975/2-A
Matrix: Water
Analysis Batch: 276243

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 275975

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	1031		ug/L		103	80 - 120
Copper	1000	1081		ug/L		108	80 - 120
Iron	10000	10520		ug/L		105	80 - 120
Manganese	1000	1052		ug/L		105	80 - 120

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 240-275975/2-A
Matrix: Water
Analysis Batch: 276243

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 275975

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Zinc			1000	1073		ug/L		107	80 - 120		

Method: 2320B-1997 - Alkalinity, Total

Lab Sample ID: MB 240-277592/3
Matrix: Water
Analysis Batch: 277592

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	<1.9		5.0	1.9	mg/L			05/04/17 07:16	1

Lab Sample ID: LCS 240-277592/2
Matrix: Water
Analysis Batch: 277592

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Alkalinity			377	369.1		mg/L		98	86 - 123		

Lab Sample ID: 240-78518-2 DU
Matrix: Water
Analysis Batch: 277592

Client Sample ID: W-170420-PS-18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Alkalinity	232			230.3		mg/L				0.9	20

Method: 2340C-1997 - Hardness, Total

Lab Sample ID: MB 240-276330/1
Matrix: Water
Analysis Batch: 276330

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	<3.1		5.0	3.1	mg/L			04/26/17 11:56	1

Lab Sample ID: LCS 240-276330/2
Matrix: Water
Analysis Batch: 276330

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Hardness as calcium carbonate			170	168.0		mg/L		99	80 - 120		

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-275818/3
Matrix: Water
Analysis Batch: 275818

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.41		1.0	0.41	mg/L			04/22/17 17:29	1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 240-275818/3
Matrix: Water
Analysis Batch: 275818

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<0.13		1.0	0.13	mg/L			04/22/17 17:29	1

Lab Sample ID: LCS 240-275818/4
Matrix: Water
Analysis Batch: 275818

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.20		mg/L		102	90 - 110
Sulfate	50.0	51.66		mg/L		103	90 - 110

Lab Sample ID: 240-78518-4 MS
Matrix: Water
Analysis Batch: 275818

Client Sample ID: W-170421-PS-20
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	32.9		50.0	82.06		mg/L		98	80 - 120
Sulfate	13.2		50.0	65.13		mg/L		104	80 - 120

Lab Sample ID: 240-78518-4 MSD
Matrix: Water
Analysis Batch: 275818

Client Sample ID: W-170421-PS-20
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	32.9		50.0	83.51		mg/L		101	80 - 120	2	15
Sulfate	13.2		50.0	66.61		mg/L		107	80 - 120	2	15

Lab Sample ID: MB 240-275819/3
Matrix: Water
Analysis Batch: 275819

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.035		0.10	0.035	mg/L			04/22/17 17:29	1

Lab Sample ID: LCS 240-275819/4
Matrix: Water
Analysis Batch: 275819

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	2.50	2.57		mg/L		103	90 - 110

Lab Sample ID: 240-78518-4 MS
Matrix: Water
Analysis Batch: 275819

Client Sample ID: W-170421-PS-20
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	0.15		2.50	2.72		mg/L		103	80 - 120

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 240-78518-4 MSD — **Client Sample ID: W-170421-PS-20**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 275819

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	0.15		2.50	2.80		mg/L		106	80 - 120	3	15

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 240-276610/38 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<0.080		1.0	0.080	mg/L			04/27/17 17:43	1

Lab Sample ID: LCS 240-276610/40 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	46.3	46.78		mg/L		101	80 - 120

Lab Sample ID: LLCS 240-276610/39 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	4.63	4.49		mg/L		97	88 - 115

Lab Sample ID: 240-78518-2 MS — **Client Sample ID: W-170420-PS-18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	1.4		12.5	12.96		mg/L		92	65 - 134

Lab Sample ID: 240-78518-2 MSD — **Client Sample ID: W-170420-PS-18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 276610

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	1.4		12.5	13.13		mg/L		93	65 - 134	1	10

GC/MS VOA

Analysis Batch: 276782

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-1	W-170420-PS-17	Total/NA	Water	8260B	
240-78518-2	W-170420-PS-18	Total/NA	Water	8260B	
240-78518-3	W-170420-PS-19	Total/NA	Water	8260B	
240-78518-4	W-170421-PS-20	Total/NA	Water	8260B	
240-78518-5	W-170421-PS-21	Total/NA	Water	8260B	
240-78518-6	W-170421-PS-22	Total/NA	Water	8260B	
240-78518-7	TRIP BLANK-005	Total/NA	Water	8260B	
MB 240-276782/7	Method Blank	Total/NA	Water	8260B	
LCS 240-276782/4	Lab Control Sample	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 275892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-1	W-170420-PS-17	Total/NA	Water	3510C	
MB 240-275892/19-A	Method Blank	Total/NA	Water	3510C	
LCS 240-275892/20-A	Lab Control Sample	Total/NA	Water	3510C	

Prep Batch: 276082

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-2	W-170420-PS-18	Total/NA	Water	3510C	
240-78518-3	W-170420-PS-19	Total/NA	Water	3510C	
240-78518-4	W-170421-PS-20	Total/NA	Water	3510C	
240-78518-5	W-170421-PS-21	Total/NA	Water	3510C	
240-78518-6	W-170421-PS-22	Total/NA	Water	3510C	
MB 240-276082/12-A	Method Blank	Total/NA	Water	3510C	
LCS 240-276082/13-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 276239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-1	W-170420-PS-17	Total/NA	Water	8270C	275892
MB 240-275892/19-A	Method Blank	Total/NA	Water	8270C	275892
LCS 240-275892/20-A	Lab Control Sample	Total/NA	Water	8270C	275892

Analysis Batch: 276417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-4	W-170421-PS-20	Total/NA	Water	8270C	276082
240-78518-5	W-170421-PS-21	Total/NA	Water	8270C	276082
MB 240-276082/12-A	Method Blank	Total/NA	Water	8270C	276082
LCS 240-276082/13-A	Lab Control Sample	Total/NA	Water	8270C	276082

Analysis Batch: 276629

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-2	W-170420-PS-18	Total/NA	Water	8270C	276082
240-78518-6	W-170421-PS-22	Total/NA	Water	8270C	276082

Analysis Batch: 276860

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-3	W-170420-PS-19	Total/NA	Water	8270C	276082

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

GC VOA

Analysis Batch: 277266

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-2	W-170420-PS-18	Total/NA	Water	RSK-175	
240-78518-3	W-170420-PS-19	Total/NA	Water	RSK-175	
240-78518-4	W-170421-PS-20	Total/NA	Water	RSK-175	
240-78518-6	W-170421-PS-22	Total/NA	Water	RSK-175	
MB 240-277266/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-277266/5	Lab Control Sample	Total/NA	Water	RSK-175	

Analysis Batch: 277484

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-5	W-170421-PS-21	Total/NA	Water	RSK-175	
MB 240-277484/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-277484/5	Lab Control Sample	Total/NA	Water	RSK-175	

GC Semi VOA

Prep Batch: 209442

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-1	W-170420-PS-17	Total/NA	Water	8151A	
240-78518-2	W-170420-PS-18	Total/NA	Water	8151A	
240-78518-3	W-170420-PS-19	Total/NA	Water	8151A	
240-78518-4	W-170421-PS-20	Total/NA	Water	8151A	
240-78518-5	W-170421-PS-21	Total/NA	Water	8151A	
240-78518-6	W-170421-PS-22	Total/NA	Water	8151A	
MB 180-209442/1-A	Method Blank	Total/NA	Water	8151A	
LCS 180-209442/2-A	Lab Control Sample	Total/NA	Water	8151A	
LCSD 180-209442/3-A	Lab Control Sample Dup	Total/NA	Water	8151A	

Analysis Batch: 209497

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-1	W-170420-PS-17	Total/NA	Water	8151A	209442
240-78518-2	W-170420-PS-18	Total/NA	Water	8151A	209442
240-78518-4	W-170421-PS-20	Total/NA	Water	8151A	209442
240-78518-5	W-170421-PS-21	Total/NA	Water	8151A	209442
240-78518-6	W-170421-PS-22	Total/NA	Water	8151A	209442
MB 180-209442/1-A	Method Blank	Total/NA	Water	8151A	209442
MB 180-209442/1-A	Method Blank	Total/NA	Water	8151A	209442
LCS 180-209442/2-A	Lab Control Sample	Total/NA	Water	8151A	209442
LCSD 180-209442/3-A	Lab Control Sample Dup	Total/NA	Water	8151A	209442

Analysis Batch: 209602

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-3	W-170420-PS-19	Total/NA	Water	8151A	209442

Metals

Prep Batch: 275975

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-1	W-170420-PS-17	Dissolved	Water	3005A	
240-78518-2	W-170420-PS-18	Dissolved	Water	3005A	
240-78518-3	W-170420-PS-19	Dissolved	Water	3005A	

Metals (Continued)

Prep Batch: 275975 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-4	W-170421-PS-20	Dissolved	Water	3005A	
240-78518-5	W-170421-PS-21	Dissolved	Water	3005A	
240-78518-6	W-170421-PS-22	Dissolved	Water	3005A	
MB 240-275975/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-275975/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 276243

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-1	W-170420-PS-17	Dissolved	Water	6020	275975
240-78518-2	W-170420-PS-18	Dissolved	Water	6020	275975
240-78518-3	W-170420-PS-19	Dissolved	Water	6020	275975
240-78518-4	W-170421-PS-20	Dissolved	Water	6020	275975
240-78518-5	W-170421-PS-21	Dissolved	Water	6020	275975
240-78518-6	W-170421-PS-22	Dissolved	Water	6020	275975
MB 240-275975/1-A	Method Blank	Total Recoverable	Water	6020	275975
LCS 240-275975/2-A	Lab Control Sample	Total Recoverable	Water	6020	275975

General Chemistry

Analysis Batch: 275818

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-2	W-170420-PS-18	Total/NA	Water	300.0	
240-78518-3	W-170420-PS-19	Total/NA	Water	300.0	
240-78518-4	W-170421-PS-20	Total/NA	Water	300.0	
240-78518-5	W-170421-PS-21	Total/NA	Water	300.0	
240-78518-6	W-170421-PS-22	Total/NA	Water	300.0	
MB 240-275818/3	Method Blank	Total/NA	Water	300.0	
LCS 240-275818/4	Lab Control Sample	Total/NA	Water	300.0	
240-78518-4 MS	W-170421-PS-20	Total/NA	Water	300.0	
240-78518-4 MSD	W-170421-PS-20	Total/NA	Water	300.0	

Analysis Batch: 275819

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-2	W-170420-PS-18	Total/NA	Water	300.0	
240-78518-3	W-170420-PS-19	Total/NA	Water	300.0	
240-78518-4	W-170421-PS-20	Total/NA	Water	300.0	
240-78518-5	W-170421-PS-21	Total/NA	Water	300.0	
240-78518-6	W-170421-PS-22	Total/NA	Water	300.0	
MB 240-275819/3	Method Blank	Total/NA	Water	300.0	
LCS 240-275819/4	Lab Control Sample	Total/NA	Water	300.0	
240-78518-4 MS	W-170421-PS-20	Total/NA	Water	300.0	
240-78518-4 MSD	W-170421-PS-20	Total/NA	Water	300.0	

Analysis Batch: 276330

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-2	W-170420-PS-18	Total/NA	Water	2340C-1997	
240-78518-3	W-170420-PS-19	Total/NA	Water	2340C-1997	
240-78518-4	W-170421-PS-20	Total/NA	Water	2340C-1997	
240-78518-5	W-170421-PS-21	Total/NA	Water	2340C-1997	
240-78518-6	W-170421-PS-22	Total/NA	Water	2340C-1997	

General Chemistry (Continued)

Analysis Batch: 276330 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 240-276330/1	Method Blank	Total/NA	Water	2340C-1997	
LCS 240-276330/2	Lab Control Sample	Total/NA	Water	2340C-1997	

Analysis Batch: 276610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-2	W-170420-PS-18	Total/NA	Water	9060	
240-78518-3	W-170420-PS-19	Total/NA	Water	9060	
240-78518-4	W-170421-PS-20	Total/NA	Water	9060	
240-78518-5	W-170421-PS-21	Total/NA	Water	9060	
240-78518-6	W-170421-PS-22	Total/NA	Water	9060	
MB 240-276610/38	Method Blank	Total/NA	Water	9060	
LCS 240-276610/40	Lab Control Sample	Total/NA	Water	9060	
LLCS 240-276610/39	Lab Control Sample	Total/NA	Water	9060	
240-78518-2 MS	W-170420-PS-18	Total/NA	Water	9060	
240-78518-2 MSD	W-170420-PS-18	Total/NA	Water	9060	

Analysis Batch: 277592

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78518-2	W-170420-PS-18	Total/NA	Water	2320B-1997	
240-78518-3	W-170420-PS-19	Total/NA	Water	2320B-1997	
240-78518-4	W-170421-PS-20	Total/NA	Water	2320B-1997	
240-78518-5	W-170421-PS-21	Total/NA	Water	2320B-1997	
240-78518-6	W-170421-PS-22	Total/NA	Water	2320B-1997	
MB 240-277592/3	Method Blank	Total/NA	Water	2320B-1997	
LCS 240-277592/2	Lab Control Sample	Total/NA	Water	2320B-1997	
240-78518-2 DU	W-170420-PS-18	Total/NA	Water	2320B-1997	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Client Sample ID: W-170420-PS-17

Lab Sample ID: 240-78518-1
Matrix: Water
Date Collected: 04/20/17 14:00
Date Received: 04/22/17 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276782	04/28/17 21:40	TJL1	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 14:17	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 14:36	MRU	TAL CAN
Total/NA	Prep	8151A			209442	04/26/17 14:50	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209497	04/27/17 12:13	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 15:36	AS1	TAL CAN

Client Sample ID: W-170420-PS-18

Lab Sample ID: 240-78518-2
Matrix: Water
Date Collected: 04/20/17 14:40
Date Received: 04/22/17 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276782	04/28/17 22:03	TJL1	TAL CAN
Total/NA	Prep	3510C			276082	04/25/17 08:39	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276629	04/28/17 19:02	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	277266	05/03/17 14:55	BPM	TAL CAN
Total/NA	Prep	8151A			209442	04/26/17 14:50	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209497	04/27/17 12:38	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 15:41	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277592	05/04/17 07:32	JWW	TAL CAN
Total/NA	Analysis	2340C-1997		1	276330	04/26/17 11:56	TPH	TAL CAN
Total/NA	Analysis	300.0		1	275818	04/22/17 18:09	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275819	04/22/17 18:09	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/27/17 23:15	TPH	TAL CAN

Client Sample ID: W-170420-PS-19

Lab Sample ID: 240-78518-3
Matrix: Water
Date Collected: 04/20/17 15:30
Date Received: 04/22/17 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276782	04/28/17 22:25	TJL1	TAL CAN
Total/NA	Prep	3510C			276082	04/25/17 08:39	KEH	TAL CAN
Total/NA	Analysis	8270C		5	276860	05/01/17 15:00	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	277266	05/03/17 15:12	BPM	TAL CAN
Total/NA	Prep	8151A			209442	04/26/17 14:50	CBY	TAL PIT
Total/NA	Analysis	8151A		10000	209602	04/28/17 08:18	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 15:45	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277592	05/04/17 07:52	JWW	TAL CAN
Total/NA	Analysis	2340C-1997		1	276330	04/26/17 11:56	TPH	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Client Sample ID: W-170420-PS-19

Lab Sample ID: 240-78518-3

Date Collected: 04/20/17 15:30

Matrix: Water

Date Received: 04/22/17 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	275818	04/22/17 18:29	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275819	04/22/17 18:29	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/28/17 01:37	TPH	TAL CAN

Client Sample ID: W-170421-PS-20

Lab Sample ID: 240-78518-4

Date Collected: 04/21/17 09:45

Matrix: Water

Date Received: 04/22/17 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276782	04/28/17 22:49	TJL1	TAL CAN
Total/NA	Prep	3510C			276082	04/25/17 08:39	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276417	04/27/17 18:08	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	277266	05/03/17 15:29	BPM	TAL CAN
Total/NA	Prep	8151A			209442	04/26/17 14:50	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209497	04/27/17 14:44	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 15:49	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277592	05/04/17 08:01	JWW	TAL CAN
Total/NA	Analysis	2340C-1997		1	276330	04/26/17 11:56	TPH	TAL CAN
Total/NA	Analysis	300.0		1	275818	04/22/17 18:49	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275819	04/22/17 18:49	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/28/17 02:07	TPH	TAL CAN

Client Sample ID: W-170421-PS-21

Lab Sample ID: 240-78518-5

Date Collected: 04/21/17 10:45

Matrix: Water

Date Received: 04/22/17 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276782	04/28/17 23:12	TJL1	TAL CAN
Total/NA	Prep	3510C			276082	04/25/17 08:39	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276417	04/27/17 18:33	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	277484	05/04/17 13:48	SEM	TAL CAN
Total/NA	Prep	8151A			209442	04/26/17 14:50	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209497	04/27/17 15:09	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 15:53	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277592	05/04/17 08:10	JWW	TAL CAN
Total/NA	Analysis	2340C-1997		1	276330	04/26/17 11:56	TPH	TAL CAN
Total/NA	Analysis	300.0		1	275818	04/22/17 19:50	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275819	04/22/17 19:50	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/28/17 02:35	TPH	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Client Sample ID: W-170421-PS-22

Lab Sample ID: 240-78518-6

Date Collected: 04/21/17 11:30

Matrix: Water

Date Received: 04/22/17 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276782	04/28/17 23:35	TJL1	TAL CAN
Total/NA	Prep	3510C			276082	04/25/17 08:39	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276629	04/28/17 18:37	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	277266	05/03/17 16:04	BPM	TAL CAN
Total/NA	Prep	8151A			209442	04/26/17 14:50	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209497	04/27/17 15:34	JMO	TAL PIT
Dissolved	Prep	3005A			275975	04/24/17 14:00	AJC	TAL CAN
Dissolved	Analysis	6020		1	276243	04/25/17 15:58	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277592	05/04/17 08:19	JWW	TAL CAN
Total/NA	Analysis	2340C-1997		1	276330	04/26/17 11:56	TPH	TAL CAN
Total/NA	Analysis	300.0		1	275818	04/22/17 20:10	LKG	TAL CAN
Total/NA	Analysis	300.0		1	275819	04/22/17 20:10	LKG	TAL CAN
Total/NA	Analysis	9060		1	276610	04/28/17 03:02	TPH	TAL CAN

Client Sample ID: TRIP BLANK-005

Lab Sample ID: 240-78518-7

Date Collected: 04/21/17 13:00

Matrix: Water

Date Received: 04/22/17 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276782	04/28/17 23:58	TJL1	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78518-1

Laboratory: TestAmerica Canton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999518190	08-31-17 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
RSK-175		Water	Methane

Laboratory: TestAmerica Pittsburgh

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	998027800	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

CAMBRIDGE 2.8/C2.5 3.0/C2.7
240506

Chain of Custody Record

2.0/C1.7

CAMBRIDGE
240506

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Peter Storbi	Lab PM: Heckler, Denise D	Carrier Tracking No(s):	COC No: 240-42024-18273.3
Client Contact: Mr. Grant Anderson	Phone: 651-247-4218	E-Mail: denise.heckler@testamericainc.com		Page: Page 3 of 4
Company: GHD Services Inc.				Job #:
Address: 1801 Old Highway 8 NW Suite 114	Due Date Requested:			
City: St. Paul	TAT Requested (days): Standard			
State, Zip: MN, 55112				
Phone: 651-639-0913(Tel) 651-639-0923(Fax)	PO #: 34001059			
Email: grant.anderson@ghd.com	WO #: 86165			
Project Name: 86165-03-11, Penta Wood	Project #: 24012755			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA
M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2O3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - pH 4-5; Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - BTEX	8151A - Pentachlorophenol	2320B - Alkalinity	2340C - Hardness, Total (mg/l as CaCO3)	6020 - As, Cu, Zn, Fe, Mn (Field filtered)	8260B, RSK_175 (Methane)	8270C - Naphthalene	300.0_28D - Chloride & Sulfate & Nitrate	9060 - TOC	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	N	N	D	D	A	N	N	S		
W-170420-PS-17	4-20-2017	1400	G	Water			X	X	-		X		X			8	**
18	↓	1440	↓	Water			X	X	X	X	X	X	X	X	X	17	Note:
19	↓	1530	↓	Water			X	X	X	X	X	X	X	X	X	17	Nitrate gets
W-170421-PS-20	4-21-2017	0945	↓	Water			X	X	X	X	X	X	X	X	X	17	48-hr
21	↓	1045	↓	Water			X	X	X	X	X	X	X	X	X	17	Extraction!!!
22	↓	1130	↓	Water			X	X	X	X	X	X	X	X	X	17	
Trip Blank-005	↓	1300	↓	Water			X										
				Water													
				Water													
				Water													
				Water													

240-78518 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	4-21-2017/1600	GHD	[signature]	4/22/17 1015	TA

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

TestAmerica Canton Sample Receipt Form/Narrative Login # : 78518
Canton Facility

Client GHP Site Name Penta Wood Cooler unpacked by: [signature]

Cooler Received on 4/22/17 Opened on 4/22/17

FedEx: 1st Grd (Exp) UPS FAS Stetson Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time ______ Storage Location ______

TestAmerica Cooler # ______ Foam Box (Client Cooler) Box (Other) MCF

Packing material used: (Bubble Wrap) Foam (Plastic Bag) None Other ______

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☑ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.3** °C) Observed Cooler Temp. ______ °C Corrected Cooler Temp. ______ °C
   IR GUN #36 (CF **+0.8**°C) Observed Cooler Temp. ______ °C Corrected Cooler Temp. ______ °C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 1 each (Yes) No
   -Were custody seals on the outside of the cooler(s) signed & dated? (Yes) No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes (No)
3. Shippers' packing slip attached to the cooler(s)? (Yes) No
4. Did custody papers accompany the sample(s)? (Yes) No
5. Were the custody papers relinquished & signed in the appropriate place? (Yes) No
6. Was/were the person(s) who collected the samples clearly identified on the COC? (Yes) No
7. Did all bottles arrive in good condition (Unbroken)? (Yes) No
8. Could all bottle labels be reconciled with the COC? (Yes) No
9. Were correct bottle(s) used for the test(s) indicated? (Yes) No
10. Sufficient quantity received to perform indicated analyses? (Yes) No
11. Are these work share samples? Yes (No)
    If yes, Questions 11-15 have been checked at the originating laboratory.
11. Were sample(s) at the correct pH upon receipt? (Yes) No NA pH Strip Lot# **HC682547**
12. Were VOAs on the COC? (Yes) No
13. Were air bubbles >6 mm in any VOA vials? ⬤ ⬅ Larger than this. Yes (No) NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Covered (Yes) No
15. Was a LL Hg or Me Hg trip blank present? ______ Yes (No)

Contacted PM ______ Date ______ by ______ via Verbal Voice Mail Other

Concerning ______

14. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

15. SAMPLE CONDITION

Sample(s) ______ were received after the recommended holding time had expired.

Sample(s) ______ were received in a broken container.

Sample(s) ______ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) ______ were further preserved in the laboratory.

Time preserved: ______ Preservative(s) added/Lot number(s): ______.

Ref: SOP NC-SC-0005, Sample Receiving
\\tacorp\corp\QA\QA_Facilities\Canton-QA\Document-Management\Work-Instruction\In Revision\WI-NC-099-040717 Cooler Receipt Form.doc djl

TestAmerica Multiple Cooler Receipt Form/Narrative **Login # :** 78518
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
TA NOT	8	2.8	2.5	ICE
↓	1	3.0	2.7	↓
	↓	2.0	1.7	

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
W-170420-PS-17	240-78518-D-1	Plastic 500ml - with Nitric Acid	<2		
W-170420-PS-18	240-78518-L-2	Plastic 250ml - with Nitric Acid	<2		
W-170420-PS-18	240-78518-M-2	Plastic 500ml - with Nitric Acid	<2		
W-170420-PS-19	240-78518-L-3	Plastic 250ml - with Nitric Acid	<2		
W-170420-PS-19	240-78518-M-3	Plastic 500ml - with Nitric Acid	<2		
W-170421-PS-20	240-78518-L-4	Plastic 250ml - with Nitric Acid	<2		
W-170421-PS-20	240-78518-M-4	Plastic 500ml - with Nitric Acid	<2		
W-170421-PS-21	240-78518-L-5	Plastic 250ml - with Nitric Acid	<2		
W-170421-PS-21	240-78518-M-5	Plastic 500ml - with Nitric Acid	<2		
W-170421-PS-22	240-78518-L-6	Plastic 250ml - with Nitric Acid	<2		
W-170421-PS-22	240-78518-M-6	Plastic 500ml - with Nitric Acid	<2		

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-78518-1

Login Number: 78518
List Number: 2
Creator: Watson, Debbie

List Source: TestAmerica Pittsburgh
List Creation: 04/25/17 01:38 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-78585-1
Client Project/Site: 86165-04-05, Penta Wood

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson

Denise D Heckler

Authorized for release by:
5/4/2017 3:36:38 PM

Denise Heckler, Project Manager II
(330)966-9477
denise.heckler@testamericainc.com

Table of Contents

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.

GC VOA

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.

General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
J	Reported value was between the limit of detection and the limit of quantitation.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Job ID: 240-78585-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-78585-1

Comments
A revised COC was received on April 24, 2017.

Receipt
The samples were received on 4/25/2017 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

GC/MS VOA
Method(s) 8260B: The reporting limit (RL) provided for the following analyte(s) falls below the laboratory's verified standard quantitation limit: Benzene. Results reported below the verified standard quantitation limit have less certainty (i.e., are estimated) and must be used at the client's discretion. The continuing calibration blanks and method blanks may not support the lower RL.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method(s) 300.0, 9056A: The associated samples were originally prepped and loaded onto the instrument prior to expiring. However due to injection issues on the instrument no usable in hold results were obtained. W-170424-PS-24 (240-78585-2).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
RSK-175	Dissolved Gases (GC)	RSK	TAL CAN
300.0	Anions, Ion Chromatography	MCAWW	TAL CAN
9060	Organic Carbon, Total (TOC)	SW846	TAL CAN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-78585-1	W-170424-PS-23	Water	04/24/17 10:30	04/25/17 09:25
240-78585-2	W-170424-PS-24	Water	04/24/17 11:25	04/25/17 09:25
240-78585-3	W-170424-PS-25	Water	04/24/17 11:45	04/25/17 09:25
240-78585-4	W-170424-PS-26	Water	04/24/17 11:55	04/25/17 09:25
240-78585-5	W-170424-PS-27	Water	04/24/17 13:25	04/25/17 09:25
240-78585-6	TRIP BLANK-006	Water	04/24/17 00:00	04/25/17 09:25

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Client Sample ID: W-170424-PS-23 — Lab Sample ID: 240-78585-1

No Detections.

Client Sample ID: W-170424-PS-24 — Lab Sample ID: 240-78585-2

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	1.6		1.0	0.26	ug/L	1		8260B	Total/NA
Toluene	1.8		1.0	0.23	ug/L	1		8260B	Total/NA
Xylenes, Total	14		2.0	0.24	ug/L	1		8260B	Total/NA
Methane	3.7		0.50	0.080	ug/L	1		RSK-175	Total/NA
Chloride	19.1		1.0	0.41	mg/L	1		300.0	Total/NA
Sulfate	25.0		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	27.9		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170424-PS-25 — Lab Sample ID: 240-78585-3

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	0.40	J	1.0	0.26	ug/L	1		8260B	Total/NA
Xylenes, Total	5.9		2.0	0.24	ug/L	1		8260B	Total/NA
Methane	0.35	J	0.50	0.080	ug/L	1		RSK-175	Total/NA
Chloride	25.6		1.0	0.41	mg/L	1		300.0	Total/NA
Sulfate	23.1		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	33.0		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170424-PS-26 — Lab Sample ID: 240-78585-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	0.40	J	1.0	0.26	ug/L	1		8260B	Total/NA
Xylenes, Total	5.8		2.0	0.24	ug/L	1		8260B	Total/NA
Methane	0.36	J	0.50	0.080	ug/L	1		RSK-175	Total/NA
Chloride	25.7		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	0.082	J	0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	23.1		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	32.1		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-170424-PS-27 — Lab Sample ID: 240-78585-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	0.089	J	0.50	0.080	ug/L	1		RSK-175	Total/NA
Chloride	6.5		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	3.8		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	8.1		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	2.3		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: TRIP BLANK-006 — Lab Sample ID: 240-78585-6

No Detections.

This Detection Summary does not include radiochemical test results.

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Client Sample ID: W-170424-PS-23
Date Collected: 04/24/17 10:30
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			05/02/17 17:21	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			05/02/17 17:21	1
Toluene	<0.23		1.0	0.23	ug/L			05/02/17 17:21	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			05/02/17 17:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*61 - 138*		*05/02/17 17:21*	*1*
4-Bromofluorobenzene (Surr)	*99*		*69 - 120*		*05/02/17 17:21*	*1*
Toluene-d8 (Surr)	*98*		*73 - 120*		*05/02/17 17:21*	*1*
Dibromofluoromethane (Surr)	*105*		*69 - 124*		*05/02/17 17:21*	*1*

Client Sample ID: W-170424-PS-24
Date Collected: 04/24/17 11:25
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			05/02/17 17:43	1
Ethylbenzene	**1.6**		1.0	0.26	ug/L			05/02/17 17:43	1
Toluene	**1.8**		1.0	0.23	ug/L			05/02/17 17:43	1
Xylenes, Total	**14**		2.0	0.24	ug/L			05/02/17 17:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*61 - 138*		*05/02/17 17:43*	*1*
4-Bromofluorobenzene (Surr)	*110*		*69 - 120*		*05/02/17 17:43*	*1*
Toluene-d8 (Surr)	*97*		*73 - 120*		*05/02/17 17:43*	*1*
Dibromofluoromethane (Surr)	*106*		*69 - 124*		*05/02/17 17:43*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**3.7**		0.50	0.080	ug/L			05/03/17 21:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*78*		*76 - 121*		*05/03/17 21:11*	*1*

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**19.1**		1.0	0.41	mg/L			04/28/17 00:51	1
Nitrate as N	<0.035	H	0.10	0.035	mg/L			04/28/17 00:51	1
Sulfate	**25.0**		1.0	0.13	mg/L			04/28/17 00:51	1
Total Organic Carbon	**27.9**		1.0	0.080	mg/L			04/30/17 21:35	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Client Sample ID: W-170424-PS-25
Date Collected: 04/24/17 11:45
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			05/02/17 18:06	1
Ethylbenzene	**0.40**	**J**	1.0	0.26	ug/L			05/02/17 18:06	1
Toluene	<0.23		1.0	0.23	ug/L			05/02/17 18:06	1
Xylenes, Total	**5.9**		2.0	0.24	ug/L			05/02/17 18:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*61 - 138*		*05/02/17 18:06*	*1*
4-Bromofluorobenzene (Surr)	*109*		*69 - 120*		*05/02/17 18:06*	*1*
Toluene-d8 (Surr)	*98*		*73 - 120*		*05/02/17 18:06*	*1*
Dibromofluoromethane (Surr)	*107*		*69 - 124*		*05/02/17 18:06*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.35**	**J**	0.50	0.080	ug/L			05/03/17 22:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*78*		*76 - 121*		*05/03/17 22:02*	*1*

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**25.6**		1.0	0.41	mg/L			04/28/17 01:52	1
Nitrate as N	<0.035		0.10	0.035	mg/L			04/26/17 00:12	1
Sulfate	**23.1**		1.0	0.13	mg/L			04/28/17 01:52	1
Total Organic Carbon	**33.0**		1.0	0.080	mg/L			05/01/17 01:02	1

Client Sample ID: W-170424-PS-26
Date Collected: 04/24/17 11:55
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			05/02/17 18:28	1
Ethylbenzene	**0.40**	**J**	1.0	0.26	ug/L			05/02/17 18:28	1
Toluene	<0.23		1.0	0.23	ug/L			05/02/17 18:28	1
Xylenes, Total	**5.8**		2.0	0.24	ug/L			05/02/17 18:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*61 - 138*		*05/02/17 18:28*	*1*
4-Bromofluorobenzene (Surr)	*107*		*69 - 120*		*05/02/17 18:28*	*1*
Toluene-d8 (Surr)	*96*		*73 - 120*		*05/02/17 18:28*	*1*
Dibromofluoromethane (Surr)	*107*		*69 - 124*		*05/02/17 18:28*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.36**	**J**	0.50	0.080	ug/L			05/03/17 22:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*77*		*76 - 121*		*05/03/17 22:19*	*1*

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**25.7**		1.0	0.41	mg/L			04/28/17 03:35	1
Nitrate as N	**0.082**	**J**	0.10	0.035	mg/L			04/26/17 00:32	1
Sulfate	**23.1**		1.0	0.13	mg/L			04/28/17 03:35	1
Total Organic Carbon	**32.1**		1.0	0.080	mg/L			05/01/17 01:30	1

Client Sample ID: W-170424-PS-27

Date Collected: 04/24/17 13:25
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-5

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			05/02/17 18:50	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			05/02/17 18:50	1
Toluene	<0.23		1.0	0.23	ug/L			05/02/17 18:50	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			05/02/17 18:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*61 - 138*		*05/02/17 18:50*	*1*
4-Bromofluorobenzene (Surr)	*104*		*69 - 120*		*05/02/17 18:50*	*1*
Toluene-d8 (Surr)	*97*		*73 - 120*		*05/02/17 18:50*	*1*
Dibromofluoromethane (Surr)	*103*		*69 - 124*		*05/02/17 18:50*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.089**	**J**	0.50	0.080	ug/L			05/03/17 22:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*78*		*76 - 121*		*05/03/17 22:36*	*1*

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**6.5**		1.0	0.41	mg/L			04/28/17 03:55	1
Nitrate as N	**3.8**		0.10	0.035	mg/L			04/26/17 00:52	1
Sulfate	**8.1**		1.0	0.13	mg/L			04/28/17 03:55	1
Total Organic Carbon	**2.3**		1.0	0.080	mg/L			05/01/17 02:00	1

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Client Sample ID: TRIP BLANK-006
Date Collected: 04/24/17 00:00
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			05/02/17 19:12	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			05/02/17 19:12	1
Toluene	<0.23		1.0	0.23	ug/L			05/02/17 19:12	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			05/02/17 19:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*61 - 138*		*05/02/17 19:12*	*1*
4-Bromofluorobenzene (Surr)	*102*		*69 - 120*		*05/02/17 19:12*	*1*
Toluene-d8 (Surr)	*98*		*73 - 120*		*05/02/17 19:12*	*1*
Dibromofluoromethane (Surr)	*104*		*69 - 124*		*05/02/17 19:12*	*1*

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(61-138)	(69-120)	(73-120)	(69-124)
240-78585-1	W-170424-PS-23	104	99	98	105
240-78585-2	W-170424-PS-24	106	110	97	106
240-78585-2 MS	W-170424-PS-24	95	108	99	106
240-78585-2 MSD	W-170424-PS-24	96	114	100	106
240-78585-3	W-170424-PS-25	104	109	98	107
240-78585-4	W-170424-PS-26	103	107	96	107
240-78585-5	W-170424-PS-27	102	104	97	103
240-78585-6	TRIP BLANK-006	101	102	98	104
LCS 240-277103/4	Lab Control Sample	101	109	103	107
MB 240-277103/6	Method Blank	108	97	98	107

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: RSK-175 - Dissolved Gases (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		rifluoroet
Lab Sample ID	Client Sample ID	(76-121)
240-78585-2	W-170424-PS-24	78
240-78585-2 MS	W-170424-PS-24	77
240-78585-2 MSD	W-170424-PS-24	76
240-78585-3	W-170424-PS-25	78
240-78585-4	W-170424-PS-26	77
240-78585-5	W-170424-PS-27	78
LCS 240-277378/5	Lab Control Sample	83
MB 240-277378/4	Method Blank	86

Surrogate Legend

1,1,1-Trifluoroethane = 1,1,1-Trifluoroethane

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-277103/6
Matrix: Water
Analysis Batch: 277103

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			05/02/17 11:45	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			05/02/17 11:45	1
Toluene	<0.23		1.0	0.23	ug/L			05/02/17 11:45	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			05/02/17 11:45	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*61 - 138*		*05/02/17 11:45*	*1*
4-Bromofluorobenzene (Surr)	*97*		*69 - 120*		*05/02/17 11:45*	*1*
Toluene-d8 (Surr)	*98*		*73 - 120*		*05/02/17 11:45*	*1*
Dibromofluoromethane (Surr)	*107*		*69 - 124*		*05/02/17 11:45*	*1*

Lab Sample ID: LCS 240-277103/4
Matrix: Water
Analysis Batch: 277103

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	11.4		ug/L		114	79 - 120
Ethylbenzene	10.0	11.1		ug/L		111	80 - 120
Toluene	10.0	11.0		ug/L		110	78 - 120
Xylenes, Total	20.0	22.2		ug/L		111	80 - 120
m-Xylene & p-Xylene	10.0	11.0		ug/L		110	80 - 120
o-Xylene	10.0	11.2		ug/L		112	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*101*		*61 - 138*
4-Bromofluorobenzene (Surr)	*109*		*69 - 120*
Toluene-d8 (Surr)	*103*		*73 - 120*
Dibromofluoromethane (Surr)	*107*		*69 - 124*

Lab Sample ID: 240-78585-2 MS
Matrix: Water
Analysis Batch: 277103

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	<0.28		10.0	10.7		ug/L		107	69 - 127
Ethylbenzene	1.6		10.0	12.2		ug/L		106	72 - 121
Toluene	1.8		10.0	11.7		ug/L		100	69 - 125
Xylenes, Total	14		20.0	34.5		ug/L		104	71 - 122
m-Xylene & p-Xylene	6.6		10.0	16.8		ug/L		102	70 - 121
o-Xylene	7.1		10.0	17.7		ug/L		106	71 - 125

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*61 - 138*
4-Bromofluorobenzene (Surr)	*108*		*69 - 120*
Toluene-d8 (Surr)	*99*		*73 - 120*
Dibromofluoromethane (Surr)	*106*		*69 - 124*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-78585-2 MSD
Matrix: Water
Analysis Batch: 277103

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	<0.28		10.0	10.4		ug/L		104	69 - 127	3	10
Ethylbenzene	1.6		10.0	11.7		ug/L		101	72 - 121	5	15
Toluene	1.8		10.0	11.2		ug/L		94	69 - 125	5	14
Xylenes, Total	14		20.0	33.6		ug/L		100	71 - 122	3	14
m-Xylene & p-Xylene	6.6		10.0	16.2		ug/L		96	70 - 121	4	15
o-Xylene	7.1		10.0	17.4		ug/L		103	71 - 125	2	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*61 - 138*
4-Bromofluorobenzene (Surr)	*114*		*69 - 120*
Toluene-d8 (Surr)	*100*		*73 - 120*
Dibromofluoromethane (Surr)	*106*		*69 - 124*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 240-277378/4
Matrix: Water
Analysis Batch: 277378

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	<0.080		0.50	0.080	ug/L			05/03/17 18:03	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*86*		*76 - 121*		*05/03/17 18:03*	*1*

Lab Sample ID: LCS 240-277378/5
Matrix: Water
Analysis Batch: 277378

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methane			199	192		ug/L		97	80 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*83*		*76 - 121*

Lab Sample ID: 240-78585-2 MS
Matrix: Water
Analysis Batch: 277378

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methane	3.7		199	183		ug/L		90	48 - 159		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*77*		*76 - 121*

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: 240-78585-2 MSD
Matrix: Water
Analysis Batch: 277378

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	3.7		199	184		ug/L		91	48 - 159	1	23

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,1,1-Trifluoroethane	*76*		*76 - 121*

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-276190/25
Matrix: Water
Analysis Batch: 276190

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.035		0.10	0.035	mg/L			04/25/17 21:51	1

Lab Sample ID: LCS 240-276190/26
Matrix: Water
Analysis Batch: 276190

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	2.50	2.52		mg/L		101	90 - 110

Lab Sample ID: MB 240-276499/27
Matrix: Water
Analysis Batch: 276499

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.41		1.0	0.41	mg/L			04/28/17 02:54	1
Sulfate	<0.13		1.0	0.13	mg/L			04/28/17 02:54	1

Lab Sample ID: MB 240-276499/3
Matrix: Water
Analysis Batch: 276499

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.41		1.0	0.41	mg/L			04/27/17 18:41	1
Sulfate	<0.13		1.0	0.13	mg/L			04/27/17 18:41	1

Lab Sample ID: LCS 240-276499/28
Matrix: Water
Analysis Batch: 276499

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	47.92		mg/L		96	90 - 110
Sulfate	50.0	48.14		mg/L		96	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 240-276499/4
Matrix: Water
Analysis Batch: 276499

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	48.02		mg/L		96	90 - 110
Sulfate	50.0	48.19		mg/L		96	90 - 110

Lab Sample ID: 240-78585-2 MS
Matrix: Water
Analysis Batch: 276499

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	19.1		50.0	67.31		mg/L		96	80 - 120
Sulfate	25.0		50.0	73.13		mg/L		96	80 - 120

Lab Sample ID: 240-78585-2 MSD
Matrix: Water
Analysis Batch: 276499

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	19.1		50.0	67.08		mg/L		96	80 - 120	0	15
Sulfate	25.0		50.0	72.93		mg/L		96	80 - 120	0	15

Lab Sample ID: MB 240-276500/27
Matrix: Water
Analysis Batch: 276500

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.035		0.10	0.035	mg/L			04/28/17 02:54	1

Lab Sample ID: MB 240-276500/3
Matrix: Water
Analysis Batch: 276500

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.035		0.10	0.035	mg/L			04/27/17 18:41	1

Lab Sample ID: LCS 240-276500/28
Matrix: Water
Analysis Batch: 276500

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	2.50	2.40		mg/L		96	90 - 110

Lab Sample ID: LCS 240-276500/4
Matrix: Water
Analysis Batch: 276500

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	2.50	2.41		mg/L		96	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 240-78585-2 MS
Matrix: Water
Analysis Batch: 276500

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	<0.035	H	2.50	2.42	H	mg/L		97	80 - 120

Lab Sample ID: 240-78585-2 MSD
Matrix: Water
Analysis Batch: 276500

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	<0.035	H	2.50	2.41	H	mg/L		96	80 - 120	1	15

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 240-276841/37
Matrix: Water
Analysis Batch: 276841

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<0.080		1.0	0.080	mg/L			04/30/17 21:11	1

Lab Sample ID: LCS 240-276841/39
Matrix: Water
Analysis Batch: 276841

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	46.3	47.04		mg/L		102	80 - 120

Lab Sample ID: LLCS 240-276841/38
Matrix: Water
Analysis Batch: 276841

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	4.63	4.63		mg/L		100	88 - 115

Lab Sample ID: 240-78585-2 MS
Matrix: Water
Analysis Batch: 276841

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	27.9		25.0	52.59		mg/L		99	65 - 134

Lab Sample ID: 240-78585-2 MSD
Matrix: Water
Analysis Batch: 276841

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	27.9		25.0	52.10		mg/L		97	65 - 134	1	10

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

GC/MS VOA

Analysis Batch: 277103

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78585-1	W-170424-PS-23	Total/NA	Water	8260B	
240-78585-2	W-170424-PS-24	Total/NA	Water	8260B	
240-78585-3	W-170424-PS-25	Total/NA	Water	8260B	
240-78585-4	W-170424-PS-26	Total/NA	Water	8260B	
240-78585-5	W-170424-PS-27	Total/NA	Water	8260B	
240-78585-6	TRIP BLANK-006	Total/NA	Water	8260B	
MB 240-277103/6	Method Blank	Total/NA	Water	8260B	
LCS 240-277103/4	Lab Control Sample	Total/NA	Water	8260B	
240-78585-2 MS	W-170424-PS-24	Total/NA	Water	8260B	
240-78585-2 MSD	W-170424-PS-24	Total/NA	Water	8260B	

GC VOA

Analysis Batch: 277378

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78585-2	W-170424-PS-24	Total/NA	Water	RSK-175	
240-78585-3	W-170424-PS-25	Total/NA	Water	RSK-175	
240-78585-4	W-170424-PS-26	Total/NA	Water	RSK-175	
240-78585-5	W-170424-PS-27	Total/NA	Water	RSK-175	
MB 240-277378/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-277378/5	Lab Control Sample	Total/NA	Water	RSK-175	
240-78585-2 MS	W-170424-PS-24	Total/NA	Water	RSK-175	
240-78585-2 MSD	W-170424-PS-24	Total/NA	Water	RSK-175	

General Chemistry

Analysis Batch: 276190

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78585-3	W-170424-PS-25	Total/NA	Water	300.0	
240-78585-4	W-170424-PS-26	Total/NA	Water	300.0	
240-78585-5	W-170424-PS-27	Total/NA	Water	300.0	
MB 240-276190/25	Method Blank	Total/NA	Water	300.0	
LCS 240-276190/26	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 276499

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78585-2	W-170424-PS-24	Total/NA	Water	300.0	
240-78585-3	W-170424-PS-25	Total/NA	Water	300.0	
240-78585-4	W-170424-PS-26	Total/NA	Water	300.0	
240-78585-5	W-170424-PS-27	Total/NA	Water	300.0	
MB 240-276499/27	Method Blank	Total/NA	Water	300.0	
MB 240-276499/3	Method Blank	Total/NA	Water	300.0	
LCS 240-276499/28	Lab Control Sample	Total/NA	Water	300.0	
LCS 240-276499/4	Lab Control Sample	Total/NA	Water	300.0	
240-78585-2 MS	W-170424-PS-24	Total/NA	Water	300.0	
240-78585-2 MSD	W-170424-PS-24	Total/NA	Water	300.0	

Analysis Batch: 276500

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78585-2	W-170424-PS-24	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 276500 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 240-276500/27	Method Blank	Total/NA	Water	300.0	
MB 240-276500/3	Method Blank	Total/NA	Water	300.0	
LCS 240-276500/28	Lab Control Sample	Total/NA	Water	300.0	
LCS 240-276500/4	Lab Control Sample	Total/NA	Water	300.0	
240-78585-2 MS	W-170424-PS-24	Total/NA	Water	300.0	
240-78585-2 MSD	W-170424-PS-24	Total/NA	Water	300.0	

Analysis Batch: 276841

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78585-2	W-170424-PS-24	Total/NA	Water	9060	
240-78585-3	W-170424-PS-25	Total/NA	Water	9060	
240-78585-4	W-170424-PS-26	Total/NA	Water	9060	
240-78585-5	W-170424-PS-27	Total/NA	Water	9060	
MB 240-276841/37	Method Blank	Total/NA	Water	9060	
LCS 240-276841/39	Lab Control Sample	Total/NA	Water	9060	
LLCS 240-276841/38	Lab Control Sample	Total/NA	Water	9060	
240-78585-2 MS	W-170424-PS-24	Total/NA	Water	9060	
240-78585-2 MSD	W-170424-PS-24	Total/NA	Water	9060	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Client Sample ID: W-170424-PS-23
Date Collected: 04/24/17 10:30
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	277103	05/02/17 17:21	LEE	TAL CAN

Client Sample ID: W-170424-PS-24
Date Collected: 04/24/17 11:25
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	277103	05/02/17 17:43	LEE	TAL CAN
Total/NA	Analysis	RSK-175		1	277378	05/03/17 21:11	BPM	TAL CAN
Total/NA	Analysis	300.0		1	276499	04/28/17 00:51	LKG	TAL CAN
Total/NA	Analysis	300.0		1	276500	04/28/17 00:51	LKG	TAL CAN
Total/NA	Analysis	9060		1	276841	04/30/17 21:35	TPH	TAL CAN

Client Sample ID: W-170424-PS-25
Date Collected: 04/24/17 11:45
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	277103	05/02/17 18:06	LEE	TAL CAN
Total/NA	Analysis	RSK-175		1	277378	05/03/17 22:02	BPM	TAL CAN
Total/NA	Analysis	300.0		1	276499	04/28/17 01:52	LKG	TAL CAN
Total/NA	Analysis	300.0		1	276190	04/26/17 00:12	LKG	TAL CAN
Total/NA	Analysis	9060		1	276841	05/01/17 01:02	TPH	TAL CAN

Client Sample ID: W-170424-PS-26
Date Collected: 04/24/17 11:55
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	277103	05/02/17 18:28	LEE	TAL CAN
Total/NA	Analysis	RSK-175		1	277378	05/03/17 22:19	BPM	TAL CAN
Total/NA	Analysis	300.0		1	276499	04/28/17 03:35	LKG	TAL CAN
Total/NA	Analysis	300.0		1	276190	04/26/17 00:32	LKG	TAL CAN
Total/NA	Analysis	9060		1	276841	05/01/17 01:30	TPH	TAL CAN

Client Sample ID: W-170424-PS-27
Date Collected: 04/24/17 13:25
Date Received: 04/25/17 09:25

Lab Sample ID: 240-78585-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	277103	05/02/17 18:50	LEE	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Client Sample ID: W-170424-PS-27

Lab Sample ID: 240-78585-5

Date Collected: 04/24/17 13:25
Matrix: Water
Date Received: 04/25/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	277378	05/03/17 22:36	BPM	TAL CAN
Total/NA	Analysis	300.0		1	276499	04/28/17 03:55	LKG	TAL CAN
Total/NA	Analysis	300.0		1	276190	04/26/17 00:52	LKG	TAL CAN
Total/NA	Analysis	9060		1	276841	05/01/17 02:00	TPH	TAL CAN

Client Sample ID: TRIP BLANK-006

Lab Sample ID: 240-78585-6

Date Collected: 04/24/17 00:00
Matrix: Water
Date Received: 04/25/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	277103	05/02/17 19:12	LEE	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78585-1

Laboratory: TestAmerica Canton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999518190	08-31-17 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
RSK-175		Water	Methane

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

CAMBRIDGE 240506

Chain of Custody Record

CAMBRIDGE 240506

TestAmerica

Client Information	Sampler: P. Stahr	Lab PM: Heckler, Denise D	Carrier Tracking No(s):	COC No: 240-42024-18273.4
Client Contact: Mr. Grant Anderson	Phone: 651-247-4218	E-Mail: denise.heckler@testamericainc.com		Page: Page 4 of 4
Company: GHD Services Inc.				Job #:
Address: 1801 Old Highway 8 NW Suite 114	Due Date Requested:			
City: St. Paul	TAT Requested (days): Standard.			
State, Zip: MN, 55112				
Phone: 651-639-0913(Tel) 651-639-0923(Fax)	PO #: 34001059			
Email: grant.anderson@ghd.com	WO #: 86165			
Project Name: 86165-03-11, Penta Wood	Project #: 24012755			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - BTEX	8151A - Pentachlorophenol	2320B - Alkalinity	2340C - Hardness, Total (mg/l as CaCO3)	6010 - As, Cu, Zn, Fe, Mn	8015B, RSK_175	8270C - Naphthalene	300.0_28D - Chloride & Sulfate, Nitrate	9060 - TOC	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	A	N	N	D	D	A	N	N	S	X	
W-170424-PS-23	4-24-2017	1030		Water			X										
24	↓	1125		Water			X					X		X	X		Note: 48-hr extraction
25		1145		Water			X					X		X	X		
26		1155		Water			X					X		X	X		
27		1325		Water			X					X		X	X		
Trip Blank - 006							X										

240-78585 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:		Time:	Method of Shipment:
Relinquished by: [signature]	Date/Time: 4-24-2017 1400	Company	Received by: [signature]	Date/Time: 04/25/17 925	Company: TAC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

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5/4/2017

14 13 12 11 10 9 8 7 6 5 4 3 2 1

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

CAMBRIDGE 240506 3.413.1 **Chain of Custody Record** CAMBRIDGE 240506

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: R Stanek	Lab PM: Heckler, Denise D	Carrier Tracking No(s):	COC No: 240-42024-18273.1
Client Contact: Mr. Grant Anderson	Phone:	E-Mail: denise.heckler@testamericainc.com		Page: Page 1 of 4
Company: GHD Services Inc.				Job #:
Address: 1801 Old Highway 8 NW Suite 114	Due Date Requested:			
City: St. Paul	TAT Requested (days): Standard			
State, Zip: MN, 55112				
Phone: 651-639-0913(Tel) 651-639-0923(Fax)	PO #: 34001059			
Email: grant.anderson@ghd.com	WO #: 86165			
Project Name: 86165-03-11, Penta Wood	Project #: 24012755			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - BTEX	8151A - Pentachlorophenol	2320B - Alkalinity	2340C - Hardness, Total (mg/l as CaCO3)	6020 - As, Cu,Zn,Fe, Mn	8260B, RSK_175	8270C - Naphthalene	300.0_28D - Chloride & Sulfate & Nitrate	9060 - TOC	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	N	N	D	D	A	N	N	S		
W-170424-PS-24 MS/MSD				Water			X					X		X	X		
25				Water			X					X		X	X		
26				Water			X					X		X	X		
27				Water			X					X		X	X		
TRIP Blank-006				Water			X										
				Water													
				Water													
				Water													
				Water													
				Water													
				Water													

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 04/25/17 925	Company TAL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 78585**
Canton Facility

Client GHD Site Name Dexter Wood | Cooler unpacked by: DSD

Cooler Received on 04/25/17 Opened on 04/25/17

FedEx: 1st Grd Exp UPS FAS Stetson Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # Foam Box Client Cooler Box Other

Packing material used: Bubble Wrap Foam Plastic Bag None Other

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.3** °C) Observed Cooler Temp. 3.4 °C Corrected Cooler Temp. 3.1 °C
   IR GUN #36 (CF **+0.8**°C) Observed Cooler Temp. ____ °C Corrected Cooler Temp. ____ °C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
   -Were custody seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 11-15 have been checked at the originating laboratory.
11. Were sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC682547**
12. Were VOAs on the COC? Yes No
13. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # COVID Yes No
15. Was a LL Hg or Me Hg trip blank present? ____ Yes No

Contacted PM ____ Date ____ by ____ via Verbal Voice Mail Other

Concerning ____

14. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES | Samples processed by:

15. SAMPLE CONDITION

Sample(s) ____ were received after the recommended holding time had expired.
Sample(s) ____ were received in a broken container.
Sample(s) ____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) ____ were further preserved in the laboratory.
Time preserved: ____ Preservative(s) added/Lot number(s): ____

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-78629-1
Client Project/Site: 86165-04-05, Penta Wood

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson

Denise D Heckler

Authorized for release by:
5/8/2017 10:30:11 AM

Denise Heckler, Project Manager II
(330)966-9477
denise.heckler@testamericainc.com

Table of Contents

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78629-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
X	Surrogate is outside control limits
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Metals

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.
B	Compound was found in the blank and sample.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-78629-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-78629-1

Comments
No additional comments.

Receipt
The samples were received on 4/26/2017 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 1.9º C, 2.1º C and 2.5º C.

GC/MS Semi VOA
Method(s) 8270C: The following samples were diluted due to the nature of the sample matrix: W-170424-PS-24 (240-78629-2), W-170424-PS-24 (240-78629-2[MS]), W-170424-PS-24 (240-78629-2[MSD]), W-170424-PS-25 (240-78629-3) and W-170424-PS-26 (240-78629-4). Elevated reporting limits (RLs) are provided.

Method(s) 8270C: Internal standard (ISTD) response for Perylene-d12 for the following samples was outside acceptance criteria: W-170424-PS-24 (240-78629-2), W-170424-PS-24 (240-78629-2[MS]), W-170424-PS-24 (240-78629-2[MSD]), W-170424-PS-25 (240-78629-3) and W-170424-PS-26 (240-78629-4). This ISTD does not correspond to any of the requested target compounds; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method(s) 8151A: The following samples was diluted due to the abundance of target analytes: W-170424-PS-24 (240-78629-2), W-170424-PS-24 (240-78629-2[MS]), W-170424-PS-24 (240-78629-2[MSD]), W-170424-PS-25 (240-78629-3) and W-170424-PS-26 (240-78629-4)MS and MSD are diluted out.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78629-1

Method	Method Description	Protocol	Laboratory
8270C	Semivolatile Organic Compounds (GC/MS)	SW846	TAL CAN
8151A	Herbicides (GC)	SW846	TAL PIT
6020	Metals (ICP/MS)	SW846	TAL CAN
2320B-1997	Alkalinity, Total	SM	TAL CAN
2340C-1997	Hardness, Total	SM	TAL CAN

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Sample Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78629-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-78629-1	W-170424-PS-23	Water	04/24/17 10:30	04/26/17 09:30
240-78629-2	W-170424-PS-24	Water	04/24/17 11:25	04/26/17 09:30
240-78629-3	W-170424-PS-25	Water	04/24/17 11:45	04/26/17 09:30
240-78629-4	W-170424-PS-26	Water	04/24/17 11:55	04/26/17 09:30
240-78629-5	W-170424-PS-27	Water	04/24/17 13:25	04/26/17 09:30

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78629-1

Client Sample ID: W-170424-PS-23 — Lab Sample ID: 240-78629-1

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.043	J p	0.11	0.016	ug/L	4		8151A	Total/NA
Arsenic	1.6	J	5.0	0.35	ug/L	1		6020	Total Recoverable
Copper	2.2	B	2.0	0.36	ug/L	1		6020	Total Recoverable
Iron	64.0	J B	100	5.3	ug/L	1		6020	Total Recoverable
Manganese	8.1	B	5.0	0.25	ug/L	1		6020	Total Recoverable

Client Sample ID: W-170424-PS-24 — Lab Sample ID: 240-78629-2

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Naphthalene	20		1.1	0.35	ug/L	5		8270C	Total/NA
Pentachlorophenol	7600		260	40	ug/L	10000		8151A	Total/NA
Arsenic	0.76	J	5.0	0.35	ug/L	1		6020	Total Recoverable
Copper	5.9	B	2.0	0.36	ug/L	1		6020	Total Recoverable
Iron	756	B	100	5.3	ug/L	1		6020	Total Recoverable
Manganese	897	B	5.0	0.25	ug/L	1		6020	Total Recoverable
Alkalinity	142		5.0	2.6	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	234		5.0	2.4	mg/L	1		2340C-1997	Total/NA

Client Sample ID: W-170424-PS-25 — Lab Sample ID: 240-78629-3

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Naphthalene	11		1.1	0.36	ug/L	5		8270C	Total/NA
Pentachlorophenol	4300		260	41	ug/L	10000		8151A	Total/NA
Arsenic	0.74	J	5.0	0.35	ug/L	1		6020	Total Recoverable
Copper	3.3	B	2.0	0.36	ug/L	1		6020	Total Recoverable
Iron	394	B	100	5.3	ug/L	1		6020	Total Recoverable
Manganese	1340	B	5.0	0.25	ug/L	1		6020	Total Recoverable
Alkalinity	195		5.0	2.6	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	332		5.0	2.4	mg/L	1		2340C-1997	Total/NA

Client Sample ID: W-170424-PS-26 — Lab Sample ID: 240-78629-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Naphthalene	10		1.1	0.36	ug/L	5		8270C	Total/NA
Pentachlorophenol	3300		260	40	ug/L	10000		8151A	Total/NA
Arsenic	0.65	J	5.0	0.35	ug/L	1		6020	Total Recoverable
Copper	3.3	B	2.0	0.36	ug/L	1		6020	Total Recoverable
Iron	406	B	100	5.3	ug/L	1		6020	Total Recoverable

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78629-1

Client Sample ID: W-170424-PS-26 (Continued) — Lab Sample ID: 240-78629-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Manganese	1380	B	5.0	0.25	ug/L	1		6020	Total Recoverable
Alkalinity	195		5.0	2.6	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	350		5.0	2.4	mg/L	1		2340C-1997	Total/NA

Client Sample ID: W-170424-PS-27 — Lab Sample ID: 240-78629-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.13		0.10	0.016	ug/L	4		8151A	Total/NA
Copper	3.3	B	2.0	0.36	ug/L	1		6020	Total Recoverable
Iron	8.3	J B	100	5.3	ug/L	1		6020	Total Recoverable
Manganese	7.4	B	5.0	0.25	ug/L	1		6020	Total Recoverable
Alkalinity	198		5.0	2.6	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	268		5.0	2.4	mg/L	1		2340C-1997	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: W-170424-PS-23

Lab Sample ID: 240-78629-1

Date Collected: 04/24/17 10:30

Matrix: Water

Date Received: 04/26/17 09:30

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.070		0.22	0.070	ug/L		04/27/17 09:01	05/02/17 12:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*82*		*42 - 120*	*04/27/17 09:01*	*05/02/17 12:28*	*1*
2-Fluorophenol (Surr)	*46*		*10 - 120*	*04/27/17 09:01*	*05/02/17 12:28*	*1*
2,4,6-Tribromophenol (Surr)	*81*		*35 - 125*	*04/27/17 09:01*	*05/02/17 12:28*	*1*
Nitrobenzene-d5 (Surr)	*78*		*36 - 120*	*04/27/17 09:01*	*05/02/17 12:28*	*1*
Phenol-d5 (Surr)	*30*		*10 - 120*	*04/27/17 09:01*	*05/02/17 12:28*	*1*
Terphenyl-d14 (Surr)	*84*		*17 - 120*	*04/27/17 09:01*	*05/02/17 12:28*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.043**	**J p**	0.11	0.016	ug/L		04/28/17 15:40	05/02/17 07:22	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*64*		*18 - 125*	*04/28/17 15:40*	*05/02/17 07:22*	*4*

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.6**	**J**	5.0	0.35	ug/L		04/28/17 14:00	05/02/17 04:19	1
Copper	**2.2**	**B**	2.0	0.36	ug/L		04/28/17 14:00	05/02/17 04:19	1
Iron	**64.0**	**J B**	100	5.3	ug/L		04/28/17 14:00	05/02/17 04:19	1
Manganese	**8.1**	**B**	5.0	0.25	ug/L		04/28/17 14:00	05/02/17 04:19	1
Zinc	<6.2		20.0	6.2	ug/L		04/28/17 14:00	05/02/17 04:19	1

Client Sample ID: W-170424-PS-24

Lab Sample ID: 240-78629-2

Date Collected: 04/24/17 11:25

Matrix: Water

Date Received: 04/26/17 09:30

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	20		1.1	0.35	ug/L		04/27/17 09:01	05/01/17 19:22	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*49*		*42 - 120*	*04/27/17 09:01*	*05/01/17 19:22*	*5*
2-Fluorophenol (Surr)	*43*		*10 - 120*	*04/27/17 09:01*	*05/01/17 19:22*	*5*
2,4,6-Tribromophenol (Surr)	*56*		*35 - 125*	*04/27/17 09:01*	*05/01/17 19:22*	*5*
Nitrobenzene-d5 (Surr)	*71*		*36 - 120*	*04/27/17 09:01*	*05/01/17 19:22*	*5*
Phenol-d5 (Surr)	*27*		*10 - 120*	*04/27/17 09:01*	*05/01/17 19:22*	*5*
Terphenyl-d14 (Surr)	*91*		*17 - 120*	*04/27/17 09:01*	*05/01/17 19:22*	*5*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	7600		260	40	ug/L		04/28/17 15:40	05/02/17 12:18	10000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*04/28/17 15:40*	*05/02/17 12:18*	*10000*

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.76	J	5.0	0.35	ug/L		04/28/17 14:00	05/02/17 03:58	1
Copper	5.9	B	2.0	0.36	ug/L		04/28/17 14:00	05/02/17 03:58	1
Iron	756	B	100	5.3	ug/L		04/28/17 14:00	05/02/17 03:58	1
Manganese	897	B	5.0	0.25	ug/L		04/28/17 14:00	05/02/17 03:58	1
Zinc	<6.2		20.0	6.2	ug/L		04/28/17 14:00	05/02/17 03:58	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	142		5.0	2.6	mg/L			05/05/17 10:42	1
Hardness as calcium carbonate	234		5.0	2.4	mg/L			05/03/17 07:40	1

Client Sample ID: W-170424-PS-25

Date Collected: 04/24/17 11:45
Date Received: 04/26/17 09:30

Lab Sample ID: 240-78629-3

Matrix: Water

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	11		1.1	0.36	ug/L		04/27/17 09:01	05/01/17 20:35	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*66*		*42 - 120*	*04/27/17 09:01*	*05/01/17 20:35*	*5*
2-Fluorophenol (Surr)	*39*		*10 - 120*	*04/27/17 09:01*	*05/01/17 20:35*	*5*
2,4,6-Tribromophenol (Surr)	*80*		*35 - 125*	*04/27/17 09:01*	*05/01/17 20:35*	*5*
Nitrobenzene-d5 (Surr)	*71*		*36 - 120*	*04/27/17 09:01*	*05/01/17 20:35*	*5*
Phenol-d5 (Surr)	*24*		*10 - 120*	*04/27/17 09:01*	*05/01/17 20:35*	*5*
Terphenyl-d14 (Surr)	*85*		*17 - 120*	*04/27/17 09:01*	*05/01/17 20:35*	*5*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	4300		260	41	ug/L		04/28/17 15:40	05/02/17 13:32	10000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*04/28/17 15:40*	*05/02/17 13:32*	*10000*

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.74	J	5.0	0.35	ug/L		04/28/17 14:00	05/02/17 04:23	1
Copper	3.3	B	2.0	0.36	ug/L		04/28/17 14:00	05/02/17 04:23	1
Iron	394	B	100	5.3	ug/L		04/28/17 14:00	05/02/17 04:23	1
Manganese	1340	B	5.0	0.25	ug/L		04/28/17 14:00	05/02/17 04:23	1
Zinc	<6.2		20.0	6.2	ug/L		04/28/17 14:00	05/02/17 04:23	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	195		5.0	2.6	mg/L			05/05/17 11:04	1
Hardness as calcium carbonate	332		5.0	2.4	mg/L			05/03/17 07:50	1

Client Sample ID: W-170424-PS-26

Date Collected: 04/24/17 11:55
Date Received: 04/26/17 09:30

Lab Sample ID: 240-78629-4

Matrix: Water

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	10		1.1	0.36	ug/L		04/27/17 09:01	05/01/17 18:58	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*75*		*42 - 120*	*04/27/17 09:01*	*05/01/17 18:58*	*5*
2-Fluorophenol (Surr)	*40*		*10 - 120*	*04/27/17 09:01*	*05/01/17 18:58*	*5*
2,4,6-Tribromophenol (Surr)	*84*		*35 - 125*	*04/27/17 09:01*	*05/01/17 18:58*	*5*
Nitrobenzene-d5 (Surr)	*70*		*36 - 120*	*04/27/17 09:01*	*05/01/17 18:58*	*5*
Phenol-d5 (Surr)	*25*		*10 - 120*	*04/27/17 09:01*	*05/01/17 18:58*	*5*
Terphenyl-d14 (Surr)	*81*		*17 - 120*	*04/27/17 09:01*	*05/01/17 18:58*	*5*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	3300		260	40	ug/L		04/28/17 15:40	05/02/17 13:57	10000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*04/28/17 15:40*	*05/02/17 13:57*	*10000*

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.65	J	5.0	0.35	ug/L		04/28/17 14:00	05/02/17 04:35	1
Copper	3.3	B	2.0	0.36	ug/L		04/28/17 14:00	05/02/17 04:35	1
Iron	406	B	100	5.3	ug/L		04/28/17 14:00	05/02/17 04:35	1
Manganese	1380	B	5.0	0.25	ug/L		04/28/17 14:00	05/02/17 04:35	1
Zinc	<6.2		20.0	6.2	ug/L		04/28/17 14:00	05/02/17 04:35	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	195		5.0	2.6	mg/L			05/05/17 11:14	1
Hardness as calcium carbonate	350		5.0	2.4	mg/L			05/03/17 07:53	1

Client Sample ID: W-170424-PS-27

Date Collected: 04/24/17 13:25
Date Received: 04/26/17 09:30

Lab Sample ID: 240-78629-5

Matrix: Water

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.071		0.23	0.071	ug/L		04/27/17 09:01	05/02/17 12:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*83*		*42 - 120*	*04/27/17 09:01*	*05/02/17 12:52*	*1*
2-Fluorophenol (Surr)	*44*		*10 - 120*	*04/27/17 09:01*	*05/02/17 12:52*	*1*
2,4,6-Tribromophenol (Surr)	*91*		*35 - 125*	*04/27/17 09:01*	*05/02/17 12:52*	*1*
Nitrobenzene-d5 (Surr)	*80*		*36 - 120*	*04/27/17 09:01*	*05/02/17 12:52*	*1*
Phenol-d5 (Surr)	*28*		*10 - 120*	*04/27/17 09:01*	*05/02/17 12:52*	*1*
Terphenyl-d14 (Surr)	*70*		*17 - 120*	*04/27/17 09:01*	*05/02/17 12:52*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.13**		0.10	0.016	ug/L		04/28/17 15:40	05/02/17 10:15	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*73*		*18 - 125*	*04/28/17 15:40*	*05/02/17 10:15*	*4*

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/28/17 14:00	05/02/17 04:40	1
Copper	**3.3**	**B**	2.0	0.36	ug/L		04/28/17 14:00	05/02/17 04:40	1
Iron	**8.3**	**J B**	100	5.3	ug/L		04/28/17 14:00	05/02/17 04:40	1
Manganese	**7.4**	**B**	5.0	0.25	ug/L		04/28/17 14:00	05/02/17 04:40	1
Zinc	<6.2		20.0	6.2	ug/L		04/28/17 14:00	05/02/17 04:40	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**198**		5.0	2.6	mg/L			05/05/17 11:24	1
Hardness as calcium carbonate	**268**		5.0	2.4	mg/L			05/03/17 07:56	1

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78629-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		FBP	2FP	TBP	NBZ	PHL	TPH
Lab Sample ID	Client Sample ID	(42-120)	(10-120)	(35-125)	(36-120)	(10-120)	(17-120)
240-78629-1	W-170424-PS-23	82	46	81	78	30	84
240-78629-2	W-170424-PS-24	49	43	56	71	27	91
240-78629-2 MS	W-170424-PS-24	50	39	56	73	24	78
240-78629-2 MSD	W-170424-PS-24	51	43	62	74	29	75
240-78629-3	W-170424-PS-25	66	39	80	71	24	85
240-78629-4	W-170424-PS-26	75	40	84	70	25	81
240-78629-5	W-170424-PS-27	83	44	91	80	28	70
LCS 240-276458/19-A	Lab Control Sample	80	45	84	76	30	81
MB 240-276458/18-A	Method Blank	79	53	78	76	36	91

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPH = Terphenyl-d14 (Surr)

Method: 8151A - Herbicides (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPA1	DCPA2
Lab Sample ID	Client Sample ID	(18-125)	(18-125)
240-78629-1	W-170424-PS-23	62	64
240-78629-2	W-170424-PS-24	0 X D	0 X D
240-78629-2 MS	W-170424-PS-24	0 X D	0 X D
240-78629-2 MSD	W-170424-PS-24	0 X D	0 X D
240-78629-3	W-170424-PS-25	0 X D	0 X D
240-78629-4	W-170424-PS-26	0 X D	0 X D
240-78629-5	W-170424-PS-27	73	73
LCS 180-209682/2-A	Lab Control Sample	69	72
MB 180-209682/1-A	Method Blank	55	58

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-276458/18-A
Matrix: Water
Analysis Batch: 276898

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276458

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/27/17 09:01	05/01/17 09:36	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*79*		*42 - 120*	*04/27/17 09:01*	*05/01/17 09:36*	*1*
2-Fluorophenol (Surr)	*53*		*10 - 120*	*04/27/17 09:01*	*05/01/17 09:36*	*1*
2,4,6-Tribromophenol (Surr)	*78*		*35 - 125*	*04/27/17 09:01*	*05/01/17 09:36*	*1*
Nitrobenzene-d5 (Surr)	*76*		*36 - 120*	*04/27/17 09:01*	*05/01/17 09:36*	*1*
Phenol-d5 (Surr)	*36*		*10 - 120*	*04/27/17 09:01*	*05/01/17 09:36*	*1*
Terphenyl-d14 (Surr)	*91*		*17 - 120*	*04/27/17 09:01*	*05/01/17 09:36*	*1*

Lab Sample ID: LCS 240-276458/19-A
Matrix: Water
Analysis Batch: 276898

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276458

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	14.6		ug/L		73	54 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*80*		*42 - 120*
2-Fluorophenol (Surr)	*45*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*84*		*35 - 125*
Nitrobenzene-d5 (Surr)	*76*		*36 - 120*
Phenol-d5 (Surr)	*30*		*10 - 120*
Terphenyl-d14 (Surr)	*81*		*17 - 120*

Lab Sample ID: 240-78629-2 MS
Matrix: Water
Analysis Batch: 276898

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA
Prep Batch: 276458

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene	20		20.8	34.9		ug/L		71	37 - 120		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*50*		*42 - 120*
2-Fluorophenol (Surr)	*39*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*56*		*35 - 125*
Nitrobenzene-d5 (Surr)	*73*		*36 - 120*
Phenol-d5 (Surr)	*24*		*10 - 120*
Terphenyl-d14 (Surr)	*78*		*17 - 120*

Lab Sample ID: 240-78629-2 MSD
Matrix: Water
Analysis Batch: 276898

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA
Prep Batch: 276458

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Naphthalene	20		22.7	36.8		ug/L		73	37 - 120	5	33

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-78629-2 MSD
Matrix: Water
Analysis Batch: 276898

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA
Prep Batch: 276458

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*51*		*42 - 120*
2-Fluorophenol (Surr)	*43*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*62*		*35 - 125*
Nitrobenzene-d5 (Surr)	*74*		*36 - 120*
Phenol-d5 (Surr)	*29*		*10 - 120*
Terphenyl-d14 (Surr)	*75*		*17 - 120*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-209682/1-A
Matrix: Water
Analysis Batch: 209869

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 209682

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/28/17 15:40	05/02/17 06:58	4

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*58*		*18 - 125*	*04/28/17 15:40*	*05/02/17 06:58*	*4*

Lab Sample ID: LCS 180-209682/2-A
Matrix: Water
Analysis Batch: 209815

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 209682

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Pentachlorophenol			5.00	5.22		ug/L		104	30 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*72*		*18 - 125*

Lab Sample ID: 240-78629-2 MS
Matrix: Water
Analysis Batch: 209869

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA
Prep Batch: 209682

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Pentachlorophenol	7600		1.05	7080	4	ug/L		-50663	30 - 150		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*

Lab Sample ID: 240-78629-2 MSD
Matrix: Water
Analysis Batch: 209869

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA
Prep Batch: 209682

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Pentachlorophenol	7600		1.05	6770	4	ug/L		-80038	30 - 150	4	35

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: 240-78629-2 MSD
Matrix: Water
Analysis Batch: 209869

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA
Prep Batch: 209682

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 240-276689/1-A
Matrix: Water
Analysis Batch: 277066

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 276689

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		04/28/17 14:00	05/02/17 03:41	1
Copper	2.95		2.0	0.36	ug/L		04/28/17 14:00	05/02/17 03:41	1
Iron	22.47	J	100	5.3	ug/L		04/28/17 14:00	05/02/17 03:41	1
Manganese	3.99	J	5.0	0.25	ug/L		04/28/17 14:00	05/02/17 03:41	1
Zinc	<6.2		20.0	6.2	ug/L		04/28/17 14:00	05/02/17 03:41	1

Lab Sample ID: LCS 240-276689/3-A
Matrix: Water
Analysis Batch: 277066

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 276689

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	971.9		ug/L		97	80 - 120
Copper	1000	1031		ug/L		103	80 - 120
Iron	10000	9990		ug/L		100	80 - 120
Manganese	1000	1053		ug/L		105	80 - 120
Zinc	1000	959.3		ug/L		96	80 - 120

Lab Sample ID: 240-78629-2 MS
Matrix: Water
Analysis Batch: 277066

Client Sample ID: W-170424-PS-24
Prep Type: Total Recoverable
Prep Batch: 276689

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.76	J	1000	980.1		ug/L		98	75 - 125
Copper	5.9	B	1000	1036		ug/L		103	75 - 125
Iron	756	B	10000	10790		ug/L		100	75 - 125
Manganese	897	B	1000	2074		ug/L		118	75 - 125
Zinc	<6.2		1000	923.6		ug/L		92	75 - 125

Lab Sample ID: 240-78629-2 MSD
Matrix: Water
Analysis Batch: 277066

Client Sample ID: W-170424-PS-24
Prep Type: Total Recoverable
Prep Batch: 276689

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.76	J	1000	941.9		ug/L		94	75 - 125	4	20
Copper	5.9	B	1000	971.2		ug/L		97	75 - 125	6	20
Iron	756	B	10000	10010		ug/L		92	75 - 125	8	20
Manganese	897	B	1000	1935		ug/L		104	75 - 125	7	20
Zinc	<6.2		1000	886.1		ug/L		89	75 - 125	4	20

Method: 2320B-1997 - Alkalinity, Total

Lab Sample ID: MB 240-277850/3
Matrix: Water
Analysis Batch: 277850

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	<2.6		5.0	2.6	mg/L			05/05/17 08:54	1

Lab Sample ID: LCS 240-277850/2
Matrix: Water
Analysis Batch: 277850

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	377	380.0		mg/L		101	86 - 123

Lab Sample ID: 240-78629-2 DU
Matrix: Water
Analysis Batch: 277850

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	142		141.2		mg/L		0.5	20

Method: 2340C-1997 - Hardness, Total

Lab Sample ID: MB 240-277280/1
Matrix: Water
Analysis Batch: 277280

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	<2.4		5.0	2.4	mg/L			05/03/17 07:30	1

Lab Sample ID: LCS 240-277280/2
Matrix: Water
Analysis Batch: 277280

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	170	168.0		mg/L		99	80 - 120

Lab Sample ID: 240-78629-2 MS
Matrix: Water
Analysis Batch: 277280

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	234		1000	1250		mg/L		102	80 - 120

Lab Sample ID: 240-78629-2 MSD
Matrix: Water
Analysis Batch: 277280

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hardness as calcium carbonate	234		1000	1250		mg/L		102	80 - 120	0	10

Method: 2340C-1997 - Hardness, Total (Continued)

Lab Sample ID: 240-78629-2 DU
Matrix: Water
Analysis Batch: 277280

Client Sample ID: W-170424-PS-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Hardness as calcium carbonate	234			234.0		mg/L				0	20

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78629-1

GC/MS Semi VOA

Prep Batch: 276458

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78629-1	W-170424-PS-23	Total/NA	Water	3510C	
240-78629-2	W-170424-PS-24	Total/NA	Water	3510C	
240-78629-3	W-170424-PS-25	Total/NA	Water	3510C	
240-78629-4	W-170424-PS-26	Total/NA	Water	3510C	
240-78629-5	W-170424-PS-27	Total/NA	Water	3510C	
MB 240-276458/18-A	Method Blank	Total/NA	Water	3510C	
LCS 240-276458/19-A	Lab Control Sample	Total/NA	Water	3510C	
240-78629-2 MS	W-170424-PS-24	Total/NA	Water	3510C	
240-78629-2 MSD	W-170424-PS-24	Total/NA	Water	3510C	

Analysis Batch: 276898

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78629-2	W-170424-PS-24	Total/NA	Water	8270C	276458
240-78629-3	W-170424-PS-25	Total/NA	Water	8270C	276458
240-78629-4	W-170424-PS-26	Total/NA	Water	8270C	276458
MB 240-276458/18-A	Method Blank	Total/NA	Water	8270C	276458
LCS 240-276458/19-A	Lab Control Sample	Total/NA	Water	8270C	276458
240-78629-2 MS	W-170424-PS-24	Total/NA	Water	8270C	276458
240-78629-2 MSD	W-170424-PS-24	Total/NA	Water	8270C	276458

Analysis Batch: 277070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78629-1	W-170424-PS-23	Total/NA	Water	8270C	276458
240-78629-5	W-170424-PS-27	Total/NA	Water	8270C	276458

GC Semi VOA

Prep Batch: 209682

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78629-1	W-170424-PS-23	Total/NA	Water	8151A	
240-78629-2	W-170424-PS-24	Total/NA	Water	8151A	
240-78629-3	W-170424-PS-25	Total/NA	Water	8151A	
240-78629-4	W-170424-PS-26	Total/NA	Water	8151A	
240-78629-5	W-170424-PS-27	Total/NA	Water	8151A	
MB 180-209682/1-A	Method Blank	Total/NA	Water	8151A	
LCS 180-209682/2-A	Lab Control Sample	Total/NA	Water	8151A	
240-78629-2 MS	W-170424-PS-24	Total/NA	Water	8151A	
240-78629-2 MSD	W-170424-PS-24	Total/NA	Water	8151A	

Analysis Batch: 209815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 180-209682/2-A	Lab Control Sample	Total/NA	Water	8151A	209682

Analysis Batch: 209869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78629-1	W-170424-PS-23	Total/NA	Water	8151A	209682
240-78629-2	W-170424-PS-24	Total/NA	Water	8151A	209682
240-78629-3	W-170424-PS-25	Total/NA	Water	8151A	209682
240-78629-4	W-170424-PS-26	Total/NA	Water	8151A	209682
240-78629-5	W-170424-PS-27	Total/NA	Water	8151A	209682

GC Semi VOA (Continued)

Analysis Batch: 209869 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-209682/1-A	Method Blank	Total/NA	Water	8151A	209682
240-78629-2 MS	W-170424-PS-24	Total/NA	Water	8151A	209682
240-78629-2 MSD	W-170424-PS-24	Total/NA	Water	8151A	209682

Metals

Prep Batch: 276689

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78629-1	W-170424-PS-23	Total Recoverable	Water	3005A	
240-78629-2	W-170424-PS-24	Total Recoverable	Water	3005A	
240-78629-3	W-170424-PS-25	Total Recoverable	Water	3005A	
240-78629-4	W-170424-PS-26	Total Recoverable	Water	3005A	
240-78629-5	W-170424-PS-27	Total Recoverable	Water	3005A	
MB 240-276689/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-276689/3-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-78629-2 MS	W-170424-PS-24	Total Recoverable	Water	3005A	
240-78629-2 MSD	W-170424-PS-24	Total Recoverable	Water	3005A	

Analysis Batch: 277066

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78629-1	W-170424-PS-23	Total Recoverable	Water	6020	276689
240-78629-2	W-170424-PS-24	Total Recoverable	Water	6020	276689
240-78629-3	W-170424-PS-25	Total Recoverable	Water	6020	276689
240-78629-4	W-170424-PS-26	Total Recoverable	Water	6020	276689
240-78629-5	W-170424-PS-27	Total Recoverable	Water	6020	276689
MB 240-276689/1-A	Method Blank	Total Recoverable	Water	6020	276689
LCS 240-276689/3-A	Lab Control Sample	Total Recoverable	Water	6020	276689
240-78629-2 MS	W-170424-PS-24	Total Recoverable	Water	6020	276689
240-78629-2 MSD	W-170424-PS-24	Total Recoverable	Water	6020	276689

General Chemistry

Analysis Batch: 277280

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78629-2	W-170424-PS-24	Total/NA	Water	2340C-1997	
240-78629-3	W-170424-PS-25	Total/NA	Water	2340C-1997	
240-78629-4	W-170424-PS-26	Total/NA	Water	2340C-1997	
240-78629-5	W-170424-PS-27	Total/NA	Water	2340C-1997	
MB 240-277280/1	Method Blank	Total/NA	Water	2340C-1997	
LCS 240-277280/2	Lab Control Sample	Total/NA	Water	2340C-1997	
240-78629-2 MS	W-170424-PS-24	Total/NA	Water	2340C-1997	
240-78629-2 MSD	W-170424-PS-24	Total/NA	Water	2340C-1997	
240-78629-2 DU	W-170424-PS-24	Total/NA	Water	2340C-1997	

Analysis Batch: 277850

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78629-2	W-170424-PS-24	Total/NA	Water	2320B-1997	
240-78629-3	W-170424-PS-25	Total/NA	Water	2320B-1997	
240-78629-4	W-170424-PS-26	Total/NA	Water	2320B-1997	
240-78629-5	W-170424-PS-27	Total/NA	Water	2320B-1997	

General Chemistry (Continued)

Analysis Batch: 277850 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 240-277850/3	Method Blank	Total/NA	Water	2320B-1997	
LCS 240-277850/2	Lab Control Sample	Total/NA	Water	2320B-1997	
240-78629-2 DU	W-170424-PS-24	Total/NA	Water	2320B-1997	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78629-1

Client Sample ID: W-170424-PS-23
Date Collected: 04/24/17 10:30
Date Received: 04/26/17 09:30

Lab Sample ID: 240-78629-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			276458	04/27/17 09:01	KEH	TAL CAN
Total/NA	Analysis	8270C		1	277070	05/02/17 12:28	JMG	TAL CAN
Total/NA	Prep	8151A			209682	04/28/17 15:40	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209869	05/02/17 07:22	JMO	TAL PIT
Total Recoverable	Prep	3005A			276689	04/28/17 14:00	WKD	TAL CAN
Total Recoverable	Analysis	6020		1	277066	05/02/17 04:19	AS1	TAL CAN

Client Sample ID: W-170424-PS-24
Date Collected: 04/24/17 11:25
Date Received: 04/26/17 09:30

Lab Sample ID: 240-78629-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			276458	04/27/17 09:01	KEH	TAL CAN
Total/NA	Analysis	8270C		5	276898	05/01/17 19:22	JMG	TAL CAN
Total/NA	Prep	8151A			209682	04/28/17 15:40	CBY	TAL PIT
Total/NA	Analysis	8151A		10000	209869	05/02/17 12:18	JMO	TAL PIT
Total Recoverable	Prep	3005A			276689	04/28/17 14:00	WKD	TAL CAN
Total Recoverable	Analysis	6020		1	277066	05/02/17 03:58	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277850	05/05/17 10:42	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	277280	05/03/17 07:40	TPH	TAL CAN

Client Sample ID: W-170424-PS-25
Date Collected: 04/24/17 11:45
Date Received: 04/26/17 09:30

Lab Sample ID: 240-78629-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			276458	04/27/17 09:01	KEH	TAL CAN
Total/NA	Analysis	8270C		5	276898	05/01/17 20:35	JMG	TAL CAN
Total/NA	Prep	8151A			209682	04/28/17 15:40	CBY	TAL PIT
Total/NA	Analysis	8151A		10000	209869	05/02/17 13:32	JMO	TAL PIT
Total Recoverable	Prep	3005A			276689	04/28/17 14:00	WKD	TAL CAN
Total Recoverable	Analysis	6020		1	277066	05/02/17 04:23	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277850	05/05/17 11:04	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	277280	05/03/17 07:50	TPH	TAL CAN

Client Sample ID: W-170424-PS-26
Date Collected: 04/24/17 11:55
Date Received: 04/26/17 09:30

Lab Sample ID: 240-78629-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			276458	04/27/17 09:01	KEH	TAL CAN
Total/NA	Analysis	8270C		5	276898	05/01/17 18:58	JMG	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78629-1

Client Sample ID: W-170424-PS-26

Lab Sample ID: 240-78629-4

Date Collected: 04/24/17 11:55

Matrix: Water

Date Received: 04/26/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8151A			209682	04/28/17 15:40	CBY	TAL PIT
Total/NA	Analysis	8151A		10000	209869	05/02/17 13:57	JMO	TAL PIT
Total Recoverable	Prep	3005A			276689	04/28/17 14:00	WKD	TAL CAN
Total Recoverable	Analysis	6020		1	277066	05/02/17 04:35	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277850	05/05/17 11:14	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	277280	05/03/17 07:53	TPH	TAL CAN

Client Sample ID: W-170424-PS-27

Lab Sample ID: 240-78629-5

Date Collected: 04/24/17 13:25

Matrix: Water

Date Received: 04/26/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			276458	04/27/17 09:01	KEH	TAL CAN
Total/NA	Analysis	8270C		1	277070	05/02/17 12:52	JMG	TAL CAN
Total/NA	Prep	8151A			209682	04/28/17 15:40	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209869	05/02/17 10:15	JMO	TAL PIT
Total Recoverable	Prep	3005A			276689	04/28/17 14:00	WKD	TAL CAN
Total Recoverable	Analysis	6020		1	277066	05/02/17 04:40	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	277850	05/05/17 11:24	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	277280	05/03/17 07:56	TPH	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-04-05, Penta Wood

TestAmerica Job ID: 240-78629-1

Laboratory: TestAmerica Canton

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999518190	08-31-17 *

Laboratory: TestAmerica Pittsburgh

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	998027800	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

CAMBRIDGE 2.4/G2.1 2.8/C2.5
240506

Chain of Custody Record

2.2/C1.9

CAMBRIDGE 240506

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Peter Storli	Lab PM: Heckler, Denise D	Carrier Tracking No(s):	COC No: 240-42024-18273.3
Client Contact: Mr. Grant Anderson	Phone: 651-247-4218	E-Mail: denise.heckler@testamericainc.com		Page: Page 3 of 4
Company: GHD Services Inc.				Job #:

Address: 1801 Old Highway 8 NW Suite 114	Due Date Requested:	Analysis Requested	Preservation Codes:
City: St. Paul	TAT Requested (days): Standard		A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: MN, 55112			
Phone: 651-639-0913(Tel) 651-639-0923(Fax)	PO #: 34001059		Other:
Email: grant.anderson@ghd.com	WO #: 86165		
Project Name: 86165-03-11, Penta Wood	Project #: 24012755		
Site:	SSOW#:		

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wastestoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - BTEX	8151A - Pentachlorophenol	2320B - Alkalinity	2340C - Hardness, Total (mg/l as CaCO3)	6020 - As, Cu,Zn,Fe, Mn	8260B, RSK_175	8270C - Naphthalene	300.0_28D - Chloride & Sulfate & Nitrate	9060 - TOC	Number of containers
			Preservation Code:				A	N	N	D	D	A	N	N	S	
W-170424-PS-23	4-24-207	1030	G	Water				X			X		X			
24		1125		Water				X	X	X	X		X			
25		1145		Water				X	X	X	X		X			
26		1155		Water				X	X	X	X		X			
27		1325		Water				X	X	X	X		X			
				Water												
				Water												
				Water												
				Water												
				Water												
				Water												

240-78629 Chain of Custody

Instructions/Note:

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	4-25-2017 / 1500	GHD		4-26-17 930	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 78629**
Canton Facility

Client GHD Site Name

Cooler Received on 4-26-17 Opened on 4-26-17

Cooler unpacked by:

FedEx: 1st Grd Exp UPS FAS Stetson Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # Foam Box Client Cooler Box Other

Packing material used: Bubble Wrap Foam Plastic Bag None Other

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☑ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.3** °C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
   IR GUN #36 (CF **+0.8**°C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 6 Yes No
   -Were custody seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 11-15 have been checked at the originating laboratory.
11. Were sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC682547**
12. Were VOAs on the COC? Yes No
13. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes No
15. Was a LL Hg or Me Hg trip blank present? Yes No

Contacted PM Date by via Verbal Voice Mail Other

Concerning

14. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

15. SAMPLE CONDITION

Sample(s) were received after the recommended holding time had expired.
Sample(s) were received in a broken container.
Sample(s) were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) were further preserved in the laboratory.
Time preserved: Preservative(s) added/Lot number(s):

TestAmerica Multiple Cooler Receipt Form/Narrative **Login # :** 745029
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
client	8	2.4	21	ice
↓	↓	2.8	2.5	↓
↓	↓	2.2	1.9	↓

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
W-170424-PS-23	240-78629-A-1	Plastic 500ml - with Nitric Acid			
W-170424-PS-24	240-78629-D-2	Plastic 250ml - with Nitric Acid	<2		
W-170424-PS-24	240-78629-E-2	Plastic 250ml - with Nitric Acid	<2		
W-170424-PS-24	240-78629-F-2	Plastic 250ml - with Nitric Acid	<2		
W-170424-PS-24	240-78629-G-2	Plastic 500ml - with Nitric Acid	<2		
W-170424-PS-24	240-78629-H-2	Plastic 500ml - with Nitric Acid	<2		
W-170424-PS-24	240-78629-I-2	Plastic 500ml - with Nitric Acid	<2		
W-170424-PS-25	240-78629-B-3	Plastic 250ml - with Nitric Acid	<2		
W-170424-PS-25	240-78629-C-3	Plastic 500ml - with Nitric Acid	<2		
W-170424-PS-26	240-78629-B-4	Plastic 250ml - with Nitric Acid	<2		
W-170424-PS-26	240-78629-C-4	Plastic 500ml - with Nitric Acid	<2		
W-170424-PS-27	240-78629-B-5	Plastic 250ml - with Nitric Acid	<2		
W-170424-PS-27	240-78629-C-5	Plastic 500ml - with Nitric Acid	<2		

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-78629-1

Login Number: 78629
List Number: 2
Creator: Watson, Debbie

List Source: TestAmerica Pittsburgh
List Creation: 04/27/17 06:01 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-78629-1

Login Number: 78629
List Number: 3
Creator: Watson, Debbie

List Source: TestAmerica Pittsburgh
List Creation: 04/27/17 06:11 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix C
Residential Well and Onsite Supply Well Water Sample Laboratory Reports and Data Validation

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-78382-1
Client Project/Site: 86165-04-06, Penta Wood

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson

Denise D Heckler

Authorized for release by:
5/1/2017 3:42:44 PM

Denise Heckler, Project Manager II
(330)966-9477
denise.heckler@testamericainc.com

Table of Contents

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Reported value was between the limit of detection and the limit of quantitation.

GC Semi VOA

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Job ID: 240-78382-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-78382-1

Comments
No additional comments.

Receipt
The samples were received on 4/20/2017 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 9 coolers at receipt time were 0.5º C, 1.5º C, 2.5º C, 2.7º C, 2.7º C, 2.9º C, 3.1º C, 3.3º C and 4.5º C.

GC/MS VOA
Method(s) 8260B: The reporting limit (RL) provided for the following analyte (Benzene) falls below the laboratory's verified standard quantitation limit: Results reported below the verified standard quantitation limit have less certainty (i.e., are estimated) and must be used at the clients discretion. The continuing calibration blanks and method blanks may not support the lower RL.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8270C	Semivolatile Organic Compounds (GC/MS)	SW846	TAL CAN
8151A	Herbicides (GC)	SW846	TAL PIT

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Sample Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-78382-1	W-170417-PS-05R	Water	04/17/17 14:25	04/20/17 09:20
240-78382-2	W-170417-PS-02R	Water	04/17/17 14:57	04/20/17 09:20
240-78382-3	W-170417-PS-04R	Water	04/17/17 15:18	04/20/17 09:20
240-78382-4	W-170417-PS-03R	Water	04/17/17 15:45	04/20/17 09:20
240-78382-5	W-170418-PS-07R	Water	04/18/17 10:20	04/20/17 09:20
240-78382-6	W-170418-PS-08R	Water	04/18/17 10:30	04/20/17 09:20
240-78382-7	W-170418-PS-09R	Water	04/18/17 10:45	04/20/17 09:20
240-78382-8	TRIP BLANK-002	Water	04/18/17 11:00	04/20/17 09:20
240-78382-9	W-170418-PS-06R	Water	04/18/17 11:36	04/20/17 09:20

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Client Sample ID: W-170417-PS-05R — Lab Sample ID: 240-78382-1

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.39	J B	0.50	0.28	ug/L	1		8260B	Total/NA

Client Sample ID: W-170417-PS-02R — Lab Sample ID: 240-78382-2

No Detections.

Client Sample ID: W-170417-PS-04R — Lab Sample ID: 240-78382-3

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.34	J B	0.50	0.28	ug/L	1		8260B	Total/NA

Client Sample ID: W-170417-PS-03R — Lab Sample ID: 240-78382-4

No Detections.

Client Sample ID: W-170418-PS-07R — Lab Sample ID: 240-78382-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.29	J B	0.50	0.28	ug/L	1		8260B	Total/NA
Pentachlorophenol	0.020	J p	0.10	0.016	ug/L	4		8151A	Total/NA

Client Sample ID: W-170418-PS-08R — Lab Sample ID: 240-78382-6

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.022	J p	0.098	0.015	ug/L	4		8151A	Total/NA

Client Sample ID: W-170418-PS-09R — Lab Sample ID: 240-78382-7

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.44	J B	0.50	0.28	ug/L	1		8260B	Total/NA

Client Sample ID: TRIP BLANK-002 — Lab Sample ID: 240-78382-8

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.44	J B	0.50	0.28	ug/L	1		8260B	Total/NA

Client Sample ID: W-170418-PS-06R — Lab Sample ID: 240-78382-9

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.47	J B	0.50	0.28	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Client Sample ID: W-170417-PS-05R
Date Collected: 04/17/17 14:25
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78382-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.39	J B	0.50	0.28	ug/L			04/26/17 16:56	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/26/17 16:56	1
Toluene	<0.23		1.0	0.23	ug/L			04/26/17 16:56	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/26/17 16:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*61 - 138*		*04/26/17 16:56*	*1*
4-Bromofluorobenzene (Surr)	*89*		*69 - 120*		*04/26/17 16:56*	*1*
Toluene-d8 (Surr)	*98*		*73 - 120*		*04/26/17 16:56*	*1*
Dibromofluoromethane (Surr)	*104*		*69 - 124*		*04/26/17 16:56*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.060		0.19	0.060	ug/L		04/24/17 08:33	04/26/17 15:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*74*		*42 - 120*	*04/24/17 08:33*	*04/26/17 15:01*	*1*
2-Fluorophenol (Surr)	*42*		*10 - 120*	*04/24/17 08:33*	*04/26/17 15:01*	*1*
2,4,6-Tribromophenol (Surr)	*62*		*35 - 125*	*04/24/17 08:33*	*04/26/17 15:01*	*1*
Nitrobenzene-d5 (Surr)	*73*		*36 - 120*	*04/24/17 08:33*	*04/26/17 15:01*	*1*
Phenol-d5 (Surr)	*25*		*10 - 120*	*04/24/17 08:33*	*04/26/17 15:01*	*1*
Terphenyl-d14 (Surr)	*77*		*17 - 120*	*04/24/17 08:33*	*04/26/17 15:01*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.015		0.097	0.015	ug/L		04/22/17 08:10	04/25/17 10:51	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*66*		*18 - 125*	*04/22/17 08:10*	*04/25/17 10:51*	*4*

Client Sample ID: W-170417-PS-02R
Date Collected: 04/17/17 14:57
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78382-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 16:30	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/26/17 17:18	1
Toluene	<0.23		1.0	0.23	ug/L			04/26/17 17:18	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/26/17 17:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*61 - 138*		*04/26/17 17:18*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*61 - 138*		*04/27/17 16:30*	*1*
4-Bromofluorobenzene (Surr)	*92*		*69 - 120*		*04/26/17 17:18*	*1*
4-Bromofluorobenzene (Surr)	*88*		*69 - 120*		*04/27/17 16:30*	*1*
Toluene-d8 (Surr)	*97*		*73 - 120*		*04/26/17 17:18*	*1*
Toluene-d8 (Surr)	*96*		*73 - 120*		*04/27/17 16:30*	*1*
Dibromofluoromethane (Surr)	*103*		*69 - 124*		*04/26/17 17:18*	*1*
Dibromofluoromethane (Surr)	*107*		*69 - 124*		*04/27/17 16:30*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.060		0.19	0.060	ug/L		04/24/17 08:33	04/26/17 15:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*76*		*42 - 120*	*04/24/17 08:33*	*04/26/17 15:27*	*1*
2-Fluorophenol (Surr)	*42*		*10 - 120*	*04/24/17 08:33*	*04/26/17 15:27*	*1*
2,4,6-Tribromophenol (Surr)	*62*		*35 - 125*	*04/24/17 08:33*	*04/26/17 15:27*	*1*
Nitrobenzene-d5 (Surr)	*75*		*36 - 120*	*04/24/17 08:33*	*04/26/17 15:27*	*1*
Phenol-d5 (Surr)	*24*		*10 - 120*	*04/24/17 08:33*	*04/26/17 15:27*	*1*
Terphenyl-d14 (Surr)	*76*		*17 - 120*	*04/24/17 08:33*	*04/26/17 15:27*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.015		0.095	0.015	ug/L		04/22/17 08:10	04/25/17 11:16	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*54*		*18 - 125*	*04/22/17 08:10*	*04/25/17 11:16*	*4*

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Client Sample ID: W-170417-PS-04R
Date Collected: 04/17/17 15:18
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78382-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.34	J B	0.50	0.28	ug/L			04/26/17 17:41	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/26/17 17:41	1
Toluene	<0.23		1.0	0.23	ug/L			04/26/17 17:41	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/26/17 17:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*61 - 138*		*04/26/17 17:41*	*1*
4-Bromofluorobenzene (Surr)	*91*		*69 - 120*		*04/26/17 17:41*	*1*
Toluene-d8 (Surr)	*99*		*73 - 120*		*04/26/17 17:41*	*1*
Dibromofluoromethane (Surr)	*106*		*69 - 124*		*04/26/17 17:41*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.060		0.19	0.060	ug/L		04/24/17 08:33	04/26/17 15:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*67*		*42 - 120*	*04/24/17 08:33*	*04/26/17 15:52*	*1*
2-Fluorophenol (Surr)	*35*		*10 - 120*	*04/24/17 08:33*	*04/26/17 15:52*	*1*
2,4,6-Tribromophenol (Surr)	*54*		*35 - 125*	*04/24/17 08:33*	*04/26/17 15:52*	*1*
Nitrobenzene-d5 (Surr)	*66*		*36 - 120*	*04/24/17 08:33*	*04/26/17 15:52*	*1*
Phenol-d5 (Surr)	*20*		*10 - 120*	*04/24/17 08:33*	*04/26/17 15:52*	*1*
Terphenyl-d14 (Surr)	*75*		*17 - 120*	*04/24/17 08:33*	*04/26/17 15:52*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.015		0.094	0.015	ug/L		04/22/17 08:10	04/25/17 11:40	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*57*		*18 - 125*	*04/22/17 08:10*	*04/25/17 11:40*	*4*

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Client Sample ID: W-170417-PS-03R
Date Collected: 04/17/17 15:45
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78382-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 17:14	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/26/17 18:03	1
Toluene	<0.23		1.0	0.23	ug/L			04/26/17 18:03	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/26/17 18:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*61 - 138*		*04/26/17 18:03*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*61 - 138*		*04/27/17 17:14*	*1*
4-Bromofluorobenzene (Surr)	*91*		*69 - 120*		*04/26/17 18:03*	*1*
4-Bromofluorobenzene (Surr)	*90*		*69 - 120*		*04/27/17 17:14*	*1*
Toluene-d8 (Surr)	*93*		*73 - 120*		*04/26/17 18:03*	*1*
Toluene-d8 (Surr)	*100*		*73 - 120*		*04/27/17 17:14*	*1*
Dibromofluoromethane (Surr)	*105*		*69 - 124*		*04/26/17 18:03*	*1*
Dibromofluoromethane (Surr)	*107*		*69 - 124*		*04/27/17 17:14*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.061		0.20	0.061	ug/L		04/24/17 08:33	04/26/17 16:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*73*		*42 - 120*	*04/24/17 08:33*	*04/26/17 16:17*	*1*
2-Fluorophenol (Surr)	*40*		*10 - 120*	*04/24/17 08:33*	*04/26/17 16:17*	*1*
2,4,6-Tribromophenol (Surr)	*54*		*35 - 125*	*04/24/17 08:33*	*04/26/17 16:17*	*1*
Nitrobenzene-d5 (Surr)	*74*		*36 - 120*	*04/24/17 08:33*	*04/26/17 16:17*	*1*
Phenol-d5 (Surr)	*23*		*10 - 120*	*04/24/17 08:33*	*04/26/17 16:17*	*1*
Terphenyl-d14 (Surr)	*79*		*17 - 120*	*04/24/17 08:33*	*04/26/17 16:17*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.015		0.095	0.015	ug/L		04/22/17 08:10	04/25/17 12:05	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*50*		*18 - 125*	*04/22/17 08:10*	*04/25/17 12:05*	*4*

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Client Sample ID: W-170418-PS-07R
Date Collected: 04/18/17 10:20
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78382-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**0.29**	**J B**	0.50	0.28	ug/L			04/26/17 21:20	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/26/17 21:20	1
Toluene	<0.23		1.0	0.23	ug/L			04/26/17 21:20	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/26/17 21:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*61 - 138*		*04/26/17 21:20*	*1*
4-Bromofluorobenzene (Surr)	*92*		*69 - 120*		*04/26/17 21:20*	*1*
Toluene-d8 (Surr)	*99*		*73 - 120*		*04/26/17 21:20*	*1*
Dibromofluoromethane (Surr)	*102*		*69 - 124*		*04/26/17 21:20*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/24/17 08:33	04/26/17 16:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*68*		*42 - 120*	*04/24/17 08:33*	*04/26/17 16:43*	*1*
2-Fluorophenol (Surr)	*39*		*10 - 120*	*04/24/17 08:33*	*04/26/17 16:43*	*1*
2,4,6-Tribromophenol (Surr)	*57*		*35 - 125*	*04/24/17 08:33*	*04/26/17 16:43*	*1*
Nitrobenzene-d5 (Surr)	*66*		*36 - 120*	*04/24/17 08:33*	*04/26/17 16:43*	*1*
Phenol-d5 (Surr)	*24*		*10 - 120*	*04/24/17 08:33*	*04/26/17 16:43*	*1*
Terphenyl-d14 (Surr)	*78*		*17 - 120*	*04/24/17 08:33*	*04/26/17 16:43*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.020**	**J p**	0.10	0.016	ug/L		04/22/17 08:10	04/25/17 12:29	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*68*		*18 - 125*	*04/22/17 08:10*	*04/25/17 12:29*	*4*

Client Sample ID: W-170418-PS-08R

Date Collected: 04/18/17 10:30
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78382-6

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 17:36	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/26/17 18:25	1
Toluene	<0.23		1.0	0.23	ug/L			04/26/17 18:25	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/26/17 18:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*61 - 138*		*04/26/17 18:25*	*1*
1,2-Dichloroethane-d4 (Surr)	*102*		*61 - 138*		*04/27/17 17:36*	*1*
4-Bromofluorobenzene (Surr)	*91*		*69 - 120*		*04/26/17 18:25*	*1*
4-Bromofluorobenzene (Surr)	*90*		*69 - 120*		*04/27/17 17:36*	*1*
Toluene-d8 (Surr)	*97*		*73 - 120*		*04/26/17 18:25*	*1*
Toluene-d8 (Surr)	*98*		*73 - 120*		*04/27/17 17:36*	*1*
Dibromofluoromethane (Surr)	*105*		*69 - 124*		*04/26/17 18:25*	*1*
Dibromofluoromethane (Surr)	*109*		*69 - 124*		*04/27/17 17:36*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/24/17 08:33	04/26/17 17:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*79*		*42 - 120*	*04/24/17 08:33*	*04/26/17 17:59*	*1*
2-Fluorophenol (Surr)	*43*		*10 - 120*	*04/24/17 08:33*	*04/26/17 17:59*	*1*
2,4,6-Tribromophenol (Surr)	*69*		*35 - 125*	*04/24/17 08:33*	*04/26/17 17:59*	*1*
Nitrobenzene-d5 (Surr)	*78*		*36 - 120*	*04/24/17 08:33*	*04/26/17 17:59*	*1*
Phenol-d5 (Surr)	*25*		*10 - 120*	*04/24/17 08:33*	*04/26/17 17:59*	*1*
Terphenyl-d14 (Surr)	*80*		*17 - 120*	*04/24/17 08:33*	*04/26/17 17:59*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.022**	**J p**	0.098	0.015	ug/L		04/22/17 08:10	04/25/17 13:43	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*51*		*18 - 125*	*04/22/17 08:10*	*04/25/17 13:43*	*4*

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Client Sample ID: W-170418-PS-09R
Date Collected: 04/18/17 10:45
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78382-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**0.44**	**J B**	0.50	0.28	ug/L			04/26/17 18:47	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/26/17 18:47	1
Toluene	<0.23		1.0	0.23	ug/L			04/26/17 18:47	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/26/17 18:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*61 - 138*		*04/26/17 18:47*	*1*
4-Bromofluorobenzene (Surr)	*92*		*69 - 120*		*04/26/17 18:47*	*1*
Toluene-d8 (Surr)	*96*		*73 - 120*		*04/26/17 18:47*	*1*
Dibromofluoromethane (Surr)	*105*		*69 - 124*		*04/26/17 18:47*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.060		0.19	0.060	ug/L		04/24/17 08:33	04/26/17 18:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*74*		*42 - 120*	*04/24/17 08:33*	*04/26/17 18:24*	*1*
2-Fluorophenol (Surr)	*41*		*10 - 120*	*04/24/17 08:33*	*04/26/17 18:24*	*1*
2,4,6-Tribromophenol (Surr)	*63*		*35 - 125*	*04/24/17 08:33*	*04/26/17 18:24*	*1*
Nitrobenzene-d5 (Surr)	*73*		*36 - 120*	*04/24/17 08:33*	*04/26/17 18:24*	*1*
Phenol-d5 (Surr)	*24*		*10 - 120*	*04/24/17 08:33*	*04/26/17 18:24*	*1*
Terphenyl-d14 (Surr)	*82*		*17 - 120*	*04/24/17 08:33*	*04/26/17 18:24*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.015		0.094	0.015	ug/L		04/22/17 08:10	04/25/17 14:57	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*75*		*18 - 125*	*04/22/17 08:10*	*04/25/17 14:57*	*4*

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Client Sample ID: TRIP BLANK-002
Date Collected: 04/18/17 11:00
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78382-8
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**0.44**	**J B**	0.50	0.28	ug/L			04/26/17 19:09	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/26/17 19:09	1
Toluene	<0.23		1.0	0.23	ug/L			04/26/17 19:09	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/26/17 19:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*61 - 138*		*04/26/17 19:09*	*1*
4-Bromofluorobenzene (Surr)	*87*		*69 - 120*		*04/26/17 19:09*	*1*
Toluene-d8 (Surr)	*92*		*73 - 120*		*04/26/17 19:09*	*1*
Dibromofluoromethane (Surr)	*102*		*69 - 124*		*04/26/17 19:09*	*1*

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Client Sample ID: W-170418-PS-06R
Date Collected: 04/18/17 11:36
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78382-9
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**0.47**	**J B**	0.50	0.28	ug/L			04/26/17 19:31	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/26/17 19:31	1
Toluene	<0.23		1.0	0.23	ug/L			04/26/17 19:31	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/26/17 19:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*61 - 138*		*04/26/17 19:31*	*1*
4-Bromofluorobenzene (Surr)	*89*		*69 - 120*		*04/26/17 19:31*	*1*
Toluene-d8 (Surr)	*100*		*73 - 120*		*04/26/17 19:31*	*1*
Dibromofluoromethane (Surr)	*103*		*69 - 124*		*04/26/17 19:31*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.060		0.19	0.060	ug/L		04/24/17 08:33	04/26/17 18:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*76*		*42 - 120*	*04/24/17 08:33*	*04/26/17 18:50*	*1*
2-Fluorophenol (Surr)	*40*		*10 - 120*	*04/24/17 08:33*	*04/26/17 18:50*	*1*
2,4,6-Tribromophenol (Surr)	*60*		*35 - 125*	*04/24/17 08:33*	*04/26/17 18:50*	*1*
Nitrobenzene-d5 (Surr)	*75*		*36 - 120*	*04/24/17 08:33*	*04/26/17 18:50*	*1*
Phenol-d5 (Surr)	*22*		*10 - 120*	*04/24/17 08:33*	*04/26/17 18:50*	*1*
Terphenyl-d14 (Surr)	*70*		*17 - 120*	*04/24/17 08:33*	*04/26/17 18:50*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.015		0.095	0.015	ug/L		04/22/17 08:10	04/25/17 15:22	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*59*		*18 - 125*	*04/22/17 08:10*	*04/25/17 15:22*	*4*

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(61-138)	(69-120)	(73-120)	(69-124)
240-78382-1	W-170417-PS-05R	100	89	98	104
240-78382-2	W-170417-PS-02R	103	92	97	103
240-78382-2	W-170417-PS-02R	103	88	96	107
240-78382-3	W-170417-PS-04R	104	91	99	106
240-78382-4	W-170417-PS-03R	104	91	93	105
240-78382-4	W-170417-PS-03R	105	90	100	107
240-78382-5	W-170418-PS-07R	102	92	99	102
240-78382-5 MS	W-170418-PS-07R	97	96	100	107
240-78382-5 MSD	W-170418-PS-07R	101	96	100	100
240-78382-6	W-170418-PS-08R	101	91	97	105
240-78382-6	W-170418-PS-08R	102	90	98	109
240-78382-7	W-170418-PS-09R	102	92	96	105
240-78382-8	TRIP BLANK-002	99	87	92	102
240-78382-9	W-170418-PS-06R	99	89	100	103
LCS 240-276309/4	Lab Control Sample	95	98	104	103
LCS 240-276533/5	Lab Control Sample	94	90	103	104
MB 240-276309/6	Method Blank	101	89	95	106
MB 240-276533/7	Method Blank	99	89	99	103

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		FBP	2FP	TBP	NBZ	PHL	TPH
Lab Sample ID	Client Sample ID	(42-120)	(10-120)	(35-125)	(36-120)	(10-120)	(17-120)
240-78382-1	W-170417-PS-05R	74	42	62	73	25	77
240-78382-2	W-170417-PS-02R	76	42	62	75	24	76
240-78382-3	W-170417-PS-04R	67	35	54	66	20	75
240-78382-4	W-170417-PS-03R	73	40	54	74	23	79
240-78382-5	W-170418-PS-07R	68	39	57	66	24	78
240-78382-5 MS	W-170418-PS-07R	70	36	79	76	21	63
240-78382-5 MSD	W-170418-PS-07R	82	46	87	87	28	71
240-78382-6	W-170418-PS-08R	79	43	69	78	25	80
240-78382-7	W-170418-PS-09R	74	41	63	73	24	82
240-78382-9	W-170418-PS-06R	76	40	60	75	22	70
LCS 240-275892/20-A	Lab Control Sample	78	52	87	85	33	76
MB 240-275892/19-A	Method Blank	73	48	59	72	29	84

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

TPH = Terphenyl-d14 (Surr)

Method: 8151A - Herbicides (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCPA1 (18-125)	DCPA2 (18-125)
240-78382-1	W-170417-PS-05R	63	66
240-78382-2	W-170417-PS-02R	51	54
240-78382-3	W-170417-PS-04R	54	57
240-78382-4	W-170417-PS-03R	47	50
240-78382-5	W-170418-PS-07R	63	68
240-78382-5 MS	W-170418-PS-07R	70	72
240-78382-5 MSD	W-170418-PS-07R	72	74
240-78382-6	W-170418-PS-08R	50	51
240-78382-7	W-170418-PS-09R	71	75
240-78382-9	W-170418-PS-06R	56	59
LCS 180-209011/2-A	Lab Control Sample	50	52
MB 180-209011/1-A	Method Blank	34	36

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-276309/6
Matrix: Water
Analysis Batch: 276309

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.552		0.50	0.28	ug/L			04/26/17 13:36	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/26/17 13:36	1
Toluene	<0.23		1.0	0.23	ug/L			04/26/17 13:36	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/26/17 13:36	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*61 - 138*		*04/26/17 13:36*	*1*
4-Bromofluorobenzene (Surr)	*89*		*69 - 120*		*04/26/17 13:36*	*1*
Toluene-d8 (Surr)	*95*		*73 - 120*		*04/26/17 13:36*	*1*
Dibromofluoromethane (Surr)	*106*		*69 - 124*		*04/26/17 13:36*	*1*

Lab Sample ID: LCS 240-276309/4
Matrix: Water
Analysis Batch: 276309

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	9.83		ug/L		98	79 - 120
Ethylbenzene	10.0	9.68		ug/L		97	80 - 120
Toluene	10.0	9.83		ug/L		98	78 - 120
Xylenes, Total	20.0	19.1		ug/L		95	80 - 120
m-Xylene & p-Xylene	10.0	9.50		ug/L		95	80 - 120
o-Xylene	10.0	9.57		ug/L		96	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*61 - 138*
4-Bromofluorobenzene (Surr)	*98*		*69 - 120*
Toluene-d8 (Surr)	*104*		*73 - 120*
Dibromofluoromethane (Surr)	*103*		*69 - 124*

Lab Sample ID: 240-78382-5 MS
Matrix: Water
Analysis Batch: 276309

Client Sample ID: W-170418-PS-07R
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	0.29	J B	10.0	9.70		ug/L		94	69 - 127
Ethylbenzene	<0.26		10.0	8.72		ug/L		87	72 - 121
Toluene	<0.23		10.0	9.12		ug/L		91	69 - 125
Xylenes, Total	<0.24		20.0	17.3		ug/L		87	71 - 122
m-Xylene & p-Xylene	<0.24		10.0	8.63		ug/L		86	70 - 121
o-Xylene	<0.28		10.0	8.70		ug/L		87	71 - 125

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*61 - 138*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*
Toluene-d8 (Surr)	*100*		*73 - 120*
Dibromofluoromethane (Surr)	*107*		*69 - 124*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-78382-5 MSD
Matrix: Water
Analysis Batch: 276309

Client Sample ID: W-170418-PS-07R
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	0.29	J B	10.0	9.41		ug/L		91	69 - 127	3	10
Ethylbenzene	<0.26		10.0	9.05		ug/L		91	72 - 121	4	15
Toluene	<0.23		10.0	9.53		ug/L		95	69 - 125	4	14
Xylenes, Total	<0.24		20.0	17.6		ug/L		88	71 - 122	2	14
m-Xylene & p-Xylene	<0.24		10.0	8.89		ug/L		89	70 - 121	3	15
o-Xylene	<0.28		10.0	8.74		ug/L		87	71 - 125	0	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*101*		*61 - 138*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*
Toluene-d8 (Surr)	*100*		*73 - 120*
Dibromofluoromethane (Surr)	*100*		*69 - 124*

Lab Sample ID: MB 240-276533/7
Matrix: Water
Analysis Batch: 276533

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			04/27/17 16:08	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			04/27/17 16:08	1
Toluene	<0.23		1.0	0.23	ug/L			04/27/17 16:08	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			04/27/17 16:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*61 - 138*		*04/27/17 16:08*	*1*
4-Bromofluorobenzene (Surr)	*89*		*69 - 120*		*04/27/17 16:08*	*1*
Toluene-d8 (Surr)	*99*		*73 - 120*		*04/27/17 16:08*	*1*
Dibromofluoromethane (Surr)	*103*		*69 - 124*		*04/27/17 16:08*	*1*

Lab Sample ID: LCS 240-276533/5
Matrix: Water
Analysis Batch: 276533

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene			10.0	9.15		ug/L		91	79 - 120		
Ethylbenzene			10.0	9.46		ug/L		95	80 - 120		
Toluene			10.0	9.56		ug/L		96	78 - 120		
Xylenes, Total			20.0	18.4		ug/L		92	80 - 120		
m-Xylene & p-Xylene			10.0	9.10		ug/L		91	80 - 120		
o-Xylene			10.0	9.28		ug/L		93	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*61 - 138*
4-Bromofluorobenzene (Surr)	*90*		*69 - 120*
Toluene-d8 (Surr)	*103*		*73 - 120*
Dibromofluoromethane (Surr)	*104*		*69 - 124*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-275892/19-A
Matrix: Water
Analysis Batch: 276239

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 275892

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/24/17 08:33	04/26/17 12:28	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*73*		*42 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
2-Fluorophenol (Surr)	*48*		*10 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
2,4,6-Tribromophenol (Surr)	*59*		*35 - 125*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Nitrobenzene-d5 (Surr)	*72*		*36 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Phenol-d5 (Surr)	*29*		*10 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Terphenyl-d14 (Surr)	*84*		*17 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*

Lab Sample ID: LCS 240-275892/20-A
Matrix: Water
Analysis Batch: 276239

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 275892

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	20.0	15.3		ug/L		76	54 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*78*		*42 - 120*
2-Fluorophenol (Surr)	*52*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*87*		*35 - 125*
Nitrobenzene-d5 (Surr)	*85*		*36 - 120*
Phenol-d5 (Surr)	*33*		*10 - 120*
Terphenyl-d14 (Surr)	*76*		*17 - 120*

Lab Sample ID: 240-78382-5 MS
Matrix: Water
Analysis Batch: 276239

Client Sample ID: W-170418-PS-07R
Prep Type: Total/NA
Prep Batch: 275892

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	<0.063		19.4	13.2		ug/L		68	37 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*70*		*42 - 120*
2-Fluorophenol (Surr)	*36*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*79*		*35 - 125*
Nitrobenzene-d5 (Surr)	*76*		*36 - 120*
Phenol-d5 (Surr)	*21*		*10 - 120*
Terphenyl-d14 (Surr)	*63*		*17 - 120*

Lab Sample ID: 240-78382-5 MSD
Matrix: Water
Analysis Batch: 276239

Client Sample ID: W-170418-PS-07R
Prep Type: Total/NA
Prep Batch: 275892

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Naphthalene	<0.063		19.4	15.4		ug/L		79	37 - 120	15	33

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-78382-5 MSD
Matrix: Water
Analysis Batch: 276239

Client Sample ID: W-170418-PS-07R
Prep Type: Total/NA
Prep Batch: 275892

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*82*		*42 - 120*
2-Fluorophenol (Surr)	*46*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*87*		*35 - 125*
Nitrobenzene-d5 (Surr)	*87*		*36 - 120*
Phenol-d5 (Surr)	*28*		*10 - 120*
Terphenyl-d14 (Surr)	*71*		*17 - 120*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-209011/1-A
Matrix: Water
Analysis Batch: 209222

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 209011

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/22/17 08:10	04/25/17 10:26	4

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*36*		*18 - 125*	*04/22/17 08:10*	*04/25/17 10:26*	*4*

Lab Sample ID: LCS 180-209011/2-A
Matrix: Water
Analysis Batch: 209222

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 209011

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Pentachlorophenol			1.00	0.881		ug/L		88	30 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*52*		*18 - 125*

Lab Sample ID: 240-78382-5 MS
Matrix: Water
Analysis Batch: 209222

Client Sample ID: W-170418-PS-07R
Prep Type: Total/NA
Prep Batch: 209011

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Pentachlorophenol	0.020	J p	0.962	0.804		ug/L		82	30 - 150		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*72*		*18 - 125*

Lab Sample ID: 240-78382-5 MSD
Matrix: Water
Analysis Batch: 209222

Client Sample ID: W-170418-PS-07R
Prep Type: Total/NA
Prep Batch: 209011

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Pentachlorophenol	0.020	J p	1.00	0.863		ug/L		84	30 - 150	7	35

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: 240-78382-5 MSD
Matrix: Water
Analysis Batch: 209222

Client Sample ID: W-170418-PS-07R
Prep Type: Total/NA
Prep Batch: 209011

Surrogate	MSD %Recovery	MSD Qualifier	Limits
2,4-Dichlorophenylacetic acid	*74*		*18 - 125*

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

GC/MS VOA

Analysis Batch: 276309

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78382-1	W-170417-PS-05R	Total/NA	Water	8260B	
240-78382-2	W-170417-PS-02R	Total/NA	Water	8260B	
240-78382-3	W-170417-PS-04R	Total/NA	Water	8260B	
240-78382-4	W-170417-PS-03R	Total/NA	Water	8260B	
240-78382-5	W-170418-PS-07R	Total/NA	Water	8260B	
240-78382-6	W-170418-PS-08R	Total/NA	Water	8260B	
240-78382-7	W-170418-PS-09R	Total/NA	Water	8260B	
240-78382-8	TRIP BLANK-002	Total/NA	Water	8260B	
240-78382-9	W-170418-PS-06R	Total/NA	Water	8260B	
MB 240-276309/6	Method Blank	Total/NA	Water	8260B	
LCS 240-276309/4	Lab Control Sample	Total/NA	Water	8260B	
240-78382-5 MS	W-170418-PS-07R	Total/NA	Water	8260B	
240-78382-5 MSD	W-170418-PS-07R	Total/NA	Water	8260B	

Analysis Batch: 276533

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78382-2	W-170417-PS-02R	Total/NA	Water	8260B	
240-78382-4	W-170417-PS-03R	Total/NA	Water	8260B	
240-78382-6	W-170418-PS-08R	Total/NA	Water	8260B	
MB 240-276533/7	Method Blank	Total/NA	Water	8260B	
LCS 240-276533/5	Lab Control Sample	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 275892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78382-1	W-170417-PS-05R	Total/NA	Water	3510C	
240-78382-2	W-170417-PS-02R	Total/NA	Water	3510C	
240-78382-3	W-170417-PS-04R	Total/NA	Water	3510C	
240-78382-4	W-170417-PS-03R	Total/NA	Water	3510C	
240-78382-5	W-170418-PS-07R	Total/NA	Water	3510C	
240-78382-6	W-170418-PS-08R	Total/NA	Water	3510C	
240-78382-7	W-170418-PS-09R	Total/NA	Water	3510C	
240-78382-9	W-170418-PS-06R	Total/NA	Water	3510C	
MB 240-275892/19-A	Method Blank	Total/NA	Water	3510C	
LCS 240-275892/20-A	Lab Control Sample	Total/NA	Water	3510C	
240-78382-5 MS	W-170418-PS-07R	Total/NA	Water	3510C	
240-78382-5 MSD	W-170418-PS-07R	Total/NA	Water	3510C	

Analysis Batch: 276239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78382-1	W-170417-PS-05R	Total/NA	Water	8270C	275892
240-78382-2	W-170417-PS-02R	Total/NA	Water	8270C	275892
240-78382-3	W-170417-PS-04R	Total/NA	Water	8270C	275892
240-78382-4	W-170417-PS-03R	Total/NA	Water	8270C	275892
240-78382-5	W-170418-PS-07R	Total/NA	Water	8270C	275892
240-78382-6	W-170418-PS-08R	Total/NA	Water	8270C	275892
240-78382-7	W-170418-PS-09R	Total/NA	Water	8270C	275892
240-78382-9	W-170418-PS-06R	Total/NA	Water	8270C	275892
MB 240-275892/19-A	Method Blank	Total/NA	Water	8270C	275892

GC/MS Semi VOA (Continued)

Analysis Batch: 276239 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 240-275892/20-A	Lab Control Sample	Total/NA	Water	8270C	275892
240-78382-5 MS	W-170418-PS-07R	Total/NA	Water	8270C	275892
240-78382-5 MSD	W-170418-PS-07R	Total/NA	Water	8270C	275892

GC Semi VOA

Prep Batch: 209011

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78382-1	W-170417-PS-05R	Total/NA	Water	8151A	
240-78382-2	W-170417-PS-02R	Total/NA	Water	8151A	
240-78382-3	W-170417-PS-04R	Total/NA	Water	8151A	
240-78382-4	W-170417-PS-03R	Total/NA	Water	8151A	
240-78382-5	W-170418-PS-07R	Total/NA	Water	8151A	
240-78382-6	W-170418-PS-08R	Total/NA	Water	8151A	
240-78382-7	W-170418-PS-09R	Total/NA	Water	8151A	
240-78382-9	W-170418-PS-06R	Total/NA	Water	8151A	
MB 180-209011/1-A	Method Blank	Total/NA	Water	8151A	
LCS 180-209011/2-A	Lab Control Sample	Total/NA	Water	8151A	
240-78382-5 MS	W-170418-PS-07R	Total/NA	Water	8151A	
240-78382-5 MSD	W-170418-PS-07R	Total/NA	Water	8151A	

Analysis Batch: 209222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78382-1	W-170417-PS-05R	Total/NA	Water	8151A	209011
240-78382-2	W-170417-PS-02R	Total/NA	Water	8151A	209011
240-78382-3	W-170417-PS-04R	Total/NA	Water	8151A	209011
240-78382-4	W-170417-PS-03R	Total/NA	Water	8151A	209011
240-78382-5	W-170418-PS-07R	Total/NA	Water	8151A	209011
240-78382-6	W-170418-PS-08R	Total/NA	Water	8151A	209011
240-78382-7	W-170418-PS-09R	Total/NA	Water	8151A	209011
240-78382-9	W-170418-PS-06R	Total/NA	Water	8151A	209011
MB 180-209011/1-A	Method Blank	Total/NA	Water	8151A	209011
LCS 180-209011/2-A	Lab Control Sample	Total/NA	Water	8151A	209011
240-78382-5 MS	W-170418-PS-07R	Total/NA	Water	8151A	209011
240-78382-5 MSD	W-170418-PS-07R	Total/NA	Water	8151A	209011

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Client Sample ID: W-170417-PS-05R
Lab Sample ID: 240-78382-1
Date Collected: 04/17/17 14:25
Matrix: Water
Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276309	04/26/17 16:56	LRW	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 15:01	MRU	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 10:51	JMO	TAL PIT

Client Sample ID: W-170417-PS-02R
Lab Sample ID: 240-78382-2
Date Collected: 04/17/17 14:57
Matrix: Water
Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276309	04/26/17 17:18	LRW	TAL CAN
Total/NA	Analysis	8260B		1	276533	04/27/17 16:30	LRW	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 15:27	MRU	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 11:16	JMO	TAL PIT

Client Sample ID: W-170417-PS-04R
Lab Sample ID: 240-78382-3
Date Collected: 04/17/17 15:18
Matrix: Water
Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276309	04/26/17 17:41	LRW	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 15:52	MRU	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 11:40	JMO	TAL PIT

Client Sample ID: W-170417-PS-03R
Lab Sample ID: 240-78382-4
Date Collected: 04/17/17 15:45
Matrix: Water
Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276309	04/26/17 18:03	LRW	TAL CAN
Total/NA	Analysis	8260B		1	276533	04/27/17 17:14	LRW	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 16:17	MRU	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 12:05	JMO	TAL PIT

Client Sample ID: W-170418-PS-07R
Lab Sample ID: 240-78382-5
Date Collected: 04/18/17 10:20
Matrix: Water
Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276309	04/26/17 21:20	LRW	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 16:43	MRU	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 12:29	JMO	TAL PIT

Client Sample ID: W-170418-PS-08R
Lab Sample ID: 240-78382-6
Date Collected: 04/18/17 10:30
Matrix: Water
Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276309	04/26/17 18:25	LRW	TAL CAN
Total/NA	Analysis	8260B		1	276533	04/27/17 17:36	LRW	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 17:59	MRU	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 13:43	JMO	TAL PIT

Client Sample ID: W-170418-PS-09R
Lab Sample ID: 240-78382-7
Date Collected: 04/18/17 10:45
Matrix: Water
Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276309	04/26/17 18:47	LRW	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 18:24	MRU	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 14:57	JMO	TAL PIT

Client Sample ID: TRIP BLANK-002
Lab Sample ID: 240-78382-8
Date Collected: 04/18/17 11:00
Matrix: Water
Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276309	04/26/17 19:09	LRW	TAL CAN

Client Sample ID: W-170418-PS-06R
Lab Sample ID: 240-78382-9
Date Collected: 04/18/17 11:36
Matrix: Water
Date Received: 04/20/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	276309	04/26/17 19:31	LRW	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Client Sample ID: W-170418-PS-06R
Date Collected: 04/18/17 11:36
Date Received: 04/20/17 09:20

Lab Sample ID: 240-78382-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			275892	04/24/17 08:33	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 18:50	MRU	TAL CAN
Total/NA	Prep	8151A			209011	04/22/17 08:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209222	04/25/17 15:22	JMO	TAL PIT

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78382-1

Laboratory: TestAmerica Canton

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999518190	08-31-17 *

Laboratory: TestAmerica Pittsburgh

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	998027800	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

CAMBRIDGE 240506

Chain of Custody Record

CAMBRIDGE 240506

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Peter Storlie	Lab PM: Heckler, Denise D	Carrier Tracking No(s):	COC No: 240-42109-18305.2
Client Contact: Mr. Grant Anderson	Phone: 651-247-4218	E-Mail: denise.heckler@testamericainc.com		Page: Page 2 of 2
Company: GHD Services Inc.				Job #:
Address: 1801 Old Highway 8 NW Suite 114	Due Date Requested:			
City: St. Paul	TAT Requested (days): STANDARD			
State, Zip: MN, 55112				
Phone: 651-639-0913(Tel) 651-639-0923(Fax)	PO #: 34001059			
Email: grant.anderson@ghd.com	WO #: 86165			
Project Name: 86165-04-06, Penta Wood	Project #: 24012755			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8151A - Pentachlorophenol	8260B - BTEX	8270C - Naphthalene	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	A	N		
W-170417-PS-05R	4-17-2017	1425		Water			X	X	X		
02R		1457					X	X	X		
04R		1518					X	X	X		
03R		1545					X	X	X		
W-170418-PS-07R MS/MSD	4-18-2017	1020				Y	X	X	X		
08R		1030					X	X	X		
09R		1045					X	X	X		
TRIP BLANK-002		1100						X			

240-78382 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	4-19-2017/1400	GHD		4-20-17 920	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

5/1/2017

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 78382**
Canton Facility

Client GHD Site Name _____ Cooler unpacked by:

Cooler Received on 4-20-17 Opened on 4-20-17

FedEx: 1st Grd Exp UPS FAS Stetson Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # _____ Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☑ See Multiple Cooler Form
   IR GUN# IR-8 (CF -0.3 °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF +0.8°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 18 Yes No
   -Were custody seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 11-15 have been checked at the originating laboratory.
11. Were sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC682547**
12. Were VOAs on the COC? Yes No
13. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes No
15. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

14. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

Rec'd Sample (W-170418-PS-062) no time
not on COC, will log at end of Lot.

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

TestAmerica Multiple Cooler Receipt Form/Narrative **Login # :** 79382
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
Client	8	3.6	3.3	ICE
		1.8	1.5	
		2.0	2.7	
		3.2	2.9	
		3.0	2.7	
		4.8	4.5	
		2.8	2.5	
		0.8	0.5	
		3.4	3.1	

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-78382-1

Login Number: 78382
List Number: 2
Creator: Say, Thomas C

List Source: TestAmerica Pittsburgh
List Creation: 04/21/17 03:17 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-78382-1

Login Number: 78382
List Number: 3
Creator: Watson, Debbie

List Source: TestAmerica Pittsburgh
List Creation: 04/21/17 03:22 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-78480-1
Client Project/Site: 86165-04-06, Penta Wood

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson

Denise D Heckler

Authorized for release by:
5/3/2017 3:34:20 PM

Denise Heckler, Project Manager II
(330)966-9477
denise.heckler@testamericainc.com

Table of Contents

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78480-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
J	Reported value was between the limit of detection and the limit of quantitation.
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78480-1

Job ID: 240-78480-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-78480-1

Comments
No additional comments.

Receipt
The samples were received on 4/21/2017 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.3º C.

GC/MS VOA
Method(s) 8260B: The reporting limit (RL) provided for the following analyte(s) falls below the laboratory's verified standard quantitation limit: Benzene. Results reported below the verified standard quantitation limit have less certainty (i.e., are estimated) and must be used at the client's discretion. The continuing calibration blanks and method blanks may not support the lower RL.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78480-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8270C	Semivolatile Organic Compounds (GC/MS)	SW846	TAL CAN
8151A	Herbicides (GC)	SW846	TAL PIT

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Sample Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78480-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-78480-1	W-170419-PS-01R	Water	04/19/17 14:10	04/21/17 09:30
240-78480-2	TRIP BLANK - 003	Water	04/19/17 14:00	04/21/17 09:30

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78480-1

Client Sample ID: W-170419-PS-01R — Lab Sample ID: 240-78480-1

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.015	J p	0.095	0.015	ug/L	4		8151A	Total/NA

Client Sample ID: TRIP BLANK - 003 — Lab Sample ID: 240-78480-2

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: W-170419-PS-01R

Date Collected: 04/19/17 14:10
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78480-1

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			05/02/17 16:02	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			05/02/17 16:02	1
Toluene	<0.23		1.0	0.23	ug/L			05/02/17 16:02	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			05/02/17 16:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*61 - 138*		*05/02/17 16:02*	*1*
4-Bromofluorobenzene (Surr)	*91*		*69 - 120*		*05/02/17 16:02*	*1*
Toluene-d8 (Surr)	*104*		*73 - 120*		*05/02/17 16:02*	*1*
Dibromofluoromethane (Surr)	*101*		*69 - 124*		*05/02/17 16:02*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.060		0.19	0.060	ug/L		04/24/17 14:17	04/26/17 14:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*61*		*42 - 120*	*04/24/17 14:17*	*04/26/17 14:10*	*1*
2-Fluorophenol (Surr)	*34*		*10 - 120*	*04/24/17 14:17*	*04/26/17 14:10*	*1*
2,4,6-Tribromophenol (Surr)	*58*		*35 - 125*	*04/24/17 14:17*	*04/26/17 14:10*	*1*
Nitrobenzene-d5 (Surr)	*60*		*36 - 120*	*04/24/17 14:17*	*04/26/17 14:10*	*1*
Phenol-d5 (Surr)	*20*		*10 - 120*	*04/24/17 14:17*	*04/26/17 14:10*	*1*
Terphenyl-d14 (Surr)	*60*		*17 - 120*	*04/24/17 14:17*	*04/26/17 14:10*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.015**	**J p**	0.095	0.015	ug/L		04/25/17 15:10	04/26/17 12:38	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*72*		*18 - 125*	*04/25/17 15:10*	*04/26/17 12:38*	*4*

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78480-1

Client Sample ID: TRIP BLANK - 003
Date Collected: 04/19/17 14:00
Date Received: 04/21/17 09:30

Lab Sample ID: 240-78480-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			05/02/17 16:25	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			05/02/17 16:25	1
Toluene	<0.23		1.0	0.23	ug/L			05/02/17 16:25	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			05/02/17 16:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*61 - 138*		*05/02/17 16:25*	*1*
4-Bromofluorobenzene (Surr)	*91*		*69 - 120*		*05/02/17 16:25*	*1*
Toluene-d8 (Surr)	*100*		*73 - 120*		*05/02/17 16:25*	*1*
Dibromofluoromethane (Surr)	*94*		*69 - 124*		*05/02/17 16:25*	*1*

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78480-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(61-138)	(69-120)	(73-120)	(69-124)
240-78480-1	W-170419-PS-01R	104	91	104	101
240-78480-1 MS	W-170419-PS-01R	106	97	106	102
240-78480-1 MSD	W-170419-PS-01R	103	94	101	96
240-78480-2	TRIP BLANK - 003	100	91	100	94
LCS 240-277100/4	Lab Control Sample	109	100	110	106
MB 240-277100/6	Method Blank	105	97	105	100

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		FBP	2FP	TBP	NBZ	PHL	TPH
Lab Sample ID	Client Sample ID	(42-120)	(10-120)	(35-125)	(36-120)	(10-120)	(17-120)
240-78480-1	W-170419-PS-01R	61	34	58	60	20	60
LCS 240-275892/20-A	Lab Control Sample	78	52	87	85	33	76
MB 240-275892/19-A	Method Blank	73	48	59	72	29	84

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPH = Terphenyl-d14 (Surr)

Method: 8151A - Herbicides (GC)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPA1	DCPA2
Lab Sample ID	Client Sample ID	(18-125)	(18-125)
240-78480-1	W-170419-PS-01R	69	72
LCS 180-209292/2-A	Lab Control Sample	77	80
MB 180-209292/1-A	Method Blank	52	54

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-277100/6
Matrix: Water
Analysis Batch: 277100

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.28		0.50	0.28	ug/L			05/02/17 10:45	1
Ethylbenzene	<0.26		1.0	0.26	ug/L			05/02/17 10:45	1
Toluene	<0.23		1.0	0.23	ug/L			05/02/17 10:45	1
Xylenes, Total	<0.24		2.0	0.24	ug/L			05/02/17 10:45	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*61 - 138*		*05/02/17 10:45*	*1*
4-Bromofluorobenzene (Surr)	*97*		*69 - 120*		*05/02/17 10:45*	*1*
Toluene-d8 (Surr)	*105*		*73 - 120*		*05/02/17 10:45*	*1*
Dibromofluoromethane (Surr)	*100*		*69 - 124*		*05/02/17 10:45*	*1*

Lab Sample ID: LCS 240-277100/4
Matrix: Water
Analysis Batch: 277100

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	10.3		ug/L		103	79 - 120
Ethylbenzene	10.0	9.77		ug/L		98	80 - 120
Toluene	10.0	10.2		ug/L		102	78 - 120
Xylenes, Total	20.0	19.4		ug/L		97	80 - 120
m-Xylene & p-Xylene	10.0	9.62		ug/L		96	80 - 120
o-Xylene	10.0	9.81		ug/L		98	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*109*		*61 - 138*
4-Bromofluorobenzene (Surr)	*100*		*69 - 120*
Toluene-d8 (Surr)	*110*		*73 - 120*
Dibromofluoromethane (Surr)	*106*		*69 - 124*

Lab Sample ID: 240-78480-1 MS
Matrix: Water
Analysis Batch: 277100

Client Sample ID: W-170419-PS-01R
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	<0.28		10.0	9.86		ug/L		99	69 - 127
Ethylbenzene	<0.26		10.0	9.37		ug/L		94	72 - 121
Toluene	<0.23		10.0	9.93		ug/L		99	69 - 125
Xylenes, Total	<0.24		20.0	18.6		ug/L		93	71 - 122
m-Xylene & p-Xylene	<0.24		10.0	9.20		ug/L		92	70 - 121
o-Xylene	<0.28		10.0	9.42		ug/L		94	71 - 125

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*106*		*61 - 138*
4-Bromofluorobenzene (Surr)	*97*		*69 - 120*
Toluene-d8 (Surr)	*106*		*73 - 120*
Dibromofluoromethane (Surr)	*102*		*69 - 124*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-78480-1 MSD
Matrix: Water
Analysis Batch: 277100

Client Sample ID: W-170419-PS-01R
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	<0.28		10.0	9.32		ug/L		93	69 - 127	6	10
Ethylbenzene	<0.26		10.0	8.86		ug/L		89	72 - 121	6	15
Toluene	<0.23		10.0	9.34		ug/L		93	69 - 125	6	14
Xylenes, Total	<0.24		20.0	17.4		ug/L		87	71 - 122	7	14
m-Xylene & p-Xylene	<0.24		10.0	8.68		ug/L		87	70 - 121	6	15
o-Xylene	<0.28		10.0	8.74		ug/L		87	71 - 125	7	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*61 - 138*
4-Bromofluorobenzene (Surr)	*94*		*69 - 120*
Toluene-d8 (Surr)	*101*		*73 - 120*
Dibromofluoromethane (Surr)	*96*		*69 - 124*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-275892/19-A
Matrix: Water
Analysis Batch: 276239

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 275892

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		04/24/17 08:33	04/26/17 12:28	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*73*		*42 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
2-Fluorophenol (Surr)	*48*		*10 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
2,4,6-Tribromophenol (Surr)	*59*		*35 - 125*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Nitrobenzene-d5 (Surr)	*72*		*36 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Phenol-d5 (Surr)	*29*		*10 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*
Terphenyl-d14 (Surr)	*84*		*17 - 120*	*04/24/17 08:33*	*04/26/17 12:28*	*1*

Lab Sample ID: LCS 240-275892/20-A
Matrix: Water
Analysis Batch: 276239

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 275892

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	15.3		ug/L		76	54 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*78*		*42 - 120*
2-Fluorophenol (Surr)	*52*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*87*		*35 - 125*
Nitrobenzene-d5 (Surr)	*85*		*36 - 120*
Phenol-d5 (Surr)	*33*		*10 - 120*
Terphenyl-d14 (Surr)	*76*		*17 - 120*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-209292/1-A
Matrix: Water
Analysis Batch: 209380

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 209292

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		04/25/17 15:10	04/26/17 10:58	4

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*54*		*18 - 125*	*04/25/17 15:10*	*04/26/17 10:58*	*4*

Lab Sample ID: LCS 180-209292/2-A
Matrix: Water
Analysis Batch: 209380

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 209292

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Pentachlorophenol			1.00	0.930		ug/L		93	30 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*80*		*18 - 125*

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78480-1

GC/MS VOA

Analysis Batch: 277100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78480-1	W-170419-PS-01R	Total/NA	Water	8260B	
240-78480-2	TRIP BLANK - 003	Total/NA	Water	8260B	
MB 240-277100/6	Method Blank	Total/NA	Water	8260B	
LCS 240-277100/4	Lab Control Sample	Total/NA	Water	8260B	
240-78480-1 MS	W-170419-PS-01R	Total/NA	Water	8260B	
240-78480-1 MSD	W-170419-PS-01R	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 275892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78480-1	W-170419-PS-01R	Total/NA	Water	3510C	
MB 240-275892/19-A	Method Blank	Total/NA	Water	3510C	
LCS 240-275892/20-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 276239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78480-1	W-170419-PS-01R	Total/NA	Water	8270C	275892
MB 240-275892/19-A	Method Blank	Total/NA	Water	8270C	275892
LCS 240-275892/20-A	Lab Control Sample	Total/NA	Water	8270C	275892

GC Semi VOA

Prep Batch: 209292

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78480-1	W-170419-PS-01R	Total/NA	Water	8151A	
MB 180-209292/1-A	Method Blank	Total/NA	Water	8151A	
LCS 180-209292/2-A	Lab Control Sample	Total/NA	Water	8151A	

Analysis Batch: 209380

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-78480-1	W-170419-PS-01R	Total/NA	Water	8151A	209292
MB 180-209292/1-A	Method Blank	Total/NA	Water	8151A	209292
LCS 180-209292/2-A	Lab Control Sample	Total/NA	Water	8151A	209292

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78480-1

Client Sample ID: W-170419-PS-01R

Lab Sample ID: 240-78480-1

Date Collected: 04/19/17 14:10

Matrix: Water

Date Received: 04/21/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	277100	05/02/17 16:02	LEE	TAL CAN
Total/NA	Prep	3510C			275892	04/24/17 14:17	KEH	TAL CAN
Total/NA	Analysis	8270C		1	276239	04/26/17 14:10	MRU	TAL CAN
Total/NA	Prep	8151A			209292	04/25/17 15:10	CBY	TAL PIT
Total/NA	Analysis	8151A		4	209380	04/26/17 12:38	JMO	TAL PIT

Client Sample ID: TRIP BLANK - 003

Lab Sample ID: 240-78480-2

Date Collected: 04/19/17 14:00

Matrix: Water

Date Received: 04/21/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	277100	05/02/17 16:25	LEE	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-04-06, Penta Wood

TestAmerica Job ID: 240-78480-1

Laboratory: TestAmerica Canton

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999518190	08-31-17 *

Laboratory: TestAmerica Pittsburgh

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	998027800	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

CAMBRIDGE 240506

CAMBRIDGE 240506

Chain of Custody Record

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Client Information	Sampler: Peter Starlo	Lab PM: Heckler, Denise D	Carrier Tracking No(s):	COC No: 240-42109-18305.1
Client Contact: Mr. Grant Anderson	Phone: 651-247-4218	E-Mail: denise.heckler@testamericainc.com		Page: Page 1 of 2
Company: GHD Services Inc.				Job #:

Address: 1801 Old Highway 8 NW Suite 114	Due Date Requested:
City: St. Paul	TAT Requested (days): Standard.
State, Zip: MN, 55112	
Phone: 651-639-0913(Tel) 651-639-0923(Fax)	PO #: 34001059
Email: grant.anderson@ghd.com	WO #: 86165
Project Name: 86165-04-06, Penta Wood	Project #: 24012755
Site:	SSOW#:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8151A - Pentachlorophenol	8260B - BTEX	8270C - Naphthalene	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	A	N		
W-170419-PS-01R	4-19-2017	1410	G	Water	N	N	X	X	X	7	
Trip Blank-003	↓	1400	G	Water				X		1	
				Water							
				Water							
				Water							
				Water							
				Water							
				Water							
				Water							
				Water							
				Water							
				Water							

240-78480 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 4-20-2017/1400	Company GHD	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 4/21/17 0930 TA NC	Company TA NC

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client GHD Site Name Penn Wood

Cooler Received on 4/21/17 Opened on 4/21/17

Cooler unpacked by: JM

FedEx: 1st Grd (Exp) UPS FAS Stetson Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA no # Foam Box Client Cooler Box Other _____

Packing material used: (Bubble Wrap) Foam Plastic Bag None Other _____

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form

IR GUN# IR-8 (CF **-0.3** °C) Observed Cooler Temp. 1.6 °C Corrected Cooler Temp. 1.3 °C

IR GUN #36 (CF **+0.8**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 2 (Yes) No
   -Were custody seals on the outside of the cooler(s) signed & dated? (Yes) No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes (No)
3. Shippers' packing slip attached to the cooler(s)? (Yes) No
4. Did custody papers accompany the sample(s)? (Yes) No
5. Were the custody papers relinquished & signed in the appropriate place? (Yes) No
6. Was/were the person(s) who collected the samples clearly identified on the COC? (Yes) No
7. Did all bottles arrive in good condition (Unbroken)? (Yes) No
8. Could all bottle labels be reconciled with the COC? (Yes) No
9. Were correct bottle(s) used for the test(s) indicated? (Yes) No
10. Sufficient quantity received to perform indicated analyses? (Yes) No
11. Are these work share samples? Yes (No)

If yes, Questions 11-15 have been checked at the originating laboratory.

11. Were sample(s) at the correct pH upon receipt? Yes No (NA) pH Strip Lot# **HC682547**
12. Were VOAs on the COC? (Yes) No
13. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. (Yes) No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # 55320 Yes No
15. Was a LL Hg or Me Hg trip blank present? Yes (No)

Contacted PM DDH Date 4/21/17 by JM via (Verbal) Voice Mail Other

Concerning # 15 Bubble in TB.

14. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.

Sample(s) _____ were received in a broken container.

Sample(s) Trip Blank - 003 1+40 were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-78480-1

Login Number: 78480
List Number: 2
Creator: Say, Thomas C

List Source: TestAmerica Pittsburgh
List Creation: 04/22/17 03:38 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Memorandum

May 5, 2017

To:	Tim Ree, GHD	Ref. No.:	086165-04-06
From:	Grant Anderson/sb/5	Tel:	651-639-0913
CC:	Tim Braun, GHD		

Subject: **Analytical Results and Reduced Validation**
Residential Water Sampling Event
Penta Wood Site
Siren, Wisconsin
April 2017

1. Introduction

This document details a reduced validation of analytical results for residential water samples collected at the Penta Wood Site during April 2017. Samples were submitted to TestAmerica Laboratories, Inc. (TA) located in North Canton, Ohio. BTEX and naphthalene analyses were performed at TA's North Canton laboratory. Pentachlorophenol analyses were performed at TA's Pittsburgh, Pennsylvania laboratory. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Standard GHD Services, Inc. (GHD) report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody forms, finished report forms, method blank data, recovery data from surrogate spikes, laboratory control samples (LCS), matrix spikes (MS), and field QC samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and applicable guidance from the documents entitled:

i) "Quality Assurance Project Plan, Long Term Response Action, Rev. II, February 2005 with addendums

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", USEPA 540/R-99/008, October 1999

Item ii) will subsequently be referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria for the analyses are summarized in Table 3. The sample chain of custody documents and analytical report were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

Laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

With the exception of benzene, all method blank results were non-detect. Table 4 lists compounds detected in the method blanks. Associated sample data are qualified as noted in the table.

4. Surrogate Spike Recoveries

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for BTEX, naphthalene, and pentachlorophenol analyses were spiked with the appropriate number of surrogate compounds prior to sample extraction or analysis.

Each individual surrogate compound is expected to meet the laboratory control limits.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries met the above criteria.

5. Laboratory Control Sample Analyses

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects.

LCS were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

The LCS contained all compounds of interest. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of the sample preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed.

MS/MSD analyses were performed as specified in Table 1.

The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits.

7. Field QA/QC Samples

The field QA/QC consisted of two trip blank samples, one field blank sample and one field duplicate sample set.

Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, two trip blank samples were submitted to the laboratory for BTEX analysis. Benzene was detected in the trip blank associated with lot 240-78382-1 (0.44J ug/L). However, associated sample results were previously qualified as non-detect based on method blank results; therefore, no qualification of data was necessary based on compounds detected in the trip blank.

Field Blank Sample Analysis

To assess ambient conditions at the site and cleanliness of sample containers, a field blank was submitted for analysis, as identified in Table 1. Benzene was detected in the field blank (0.44J ug/L). However, associated sample results were previously qualified as non-detect based on method blank results; therefore, no qualification of data was necessary based on compounds detected in the field blank.

Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, a field duplicate sample set was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with the duplicate samples must be less than 50 percent. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criteria is one times the RL value.

All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision.

8. Analyte Reporting

The laboratory reported detected results down to the laboratory's method detection limit (MDL) for each analyte. Positive analyte detections less than the RL but greater than the MDL were qualified as estimated (J) in Table 2 unless qualified otherwise in this memorandum. Non-detect results were presented as non-detect at the MDL in Table 2.

9. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable with the qualifications noted herein.

Table 1

Sample Collection and Analysis Summary
Residential Water Sampling Event
Penta Wood Site
Siren, Wisconsin
April 2017

					Analysis/Parameters			
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**BTEX**	**Naphthalene**	**Pentachlorophenol**	**Comments**
W-170417-PS-02R	RW02	water	04/17/2017	14:57	X	X	X	
W-170417-PS-03R	RW03	water	04/17/2017	15:45	X	X	X	
W-170417-PS-04R	RW04	water	04/17/2017	15:18	X	X	X	
W-170417-PS-05R	RW05	water	04/17/2017	14:25	X	X	X	
W-170418-PS-06R	RW06	water	04/18/2017	11:36	X	X	X	
W-170418-PS-07R	DW01	water	04/18/2017	10:20	X	X	X	MS/MSD
W-170418-PS-08R	DW01	water	04/18/2017	10:30	X	X	X	duplicate (PS-07R)
W-170418-PS-09R	DW01	water	04/18/2017	10:45	X	X	X	field blank
TRIP BLANK-002	lab	water	04/18/2017	11:00	X	-	-	trip blank
W-170419-PS-01R	RW01	water	04/17/2018	14:57	X	X	X	
TRIP BLANK-002	lab	water	04/19/2019	14:00	X	-	-	trip blank

Notes:

MS/MSD - Matrix spike/matrix spike duplicate
BTEX - Benzene, toluene, ethylbenzene, and xylenes (total)

Table 2

Validated Analytical Results Summary
Residential Water Sampling Event
Penta Wood Site
Siren, Wisconsin
April 2017

Location ID:		RW01	RW02	RW03	RW04	RW05
Sample Name:		W-170419-PS-01R	W-170417-PS-02R	W-170417-PS-03R	W-170417-PS-04R	W-170417-PS-05R
Sample Date:		04/19/2017	04/17/2017	04/17/2017	04/17/2017	04/17/2017
Parameters	**Unit**					
Volatile Organic Compounds						
Benzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (total)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Semivolatile Organic Compounds						
Naphthalene	µg/L	0.19 U	0.19 U	0.20 U	0.19 U	0.19 U
Herbicides						
Pentachlorophenol	µg/L	0.015 J	0.095 U	0.095 U	0.094 U	0.097 U

Table 2

Validated Analytical Results Summary
Residential Water Sampling Event
Penta Wood Site
Siren, Wisconsin
April 2017

Location ID:		**RW06**	**DW01**	**DW01**	**DW01**
Sample Name:		**W-170418-PS-06R**	**W-170418-PS-07R**	**W-170418-PS-08R**	**W-170418-PS-09R**
Sample Date:		**04/18/2017**	**04/18/2017**	**04/18/2017 Duplicate**	**04/18/2017 Field Blank**
Parameters	**Unit**				
Volatile Organic Compounds					
Benzene	µg/L	0.50 U	0.50 U	0.50 U	0.44 J
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (total)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U
Semivolatile Organic Compounds					
Naphthalene	µg/L	0.19 U	0.20 U	0.20 U	0.19 U
Herbicides					
Pentachlorophenol	µg/L	0.095 U	0.020 J	0.022 J	0.094 U

Note:

U - Not detected at the associated reporting limit
J - Estimated concentration

Table 3

Analytical Methods and Holding Time Criteria
Residential Water Sampling Event
Penta Wood Site
Siren, Wisconsin
April 2017

			Holding Time	
			Collection to Extraction	Collection or Extraction to Analysis
Parameter	**Method**	**Matrix**	**(Days)**	**(Days)**
BTEX	SW 8260B	Water	-	14
Naphthalene	SW 8270C	Water	7	40
Pentachlorophenol	SW 8151	Water	7	40

Notes:

Method References:
SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions

Table 4

Qualified Sample Results Due to Analyte Concentrations in the Method Blanks
Residential Water Sampling Event
Penta Wood Site
Siren, Wisconsin
April 2017

Parameter	Analyte	Analysis Batch	Blank Result *	Sample ID	Original Result	Qualified Result	Units
VOC	Benzene	276309	0.552	W-170417-PS-05R	0.39 J	0.50 U	ug/L
				W-170417-PS-04R	0.34 J	0.50 U	ug/L
				W-170418-PS-07R	0.29 J	0.50 U	ug/L
				W-170418-PS-06R	0.47 J	0.50 U	ug/L

Notes:

* - Blank result adjusted for sample factors where applicable
U - Not detected at the associated reporting limit
J - Estimated concentration

Appendix D
Microcosm and BioTrap Study Memorandum

Memorandum

May 16, 2017
Revised July 7, 2017
Revised July 10, 2017

To:	Brian Sandberg	Ref. No.:	086165
From:	Sophia Dore/Christa Bucior/adh/5	Tel:	716-205-1978
cc:	Timothy Ree		

Subject: **Evaluation of the Potential for Natural Attenuation of Pentachlorophenol Treatability Study**
Penta Wood Products Superfund Site, Siren, Wisconsin

1. Introduction

Pentachlorophenol (PCP) and diesel fuel are present in groundwater at the Penta Wood Products Superfund Site, located in Siren, Wisconsin. Light Non-Aqueous Phase Liquid (LNAPL) present in some wells. The PCP concentrations range from 1,000 micrograms per liter (µg/L) (in the LNAPL wells) to 10 µg/L in the former release area. The remediation system operation was temporarily shut down at the Site for conducting a pilot study to evaluate whether monitored natural attenuation (MNA) will be an effective remedial action at the Site. A microcosm study and a BioTrap study were performed as lines of evidence that MNA is occurring at the Site. This memorandum contains the results of the microcosm and BioTrap studies. The studies were conducted in general accordance with the Remediation System Shutdown Pilot Study Work Plan (GHD, November 2015) Microcosm Study.

2. Microcosm Study

2.1 Objectives

The objectives of this microcosm laboratory study were to gather the data necessary to:

i) Determine whether natural attenuation of PCP is occurring at the Site

ii) Determine whether natural attenuation can occur under aerobic conditions, anaerobic conditions, or both

iii) Determine a Site-specific degradation rate for PCP

2.2 Sample Acquisition

The microcosm study was conducted using samples of soil and groundwater collected from the Site during drilling and well installation activities in November and December 2015. Four gallons of groundwater from the aerobic zone and 4 gallons of groundwater from the anaerobic zone were collected separately along with

5 pounds of soil from the aerobic zone and 5 pounds of soil from the anaerobic zone. The aerobic zone samples were collected at borehole SB1. The anaerobic zone samples were collected at well MW29. Borehole SB1 and well MW29 are shown on Figure 1. The soil samples from the aerobic and anaerobic zones and the groundwater from the aerobic zone were received by the GHD Innovative Technology Group (ITG) laboratory in Niagara Falls, New York on December 3, 2015. An additional four gallons of groundwater from the anaerobic zone were received on April 22, 2016.

2.3 Task 1: Initial Characterization

Upon arrival at the laboratory, the samples were analyzed for the following parameters to provide a characterization of baseline conditions for the study:

Groundwater

i) pH

ii) PCP

iii) Diesel range petroleum hydrocarbons (TPH[C_9-C_{36}])

iv) Ammonia-nitrogen

v) Orthophosphate-phosphorus

vi) Total and dissolved iron and manganese (groundwater)

Soil

i) pH

ii) PCP

iii) Diesel range petroleum hydrocarbons

iv) Ammonia-nitrogen

v) Orthophosphate-phosphorus

vi) Percent Moisture

vii) Percent Solids

viii) Total iron and manganese (soil)

The results from the initial analysis of groundwater SB1, the groundwater from the aerobic area, showed 87 µg/L of PCP and 0.176 milligram per liter (mg/L) of TPH(C_9-C_{36}). The pH was in the neutral range at 6.72, ammonia-nitrogen was below the analytical detection limit, and orthophosphate-phosphorus was present at 1.85 mg/L. Total iron was present at 27,600 µg/L and dissolved iron at 1,010 µg/L. Total manganese was present at 4,480 µg/L and dissolved manganese at 3,340 µg/L. These ratios of total to dissolved iron and manganese are consistent with the aerobic conditions known to exist in the area from which this sample was collected.

The results from the initial analysis of groundwater MW29, the groundwater from the anaerobic area, showed 1,430 µg/L of PCP and 1,540 mg/L of TPH(C_9-C_{36}). The pH was again in the neutral range at 6.71, ammonia-nitrogen was below the analytical detection limit, and orthophosphate-phosphorus was present at 1.45 mg/L. Total iron was present at 10,500 µg/L and dissolved iron was present at 270 µg/L. Total manganese was present at 2,530 µg/L and dissolved manganese at 2,350 µg/L. The manganese results are typical of anaerobic conditions; however, the dissolved iron concentration is lower than would be expected. These data are summarized in Table 1.

The results from the initial analysis of soil SB1, the soil sample collected from the aerobic area, showed 0.502 milligram per kilogram (mg/kg) of PCP and TPH(C_9-C_{36}) below the analytical detection limit. The pH of the soil was 7.14, ammonia-nitrogen was below the analytical detection limit, and orthophosphate-phosphorus was present at 27.8 mg/kg. The soil contained 6,880 mg/kg of total iron and 79.9 mg/kg of total manganese.

The results from the initial analysis of soil MW29, the soil sample collected from the anaerobic area, showed 61.0 mg/kg of PCP and 153 mg/kg of TPH(C_9-C_{36}). The pH of the soil was 6.65, ammonia-nitrogen was below the analytical detection limit, and orthophosphate-phosphorus was present at 20.5 mg/kg. The soil contained 8,330 mg/kg of total iron and 94.6 mg/kg of total manganese. These data are summarized in Table 2.

2.4 Task 2: Aerobic Microcosm Tests

Microcosms were set up to assess the potential for natural attenuation of PCP and petroleum hydrocarbons under aerobic conditions using soil and groundwater from borehole SB1. Forty grams of soil were placed in serum bottles along with 200 milliliters (mL) of groundwater.

The following treatments were performed:

1. Soil and groundwater only (biotic control)
2. Soil, groundwater, oxygen
3. Soil/sand, groundwater, oxygen, and sodium azide (abiotic control)

After 0, 3, 6, and 12 months, duplicate microcosms for each treatment were to be sacrificed and analyzed for PCP and petroleum hydrocarbons in the soil and groundwater. After 3 months, treatment of 94 percent of the PCP was observed in the microcosms that contained soil and groundwater, and TPH(C_9-C_{36}) was removed to non-detect levels. Ninety-five percent treatment of PCP was observed in microcosms that received oxygen. TPH(C_9-C_{36}) was also removed to non-detect levels in these microcosms. These data suggest that natural attenuation is effective for treatment of PCP and TPH in the aerobic zone of the Site. These data are summarized in Tables 3 and 4.

After 6 months, PCP and TPH(C_9-C_{36}) were not detected in any of the biological microcosms. These data show that natural attenuation is effective for treatment of PCP and TPH in the aerobic zone of the Site. These data are summarized in Tables 5 and 6.

PCP and TPH(C_9-C_{36}) concentrations did not decrease in the sodium azide treatment samples (abiotic control), which confirms that the decreased concentrations in the soil and groundwater (biotic control) and soil, groundwater, and oxygen treatments are due to biological degradation.

Since both PCP and TPH(C_9-C_{36}) had been reduced to non-detect levels, no further analyses of these microcosms were performed. The data were used to calculate first order rate constants and half lives for PCP. Under aerobic conditions, the half life for PCP was 0.7 month. These calculations are shown in Attachment A. Since TPH was removed to non-detect levels at the 3-month sampling event, the half life for TPH could not be calculated.

2.5 Task 3: Anaerobic Microcosm Tests

Microcosms were set up to assess the potential for natural attenuation of PCP and TPH(C_9-C_{36}) under anaerobic conditions using soil and groundwater collected from well MW29. Microcosms were set up in the anaerobic hood. Forty grams of soil were placed in serum bottles along with 200 mL of groundwater.

The following treatments were performed:

1. Soil and groundwater only (biotic control)
2. Soil, groundwater, and emulsified vegetable oil (EVO)
3. Soil/sand, groundwater, and sodium azide (abiotic control)

After 0, 3, 6, and 12 months, duplicate microcosms for each treatment were to be sacrificed and analyzed for PCP in the soil and groundwater.

After 3 months, no reduction in the concentration of PCP was observed in any of the microcosms. An increase in the aqueous concentration of PCP was observed in some of the microcosms, which is likely associated with PCP partitioning out of the soil into the groundwater. Treatment of TPH(C_9-C_{36}) was observed in all microcosms. In microcosms containing soil and groundwater, 37 percent removal of TPH(C_9-C_{36}) was observed and 30 percent removal of TPH(C_9-C_{36}) was observed in the microcosms that received EVO. These data suggest that anaerobic biodegradation of the TPH has occurred; however 3 months is not enough time for anaerobic biodegradation of PCP to occur. These data are shown in Tables 7 and 8.

After 6 months, 35 percent removal of PCP was observed in the microcosms that received EVO. No removal of PCP was observed in any of the other microcosms, and the increases in aqueous PCP combined with decreases in soil PCP were again observed suggesting that PCP is partitioning out of the soil. Treatment of TPH(C_9-C_{36}) was again observed in all microcosms. In microcosms containing soil and groundwater, treatment of TPH(C_9-C_{36}) had increased to 42 percent, and 51 percent removal of TPH(C_9-C_{36}) was observed in the microcosms that received EVO. These data suggest that after 6 months some anaerobic degradation of the PCP has occurred in microcosms where anaerobic conditions were optimized with EVO. Anaerobic degradation of the TPH is continuing but appears to be slow. These data are shown in Tables 9 and 10.

After 12 months, 93 percent removal of PCP and 64 percent removal of TPH(C_9-C_{36}) were observed in the microcosms that received EVO. Seventy percent removal of PCP and 56 percent removal of TPH(C_9-C_{36}) were observed in the microcosms that contained soil and groundwater only. Eighty-seven percent removal of PCP and 52 percent removal of TPH(C_9-C_{36}) observed in the azide control samples suggest that after 12 months, the azide is no longer suppressing microbial activity. These data suggest that anaerobic degradation of PCP and TPH is occurring, both in the microcosms where anaerobic conditions were optimized and in the unamended microcosms. Biodegradation of the PCP appears to have taken more than 6 months to start, but once started, biodegradation is proceeding fairly rapidly. Biodegradation of the TPH(C_9-C_{36}) continues to proceed slowly. These data are shown in Tables 11 and 12. Additional testing may be performed after 24 and 36 months.

The data were used to calculate first order rate constants and half lives for PCP. Under anaerobic conditions, the half life for PCP under unenhanced conditions was 5.5 months and with the addition of EVO was 2.9 months. The half life for TPH(C_9-C_{36}) under unenhanced conditions was 9.6 months and with the addition of EVO was 8.5 months. These calculations are shown in Attachment A.

3. BioTrap Study

BioTrap samplers are passive sampling tools that collect microbes over time for the purpose of better understanding biodegradation potential. BioTraps contain Bio-Sep® beads that are 2-4 millimeters (mm) in diameter and are made of Nomex® and powdered activated carbon (PAC). When a BioTrap sampler is deployed in a monitoring well, the beads absorb contaminants and nutrients present in the aquifer and become colonized by microorganisms. Once recovered from a monitoring well, Deoxyribose Nucleic Acid (DNA) and Ribose Nucleic Acid (RNA), or phospholipid fatty acids (PLFA) can be extracted from the beads for analysis to evaluate the microbial community. Most microbes prefer to be attached to a surface rather than free floating. The BioTrap provides a large surface area for the microbes to colonize and form biofilms. BioTrap samplers can be "baited" with various amendments or compounds to answer Site-specific questions and screen remedial alternatives. For example, BioTraps can be baited with specific contaminants of concern, such as PCP. They can also be baited with ^{13}C labeled compounds (stable isotope probing) to demonstrate conclusively that biodegradation is occurring.

3.1 Objectives

The objectives of the BioTrap study were to gather the data necessary to:

i) Determine whether bacteria capable of degrading PCP are present at the Site

ii) Demonstrate in situ biodegradation of PCP using a BioTrap

3.2 BioTrap Study

BioTraps baited with ^{13}C labelled PCP were obtained from Microbial Insights. During April and May 2016, they were installed in two wells in the source area (wells MW20 and MW29) and two wells in the downgradient area (wells MW9 and EW11S). The BioTraps were left in place for 32 days. After 32 days, the BioTraps were retrieved and analyzed for the following:

- ^{13}C PCP concentration
- PLFA
- Stable isotope probing
- Dissolved ^{13}C inorganic carbon

A copy of the laboratory report is included in Attachment B.

3.2.1 ^{13}C Pentachlorophenol Concentration

An attempt to quantify ^{13}C PCP in the BioTraps after deployment was made; however, the phenol group on the PCP has been found to chemisorb to the beads. Therefore, quantitative extraction of the PCP was not possible, and it was not possible to compare the concentration of PCP after the BioTraps were retrieved from the wells to the initial concentration of PCP in the BioTraps.

3.2.2 Phospholipid Fatty Acids

The biomass collected in the BioTraps was analyzed for PLFA. The biomass in the four BioTraps was similar with the source area. BioTraps from wells MW20 and MW29 having counts of 3.8×10^5 cells per bead and 1.9×10^6 cells per bead, respectively. BioTraps from downgradient wells MW9 and EW11S had counts of 2.3×10^6 cells per bead and 1.1×10^6 cells per bead, respectively.

The PLFA analysis showed that the dominant class of organism in the well MW20 BioTrap was Proteobacteria, which are fast growing gram negative bacteria, which utilize many carbon sources and adapt quickly to a variety of environments. The dominant class of organism in the well MW29 BioTrap was Firmicutes, which are anaerobic fermenting bacteria. The well MW20 BioTrap also contained Firmicutes.

The dominant type of organism in both downgradient wells MW9 and EW11S was the Proteobacteria with very low percentage of Firmicutes. These data show that anaerobic bacteria were dominant in well MW29 and also present in well MW20 but not present in the downgradient wells MW9 and EW11S. This is consistent with the source area being anaerobic while the downgradient area is more aerobic.

3.2.3 Stable Isotope Probing

Stable isotope probing demonstrated that ^{13}C was incorporated into the microbial biomass. The ^{13}C enriched biomass was between 1.1 and 2.0×10^4 cells per bead for wells MW9, MW29, and EW11S and 2.2×10^3 cells per bead for well MW20.

The ratio between the heavier and lighter isotopes is expressed as a delta value (δ). The δ value is calculated according to the following equation:

$\delta(‰) = (R(sample)/R(standard)-1)X1000$

R= ratio of heavy to light isotope

This ratio was calculated for the PLFA to determine the extent to which they were enriched in ^{13}C. The average $\delta^{13}C$ values for the PLFA in wells MW9 and EW11S, as well as well MW20, ranged from 257 to

360 percent, which is in the moderate range indicating a moderate incorporation of ^{13}C-labeled PCP into microbial biomass. The average $\delta^{13}C$ value for well MW29 was 94 percent, which is in the low range indicating low incorporation of ^{13}C-labeled PCP into microbial biomass. Well MW29 had the greatest concentration of Firmicutes, which are anaerobic bacteria and a lower concentration of Proteobacteria, which are bacteria that can utilize a wide range of carbon sources. It is possible that Proteobacteria have a greater capacity to degrade PCP than Firmicutes.

3.2.4 Dissolved ^{13}C Inorganic Carbon

$\delta^{13}C$ value for dissolved inorganic carbon was also measured in the BioTraps. If inorganic carbon was enriched in ^{13}C, it would indicate that complete mineralization of the PCP to carbon dioxide (CO_2) had occurred. The natural abundance of ^{13}C is approximately 1 percent, and the percent ^{13}C in the inorganic carbon in the four BioTraps ranged from 1.08 to 1.09, which is very close to the natural abundance. The $\delta^{13}C$ values ranged from -21 to -14 percent, which are near background levels; therefore, it appears that little to no PCP mineralization occurred during the 32 days in which the BioTraps were in place. PCP mineralization could have occurred if the BioTraps had been left in place for a longer duration.

The BioTrap data are summarized in Table 13. The Microbial Insights laboratory report is included in Attachment B.

4. Summary

Aerobic Microcosms

- After 3 months, PCP was reduced by 94-95 percent, and TPH(C_9-C_{36}) was reduced to non-detect levels in the biological microcosms.
- After 6 months, both PCP and TPH(C_9-C_{36}) were reduced to non-detect levels in the biological microcosms.
- The addition of oxygen to the microcosms did not increase biodegradation rates.
- Under aerobic conditions, the half life for PCP was 0.7 month. Since TPH was removed to non-detect levels at the 3-month sampling event, the half life for TPH could not be calculated.
- These data show that natural attenuation under aerobic conditions is effective for treatment of the PCP and TPH(C_9-C_{36}) in the aerobic area of the Site.

Anaerobic Microcosms

- After 3 months, no treatment of PCP was observed in any of the microcosms; however, treatment of 37 percent of the TPH(C_9-C_{36}) was observed in the unamended microcosms.
- After 6 months, treatment of PCP was not observed in the unamended microcosms; however, 35 percent removal of PCP was observed when anaerobic conditions were optimized by the addition of EVO.
- Treatment of TPH(C_9-C_{36}) was observed in both the unamended and amended microcosms.

- After 12 months, 93 percent removal of PCP and 64 percent removal of TPH(C_9-C_{36}) were observed in the microcosms that received EVO; and 70 percent removal of PCP and 56 percent removal of TPH(C_9-C_{36}) were shown in the unamended microcosms.
- Removal was observed in the azide kill controls, suggesting that after 12 months, azide is no longer suppressing microbial activity.
- Under anaerobic conditions, the half life for PCP under unenhanced conditions was 5.5 months and with the addition of EVO was 2.9 months. The half life for TPH(C_9-C_{36}) under unenhanced conditions was 9.6 months and with the addition of EVO was 8.5 months. Additional treatment of PCP and TPH(C_9-C_{36}) is expected over time.

BioTraps

- Total biomass in the BioTraps ranged from 3.8 x 10^5 cells per bead to 2.3 x 10^6 cells per bead.
- The PLFA analysis showed that the dominant class of organism in the downgradient well BioTraps and the BioTrap from well MW20, which is located in the source area, was Proteobacteria, which are fast growing gram negative bacteria that utilize many carbon sources. The dominant class of organism in the well MW29 BioTrap (source area) was Firmicutes, which are anaerobic fermenting bacteria. The well MW20 BioTrap also contained Firmicutes.
- Stable isotope probing demonstrated that ^{13}C was incorporated into the microbial biomass.
- The average $\delta^{13}C$ values for the PLFA in wells MW9 and EW11S and well MW20 ranged from 257 to 360 percent, which indicate a moderate rate of incorporation of ^{13}C-labeled PCP into microbial biomass. The average $\delta^{13}C$ value for well MW29 was 94 percent, which indicates a low rate of incorporation of ^{13}C-labeled PCP into microbial biomass.
- Mineralization of ^{13}C labeled PCP into CO_2 was not observed during the 32-day BioTrap study period.

5. Conclusions

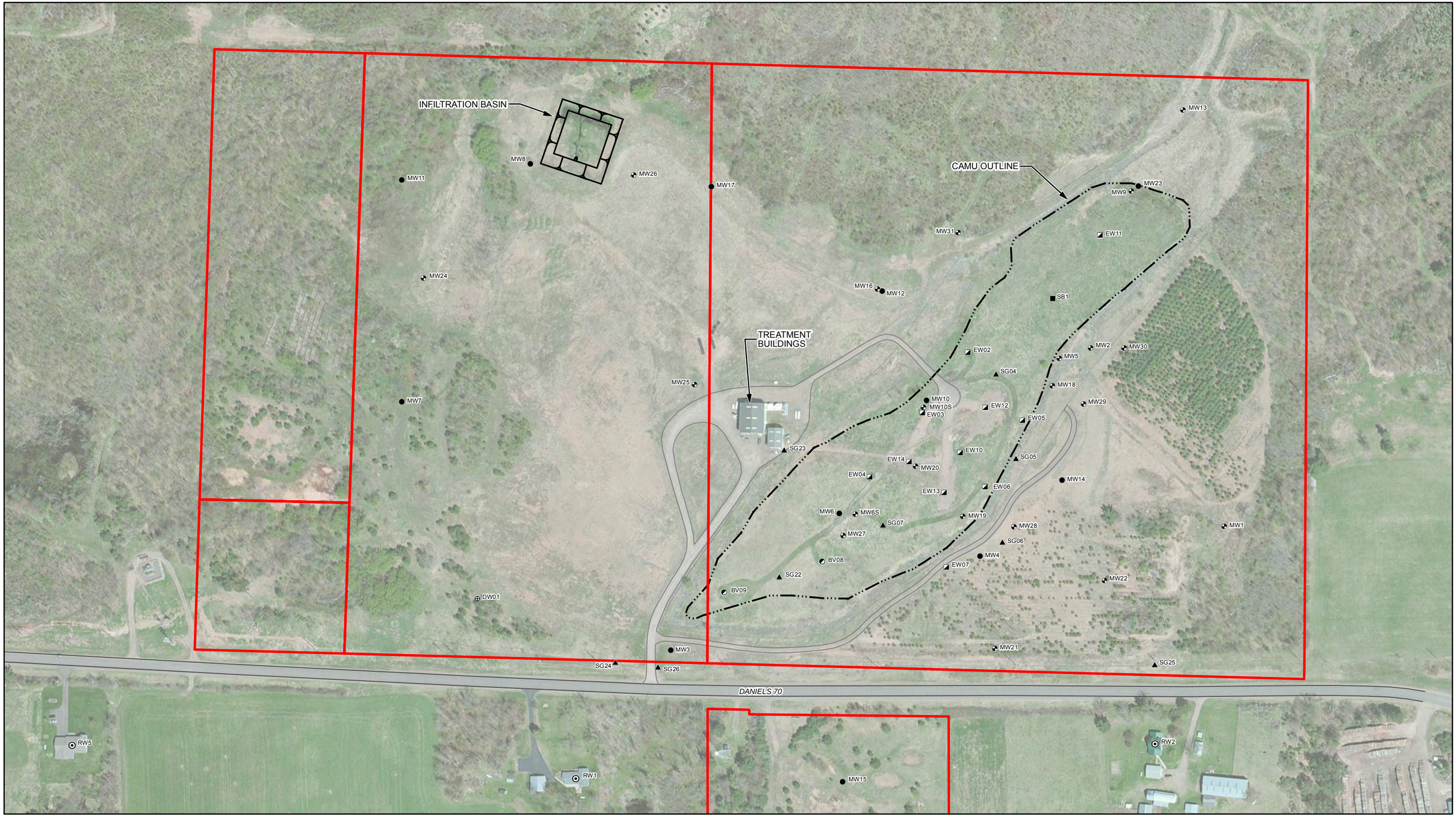
The results from the microcosm tests indicate that PCP and TPH(C_9-C_{36}) are readily degradable under aerobic conditions and that PCP and TPH(C_9-C_{36}) are also degradable under anaerobic conditions; however, this process is much slower. The addition of EVO to optimize anaerobic conditions appears to increase the biodegradation rate of PCP. Based on the half lives measured for the microcosms, the cleanup time for the aerobic area under aerobic conditions would be 6.3 months and for the anaerobic area without enhancement would be 66 months (5.5 years).

These conclusions are supported by the data from the BioTraps. In the BioTraps deployed in the downgradient area in wells MW9 and EW11S, the dominant class of organisms, the Proteobacteria, degraded PCP and incorporated it into their biomass at a moderate rate. In the source area in wells MW20 and MW29, the BioTrap data appears to indicate that well MW20 may be in a transitional zone where some aerobic and some anaerobic processes are occurring. Although the BioTrap from MW20 contained the anaerobic Firmicutes, which were the dominant class of organisms found in MW29, Proteobacteria were the

dominant class of organisms in MW20, and the rate of incorporation of PCP into biomass was similar to the aerobic wells. In MW29, which was likely highly anaerobic, the Firmicutes dominated, and slower incorporation of PCP into biomass was observed.

No mineralization of PCP (i.e., degradation into CO_2) was observed in the BioTrap study; however, the BioTraps were deployed for only 32 days, which may not be long enough for mineralization of PCP to occur.

Overall, it appears that MNA would be an effective treatment for the downgradient area, and biodegradation of PCP and TPH(C_9-C_{36}) is expected to occur at a moderate rate. MNA may be effective for the source area. The BioTrap and amended microcosm data show that PCP degradation does occur under anaerobic conditions; however, slower biodegradation rates are expected. Analysis of the unamended anaerobic microcosms after more time has elapsed would provide additional information about the rates that can be expected. Additional anaerobic microcosm testing may be performed after 24 and 36 months.



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LEGEND

- EXTRACTION WELL NEST
- UNCONFINED MONITORING WELL
- SEMICONFINED MONITORING WELL
- BIOVENTING WELL
- SOIL GAS WELL NEST
- WATER SUPPLY WELL
- RESIDENTIAL WELL
- APPROXIMATE CAMU LIMIT
- SITE PARCEL BOUNDARY

PENTA WOOD PRODUCTS SUPERFUND SITE
SIREN, WISCONSIN
EVALUATION OF THE POTENTIAL FOR NATURAL ATTENUATION OF PCP

086165-03-16
Jun 28, 2017

SITE PLAN

FIGURE 1

GIS File: I:\GIS\Projects\6-chars\08----\0861--\086165\086165-MEMO\086165-03(MEMO005)\086165-03(MEMO005)GIS-SP001.mxd

Table 1

Initial Groundwater Characterization Analytical Data - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

Parameters	Date Analyzed / Units	12/4/2015 SB1	4/28/2016 MW29
General Chemistry			
pH	S.U.	6.72	6.71
Ammonia-Nitrogen	mg/L	< 1.0	< 1.0
Orthophosphate-Phosphorus	mg/L	1.85	1.45
Semi-Volatile Organic Compounds			
Pentachlorophenol	µg/L	87	1430
Total Petroleum Hydrocarbons			
TPH(C_9-C_{36})	mg/L	0.176	1540
Total Metals			
Iron	µg/L	27600	10500
Manganese	µg/L	4480	2530
Dissolved Metals			
Dissolved Iron	µg/L	1010	270
Dissolved Manganese	µg/L	3340	2350

Notes:

< - Compound not detected above the reporting limit
S.U. - Standard units
µg/L - Micrograms per liter

Table 2

Initial Soil Characterization Analytical Data - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

Parameters	Date Analyzed / Units	12/3/2015 SB1	12/3/2015 MW29
General Chemistry			
pH	S.U.	7.14	6.65
Ammonia-Nitrogen	mg/kg	ND	ND
Orthophosphate-Phosphorus	mg/kg	27.8	20.5
Percent Moisture	%	7.77	4.45
Percent Solids	%	92.2	95.6
Semi-Volatile Organic Compounds			
Pentachlorophenol	mg/kg	0.502	61
Total Petroleum Hydrocarbons			
TPH(C_9-C_{36})	mg/kg	< 50	153
Total Metals			
Iron	mg/kg	6880	8330
Manganese	mg/kg	79.9	94.56

Notes:

ND - Not detected
< - Compound not detected above the reporting limit
J - Estimated value
S.U. - Standard units
mg/kg - Milligrams per kilogram
% - Percent

Table 3

Aerobic Biostudy SB1 Groundwater Analytical Data (3-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

			3-Month Period		
	Date Analyzed	**1/11/2016**	**4/11/2016**	**4/11/2016**	**4/11/2016**
Parameters	**Units**	**Start of Microcosm Study**	**Soil and Groundwater**	**Soil, Groundwater, and Oxygen**	**Soil, Groundwater, Oxygen, and Azide**
Semi-Volatile Organic Compounds					
Pentachlorophenol	µg/L	289 / 302	9.29 J / < 50	3.10 J / < 50	362 / 282
Total Petroleum Hydrocarbons					
TPH(C_9-C_{36})	mg/L	4.61 / 5.10	< 0.5 / < 0.5	< 0.5 / < 0.5	4.45 / 4.28
Removal of Pentachlorophenol	%		94.2	95.2	-8.96
Removal of TPH(C_9-C_{36})	%		41.5	41.5	4.41

Notes:

< - Compound not detected above the reporting limit
µg/L - Micrograms per liter
mg/L - Milligrams per liter
J - Estimated value
All samples were analyzed in duplicate.

Table 4

Aerobic Biostudy SB1 Soil Analytical Data (3-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

			3-Month Period		
Parameters	**Date Analyzed** / **Units**	**1/11/2016 Start of Microcosm Study**	**4/11/2016 Soil and Groundwater**	**4/11/2016 Soil, Groundwater, and Oxygen**	**4/11/2016 Soil, Groundwater, Oxygen, and Azide**
Semi-Volatile Organic Compounds					
Pentachlorophenol	mg/kg	0.087 J / 0.094 J	< 0.1 / < 0.1	< 0.1 / < 0.1	< 0.1 / < 0.1
Total Petroleum Hydrocarbons					
TPH(C_9-C_{36})	mg/kg	< 50 / < 50	< 50 / < 50	< 50 / < 50	< 50 / < 50

Notes:

J - Estimated value
< - Compound not detected above the reporting limit
mg/kg - Milligrams per kilogram
All samples were analyzed in duplicate.

Table 5

Aerobic Biostudy SB1 Groundwater Analytical Data (6-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

Parameters	Date Analyzed	1/11/2016 Start of Microcosm Study	6-Month Period 8/1/2016 Soil and Groundwater	8/1/2016 Soil, Groundwater, and Oxygen	8/1/2016 Soil, Groundwater, Oxygen, and Azide
	Units				
Semi-Volatile Organic Compounds					
Pentachlorophenol	µg/L	289 / 302	< 50 / < 50	< 50 / < 50	92.7 / 110
Total Petroleum Hydrocarbons					
TPH(C_9-C_{36})	mg/L	4.61 / 5.10	< 0.5 / < 0.5	< 0.5 / < 0.5	< 0.5 / < 0.5
Removal of Pentachlorophenol	%		91.5	91.5	65.7
Removal of TPH(C_9-C_{36})	%		41.5	41.5	41.5

Notes:

< - Compound not detected above the reporting limit
µg/L - Micrograms per liter
mg/L - Milligrams per liter
J - Estimated value
% - Percent
All samples were analyzed in duplicate.

Table 6

Aerobic Biostudy SB1 Soil Analytical Data (6-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

			6-Month Period		
Parameters	**Date Analyzed** / **Units**	**1/11/2016 Start of Microcosm Study**	**8/1/2016 Soil and Groundwater**	**8/1/2016 Soil, Groundwater, and Oxygen**	**8/1/2016 Soil, Groundwater, Oxygen, and Azide**
Semi-Volatile Organic Compounds					
Pentachlorophenol	mg/kg	0.087 J / 0.094 J	< 0.1 / < 0.1	< 0.1 / < 0.1	< 0.1 / < 0.1
Total Petroleum Hydrocarbons					
TPH(C_9-C_{36})	mg/kg	< 50 / < 50	< 50 / < 50	< 50 / < 50	< 50 / < 50

Notes:

J - Estimated value
< - Compound not detected above the reporting limit
mg/kg - Milligrams per kilogram
All samples were analyzed in duplicate.

Table 7

Anaerobic Biostudy MW29 Groundwater Analytical Data (3-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

Parameters	Units	Date Analyzed: 5/6/2016 Start of Microcosm Study	3-Month Period: 8/3/2016 Soil and Groundwater	3-Month Period: 8/3/2016 Soil, Groundwater, and EVO	3-Month Period: 8/3/2016 Soil, Groundwater, Oxygen, and Azide
Semi-Volatile Organic Compounds					
Pentachlorophenol	µg/L	2460 / 1580	8900 / 9600	3250 / 1240	8600 / 7900
Total Petroleum Hydrocarbons					
TPH(C_9-C_{36})	mg/L	464 / 501	224 / 224	470 / 308	430 / 428
Removal of Pentachlorophenol	%		<1	<1	<1
Removal of TPH(C_9-C_{36})	%		37.3	29.7	9.19

Notes:

µg/L - Micrograms per liter
mg/L - Milligrams per liter
EVO - Emulsified Vegetable Oil
% - Percent
< - Less than value listed
All samples were analyzed in duplicate.

Table 8

Anaerobic Biostudy MW29 Soil Analytical Data (3-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

			3-Month Period		
	Date Analyzed	**5/6/2016**	**8/3/2016**	**8/3/2016**	**8/3/2016**
Parameters	**Units**	**Start of Microcosm Study**	**Soil and Groundwater**	**Soil, Groundwater, and EVO**	**Soil, Groundwater, Oxygen, and Azide**
Semi-Volatile Organic Compounds					
Pentachlorophenol	mg/kg	23.3 / 38.1	3.60 / 2.63	3.20 / 1.68	< 0.1 / < 0.1
Total Petroleum Hydrocarbons					
TPH(C_9-C_{36})	mg/kg	919 / 2370	1250 / 1440	932 / 983	1400 / 1660

Notes:

< - Compound not detected above the reporting limit
mg/kg - Milligrams per kilogram
EVO - Emulsified Vegetable Oil
All samples were analyzed in duplicate.

Table 9

Anaerobic Biostudy MW29 Groundwater Analytical Data (6-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

Parameters	Units	Date Analyzed: 5/6/2016 Start of Microcosm Study	6-Month Period: 11/15/2016 Soil and Groundwater	11/15/2016 Soil, Groundwater, and EVO	11/15/2016 Soil, Groundwater, Oxygen, and Azide
Semi-Volatile Organic Compounds					
Pentachlorophenol	µg/L	2460 / 1580	15000 / 17800	1010 / 1610	6100 / 6500
Total Petroleum Hydrocarbons					
TPH(C_9-C_{36})	mg/L	464 / 501	105 / 237	149 / 264	295 / 213
Removal of Pentachlorophenol	%		<1	35.30	<1
Removal of TPH(C_9-C_{36})	%		42.3	51.0	25.40

Notes:

µg/L - Micrograms per liter
mg/L - Milligrams per liter
EVO - Emulsified Vegetable Oil
% - Percent
< - Less than value listed
All samples were analyzed in duplicate.

Table 10

Anaerobic Biostudy MW29 Soil Analytical Data (6-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

			6-Month Period		
Parameters	**Date Analyzed** / **Units**	**5/6/2016** **Start of Microcosm Study**	**11/15/2016** **Soil and Groundwater**	**11/15/2016** **Soil, Groundwater, and EVO**	**11/15/2016** **Soil, Groundwater, Oxygen, and Azide**
Semi-Volatile Organic Compounds					
Pentachlorophenol	mg/kg	23.3 / 38.1	18.3 / 22.4	11.0 / 10.5	4.69 / 9.53
Total Petroleum Hydrocarbons					
TPH(C_9-C_{36})	mg/kg	919 / 2370	1400 / 1360	1010 / 838	1950 / 1350

Notes:

< - Compound not detected above the reporting limit
mg/kg - Milligrams per kilogram
EVO - Emulsified Vegetable Oil
All samples were analyzed in duplicate.

Table 11

Anaerobic Biostudy MW29 Groundwater Analytical Data (12-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

			6-Month Period		
	Date Analyzed	**5/6/2016**	**5/8/2017**	**5/8/2017**	**5/8/2017**
Parameters	**Units**	**Start of Microcosm Study**	**Soil and Groundwater**	**Soil, Groundwater, and EVO**	**Soil, Groundwater, Oxygen, and Azide**
Semi-Volatile Organic Compounds					
Pentachlorophenol	µg/L	2460 / 1580	872 / 353	69 / 205	182 / 344
Total Petroleum Hydrocarbons					
TPH(C_9-C_{36})	mg/L	464 / 501	194 / 169	169 / 208	173 / 141
Removal of Pentachlorophenol	%		70	93.20	87
Removal of TPH(C_9-C_{36})	%		55.6	63.5	52.20

Notes:

µg/L - Micrograms per liter
mg/L - Milligrams per liter
EVO - Emulsified Vegetable Oil
% - Percent
All samples were analyzed in duplicate.

Table 12

Anaerobic Biostudy MW29 Soil Analytical Data (12-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

			6-Month Period		
Parameters	**Date Analyzed** / **Units**	**5/6/2016** **Start of Microcosm Study**	**5/8/2017** **Soil and Groundwater**	**5/8/2017** **Soil, Groundwater, and EVO**	**5/8/2017** **Soil, Groundwater, Oxygen, and Azide**
Semi-Volatile Organic Compounds					
Pentachlorophenol	mg/kg	23.3 / 38	12 / 11.2	7.1 / 6.54	1.04 / 0.67
Total Petroleum Hydrocarbons					
TPH(C_9-C_{36})	mg/kg	919 / 2370	903 / 819	501 / 359	1070 / 1090

Notes:

mg/kg - Milligrams per kilogram
EVO - Emulsified Vegetable Oil
All samples were analyzed in duplicate.

Table 13

Bio-Trap Analytical Data
Penta Wood Products Superfund Site
Siren, Wisconsin

Parameters	Sample Date: Units	5/23/2016 MW9	5/23/2016 EW11S	5/23/2016 MW20	5/23/2016 MW29
Biomass and ^{13}C Incorporation					
Total Biomass	Cells/bead	2,280,000	1,100,000	380,000	1,920,000
^{13}C Enriched Biomass	Cells/bead	19,800	14,500	2,170	11,200
Average PLFA $\delta^{13}C$	‰	257	360	276	94
Maximum PLFA $\delta^{13}C$	‰	435	1192	399	232
^{13}C Mineralization					
Inorganic Carbon $\delta^{13}C$	‰	-17	-14	-21	-20
$\%^{13}C$	%	1.09	1.09	1.08	1.08
Community Structure (% Total PLFA)					
Firmicutes	%	0.7	2.68	16.17	52.88
Proteobacteria	%	63.6	65.59	49.44	31.17
Anaerobic Metal Reducers	%	0.18	1.02	6.32	0
Actinomycetes	%	0.34	0.36	1.48	4.4
General	%	34.29	29.85	25.96	11.56
Eukaryotes	%	0.88	0.52	0.64	0

Notes:

δ13C - Del Carbon 13
PLFA - Phospholipid Fatty Acids
‰ - Parts per thousand
% - Percent

Attachment A
Biodegradation Rates

Attachment A – Biodegradation Rates

Based on the treatability study, the half lives under the different conditions tested are shown in the table below. Since no target concentration exists for total petroleum hydrocarbons (TPH), 10 milligrams per liter (mg/L) were used to calculate a treatment time. Please note that these half lives assume that non-aqueous phase liquid (NAPL) is not present and that there is no ongoing source.

	First Order Degradation Rate Constant	Half Life	Initial Concentration	Target Concentration	Time to Reach Target
PCP Aerobic Conditions – not enhanced	0.948	0.7 month	295 µg/L	1 µg/L	6.3 months
PCP Aerobic Conditions - O_2 added	0.948	0.7 month	295 µg/L	1 µg/L	6.3 months
TPH Aerobic Conditions	n/a	Too fast to measure			
PCP Anaerobic Conditions – not enhanced	0.126	5.5 months	2,020 µg/L	1 µg/L	66 months
PCP Anaerobic Conditions – enhanced with EVO	0.238	2.9 months	2,020 µg/L	1 µg/L	34.8 months
TPH Anaerobic Conditions - not enhanced	0.072	9.6 months	483 mg/L	10 mg/L	57.6 months
TPH Anaerobic Conditions - not enhanced with EVO	0.082	8.5 months	483 mg/L	10 mg/L	51 months

Attachment B
Laboratory Report

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Client: Brian Sandberg
GHD Services Inc.
1801 Old Hwy 8
Suite 114
St. Paul, MN 55112

Phone:

Fax:

Identifier: 079NE **Date Rec:** 05/24/2016 **Report Date:** 08/12/2016

Client Project #: 086165 **Client Project Name:** PentaWood

Purchase Order #: 34005538

Analysis Requested: PLFA, Stable Isotope Probing

Reviewed By:

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

PLFA

Client: **GHD Services Inc.**
Project: PentaWood

MI Project Number: **079NE**
Date Received: 05/24/2016

Sample Information

Sample Name:	**MW9**	**MW20**	**MW29**	**EW11S**
Sample Date:	05/23/2016	05/23/2016	05/23/2016	05/23/2016
Sample Matrix:	Adv. Bio-Trap	Adv. Bio-Trap	Adv. Bio-Trap	Adv. Bio-Trap
Analyst:	JS	JS	JS	JS

Biomass Concentrations

Total Biomass (cells/bead)	**2.28E+06**	**3.80E+05**	**1.92E+06**	**1.10E+06**

Community Structure (% total PLFA)

Firmicutes (TerBrSats)	**0.70**	**16.17**	**52.88**	**2.68**
Proteobacteria (Monos)	**63.60**	**49.44**	**31.17**	**65.59**
Anaerobic metal reducers (BrMonos)	**0.18**	**6.32**	**0.00**	**1.02**
SRB/Actinomycetes (MidBrSats)	**0.34**	**1.48**	**4.40**	**0.36**
General (Nsats)	**34.29**	**25.96**	**11.56**	**29.85**
Eukaryotes (polyenoics)	**0.88**	**0.64**	**0.00**	**0.52**

Physiological Status (Proteobacteria only)

Slowed Growth	**2.79**	**0.86**	**1.19**	**2.65**
Decreased Permeability	**0.19**	**0.82**	**0.85**	**0.21**

Legend:
NA = Not Analyzed NS = Not Sampled

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

PLFA

Client: **GHD Services Inc.**
Project: PentaWood

MI Project Number: **079NE**
Date Received: 05/24/2016

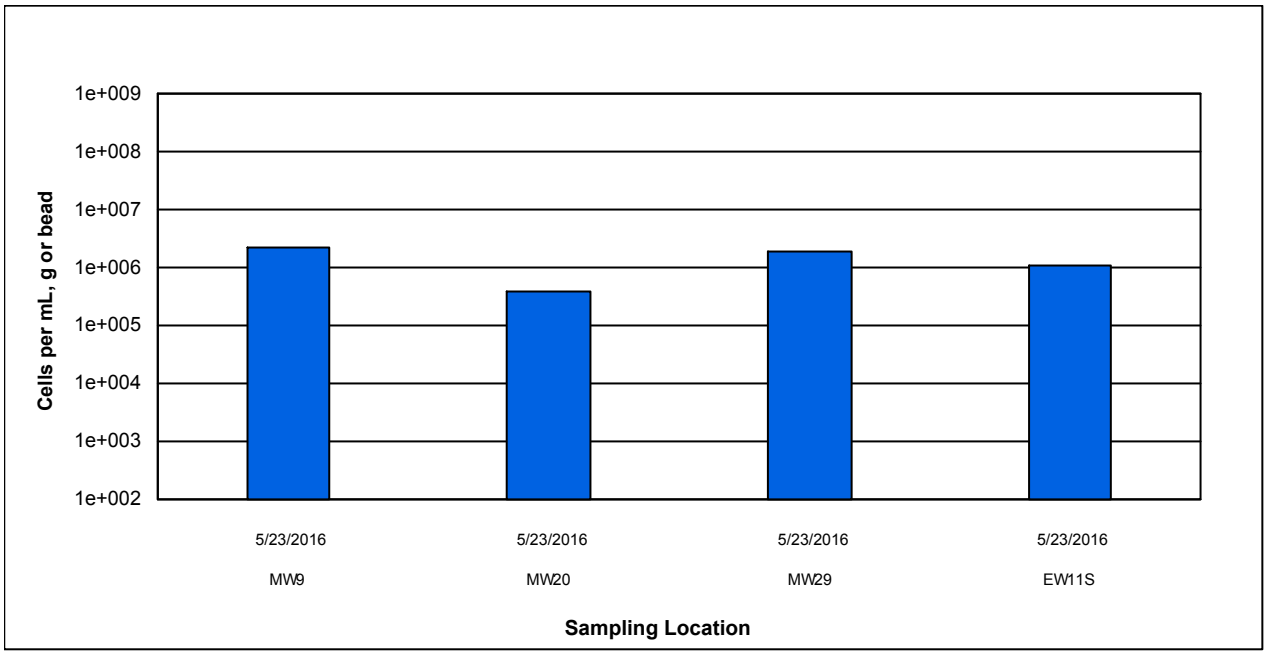

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass

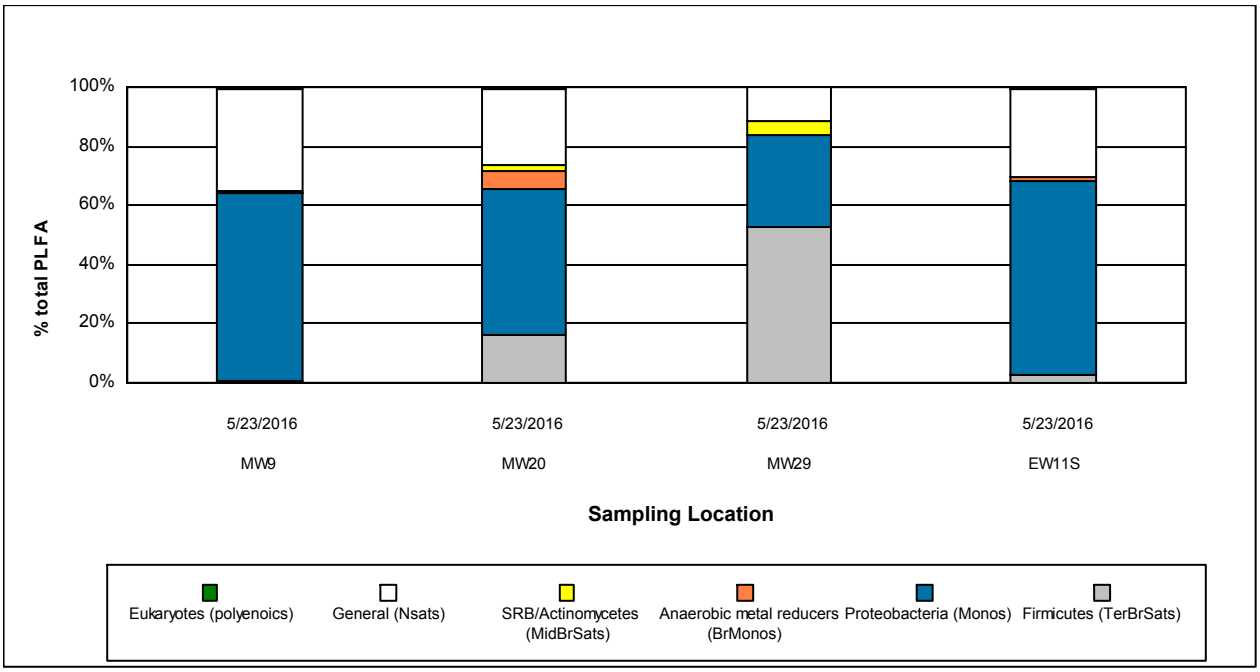

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis.

Quality Assurance/Quality Control Data

Samples Received **5/24/2016**

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
PLFA	05/24/2016	06/16/2016	4 °C	64%	non-detect	non-detect

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SITE LOGIC Report

Stable Isotope Probing (SIP) Study

Contact: Brian Sandberg
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St. Paul, MN 55112

Phone: (651) 639-0913

Email: Brian.Sandberg@GHD.com

MI Identifier: 079NE

Report Date: 08-12-2016

Project: PentaWood, #086165

Comments:

Executive Summary

A Stable Isotope Probing (SIP) study was performed to determine whether biodegradation of pentachlorophenol (PCP) is occurring under existing site conditions. Bio-Trap® samplers baited with ^{13}C-labeled PCP were deployed in monitoring wells MW9, MW20, MW29, and EW11S. Following a 32-day deployment period, the Bio-Traps were recovered to quantify ^{13}C incorporation into biomass and dissolved inorganic carbon (DIC). A complete summary of the SIP results is provided in Table 1 and Figures 1 through 4. Following are the key observations from the results obtained for the monitoring wells.

Stable Isotope Probing Results

- The average DIC δ^{13}C values in MW9, MW20, MW29, and EW11S were near background levels, indicating little to no PCP mineralization during the deployment period.
- However, incorporation of ^{13}C into biomass in all wells conclusively demonstrated that PCP was metabolized at these locations under existing site conditions.
- For samples MW9, MW20, and EW11S the average PLFA δ^{13}C values fell within the moderate range indicating a moderate incorporation of ^{13}C-labeled PCP into microbial biomass.
- The average PLFA δ^{13}C value for sample MW29 fell below 100‰, indicating low incorporation of ^{13}C-labeled PCP into microbial biomass.
- Total PLFA biomass concentrations for all samples ranged from 10^5 to 10^6 cells/bead and were within the moderate range.
- The PLFA community structures were similar between MW9 and EW11S, which were primarily composed of monoenoics and normal saturates.
- The PLFA community structure in MW20 was composed of a large portion of monoenoics (49.44%) followed by normal saturates (25.96%), and firmicutes (16.17%). Indicators of anaerobic metal reducers, eukaryotes, and actinomycetes were also detected.
- The PLFA community structure in MW29 was composed primarily of firmicutes (52.88%). Monoenoics (31.17%) and normal saturates (11.56%) were the next most abundant groups. Indicators of actinomycetes were also detected.

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Overview of Approach

Stable Isotope Probing (SIP)

Stable isotope probing (SIP) is an innovative method to track the environmental fate of a "labeled" contaminant of concern to unambiguously demonstrate biodegradation. Two stable carbon isotopes exist in nature – carbon 12 (^{12}C) which accounts for 99% of carbon and carbon 13 (^{13}C) which is considerably less abundant (~1%). With the SIP method, the Bio-Trap® sampler is baited with a specially synthesized form of the contaminant containing ^{13}C labeled carbon. Since ^{13}C is rare, the labeled compound can be readily differentiated from the contaminants present at the site. Following deployment, the Bio-Trap® is recovered and three approaches are used to conclusively demonstrate biodegradation of the contaminant of concern.

- The loss of the labeled compound provides an estimate of the degradation rate (% loss of ^{13}C).
- Quantification of ^{13}C enriched phospholipid fatty acids (PLFA) indicates incorporation into microbial biomass.
- Quantification of ^{13}C enriched dissolved inorganic carbon (DIC) indicates contaminant mineralization.

Phospholipid Fatty Acids (PLFA)

PLFA are a primary component of the membrane of all living cells including bacteria. PLFA decomposes rapidly upon cell death (1, 2), so the total amount of PLFA present in a sample is indicative of the viable biomass. When combined with stable isotope probing (SIP), incorporation of ^{13}C into PLFA is a conclusive indicator of biodegradation.

Some organisms produce "signature" types of PLFA allowing quantification of important microbial functional groups (e.g. iron reducers, sulfate reducers, or fermenters). The relative proportions of the groups of PLFA provide a "fingerprint" of the microbial community. In addition, *Proteobacteria* modify specific PLFA during periods of slow growth or in response to environmental stress providing an index of their health and metabolic activity.

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Results

Table 1. Summary of the results obtained from the Bio-Trap® Units. Interpretation guidelines and definitions are found later in the document.

Sample Name	MW9	MW20	MW29	EW11S
Biomass & ^{13}C Incorporation				
Total Biomass (Cells/bead)	2.28E+06	3.80E+05	1.92E+06	1.10E+06
^{13}C Enriched Biomass (Cells/bead)	1.98E+04	2.17E+03	1.12E+04	1.45E+04
Average PLFA Del (‰)	257	276	94	360
Maximum PLFA Del (‰)	435	399	232	1192
^{13}C Mineralization				
DIC Del (‰)	-17	-21	-20	-14
% 13C	1.09	1.08	1.08	1.09
Community Structure (% total PLFA)				
Firmicutes (TerBrSats)	0.70	16.17	52.88	2.68
Proteobacteria (Monos)	63.60	49.44	31.17	65.59
Anaerobic metal reducers (BrMonos)	0.18	6.32	0.00	1.02
Actinomycetes (MidBrSats)	0.34	1.48	4.40	0.36
General (Nsats)	34.29	25.96	11.56	29.85
Eukaryotes (Polyenoics)	0.88	0.64	0.00	0.52
Physiological Status (Proteobacteria only)				
Slowed Growth	2.79	0.86	1.19	2.65
Decreased Permeability	0.19	0.82	0.85	0.21

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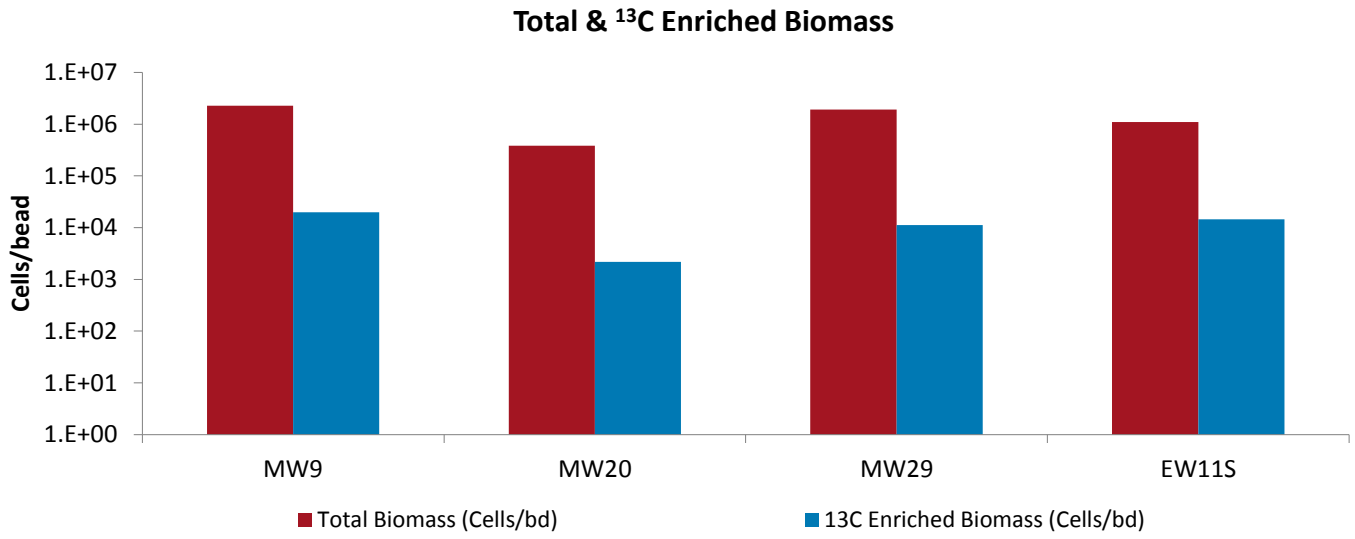

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass (associated with higher organisms).

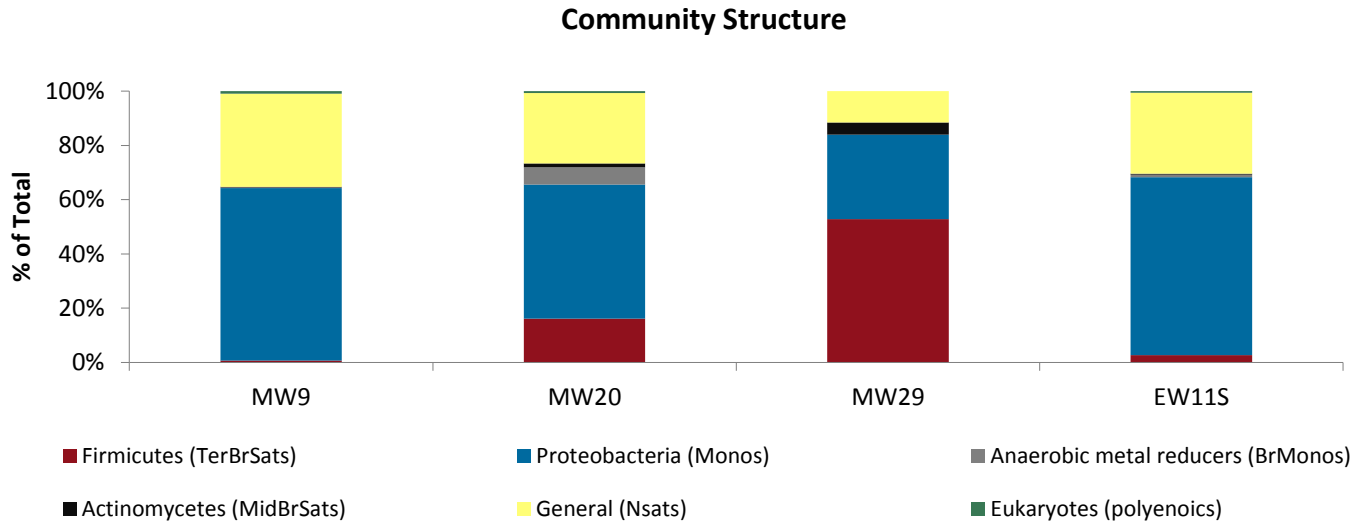

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis. See the table in the interpretation section for detailed descriptions of the structural groups.

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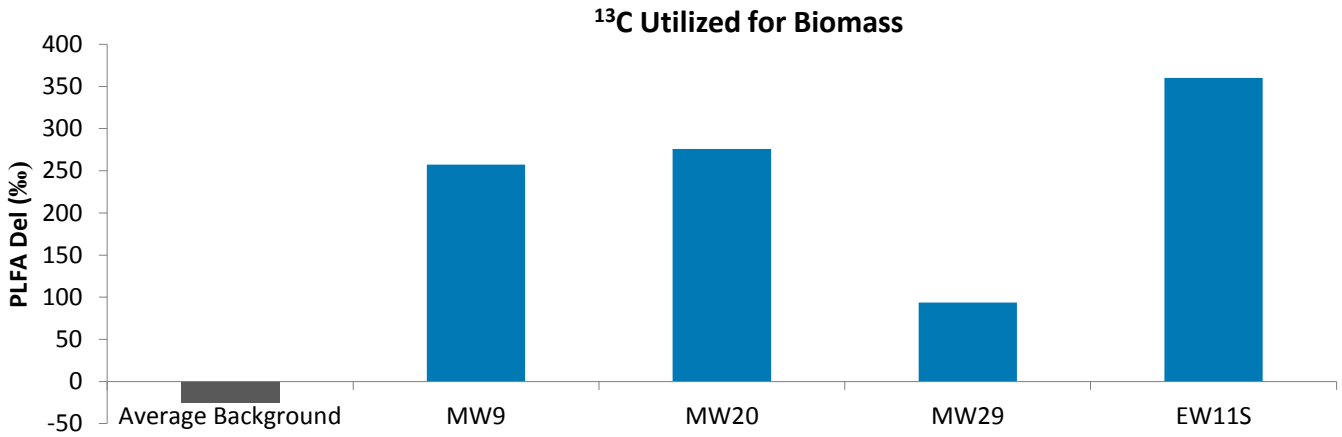

Figure 3. Comparison of the average Del value obtained from PLFA biomarkers from each Bio-Trap® unit to the average background Del observed in samples not exposed to ^{13}C enriched compounds.

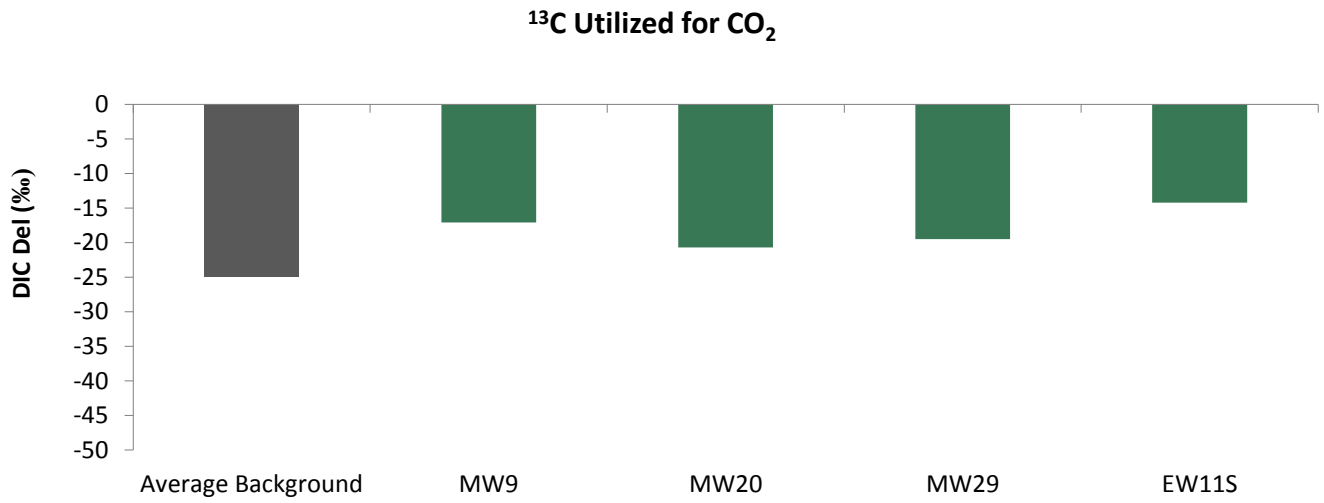

Figure 4. Comparison of the Del value obtained from DIC from each Bio-Trap® unit to the average background Del observed in samples not exposed to ^{13}C enriched compounds.

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Interpretation

Interpretation of the results of the SIP Bio-Trap® study must be performed with due consideration of site conditions, site activities, and the desired treatment mechanism. The following discussion describes interpretation of results in general terms and is meant to serve as a guide.

Contaminant Concentration: Bio-Traps® are baited with a ^{13}C labeled contaminant of concern and a pre-deployment concentration is determined prior to shipping. Following deployment, Bio-Traps® are recovered for analysis including measurement of the concentration of the ^{13}C labeled contaminant remaining. Pre- and post-deployment concentrations are used to calculate percent loss.

Biomass Concentrations: PLFA analysis is one of the most reliable and accurate methods available for the determination of viable (live) biomass. Phospholipids break down rapidly upon cell death, so biomass calculations based on PLFA content do not include "fossil" lipids from dead cells. Total biomass (cells/bead) is calculated from total PLFA using a conversion factor of 20,000 cells/pmole of PLFA. When making comparisons between wells, treatments, or over time, differences of one order of magnitude or more are considered significant.

Total Biomass		
Low	**Moderate**	**High**
10^3 to 10^4 cells	10^5 to 10^6 cells	10^7 to 10^8 cells

For SIP studies, the ^{13}C enriched PLFA is also determined to conclusively demonstrate contaminant biodegradation and quantify incorporation into biomass as a result of the ^{13}C being used for cellular growth. The % ^{13}C incorporation (^{13}C enriched biomass/total biomass) is also provided in the data summary table, but the value must be interpreted carefully especially when comparing wells or treatments. Typically, biodegradation of a contaminant of concern is performed by a small subset of the total microbial community. For Bio-Traps® with large total biomass, the % ^{13}C incorporation value could be low despite significant ^{13}C labeled biomass and loss of the compound. The % ^{13}C incorporation should be viewed in light of total biomass, percent loss, and dissolved inorganic carbon (DIC) results.

^{13}C enrichment data is often reported as a del value. The del value is the difference between the isotopic ratio ($^{13}C/^{12}C$) of the sample (R_x) and a standard (R_{std}) normalized to the isotopic ratio of the standard (R_{std}) and multiplied by 1,000 (units are parts per thousand, denoted ‰).

R_{std} is the naturally occurring isotopic ratio and is approximately 0.011180 (roughly 1% of naturally occurring carbon is ^{13}C). The isotopic ratio, R_x, of PLFA is typically less than the R_{std} under natural conditions, resulting in a del value between -20 and -30‰. For a SIP Bio-Trap® study, biodegradation and incorporation of the ^{13}C labeled compound into PLFA results in a larger $^{13}C/^{12}C$ ratio (R_x) and thus del values greater than under natural conditions. Typical PLFA del values are provided below.

PLFA Del (‰)		
Low	**Moderate**	**High**
0 to 100	100 to 1,000	>1,000

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Dissolved Inorganic Carbon (DIC): Often, bacteria can utilize the ^{13}C labeled compound as both a carbon and energy source. The ^{13}C portion used as a carbon source for growth can be incorporated into PLFA as discussed above, while the ^{13}C used for energy is oxidized to $^{13}CO_2$ (mineralized).

^{13}C enriched CO_2 data is often reported as a del value as described above for PLFA. Under natural conditions, the R_x of CO_2 is approximately the same as R_{std} (0.01118 or about 1.1% ^{13}C). For an SIP Bio-Trap® study, mineralization of the ^{13}C labeled contaminant of concern would lead to a greater value of R_x (increased $^{13}CO_2$ production) and thus a positive del value. As with PLFA, del values between 0 and 100‰ are considered low, values between 100 and 1,000‰ are considered moderate, and values greater than 1,000‰ are considered high. Thus DIC $\%^{13}C$ are considered low if the value is less than 1.23%, moderate if between 1.23 and 2.24%, and high if greater than 2.24%.

Dissolved Inorganic Carbon (DIC) Del and $\%^{13}C$		
Low	**Moderate**	**High**
0 to 100	100 to 1,000	>1,000
1.11 to 1.23%	1.23 to 2.24%	>2.24%

Community Structure (% total PLFA): Community structure data is presented as a percentage of PLFA structural groups normalized to the total PLFA biomass. The relative proportions of the PLFA structural groups provide a "fingerprint" of the types of microbial groups (e.g. anaerobes, sulfate reducers, etc.) present and therefore offer insight into the dominant metabolic processes occurring at the sample location. Thorough interpretation of the PLFA structural groups depends in part on an understanding of site conditions and the desired microbial biodegradation pathways. For example, an increase in mid chain branched saturated PLFA (MidBrSats), indicative of sulfate reducing bacteria (SRB) and *Actinomycetes*, may be desirable at a site where anaerobic BTEX biodegradation is the treatment mechanism, but would not be desirable for a corrective action promoting aerobic BTEX or MTBE biodegradation. The following table provides a brief summary of each PLFA structural group and its potential relevance to bioremediation.

Table 2. Description of PLFA structural groups.

PLFA Structural Group	General classification	Potential Relevance to Bioremediation Studies
Monoenoic (Monos)	Abundant in Proteobacteria (Gram negative bacteria), typically fast growing, utilize many carbon sources, and adapt quickly to a variety of environments.	Proteobacteria is one of the largest groups of bacteria and represents a wide variety of both aerobes and anaerobes. The majority of Hydrocarbon utilizing bacteria fall within the Proteobacteria
Terminally Branched Saturated (TerBrSats)	Characteristic of Firmicutes (Low G+C Gram-positive bacteria), and also found in Bacteriodes, and some Gram-negative bacteria (especially anaerobes).	Firmicutes are indicative of presence of anaerobic fermenting bacteria (mainly *Clostridia/Bacteriodes*-like), which produce the H_2 necessary for reductive dechlorination
Branched Monoenoic (BrMonos)	Found in the cell membranes of micro-aerophiles and anaerobes, such as sulfate- or iron-reducing bacteria	In contaminated environments high proportions are often associated with anaerobic sulfate and iron reducing bacteria
Mid-Chain Branched Saturated (MidBrSats)	Common in sulfate reducing bacteria and also Actinobacteria (High G+C Gram-positive bacteria).	In contaminated environments high proportions are often associated with anaerobic sulfate and iron reducing bacteria
Normal Saturated (Nsats)	Found in all organisms.	High proportions often indicate less diverse populations.
Polyenoic	Found in eukaryotes such as fungi, protozoa, algae, higher plants, and animals.	Eukaryotic scavengers will often rise up and prey on contaminant utilizing bacteria

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Physiological Status (*Proteobacteria*): Some *Proteobacteria* modify specific PLFA as a strategy to adapt to stressful environmental conditions (3, 4). For example, *cis* monounsaturated fatty acids may be modified to cyclopropyl fatty acids during periods of slowed growth or modified to *trans* monounsaturated fatty acids to decrease membrane permeability in response to environmental stress. The ratio of product to substrate fatty acid thus provides an index of their health and metabolic activity. In general, status ratios greater than 0.25 indicate a response to unfavorable environmental conditions.

Glossary

Del: A Del value is the difference between the isotopic ratio ($^{13}C/^{12}C$) of the sample (R_x) and a standard (R_{std}) normalized to the isotopic ratio of the standard (R_{std}) and multiplied by 1,000 (units are parts per thousand denoted ‰).

$$Del = (R_x - R_{std})/R_{std} \times 1000$$

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Phospholipid Fatty Acid Analysis

Interpretation Guidelines

Phospholipids fatty acids (PLFA) are a main component of the membrane (essentially the "skin") of microbes and provide a powerful tool for assessing microbial responses to changes in their environment. This type of analysis provides direct information for assessing and monitoring sites where bioremediation processes, including natural attenuation, are of interest. Analysis of the types and amount of PLFA provides a broad based understanding of the entire microbial community with information obtained in three key areas viable biomass, community structure and metabolic activity.

What is the detection limit for PLFA?

Our limit of detection for PLFA analysis is ~150 picomoles of total PLFA and our limit of quantification is ~500 picomoles of total PLFA. Samples which contain PLFA amounts at or below 150 pmol cannot be used to determine biomass, likewise samples with PLFA content below ~500 pmol are generally considered to contain too few fatty acids to discuss community composition.

How should I interpret the PLFA results?

Interpreting the results obtained from PLFA analysis can be somewhat difficult, so this document was designed to provide a technical guideline. For convenience, this guideline has been divided into the three key areas.

Viable Biomass

PLFA analysis is one of the most reliable and accurate methods available for the determination of viable microbial biomass. Phospholipids break down rapidly upon cell death (21, 23), so biomass calculations based on PLFA content do not contain 'fossil' lipids of dead cells.

How is biomass measured?

Viable biomass is determined from the total amount of PLFA detected in a given sample. Since, phospholipids are an essential part of intact cell membranes they provide an accurate measure of viable cells.

How is biomass calculated?

Biomass levels are reported as cells per gram, mL or bead, and are calculated using a conversion factor of 20,000 cells/pmole of PLFA. This conversation factor is based upon cells grown in laboratory media, and varies somewhat with the type of organism and environmental conditions.

What does the concentration of biomass mean?

The overall abundance of microbes within a given sample is often used as an indicator of the potential for bioremediation to occur, but understanding the levels of biomass within each sample can be cumbersome. The following are benchmarks that can be used to understand whether the biomass levels are low, moderate or high.

Low	Moderate	High
10^3 to 10^4 cells	10^5 to 10^6 cells	10^7 to 10^8 cells

How do I know if a change in biomass is significant?

One of the primary functions of using PLFA analysis at contaminated sites is to evaluate how a community responds following a given treatment, but how does one know if the changes observed between two events are significant? As a general rule, biomass levels which increase or decrease by at least an order of magnitude are considered to be significant. However, changes in biomass levels of less than an order of magnitude may still show a trend. It is important to remember that many factors can affect microbial growth, so factors other than the treatment could be influencing the changes observed between sampling events. Some of the factors to consider are: temperature, moisture, pH, etc. The following illustration depicts three types of changes that occurred over time and the conclusions that could be drawn.

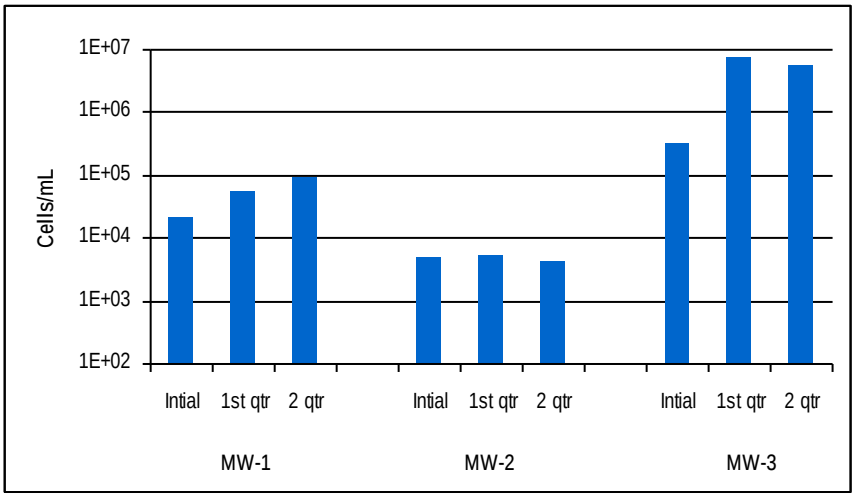

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass (associated with higher organisms).

Conclusions from graph above:

- MW-1 showed a trend of biomass levels increasing steadily over time, although cell concentrations were ~10^4 cells/mL at each sampling event.
- MW-2 showed no notable trends or significant changes in biomass concentrations.
- MW-3 showed a significant increase in biomass levels between the initial and 1st quarter sampling events (from ~10^5 to ~10^6 cells/mL).

Community Structure:

The PLFA in a sample can be separated into particular types, and the resulting PLFA "profile" reflects the proportions of the categories of organisms present in the sample. Because groups of bacteria differ in their metabolic capabilities, determining which bacterial groups are present and their relative distributions within the community can provide information on what metabolic processes are occurring at that location. This in turn can also provide information on the subsurface conditions (i.e oxidation/reduction status, etc.). Table 1 describes the six major structural groups used and their potential relevance to site specific projects.

Table 1. Description of PLFA structural groups.

PLFA Structural Group	General classification	Potential Relevance to Bioremediation Studies
Monoenoic (Monos)	Abundant in Proteobacteria (Gram negative bacteria), typically fast growing, utilize many carbon sources, and adapt quickly to a variety of environments.	Proteobacteria is one of the largest groups of bacteria and represents a wide variety of both aerobes and anaerobes. The majority of Hydrocarbon utilizing bacteria fall within the Proteobacteria
Terminally Branched Saturated (TerBrSats)	Characteristic of Firmicutes (Low G+C Gram-positive bacteria), and also found in Bacteriodes, and some Gram-negative bacteria (especially anaerobes).	Firmicutes are indicative of presence of anaerobic fermenting bacteria (mainly *Clostridia/Bacteriodes*-like), which produce the H_2 necessary for reductive dechlorination
Branched Monoenoic (BrMonos)	Found in the cell membranes of micro-aerophiles and anaerobes, such as sulfate- or iron-reducing bacteria	In contaminated environments high proportions are often associated with anaerobic sulfate and iron reducing bacteria
Mid-Chain Branched Saturated (MidBrSats)	Common in sulfate reducing bacteria and also Actinobacteria (High G+C Gram-positive bacteria).	In contaminated environments high proportions are often associated with anaerobic sulfate and iron reducing bacteria
Normal Saturated (Nsats)	Found in all organisms.	High proportions often indicate less diverse populations.
Polyenoic	Found in eukaryotes such as fungi, protozoa, algae, higher plants, and animals.	Eukaryotic scavengers will often rise up and prey on contaminant utilizing bacteria

Following are answers to some of the common questions about community composition and some detailed descriptions of some typical shifts which can be observed between sampling events.

How is the community structure data presented?

Community structure data is presented as percentage (%) of the total amount of PLFA. In order to relate the complex mixture of PLFA to the organisms present, the ratio of a specific PLFA group is determined (detailed in Table 1 above), and this corresponds to the proportion of the related bacterial classification within the overall community structure. Because normal saturated PLFA are found in both prokaryotes (bacteria) and eukaryotes (fungi, protozoa, diatoms etc), their distribution provides little insight into the types of microbes that are present at a sampling location. However, high proportions of normal saturates are often associated with less diverse microbial populations.

How can community structure data be used to manage my site?

It is important to understand that microbial communities are often a mixture of different types of bacteria (e.g. aerobes, sulfate reducers, methanogens, etc) with the abundance of each group behaving like a seesaw, i.e. as the population of one group increases, another is likely decreasing, mostly due to competition for available resources. The PLFA profile of a sample provides a "fingerprint" of the microbial community, showing relative proportions of the specific bacterial types at the time of sampling. This is a great tool for detecting shifts within the community over time and also to evaluate similarities/differences between sampling locations. It is important to note that PLFA analysis of community structure is analyzing the microbes directly, not just secondary breakdown products. So this provides evidence of how the entire microbial community is responding to the treatment.

How do I recognize community shifts and what they mean?

Shifts in the community structure are indications of changing conditions and their effect on the microbial community, and, by extension on the metabolic processes occurring at the sampling location. Some of the more commonly seen shifts within the community are illustrated and discussed below:

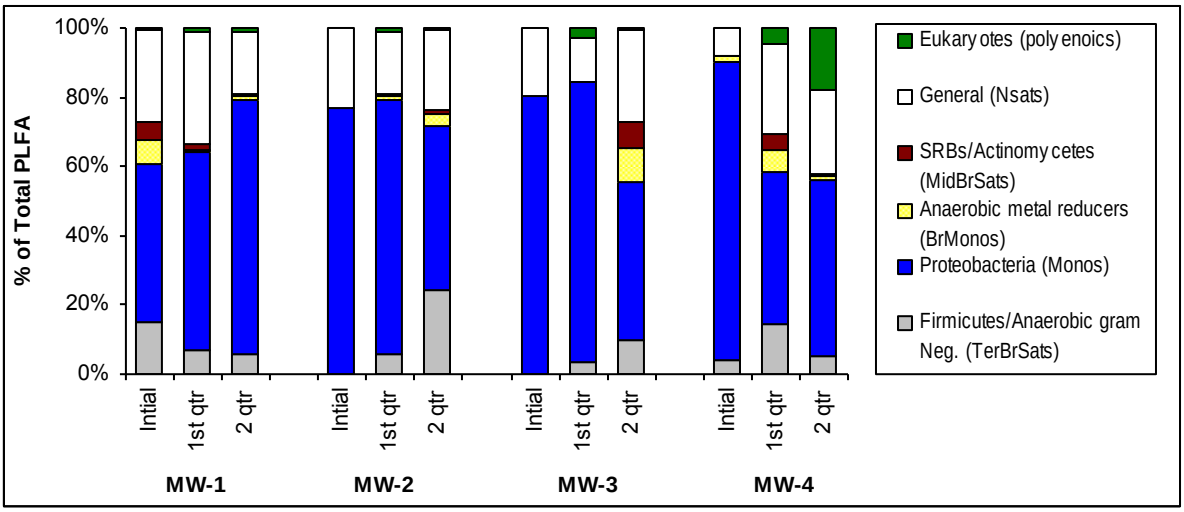

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis. See Table 1 for detailed descriptions of structural groups.

- **Increased Proteobacteria**

Proportions of Proteobacteria are of interest because it is one of the largest groups of bacteria and represents a wide variety of both aerobe and anaerobes. The majority of hydrocarbons (including benzene and naphthalene) are metabolized by some member of Proteobacteria, mainly due to their ability to grow opportunistically, quickly taking advantage of available food (i.e. hydrocarbons), and adapting quickly to changes in the environment. The detection of increased proportions of Proteobacteria coupled with increased biomass suggests that the Proteobacteria are consuming something. In situations where it is important to determine the extent to which the Proteobacteria are utilizing anaerobic or aerobic pathways, it is possible to measure relative proportions of specific biomarkers that are associated with anaerobic or aerobic pathways thus separating the Proteobacteria into different groups, based on pathways used. Sample MW-1 from Figure 2 depicts a shift in community structure where the proportion of Proteobacteria has increased over time.

- **Increased Firmicutes/Anaerobic Gram negative bacteria**

Increased proportions of Firmicutes/Anaerobic Gram negative bacteria generally indicate that conditions are becoming more reductive (i.e. more anaerobic). Proportions of Firmicutes are of particular interest in sites contaminated with chlorinated hydrocarbons because Firmicutes include anaerobic fermenting bacteria (mainly *Clostridia/Bacteriodes*-like), which produce the H_2 necessary for reductive dechlorination.

Enhanced bioremediation of chlorinated solvents often employs the injection of fermentable substrates which, when utilized by fermenting bacteria, results in the release of H_2. Engineered shifts in the microbial community can be shown by observing increased proportions Firmicutes following an injection of fermentable substrate. Through long-term monitoring of the community structure it is possible to know when re-injection may be necessary or desirable. Sample MW-2 from Figure 2 depicts a shift in community structure where the proportion of Firmicutes has increased over time.

- **Increased anaerobic metal reducing bacteria (BrMonos) and SRB/Actinomycetes (MidBrSats)**

An increase in the proportions of metal and sulfate reducing bacterial groups, especially when combined with shifts in the other bacterial groups, can provide information helpful to monitoring bioremediation. Generally, an increase in metal and sulfate reducers points to more reduced (anaerobic) conditions at the sampled location. This is especially true if there is an increase in Firmicutes at the same time. Large increases in either metal and sulfate reducers, particularly if accompanied by a decrease in Firmicutes, may suggest that conditions are becoming increasingly reduced. In this situation the metal and sulfate reducers may be out-competing dechlorinators for available H_2, thereby limiting the potential for reductive dechlorination at that location. Sample MW-3 from Figure 2 depicts a shift in community structure where the proportion of metal reducing bacteria has increased over time.

- **Increased Eukaryotes**

Eukaryotes include organisms such as fungi, protozoa, and diatoms. At a contaminated location, an increase in eukaryotes, particularly if seen with a decrease in the contaminant utilizing bacteria, suggests that eukaryotic scavengers are preying upon what had been an abundance of bacteria which were consuming the contaminant. Sample MW-4 from Figure 2 depicts a shift in community structure where the proportion of eukaryotes has increased over time.

Physiological status of Proteobacteria

The membrane of a microbe adapts to the changing conditions of its environment, and these changes are reflected in the PLFA. Toxic compounds or environmental conditions may disrupt the membrane and some bacteria respond by making *trans* fatty acids instead of the usual *cis* fatty acids (7) in order to strengthen the cell membrane, making it less permeable. Many Proteobacteria respond to lack of available substrate or to highly toxic conditions by making cyclopropyl (7) or mid-chain branched fatty acids (20) which point to less energy expenditure and a slowed growth rate. The physiological status ratios for Decreased Permeability (trans/cis ratio) and for Slowed Growth (cy/cis ratio) are based on dividing the amount of the fatty acid induced by environmental conditions by the amount of its biosynthetic precursor.

What does slowed growth or decreased permeability mean?

Ratios for slowed growth and for decreased permeability of the cell membrane provide information on the "health" of the Gram negative community, that is, how this population is responding to the conditions present in the environment. It should be noted that one must be cautious when interpreting these measures from only one sampling event. The most effective way to use the physiological status indicators is in long term monitoring and comparing how these ratios increase/decrease over time.

A marked increase in either of these ratios suggests a change in environment which is less favorable to the Gram negative Proteobacteria population. The ratio for slowed growth is a relative measure, and does not directly correspond to log or stationary phases of growth, but is useful as a comparison of growth rates among sampling locations and also over time. An increase in this ratio (i.e. slower growth rate) suggests a change in conditions which is not as supportive of rapid, "healthy" growth of the Gram negative population, often due to reduced available substrate (food). A larger ratio for decreased permeability suggests that the environment has become more toxic to the Gram negative population, requiring energy expenditure to produce *trans* fatty acids in order to make the membrane more rigid.

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24. White, D. C., J. O. Stair, and D. B. Ringelberg. 1996. Quantitative comparisons of in situ microbial biodiversity by signature biomarker analysis. Journal of Industrial Microbiology 17:185-196.
25. Vandamme P, Pot B, Gillis M, de Vos P, Kersters K, Swings J. Polyphasic taxonomy, a consensus approach to bacterial systematics. Microbiol Rev 1996 Jun;60(2):407-38.

REPORT TO:

Reports will be provided to the contact(s) listed below. Parties other than the contact(s) listed below will require prior approval.

Name:	Peter Storlie
Company:	GHD
Address:	1801 Old Hwy 8, Suite 114 St. Paul, MN 55112
email:	pete.storlie@ghd.com
Phone:	651-639-0913
Fax:	651-639-0923
Project Manager:	grant.anderson@ghd.com
Project Name:	PentaWood
Project No.:	068165-03

INVOICE TO:

For Invoices **paid by a third party** it is imperative that contact information & corresponding reference No. be provided.

Name:	grant.anderson@ghd.com
Company:	GHD
Address:	
email:	
Phone:	
Fax:	
Purchase Order No.	
Subcontract No.	
MI Quote No.	

microbialinsights
10515 Research Dr
Knoxville, TN 37932
865-573-8188
www.microbe.com

Please Check One:

☐ More samples to follow

☒ No Additional Samples

Saturday Delivery

Please see sampling protocol for instructions

Please contact us prior to submitting samples regarding questions about the analyses you are requesting at (865) 573-8188 (8:00 am to 4:00 pm M-F). After these hours please email customerservice@microbe.com.

Sample Information					A					CENSUS: Please select the target organism/gene																				
MI ID (Laboratory Use Only)	Sample Name	13C Compound	Date Sampled	Matrix	PLFA + SIP	DIC	13C Compound Concentration		QuantArray-Petro	EBAC (Total)	APS (Sulfate Reducing Bacteria)	MGN (Methanogens)	MOB (Methanotrophs)	SMMO	DNF (Dentrifiers-nirS and nirK)	AOB (ammonia oxidizing bacteria)	PM1 (MTBE aerobic)	RMO (Toluene Monooxygenase)	RDEG (Toluene Monooxygenase)	PHE (Phenol Hydroxylase)	NAH (Napthalene-aerobic)	BSSA (Benzyl Succinate Synthase)	abcA (Benzene Carboxylase)	BCR (Benzoyl coenzyme A reductase)	NAH (Napthalene aerobic)	add. qPCR:	add. qPCR:	add. qPCR:	add. qPCR:	RNA (Expression Option)*	Other:	Other:	Other:
079NE1	MW9	PCP		SIP	X	X	X																							
2	MW20	PCP		SIP	X	X	X																							
3	MW29	PCP		SIP	X	X	X																							
4	EW11S	PCP		SIP	X	X	X																							

Relinquished by: Peter Storlie (Peter Storlie. 5/22/16 - 1700) Received by: Date 5/24/16

In order for analysis to be completed correctly, it is vital that chain of custody is filled out correctly & that all relative information is provided. Failure to provide sufficient and/or correct information regarding reporting, invoicing & analyses requested information may result in delays for which MI will not be liable. * additional cost and sample preservation are associated with RNA samples.

Appendix E
Sodium Hydroxide and Ferric Sulfate Disposal Documentation

VEOLIA
ENVIRONMENTAL SERVICES

WASTESTREAM INFORMATION PROFILE

☐ Recertification

Disposal Code

Veolia ES LOCATION
☐ Invoice Address
☐ Manifest from – blank if direct

ADDRESS _____ CITY _____ ST _____

Veolia ES TSDF requested _____ Technology requested _____ Generator No._____ **Generator EPA ID No. WID006176945**

1. **Generator Name** Wisconsin Department of Natural Resources **Generator State No.** _____
   Address 8682 Daniels 70 **State Wastestream No.** _____
   City Siren **State** WI **Country** USA **ZIP** 54872
   NAICS (SIC) Code 562910 _____ _____ **Source** G49 **Origin** _____ **Form** W119 **System Type** _____

2. **Waste Name** Sodium Hydroxide **Lab or Waste Area** _____

3. **Process Generating Waste** Virgin Material used for former Wastewater Treatment process

4. **Shipping Name** RQ, UN1824, SODIUM HYDROXIDE SOLUTION, 8, PG II
   Hazard Class 8 **UN/NA No.** 1824 **PG** II **RQ amt** 1,000 lb

RQ Desc:	1.	2.
DOT Desc:	1.	2.

5. **Waste Codes** NA _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

Wastewater ☐ **Non Wastewater** ☒ **Sub Category** _____

6. **Physical and chemical properties** *(check all that apply)*

pH
a ☐ < 2
b ☐ 2 - 5
c ☐ 5 - 9
d ☐ 9 - 12.5
e ☒ > 12.5
_____ exact

Specific Gravity
a ☐ < .8
b ☐ .8 - 1.0
c ☐ 1.0
d ☒ 1.0 - 1.2
e ☐ > 1.2
_____ exact

Flash Point (F)
a ☐ < 80
b ☐ 80 - 100
c ☐ 101 - 140
d ☒ 141 - 200
e ☐ > 200
f ☐ no flash _____ exact

Solids
1 % suspended
0 % settleable
0 % dissolved

0 % ash
YES water solubility
NA BTU/lb

Free Liquid Range 99 to 100%

Physical State
s ☐ solid
m ☐ semi-solid
l ☒ liquid
p ☐ pumpable semi-solid
f ☐ flowable powder
g ☐ gas
a ☐ aerosol
r ☐ pressurized liquid
d ☐ debris per 40 CFR 268.45
h ☐ sharps

Hazardous Characteristics
a ☐ air reactive
w ☐ water reactive
c ☐ cyanide reactive
f ☐ sulfide reactive
e ☐ explosive
o ☐ oxidizing acid
p ☐ peroxide former
r ☐ radioactive or NRC regulated
s ☐ shock sensitive
t ☒ temp sensitive
m ☐ polymerization/monomer
n ☐ OSHA carcinogen
I ☐ infectious
h ☐ inhalation hazard
Zone: _

Odor
a. none ☒
b mild ☐
c strong ☐
describe_____

Halogens
Br 0 % Bromine
Cl 0 % Chlorine
F 0 % Fluorine
I 0 % Iodine

Layers: a ☐ **multilayered:** b ☐ **bi-layered:** c ☒ **single phase:**

Viscosity by Layer:	Top Layer	Second Layer	Bottom Layer
	☐ high (syrup)	☐ high (syrup)	☐ high (syrup)
	☐ medium (oil)	☐ medium (oil)	☐ medium (oil)
	☒ low (water)	☐ low (water)	☐ low (water)
	☐ solid	☐ solid	☐ solid

Color
Colorless
_____
_____

Used oil y/n N **HOC <1000 ppm** ☐ **or > 1000 ppm** ☐

WIP No. _____

7. **Chemical Composition** [M = Marine Pollutant, S - Severe Marine Pollutant, O = Ozone Depleting Substance, U = Underlying Hazardous Constituent, B = Benzene NESHAP, T = TRI Chemical, C = OSHA Carcinogen]

	Constituents	Range	Units		Constituents	Range	Units
	Water	48.5-60	%				
	Sodium Hydroxide	20-50	%				
	Sodium Chloride	1-35	%				

Total Composition Must Equal or Exceed 100%

Other:

8. Is the wastestream being imported into the USA? Yes ☐ No ☒
9. Does the wastestream contain PCBs regulated by 40CFR? Yes ☐ No ☒
   PCB concentration _____ppm
10. Is the wastestream subject to the Marine Pollutant Regulations? Yes ☐ No ☒
11. Is the wastestream subject to Benzene NESHAP? Yes ☐ No ☒
    If yes, is the wastestream subject to Notification and Control Requirements? Yes ☐ No ☒
    Benzene concentration _____ ppm
12. Is the wastestream subject to RCRA subpart CC controls? Yes ☐ No ☒
    Volatile organic concentration, if known _____ ppmw
    CC approved analytical method ☐ Generator Knowledge ☐
13. Is the wastestream from a CERCLA or state mandated cleanup? Yes ☒ No ☐

14. **Container Information** (*Identify UN container marking if known*)
    Packaging: Bulk Solid ☐ Type/Size: _____ **Bulk Liquid** ☒ Type/Size: **AST/5,000 Gal** **Drum** ☐ Type/Size: _____
    Other _____
    Shipping Frequency: Units _____ Per Month ☐ Quarter ☐ Year ☐ One Time ☒ Other _____

15. **Additional Information:** **Tanker truck will need at least 100 ft of hose.**

The material is RCRA non-hazardous and being sent off for reuse and will be on a BOL.

Is analytical or an MSDS available that describes the waste? Yes ☒ No ☐ If yes, please attach.

GENERATOR CERTIFICATION

I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of this waste. Any sample submitted is representative as defined in 40 CFR 261 - Appendix I or by using an equivalent method. All relevant information regarding known or suspected hazards in the possession of the generator has been disclosed. I authorize sampling of any waste shipment for purposes of recertification.

Philip E. Richard	715 762 1352	2/14/17
NAME (PRINT OR TYPE)	PHONE	DATE
Philip E. Richard	DNR Project Manager	
SIGNATURE	TITLE	

FACILITY NOTIFICATION

If approved for management, Veolia ES has all the necessary permits and licenses for the waste that has been characterized and identified by this profile.

TSDF PROCESSING USE ONLY: PPE REQUIRED No _____ Yes _____ Describe _____

WIP No. _____

VEOLIA ENVIRONMENTAL SERVICES
WIP INSTRUCTIONS

Veolia ES requires completion of all sections of the Wastestream Information Profile (WIP). Sections not applicable to the wastestream must have N/A written in the space provided.

Documented WIP information is used to comply with TSDF Waste Analysis Plans, RCRA and DOT regulations, Emergency Planning and Community Right-to-Know Act (EPCRA), Pollution Prevention Act, Toxic Release Inventory Report and other regulatory and generator requirements.

MARINE POLLUTANT

- The wastestream is subject to the Marine Pollutant Regulations if:
  1. it is a bulk (>119 gallons) packaging with Marine Pollutant concentration $\geq$ 10% or Severe Marine Pollutant concentration $\geq$ 1%

     or
  2. it is non-bulk Marine Pollutant shipped by vessel (boat) in packages larger than 5 liters (liquid) or 5 kg (solid)

     or
  3. it is a non-bulk Severe Marine Pollutant, shipped by vessel (boat) in packages larger than 0.5 liters (liquid) or 0.5 kg (solid).

  Refer to the list of Marine Pollutants.

OZONE DEPLETING SUBSTANCE (ODS)

Refer to the list of Ozone Depleting Substances.

UNDERLYING HAZARDOUS CONSTITUENT (UHC)

Refer to the list of Underlying Hazardous Constituents (40 CFR 268.48)

BENZENE NESHAP

- The wastestream is subject to Benzene NESHAP notification and control requirements if it:
  1. contains > 10 ppm benzene, **and**
  2. is generated by a chemical manufacturing plant, petroleum refinery or coke by-product recovery plant, **and**
  3. the generator's Total Annual Benzene (TAB) is $\geq$ 10 Mg/yr

TRI CHEMICAL

- The wastestream is subject to Toxic Release Inventory Reporting if it contains a Section 313 Toxic Chemical and meets Qualifier requirements.

OSHA CARCINOGEN

- OSHA promulgated standards in 1974 to regulate the industrial use of 13 chemicals identified as occupational carcinogens. Exposures are to be controlled through the required use of engineering controls, work practices, and personal protective equipment, including respirators.
  See 29 CFR 1910.1003-1910.1016 for specific details.

RCRA SUB-PART CC CONTROLS

- Subpart CC Air Emission Control requirements apply to large quantity hazardous waste generators and to treatment, storage, and disposal facilities.
- Waste in containers greater than 0.1 cubic meters (i.e., 26.4 gallons) with greater than 500 ppm volatile organics are subject to this rule., unless otherwise exempted. Allowable controls include DOT approved containers, containers with an adequate cover and closure devices, and containers which operate with no detectable emissions (less than 500 ppm).

VEOLIA

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

BOL No.: **BL2790504000**
Shipper No.: **wid006176945**
Date: **04/03/2017**

Emergency Contact #: (877) 818-0087

Consignee: CHEMWORKS	Shipper: WISCONSIN DNR
Street: 3801K WEST MCKINLEY	Street: 8682 DANIELS 70
City, State, Zip: MILWAUKEE, WI 53208	City, State, Zip: SIREN, WI, 54872
1) Carrier: COVANTA ENVIRONMENTALSOLUTIONS	1) Carrier Number: WI0000815381
2) Carrier:	2) Carrier Number:

# of Pkgs.	HM	Cont Type	Description of articles, special marks, and exceptions	Total Quantity	UOM	Material ID
1	X	TT	UN1824, SODIUM HYDROXIDE SOLUTION, (FOR REUSE), 8, III TDC 4/4/2017	~~500~~ 2100 4/7/2017	G	

Special Handling and Instructions:

1) ERG:154 W:107935 A:CHE1000137125 ER Service Contracted by VESTS

TT = Cargo tanks (tank trucks).

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

Shipper Signature: [signature] Date: 4/4/17

1) Carrier Signature: [signature] Mark Cruz Date: 4/7/17

2) Carrier Signature: Date:

Received, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certified that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of the Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

Consignee Signature: [signature] Date: 04/07/17

VEOLIA
ENVIRONMENTAL SERVICES

WASTESTREAM INFORMATION PROFILE

☐ Recertification

Disposal Code

Veolia ES LOCATION
☐ Invoice Address
☐ Manifest from – blank if direct

ADDRESS _____ CITY _____ ST _____

Veolia ES TSDF requested _____ Technology requested _____ Generator No._____ **Generator EPA ID No. WI0006176945**

1. **Generator Name** Wisconsin Department of Natural Resources **Generator State No.** _____
   Address 8682 Daniels 70 **State Wastestream No.**_____
   City Siren **State** WI **Country** USA **ZIP** 54872
   NAICS (SIC) Code 562910 _____ _____ **Source** G49 **Origin** _____ **Form** W119 **System Type** _____

2. **Waste Name** Ferric Sulfate **Lab or Waste Area**_____

3. **Process Generating Waste** Virgin Material used for former Wastewater Treatment process

4. **Shipping Name** RQ, UN3264, CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S (CONTAINS FERRIC SULFATE), PGIII
   Hazard Class 8 **UN/NA No.** 3264 **PG** III **RQ amt** 1,000 lb

RQ Desc:	1.	2.
DOT Desc:	1.	2.

5. **Waste Codes** D002 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

Wastewater ☒ **Non Wastewater** ☐ **Sub Category** _____

6. **Physical and chemical properties** *(check all that apply)*

pH
a ☒ < 2
b ☐ 2 - 5
c ☐ 5 - 9
d ☐ 9 - 12.5
e ☐ > 12.5
_____ exact

Specific Gravity
a ☐ < .8
b ☐ .8 - 1.0
c ☐ 1.0
d ☐ 1.0 - 1.2
e ☒ > 1.2
_____ exact

Flash Point (F)
a ☐ < 80
b ☐ 80 - 100
c ☐ 101 - 140
d ☐ 141 - 200
e ☐ > 200
f ☒ no flash _____ exact

Solids
1 % suspended
0 % settleable
0 % dissolved
Free Liquid Range 99 to 100%

0 % ash
YES water solubility
NA BTU/lb

Physical State
s ☐ solid
m ☐ semi-solid
l ☒ liquid
p ☐ pumpable semi-solid
f ☐ flowable powder
g ☐ gas
a ☐ aerosol
r ☐ pressurized liquid
d ☐ debris per 40 CFR 268.45
h ☐ sharps

Hazardous Characteristics
a ☐ air reactive
w ☐ water reactive
c ☐ cyanide reactive
f ☐ sulfide reactive
e ☐ explosive
o ☐ oxidizing acid
p ☐ peroxide former
r ☐ radioactive or NRC regulated
s ☐ shock sensitive
t ☒ temp sensitive
m ☐ polymerization/monomer
n ☒ OSHA carcinogen
l ☐ infectious
h ☐ inhalation hazard Zone: _

Odor
a none ☐
b mild ☒
c strong ☐
describe Acidic

Halogens
Br 0 % Bromine
Cl 0 % Chlorine
F 0 % Fluorine
I 0 % Iodine

Layers: a ☐ **multilayered:** b ☐ **bi-layered:** c ☒ **single phase:**

Viscosity by Layer:	Top Layer	Second Layer	Bottom Layer
	☐ high (syrup)	☐ high (syrup)	☐ high (syrup)
	☐ medium (oil)	☐ medium (oil)	☐ medium (oil)
	☒ low (water)	☐ low (water)	☐ low (water)
	☐ solid	☐ solid	☐ solid

Color
Red-Brown
_____
_____

Used oil y/n N **HOC <1000 ppm** ☐ **or > 1000 ppm** ☐

WIP No. _____

7. **Chemical Composition** [M = Marine Pollutant, S - Severe Marine Pollutant, O = Ozone Depleting Substance, U = Underlying Hazardous Constituent, B = Benzene NESHAP, T = TRI Chemical, C = OSHA Carcinogen]

	Constituents	Range	Units		Constituents	Range	Units
	Iron	10-11	%				
	Sulfuric Acid	.10-.011	%				
	Ferric Sulfate	66-73	%				
	Chloride	49.4	ppm				

Total Composition Must Equal or Exceed 100%

Other:

8. Is the wastestream being imported into the USA? Yes ☐ No ☒
9. Does the wastestream contain PCBs regulated by 40CFR? Yes ☐ No ☒
   PCB concentration _____ppm
10. Is the wastestream subject to the Marine Pollutant Regulations? Yes ☐ No ☒
11. Is the wastestream subject to Benzene NESHAP? Yes ☐ No ☒
    If yes, is the wastestream subject to Notification and Control Requirements? Yes ☐ No ☒
    Benzene concentration _____ ppm
12. Is the wastestream subject to RCRA subpart CC controls? Yes ☐ No ☒
    Volatile organic concentration, if known _____ ppmw
    CC approved analytical method ☐ Generator Knowledge ☐
13. Is the wastestream from a CERCLA or state mandated cleanup? Yes ☒ No ☐

14. **Container Information** (*Identify UN container marking if known*)
    Packaging: Bulk Solid ☐ Type/Size: _____ **Bulk Liquid** ☒ Type/Size: **AST/5,000 Gal** **Drum** ☐ Type/Size: _____
    Other _____
    Shipping Frequency: Units _____ Per Month ☐ Quarter ☐ Year ☐ One Time ☒ Other _____

15. **Additional Information**: **Tanker truck will need at least 100 ft of hose.**

Is analytical or an MSDS available that describes the waste? Yes ☒ No ☐ If yes, please attach.

GENERATOR CERTIFICATION

I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of this waste. Any sample submitted is representative as defined in 40 CFR 261 - Appendix I or by using an equivalent method. All relevant information regarding known or suspected hazards in the possession of the generator has been disclosed. I authorize sampling of any waste shipment for purposes of recertification.

Philip E. Richard	715 762 1352	2/14/17
NAME (PRINT OR TYPE)	PHONE	DATE
Phil E. Rich	Project Manager (DNR)	
SIGNATURE	TITLE	

FACILITY NOTIFICATION

If approved for management, Veolia ES has all the necessary permits and licenses for the waste that has been characterized and identified by this profile.

TSDF PROCESSING USE ONLY: PPE REQUIRED No _____ Yes _____ Describe _____

WIP No. _____

VEOLIA ENVIRONMENTAL SERVICES
WIP INSTRUCTIONS

Veolia ES requires completion of all sections of the Wastestream Information Profile (WIP). Sections not applicable to the wastestream must have N/A written in the space provided.

Documented WIP information is used to comply with TSDF Waste Analysis Plans, RCRA and DOT regulations, Emergency Planning and Community Right-to-Know Act (EPCRA), Pollution Prevention Act, Toxic Release Inventory Report and other regulatory and generator requirements.

MARINE POLLUTANT

- The wastestream is subject to the Marine Pollutant Regulations if:
  1. it is a bulk (>119 gallons) packaging with Marine Pollutant concentration $\geq$ 10% or Severe Marine Pollutant concentration $\geq$ 1%

     or
  2. it is non-bulk Marine Pollutant shipped by vessel (boat) in packages larger than 5 liters (liquid) or 5 kg (solid)

     or
  3. it is a non-bulk Severe Marine Pollutant, shipped by vessel (boat) in packages larger than 0.5 liters (liquid) or 0.5 kg (solid).

  Refer to the list of Marine Pollutants.

OZONE DEPLETING SUBSTANCE (ODS)

Refer to the list of Ozone Depleting Substances.

UNDERLYING HAZARDOUS CONSTITUENT (UHC)

Refer to the list of Underlying Hazardous Constituents (40 CFR 268.48)

BENZENE NESHAP

- The wastestream is subject to Benzene NESHAP notification and control requirements if it:
  1. contains > 10 ppm benzene, **and**
  2. is generated by a chemical manufacturing plant, petroleum refinery or coke by-product recovery plant, **and**
  3. the generator's Total Annual Benzene (TAB) is $\geq$ 10 Mg/yr

TRI CHEMICAL

- The wastestream is subject to Toxic Release Inventory Reporting if it contains a Section 313 Toxic Chemical and meets Qualifier requirements.

OSHA CARCINOGEN

- OSHA promulgated standards in 1974 to regulate the industrial use of 13 chemicals identified as occupational carcinogens. Exposures are to be controlled through the required use of engineering controls, work practices, and personal protective equipment, including respirators. See 29 CFR 1910.1003-1910.1016 for specific details.

RCRA SUB-PART CC CONTROLS

- Subpart CC Air Emission Control requirements apply to large quantity hazardous waste generators and to treatment, storage, and disposal facilities.
- Waste in containers greater than 0.1 cubic meters (i.e., 26.4 gallons) with greater than 500 ppm volatile organics are subject to this rule., unless otherwise exempted. Allowable controls include DOT approved containers, containers with an adequate cover and closure devices, and containers which operate with no detectable emissions (less than 500 ppm).

Manifest : 001251251VES

3130300

C174010EIL

84419

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	WID006176945	1	(877) 818-0087	001251251 VES

GENERATOR

5. Generator's Name and Mailing Address
WISCONSIN DNR
8682 DANIELS 70
SIREN, WI 54872

Generator's Site Address (if different than mailing address)
SAME

Generator's Phone: 317 340-8245

6. Transporter 1 Company Name: ENVIRITE OF ILLINOIS — U.S. EPA ID Number: ILD 000666206

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
ENVIRITE OF ILLINOIS, INC.
16435 CENTER AVENUE
HARVEY, IL 60426

U.S. EPA ID Number: ILD000666206

Facility's Phone: 800 337-7085

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. UN3264, WASTE CORROSIVE LIQUID, ACIDIC, INORGANIC, n.o.s., (CONTAINS FERRIC SULFATE), 8, III, RQ (D002)	001	TT	2759	G	D002
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
ER Service Contracted by VESTS -I- 1) ERG:154 W:111692 A:C174010EIL-OTS

ERG 154

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Peter Storlie (for Phil Richard) — Signature: (for Phil Richard) — Month 4 Day 7 Year 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: DAVE GLAESER — Signature — Month 04 Day 07 Year 17

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Phil Richard P.S. Williams & Troy — Signature: P.S. — Month 04 Day 07 Year 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

US ecology

Certificate of Disposal

This certificate is to verify that the wastes specified on the following manifest numbers have been properly managed in accordance with all local, state and federal regulations.

Facility: EQ Illinois
16435 Center Avenue
Harvey, IL 60426-6078
Phone: 708-596-7040
Fax: 708-596-7045

Generator: WISCONSIN DNR (WID 006 176 945)

Manifest
001251251VES

I certify that the above information is true and correct to the best of my knowledge.

Authorized Signature: 6-5-17

Appendix F
Site Inspection Forms

Well Inspection Form
Penta Wood Products Superfund Site
Siren, Wisconsin

086165

Monitoring Wells

	Protective Casing	Lock & Cover	J-Plug	Well Casing	Ground Surface	Notes
MW1	✓	✓	✓	✓	✓	
MW2	↓	↓	↓	↓	↓	
MW3	↓	↓	↓	↓	↓	
MW4	↓	↓	↓	↓	↓	
MW5	↓	↓	↓	↓	↓	
MW6	↓	↓	↓	↓	↓	
MW6S	↓	↓	↓	↓	↓	
MW7	↓	↓	↓	↓	↓	
MW8	↓	↓	↓	↓	↓	
MW9	↓	↓	↓	↓	↓	
MW10	↓	↓	↓	↓	↓	
MW10S	↓	↓	↓	↓	↓	
MW11	↓	↓	↓	↓	↓	
MW12	↓	↓	↓	↓	↓	
MW13	↓	↓	↓	↓	↓	
MW14	↓	↓	↓	↓	↓	
MW15	↓	↓	↓	↓	↓	
MW16	↓	↓	↓	↓	↓	
MW17	↓	↓	↓	↓	↓	
MW18	↓	↓	↓	↓	↓	
MW19	↓	↓	↓	↓	↓	
MW20	↓	↓	↓	↓	↓	
MW21	↓	↓	↓	↓	↓	
MW22	↓	↓	↓	↓	↓	
MW23	↓	↓	↓	↓	↓	
MW24	↓	↓	↓	↓	↓	
MW25	↓	↓	↓	↓	↓	
MW26	↓	↓	↓	↓	↓	
MW27	↓	↓	↓	↓	↓	
MW28	↓	↓	↓	↓	↓	
MW29	↓	↓	↓	↓	↓	
MW30	↓	↓	↓	↓	↓	
MW31	↓	↓	↓	↓	↓	

Extraction Wells

	Vault & Cover	Well Casings	Ground Surface	Notes
EW2	✓	✓	✓	
EW3	↓	↓	↓	
EW4	↓	↓	↓	
EW5	↓	↓	↓	
EW6	↓	↓	↓	
EW7	↓	↓	↓	
EW10	↓	↓	↓	
EW12	↓	↓	↓	
EW13	↓	↓	↓	
EW14	↓	↓	↓	

Gas Probes

	Protective Casing	Lock & Cover	Ground Surface	Inner Casing/Tubing	Notes
SG-04DIS	✓	✓	✓	✓	
SG-05DIS	↓	↓	↓	↓	
SG-06DIS	↓	↓	↓	↓	
SG-07DIS	↓	↓	↓	↓	
SG-22	↓	↓	↓	↓	
SG-23	↓	↓	↓	↓	
SG-24	↓	↓	↓	↓	
SG-25	↓	↓	↓	↓	
SG-26	↓	↓	↓	↓	

Inspected By: Pete Storlie
Date: 4-26-2017
Additonal Notes:

Continuing Obligations Inspection Form
Penta Wood Products Superfund Site
Siren, Wisconsin

086165

	Verified	Notes
Verify Site Conditions		
CAMU area fence condition is satisfactory	✓	
CAMU signage is present/visible at all fence gates	✓	
CAMU surface soil condition is satifactory and does not require erosion/settlement repairs	✓	
Perimeter area fence is satisfactory and does not require repairs	✓	
Perimeter signage is present/visible	✓	
Site access is limited and all perimeter fence locks in working order	✓	
NaOH tank condition is satisfactory with no signs of leaks	N/A ✓	empty
FeSO4 tank condition is satisfactory with no signs of leaks	N/A ✓	empty
Verify situations have not and are not occuring		
Removal of the existing barrier or cover	✓	
Replacement with another barrier or cover	✓	
Excavating or grading of the land surface	✓	
Filling on covered or paved areas	✓	
Plowing for agricultural cultivation	✓	
Construction or placement of a building or other structure	✓	
Change in use or occupancy of the property	✓	

Inspected By: Peter Stirlu

Date: 4-26-2017

Outside of CAMU near EW7, 20 feet NW is a hole ~~above~~ about 4.5 ft deep, 18 in. in diameter. Marked w/ caution tape inside the hole as if it is a trenched pipe. Also noted steel casing in the hole.

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